

» User Guide «

CP6002

**6U CompactPCI Processor Board based on
the Intel® Core™ i7 Processor with
the Intel® QM57 Chipset**

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This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.



Explanation of Symbols



Caution, Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

Please refer also to the section “High Voltage Safety Instructions” on the following page.



Warning, ESD Sensitive Device!

This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Please read also the section “Special Handling and Unpacking Instructions” on the following page.



Warning!

This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.



Note ...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.



For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions



Warning!

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



Caution, Electric Shock!

Before installing a not hot-swappable Kontron product into a system always ensure that your mains power is switched off. This applies also to the installation of piggybacks.

Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing work.

Special Handling and Unpacking Instructions



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the board.



General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

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

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board, please re-pack it as nearly as possible in the manner in which it was delivered.

Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction on the previous page of this manual.



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Kontron grants the original purchaser of Kontron's products a ***TWO YEAR LIMITED HARDWARE WARRANTY*** as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

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Kontron provides for repair or replacement of any part, assembly or sub-assembly at their own discretion, or to refund the original cost of purchase, if appropriate. In the event of repair, refunding or replacement of any part, the ownership of the removed or replaced parts reverts to Kontron, and the remaining part of the original guarantee, or any new guarantee to cover the repaired or replaced items, will be transferred to cover the new or repaired items. Any extensions to the original guarantee are considered gestures of goodwill, and will be defined in the "Repair Report" issued by Kontron with the repaired or replaced item.

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Chapter

1

Introduction



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1. Introduction

1.1 Board Overview

The CP6002 is a highly integrated 6U CompactPCI system controller board based on the multi-chip Intel® Core™ i7 processor combined with the mobile Intel® QM57 Express chipset.

The board supports the Intel® Core™ i7-610E processor with 2.53 GHz frequency, the Intel® Core™ i7-620LE processor with 2.0 GHz frequency, and the Intel® Core™ i7-660UE processor with 1.33 GHz frequency, all with 64 kB L1 cache, 256 kB L2 cache and 4 MB L3 cache, as well as the Intel® Celeron® P4505 processor with 1.86 GHz frequency and 64 kB L1 cache, 512 kB L2 cache, 2 MB L3 cache. The processors are built on 32-nm technology and provided in a BGA package.

The CP6002 includes up to 8 GB, dual-channel Double Data Rate (DDR3) memory with Error Checking and Correcting (ECC) running at 1066 MHz. The graphics controller and the memory controller are integrated in the processor.

The CP6002 provides support for up to two PMC/XMC modules, up to 32 GB SATA Flash memory (SSD) or one 2.5" HDD/SSD, and one CompactFlash card.

The board also includes up to four Intel® 82574L Gigabit Ethernet controllers utilizing x1 lane PCI Express interconnections to the Intel® QM57 chipset and implemented as up to two ports on front I/O and two ports on rear I/O (PICMG 2.16).

The CP6002 comes with six Serial ATA interfaces with RAID support, one SATA NAND or HDD/SSD, one CompactFlash, and four on the rear I/O; one high-resolution graphics interface (VGA/DP/HDMI); and up to two PMC/XMC slots (64-bit/66 MHz PCI or 64-bit/100 MHz PCI-X or x8 PCI Express interfaces). In addition, six USB 2.0 ports are available on the board, two on front I/O and four on rear I/O. Further interfaces include two COM ports, one RS-232 port implemented as an RJ-45 connector (only available on the CP6002-R1) on the front panel and routed to rear I/O as well as one RS-422 port on the rear I/O.

The board supports a configurable 64-bit/66 MHz PCI or PCI-X, hot swap CompactPCI interface. When installed in the system slot, the interface is enabled, and when installed in a peripheral slot, the CP6002 is isolated from the CompactPCI bus.

The CP6002 further provides Intelligent Platform Management Interface (IPMI) support. On request, the CP6002 provides safety and security features via a Trusted Platform Module (TPM) 1.2.

The CP6002 is offered in three versions, one with a single PMC/XMC (CP6002-R1) and two with two PMCs/XMCs (CP6002-R1-MC and CP6002-R2-MC). The CP6002-R1 can further accommodate an onboard 2.5" SATA HDD/SSD and provides two Gigabit Ethernet ports, one VGA (CRT) port, one COM port and two USB ports on the front panel. The CP6002-R1-MC and CP6002-R2-MC provide one Gigabit Ethernet port, one DisplayPort and two USB ports on the front panel. CP6002-R1 and CP6002-R1-MC are designed for standard application environments whereas CP6002-R2-MC is available with an extended operating temperature range, is ruggedized for high shock and vibration environments and provides support for conduction cooled PMCs/XMCs.

Designed for stability, the board fits into applications situated in industrial environments, including I/O intensive applications where only one slot is available for the CPU, making it a perfect core technology for long-life applications. Components with high temperature tolerance have been selected from embedded technology programs, and therefore offer long-term availability.



The board is offered with various Board Support Packages including Windows and Linux operating systems. For further information concerning the operating systems available for the CP6002, please contact Kontron.

1.2 Board-Specific Information

The CP6002 is a CompactPCI single-board computer based on the Intel® Core™ i7 processor and specifically designed for use in highly integrated platforms with solid mechanical interfacing for a wide range of industrial environment applications.

Some of the CP6002's outstanding features are:

- Support for the following processors:
 - Intel® Core™ i7-610E (SV), 2.53 GHz, 4 MB L3 cache
 - Intel® Core™ i7-620LE (LV), 2.0 GHz, 4 MB L3 cache
 - Intel® Core™ i7-660UE (ULV), 1.33 GHz, 4 MB L3 cache
 - Intel® Celeron® P4505 (SV), 1.86 GHz, 2 MB L3 cache
- Intel® QM57 Express chipset
- Up to 8 GB, dual-channel, DDR3 SDRAM memory with ECC running at 1066 MHz
- Integrated 3D high-performance graphics controller with three high-resolution graphics interfaces (VGA/DP/HDMI/DVI)
- 64-bit/66 MHz PCI or PCI-X CompactPCI interface (PICMG 2.0)
- Two PMC slots with PCI functionality, 64-bit/66 MHz PCI or 64-bit/100 MHz PCI-X interface; one PMC slot provides rear I/O support
- Two XMC slots utilizing a x8 lane PCI Express interconnection
- Four Intel® 82574L Gigabit Ethernet controllers for:
 - Up to two Gigabit Ethernet interfaces on front I/O
 - Two Gigabit Ethernet interfaces on rear I/O (PICMG 2.16)
- Six Serial ATA interfaces with SATA RAID 0/1/5/10 support:
 - Two onboard Serial ATA interfaces
 - Four Serial ATA interfaces on the rear I/O
- Socket for one Serial ATA 2.5" hard disk drive (HDD) or solid state drive (SSD)
- Socket for one Serial ATA Flash module (SSD)
- CompactFlash socket
- Six USB ports:
 - Two USB 2.0 ports on the front panel
 - Four USB 2.0 ports on the rear I/O
- Two COM ports:
 - One RS-232 COM port either on the front panel or on the rear I/O
 - One RS-422 COM port on the rear I/O
- TCG 1.2 compliant Trusted Platform Module (TPM), on request
- Two SPI boot flashes for two separate uEFI BIOS images:
 - One standard SPI boot flash
 - One recovery SPI boot flash
- Watchdog timer
- Battery-backed real-time clock (RTC)
- Three onboard DIP switches for board configuration
- Hot swap capability: as system controller or as peripheral device
- Supports PICMG Packet Switching Backplane Specification 2.16
- IPMI compliant Baseboard Management Controller
- 4HP, 6U CompactPCI
- Passive heat sink solution for forced-airflow cooling
- Several rear I/O configurations



- Rear I/O on J3 and J5; optionally on J4 for PMC only
- Two GPIOs on J5 (on request)
- AMI Aptio®, a uEFI-compliant platform firmware

1.3 System Expansion Capabilities

1.3.1 PMC/XMC Module

The CP6002 has up to two PMC/XMC slots and provides a 3.3V PCI/PCI-X interface running with up to 64-bit/100 MHz for PMCs as well as up to two x8 PCI Express interfaces for XMCs. One PMC/XMC interface is rear I/O capable. The PMC/XMC slots provide support for a wide range of standard PMC/XMC and conduction-cooled PMC/XMC modules with PCI/PCI-X/PCI Express interfaces including all of Kontron's PMC/XMC modules and provides an easy and flexible way to configure the CP6002 for various application requirements. For information on the PMC interface, please refer to chapter 2.10.8, "PMC Interface".

1.3.2 CP6002-MK2.5SATA Assembly Kit

The CP6002 comes with an optional CP6002-MK2.5SATA assembly kit comprised of one CP6001-EXT-SATA module and the necessary components needed for mounting the module on the CP6002. The CP6001-EXT-SATA module is required for connecting an onboard 2.5" Serial ATA HDD or SSD to the CP6002. For further information concerning the CP6001-EXT-SATA module, please refer to Appendix A.

1.3.3 Serial ATA Flash Module

The CP6002 provides support for up to 32 GB of Serial ATA Flash memory in combination with an optional Serial ATA Flash module, which is connected to an onboard extension connector. For further information concerning the Serial ATA Flash module, please refer to Appendix B.

1.4 Version Comparison

Table 1-1: Version Comparison

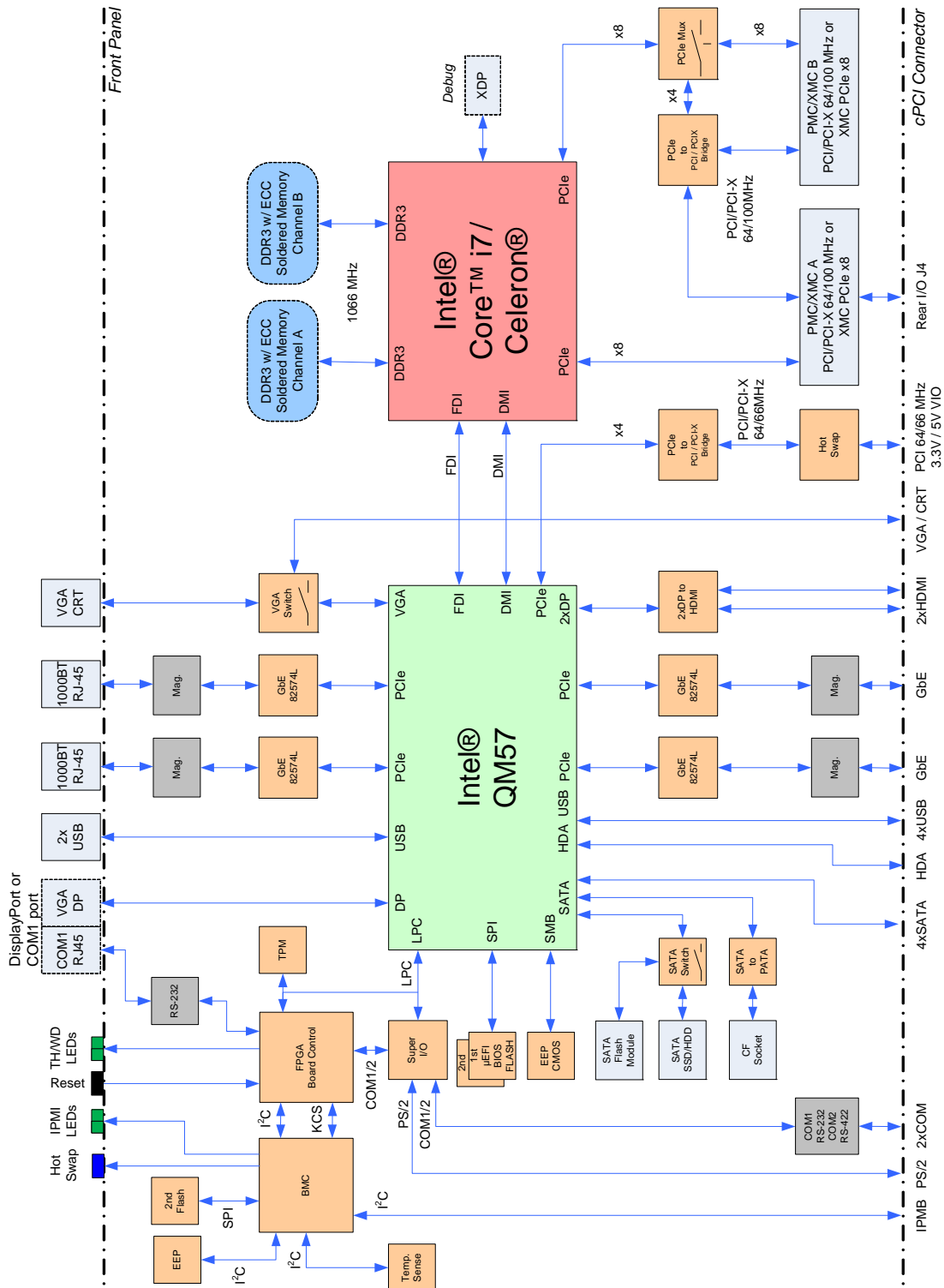
FEATURE	CP6002-R1	CP6002-R1-MC	CP6002-R2-MC
CPU	Intel® Core™ i7-610E, 2.53 GHz Intel® Core™ i7-620LE, 2.0 GHz- Intel® Core™ i7-660UE, 1.33 GHz Intel® Celeron® P4505, 1.86 GHz	Intel® Core™ i7-610E, 2.53 GHz Intel® Core™ i7-620LE, 2.0 GHz- Intel® Core™ i7-660UE, 1.33 GHz Intel® Celeron® P4505, 1.86 GHz	Intel® Core™ i7-620LE, 2.0 GHz- Intel® Core™ i7-660UE, 1.33 GHz
Operating Temperature	0°C to +60°C	0°C to +60°C	0°C to +60°C (standard) -40°C to +70°C (extended)
Board Stiffener	--	--	1
PMC/XMC	1	2	--
Conductive-cooled PMC/XMC	--	--	2
2.5" SATA HDD/SSD	1	--	--
CompactFlash	1	1	--
Front Ethernet port	2	1	1
Front VGA port	1	--	--
Front RS-232 port	1	--	--
Front DisplayPort	--	1	1
Shock/Vibration	Standard	Standard	Extended

1.5 Board Diagrams

The following diagrams provide additional information concerning board functionality and component layout.

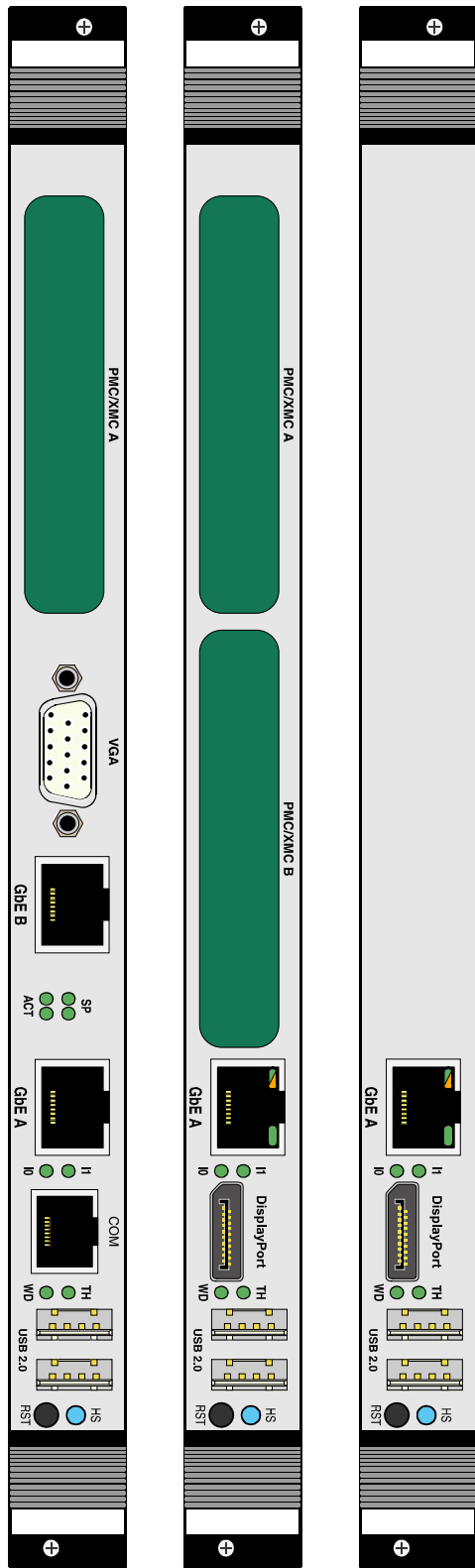
1.5.1 Functional Block Diagram

Figure 1-1: CP6002 Functional Block Diagram





1.5.2 Front Panels



CP6002-R1 CP6002-R1-MC CP6002-R2-MC

Figure 1-2: CP6002 Front Panels

Legend:

IPMI LEDs:

I0/I1 (green): Indicate the software status of the IPMI controller

Status LEDs:

- WD (green): Watchdog Status
- TH (green): Temperature Status
- HS (blue): Hot Swap Control

Ethernet LEDs on CP6002-R1:

- ACT (green): Ethernet Link/Activity
- SPEED (green): Ethernet Speed

Ethernet LEDs on CP6002-R1-MC and CP6002-R2-MC:

- ACT (green): Ethernet Link/Activity
- SPEED (green/orange/off): Ethernet Speed



1.5.3 Board Layout

Figure 1-3: CP6002-R1 Board Layout – Top View

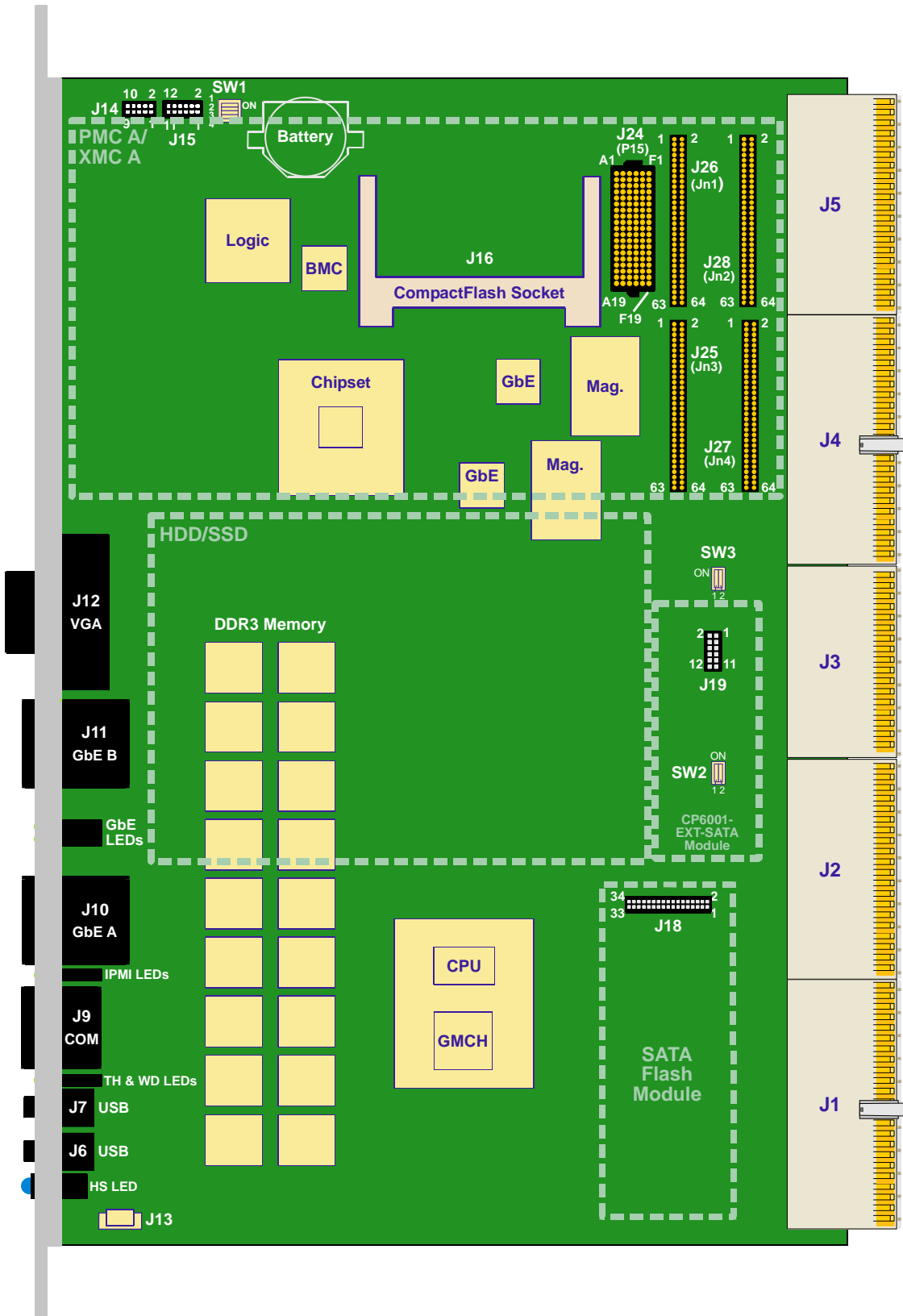


Figure 1-4: CP6002-R1-MC Board Layout – Top View

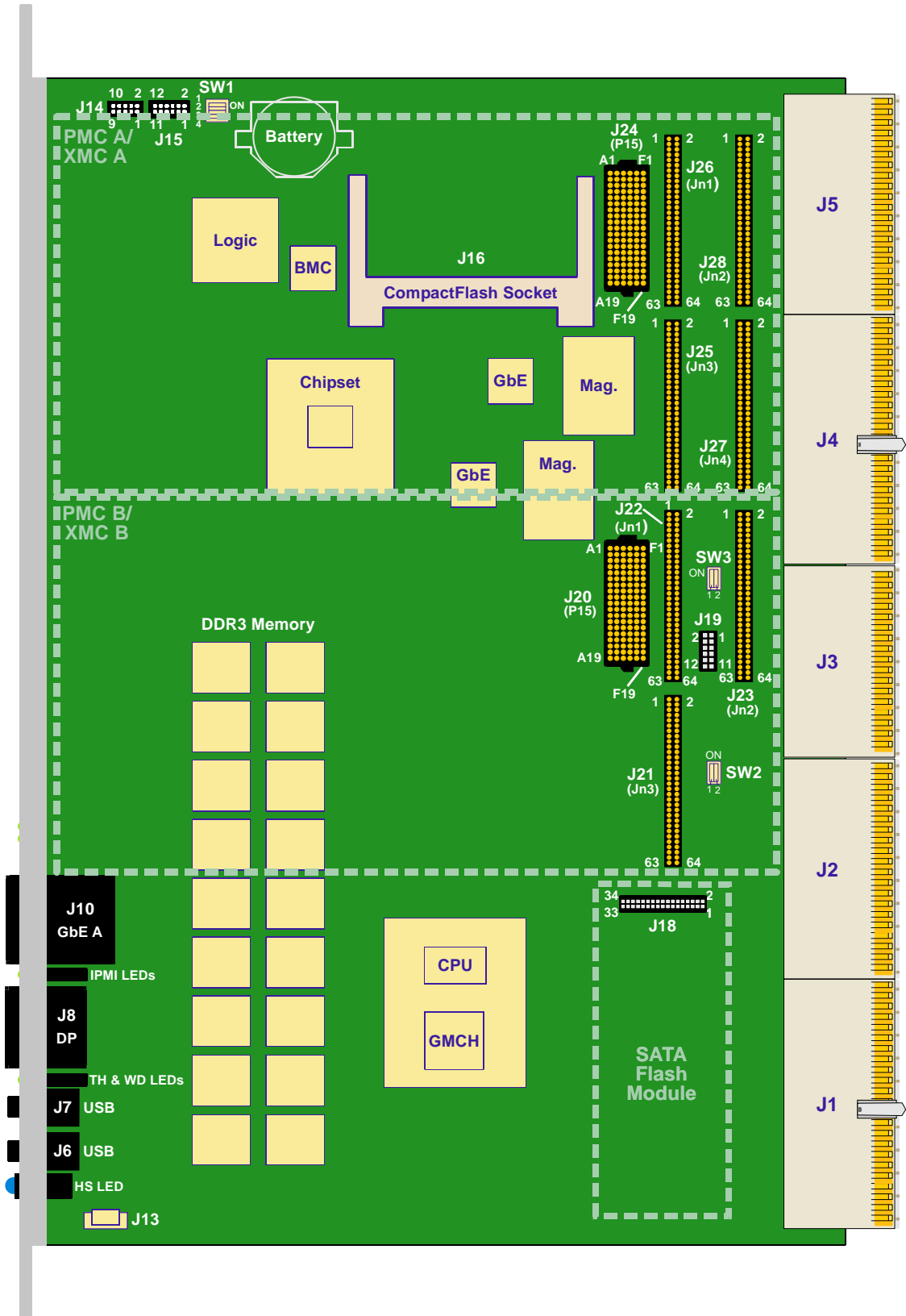


Figure 1-5: CP6002-R2-MC Board Layout – Top View

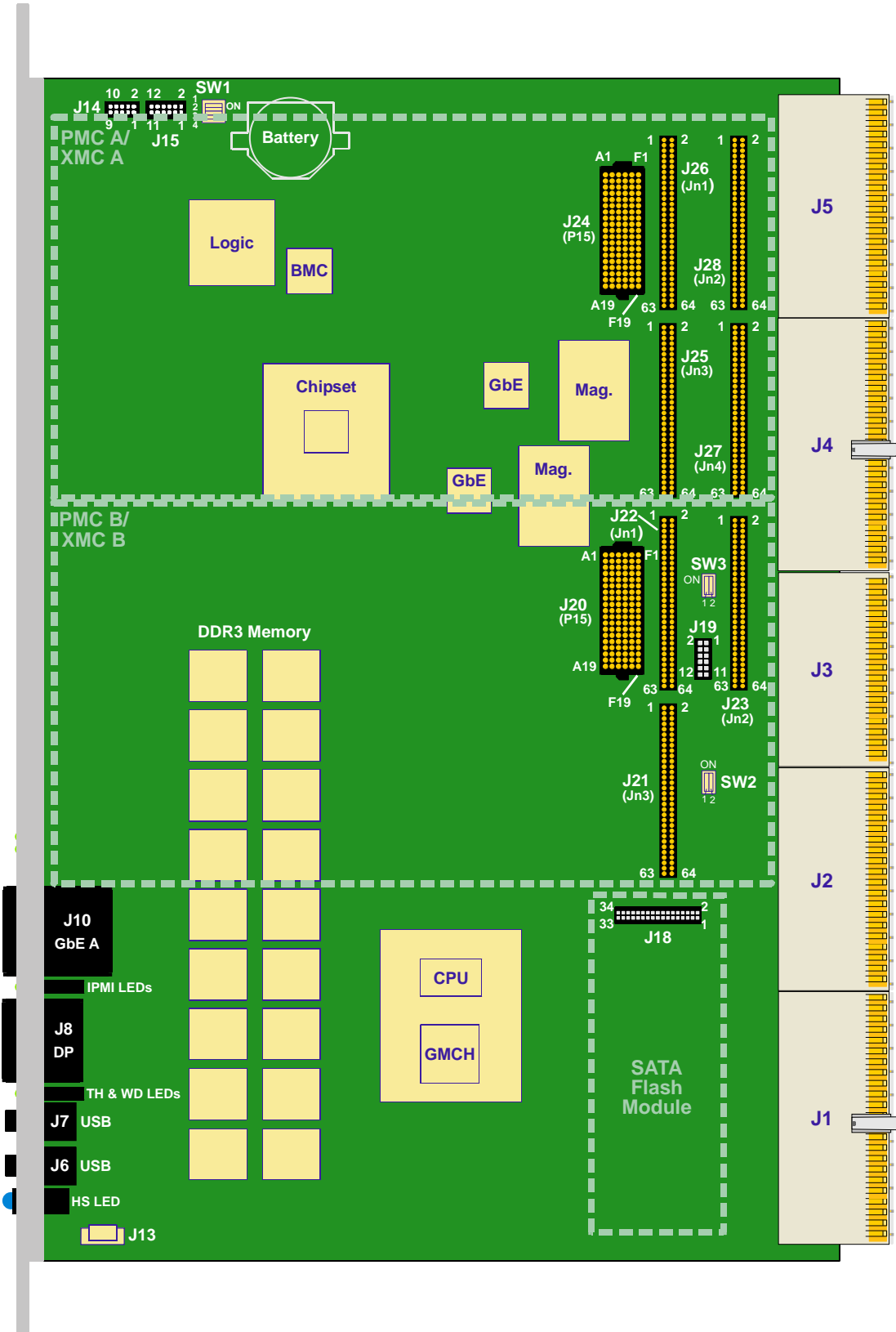
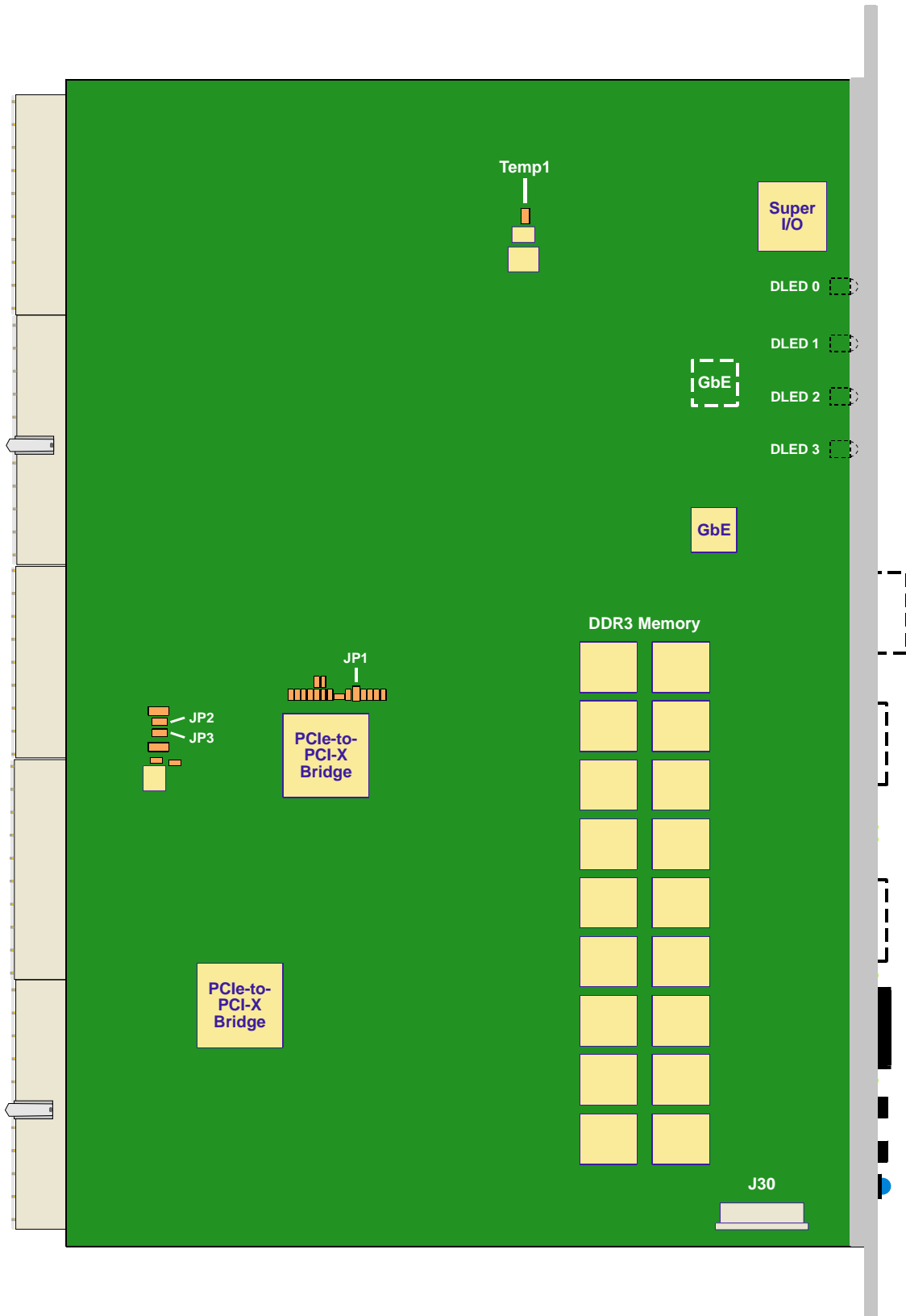




Figure 1-6: CP6002 Board Layout – Bottom View



1.6 Technical Specification

Table 1-2: CP6002 Main Specifications

FEATURES		SPECIFICATIONS
Processor and Memory	CPU	<p>The CP6002 supports the following microprocessors:</p> <ul style="list-style-type: none"> • Intel® Core™ i7-610E (SV), 2.53 GHz, 4 MB L3 cache • Intel® Core™ i7-620LE (LV), 2.0 GHz, 4 MB L3 cache • Intel® Core™ i7-660UE (ULV), 1.33 GHz, 4 MB L3 cache • Intel® Celeron® P4505 (SV), 1.86 GHz, 2 MB L3 cache <p>Further processor features:</p> <ul style="list-style-type: none"> • Two execution cores • Intel® Hyper-Threading Technology (Core™ i7) • Intel® 64 Architecture • Intel® Turbo Boost Technology (Core™ i7) • Intel® Intelligent Power Sharing (Core™ i7) • System Memory interface with optimized support for dual-channel DDR3 SDRAM memory at 1066 MHz with ECC • Integrated 2D and 3D Graphics Engines • DMI and FDI interfaces to the Intel® QM57 chipset • Two x8 PCI Express 2.0 ports operating at 2.5 GT/s <p>Please contact Kontron for further information concerning the suitability of other Intel processors for use with the CP6002.</p>
	Memory	<p>Main Memory:</p> <ul style="list-style-type: none"> • Up to 8 GB, dual-channel DDR3 SDRAM memory with ECC running at 1066 MHz <p>Cache Structure:</p> <ul style="list-style-type: none"> • 64 kB L1 cache for each core <ul style="list-style-type: none"> • 32 kB instruction cache • 32 kB data cache • Up to 512 kB L2 shared instruction/data cache for each core • Up to 4 MB L3 shared instruction/data cache shared between both cores <p>Flash Memory:</p> <ul style="list-style-type: none"> • CompactFlash with true IDE mode (CP6002-R1 and CP6002-R1-MC) • Two redundant SPI boot flashes (2 x 8 MB) for two separate uEFI BIOS images • Up to 32 GB NAND Flash via an onboard Serial ATA Flash module (SSD) <p>Serial EEPROM with 64 kbit</p>

Table 1-2: CP6002 Main Specifications (Continued)

FEATURES		SPECIFICATIONS
Chipset	Intel® QM57	<p>Mobile Intel® QM57 Express Chipset:</p> <ul style="list-style-type: none"> • One x4 and four x1 PCI Express 2.0 ports operating at 2.5 GT/s • SATA host controller with six ports, 3 Gbit/s data transfer rate and RAID 0/1/5/10 support • USB 2.0 host interface with up to 14 USB ports available (only six ports are used on the CP6002) • SPI Flash interface support • Low Pin Count (LPC) interface • PCI interface, 32-bit/33 MHz (not used on the CP6002) • Power management logic support • Enhanced DMA controller, interrupt controller, and timer functions • System Management Bus (SMBus) compatible with most I²C™ devices • DMI and FDI interfaces to the processor • High Definition Audio (HDA) interface • Analog display port • Three digital display ports • Integrated RTC
Integrated Controller	Graphics controller	<p>High-performance 3D graphics controller integrated in the processor:</p> <ul style="list-style-type: none"> • Supports resolutions up to 2560 x 1600 pixels @ 60 Hz • Support for two independent displays • Dynamic Video Memory Technology (DVMT)
Interfaces	CompactPCI	<p>Compliant with CompactPCI Specification PICMG 2.0 R 3.0:</p> <ul style="list-style-type: none"> • System controller operation • 64-bit/66 MHz PCI or PCI-X master interface with dedicated PCIe-to-PCI-X bridge • 3.3V or 5V signaling levels (universal signaling support) <p>Compliant with the Packet Switching Specification PICMG 2.16.</p> <p>When installed in a peripheral slot, the CP6002 is isolated from the CompactPCI bus. It receives power from the backplane and supports rear I/O and, if the system supports it, packet switching (in this case up to two channels of Gigabit Ethernet).</p>
	Rear I/O	<p>The following interfaces are routed to the rear I/O connector J3, J4 and J5:</p> <ul style="list-style-type: none"> • COM1 and COM2 (RS-232 and RS-422 signaling); no buffer on the rear I/O module is necessary • 4 x USB 2.0 • 1 x CRT VGA, 2 x HDMI/DVI (with HDCP 1.4 support) • 1 x HDA • 2 x Gigabit Ethernet (compliant with PICMG 2.16, R 1.0) • 4 x SATA • 1 x rear I/O interconnection to PMC/XMC slot A • 2 x GPIOs (on request)

Table 1-2: CP6002 Main Specifications (Continued)

FEATURES		SPECIFICATIONS
Interfaces	Hot Swap Compatible	The CP6002 supports System Master hot swap functionality and application-dependent hot swap functionality when used in a peripheral slot. When used as a System Master, the CP6002 supports individual clocks for each slot and the ENUM signal handling is in compliance with the PICMG 2.1 Hot Swap Specification.
	Gigabit Ethernet	Up to four 10 Base-T/100 Base-TX/1000 Base-T Gigabit Ethernet interfaces based on up to four Intel® 82574L Ethernet PCI Express bus controllers: <ul style="list-style-type: none"> Up to two RJ-45 connectors on the front panel Two ports on the rear I/O (PICMG 2.16) Automatic mode recognition (Auto-Negotiation) Automatic cabling configuration recognition (Auto-MDI/X)
	USB	Six USB ports supporting UHCI and EHCI: <ul style="list-style-type: none"> Two type A USB 2.0 connectors on the front panel Four USB 2.0 ports on the rear I/O interface
	Serial	Two 16C550-compatible UARTs (RS-232/RS-422 signaling): <ul style="list-style-type: none"> One RS-232 port on the front panel and routed to rear I/O, COM1 One RS-422 port on the rear I/O, COM2
	PMC	Up to two PMC slots: <ul style="list-style-type: none"> Onboard mezzanine connectors for standard PMC modules: <ul style="list-style-type: none"> Four connectors for PMC/XMC slot A (Jn1-Jn4) Three connectors for PMC/XMC slot B (Jn1-Jn3), optional Up to 64-bit/66 MHz PCI or up to 64-bit/100 MHz PCI-X interface with dedicated PCIe-to-PCI-X bridge Only 3.3V PCI signaling voltage Rear I/O supported through the CompactPCI connector J4 (slot A) Supported voltages: 3.3 V, 5 V, +12 V, and -12 V
	XMC	Up to two XMC slots: <ul style="list-style-type: none"> One onboard XMC connector (P15) for PMC/XMC Slot A One onboard XMC connector (P15) for PMC/XMC Slot B, optional Up to x8 lanes PCI Express per XMC slot Rear I/O supported through the PMC connector (Jn4) to the CompactPCI connector J4 (slot A)
	Keyboard and Mouse	Keyboard and mouse are supported: <ul style="list-style-type: none"> USB support

Table 1-2: CP6002 Main Specifications (Continued)

FEATURES		SPECIFICATIONS
Interfaces	Mass Storage	<p>CompactFlash (CP6002-R1 and CP6002-R1-MC):</p> <ul style="list-style-type: none"> • CompactFlash socket for type I and II CompactFlash cards (DMA capable true IDE mode) • The CompactFlash is always configured as IDE master • The CompactFlash interface is realized via a SATA-to-PATA bridge <p>One Serial ATA interface for:</p> <ul style="list-style-type: none"> • Up to 32 GB Flash memory via an onboard Serial ATA Flash module (SSD), or • Onboard 2.5" hard disk drive (HDD) or solid state drive (SSD) is supported via the SATA extension connector, J19, in combination with the CP6001-EXT-SATA module <p>Integrated Serial ATA Host Controllers:</p> <ul style="list-style-type: none"> • Provide support for independent DMA operation on six ports • Data transfer rates up to 300 MB/s • High-performance RAID 0/1/5/10 functionality on all SATA ports
	Front Panel Connectors	<p>CP6002-R1:</p> <ul style="list-style-type: none"> • VGA: 15-pin, D-Sub connector, J12 • USB: two 4-pin, type A connectors, J6 and J7 • Ethernet: two 8-pin, RJ-45 connectors, J10 and J11 • COM: one 8-pin, RJ-45 connector, J9 <p>CP6002-R1-MC and CP6002-R2-MC:</p> <ul style="list-style-type: none"> • USB: two 4-pin, type A connectors, J6 and J7 • Ethernet: one 8-pin, RJ-45 connector, J10 • DisplayPort: one 20-pin DisplayPort connector, J8
Sockets	Onboard Connectors	<p>CP6002-R1:</p> <ul style="list-style-type: none"> • PMC/XMC Slot A: Four PMC connectors, J25 - J28 (Jn1 - Jn4) • PMC/XMC Slot A: One XMC connector, J24 (P15) • One 12-pin SATA extension connector, J19, for CP6001-EXT-SATA • One 34-pin extension connector, J18, for SATA Flash module (SSD) • JTAG connector, J15 • Extension connector, J14 • XDP-SFF (debug) connector, J30 • CompactFlash socket, J16 • CompactPCI Connectors J1 - J5 • Hot Swap connector J13 <p>CP6002-R1-MC and CP6002-R2-MC:</p> <ul style="list-style-type: none"> • PMC/XMC Slot A: Four PMC connectors, J25 - J28 (Jn1 - Jn4) • PMC/XMC Slot B: Three PMC connectors, J21 - J23 (Jn1 - Jn3) • PMC/XMC Slot A: One XMC connector, J24 (P15) • PMC/XMC Slot B: One XMC connector, J20 (P15) • One 34-pin extension connector, J18, for SATA Flash module (SSD) • JTAG connector, J15 • Extension connector, J14 • XDP-SFF (debug) connector, J30 • CompactFlash socket, J16 (CP6002-R1-MC) • CompactPCI Connectors J1 - J5 • Hot Swap connector J13

Table 1-2: CP6002 Main Specifications (Continued)



FEATURES		SPECIFICATIONS
Switches	DIP Switches	Three onboard DIP switches, SW1, SW2, and SW3, for board configuration
	Reset Switch	One front panel hardware reset switch
	Hot Swap Switch	One switch for hot swap purposes integrated in the front panel handle in accordance with PICMG 2.1 Rev. 2.0.
LEDs	System LEDs	System Status LEDs: <ul style="list-style-type: none"> • I0/I1 (green): Indicate the software status of the IPMI controller • WD (green): Watchdog Status • TH (green): Temperature Status • HS (blue): Hot Swap Control Debug LEDs: <ul style="list-style-type: none"> • DLED0-3: Onboard LEDs for debugging purposes (located on the rear side of the board)
	Ethernet LEDs	Gigabit Ethernet Status on CP6002-R1: <ul style="list-style-type: none"> • ACT (green): Ethernet Link/Activity • SPEED (green): Ethernet Speed Gigabit Ethernet Status on CP6002-R1-MC and CP6002-R2-MC: <ul style="list-style-type: none"> • ACT (green): Ethernet Link/Activity • SPEED (green/orange/off): Ethernet Speed
Timer	Watchdog Timer	<ul style="list-style-type: none"> • Software-configurable, two-stage Watchdog with programmable timeout ranging from 125 ms to 4096 s in 16 steps • Serves for generating IRQ or hardware reset
	System Timer	<ul style="list-style-type: none"> • The Intel® QM57 chipset contains three 8254-style counters which have fixed uses • In addition to the three 8254-style counters, the Intel® QM57 chipset includes eight individual high-precision event timers that may be used by the operating system. They are implemented as a single counter each with its own comparator and value register.
IPMI	Baseboard Management Controller	<ul style="list-style-type: none"> • NXP® ARM7 microcontroller with redundant 512 kB Firmware Flash and automatic roll-back strategy • The BMC carries out IPMI commands such as monitoring several on-board temperature conditions, board voltages and the power supply status, and managing hot swap operations. • The BMC is accessible via two IPMBs (through the J1 and J2 connectors) and one host Keyboard Controller Style (KCS) interface.
	Thermal Management	CPU and board overtemperature protection is provided by: <ul style="list-style-type: none"> • Temperature sensors integrated in processor: <ul style="list-style-type: none"> • Two temperature sensors for monitoring the processor cores • One temperature sensor for monitoring the graphics controller and the memory controller • One temperature sensor integrated in the Intel® QM57 chipset for monitoring the chipset • One onboard temperature sensor for monitoring the board temperature • Specially designed heat sinks



Table 1-2: CP6002 Main Specifications (Continued)

FEATURES		SPECIFICATIONS
Security	TPM	Trusted Platform Module (TPM) 1.2 for enhanced hardware- and software-based data and system security (on request)
Software	uEFI BIOS	AMI Aptio®, AMI's next-generation BIOS firmware based on the uEFI Specification and the Intel Platform Innovation Framework for EFI. <ul style="list-style-type: none"> • LAN boot capability for diskless systems (standard PXE) • Redundant image; automatic fail-safe recovery in case of a damaged image • Non-volatile storage of setting in the SPI Flash (battery only required for the RTC) • Compatibility Support Module (CSM) providing legacy BIOS compatibility based on AMIBIOS8 • Command shell for diagnostics and configuration • uEFI shell commands executable from mass storage device in a Pre-OS environment (open interface) • IPMI support in the command shell
	Software IPMI	Board Management Controller Firmware providing the following features: <ul style="list-style-type: none"> • The BMC is accessible via two IPMBs and one KCS interface with interrupt support • The BMC Firmware can be updated in field through all supported interfaces using the function "fwum..." of the open-source tool "ipmitool". For further information on the ipmitool refer to the sourceforge.net website. • Two BMC Flash banks with automatic roll-back capability in case of an upgrade firmware failure • Board supervision and control extensions such as board reset, power and SPI Flash control, and boot order configuration
	Operating Systems	The board is offered with various Board Support Packages including Windows and Linux operating systems. For further information concerning the operating systems available for the CP6002, please contact Kontron.

Table 1-2: CP6002 Main Specifications (Continued)

FEATURES		SPECIFICATIONS	
General	Mechanical	6U, 4HP, CompactPCI-compliant form factor	
	Power Consumption	See Chapter 5 for details.	
	Temperature Ranges	Operational: 0°C to +60°C	Standard (depending on processor version and airflow in the system)
		-40°C to +70°C	Extended (CP6002-R2-MC) without TPM
		Storage: -55°C to +85°C	Without hard disk and without battery
			Note ... When a battery is installed, refer to the operational specifications of the battery as this determines the storage temperature of the CP6002 (See "Battery" below).
			Note ... When additional components are installed, refer to their operational specifications as this will influence the operational and storage temperature of the CP6002.
Battery	3.0V lithium battery for RTC with battery socket. Recommended type: CR1632 Temperature ranges: Operational: -20°C to +70°C typical (refer to the battery manufacturer's specifications for exact range) Storage: -55°C to +70°C typical (no discharge)		
Climatic Humidity	93% RH at 40 °C, non-condensing (acc. to IEC 60068-2-78)		
Dimensions	233.35 mm x 160 mm		
Board Weight	CP6002-R1:	500 g (with heat sink but without mezzanine cards)	
	CP6002-R1-MC:	500 g (with heat sink but without mezzanine cards)	
	CP6002-R2:	720 g (with heat sink but without mezzanine cards)	

1.7 Standards

The board complies with the requirements of the following standards:

Table 1-3: Standards for the CP6002

TYPE	ASPECT	STANDARD	REMARKS
CE	Emission	EN55022 EN61000-6-3	--
	Immission	EN55024 EN61000-6-2	--
	Electrical Safety	EN60950-1	--
Mechanical	Mechanical Dimensions	IEEE 1101.10	--
Environmental	Climatic Humidity	IEC60068-2-78	--
	WEEE	Directive 2002/96/EC	Waste electrical and electronic equipment
	RoHS	Directive 2002/95/EC	Restriction of the use of certain hazardous substances in electrical and electronic equipment
	Vibration (Sinusoidal)	IEC60068-2-6	Ruggedized version test parameters: <ul style="list-style-type: none"> • 10-300 (Hz) frequency range • 2 (g) acceleration • 1 (oct/min) sweep rate • 10 cycles/axis • 3 axes
	Single Shock	IEC60068-2-27	Ruggedized version test parameters: <ul style="list-style-type: none"> • 30 (g) acceleration • 9 (ms) shock duration half sine • 3 number of shocks per direction (total: 18) • 6 directions • 5 (s) recovery time
	Permanent Shock	IEC60068-2-29	Ruggedized version test parameters: <ul style="list-style-type: none"> • 15 (g) acceleration • 11 (ms) shock duration half sine • 500 number of shocks per direction • 6 directions • 5 (s) recovery time

**Note ...**

Kontron performs comprehensive environmental testing of its products in accordance with applicable standards.

Customers desiring to perform further environmental testing of Kontron products must contact Kontron for assistance prior to performing any such testing. This is necessary, as it is possible that environmental testing can be destructive when not performed in accordance with the applicable specifications.

In particular, for example, boards **without conformal coating** must not be exposed to a change of temperature exceeding 1K/minute, averaged over a period of not more than five minutes. Otherwise, condensation may cause irreversible damage, especially when the board is powered up again.

Kontron does not accept any responsibility for damage to products resulting from destructive environmental testing.

In addition, the CP6002-R2-MC complies with the following standards as well.

Table 1-4: Additional Standards for the CP6002-R2-MC

TYPE	ASPECT	STANDARD	REMARKS
Environmental	Random Vibration (Broadband)	ANSI/VITA 47, Class V2	Test parameters: <ul style="list-style-type: none"> • 5-100 (Hz) frequency range: +3dB slope • 100-1000 (Hz) freq. range: 0.04 (g²/Hz) • 1000-2000 (Hz) freq. range: -6dB slope • 7.619 g (rms) • 60 (min) test duration/axis • 3 axes
	Single Shock	ANSI/VITA 47, Class OS1	Test parameters: <ul style="list-style-type: none"> • 20 (g) acceleration • 11 (ms) shock duration half sine • 3 shocks per direction • 6 directions • 5 (s) recovery time



1.8 Related Publications

The following publications contain information relating to this product.

Table 1-5: Related Publications

PRODUCT	PUBLICATION
CompactPCI Systems and Boards	CompactPCI Specification PICMG 2.0, Rev. 3.0 CompactPCI Packet Switching Backplane Specification PICMG 2.16 Rev. 1.0 CompactPCI System Management Specification PICMG 2.9 Rev. 1.0 CompactPCI Hot Swap Specification PICMG 2.1 Rev. 2.0
	IPMI - Intelligent Platform Management Interface Specification v2.0 (without LAN support)
	Kontron CompactPCI Backplane Manual, ID 24229
PMC Module	IEEE 1386-2001, IEEE Standard for a Common Mezzanine Card (CMC) Family IEEE 1386.1-2001, IEEE Standard Physical and Environmental Layers for PCI Mezzanine Cards (PMC)
XMC Module	ANSI/VITA 42.0-200x XMC Switched Mezzanine Card Auxiliary Standard ANSI/VITA 42.3-2006 XMC PCI Express Protocol Layer Standard
CCPMC Modules	VITA 20-2001 (R2005)
CompactFlash Cards	CF+ and CompactFlash Specification Revision 2.1
Platform Firmware	Unified Extensible Firmware Interface (UEFI) Specification, Version 2.1
All Kontron products	Product Safety and Implementation Guide, ID 1021-9142
Kontron	CP6002 uEFI BIOS User Guide, ID 1039-1612
	CP6002 IPMI Firmware User Guide: ID 1039-1613



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