Intel® Core™ i7 Rugged 6U CompactPCI Processor Blade

» High computing and graphic performance
  Intel® Core™ i7 processors combined with QM57 chipset

» Rugged Levels for demanding application requirements
  Highly shock and vibration resistant, extended temperature range

» Comprehensive I/O capabilities
  4x GbE, 6x SATA with RAID, DVI & HDMI, onboard HDD, CompactFlash …
**CP6002**

**Intel® Core™ i7 Rugged 6U CompactPCI Processor Blade**

Explore the power and the potential of two 32nm cores in one processor with Kontron’s CP6002 based on the Intel® Core™ i7 processor.

The CP6002, a CompactPCI PICMG 2.16 compliant 6U CPU board, comes with various rugged levels, making it yet another addition to Kontron’s rugged PICMG 2.16 portfolio. Based on the Intel® Core™ i7 processor and mobile chipset, the CP6002 features high computing and graphic performance with a low thermal power design and a complete set of data, communication and multi-media interfaces.

» **Maximum Ruggedization**

Designed to withstand even the toughest environmental conditions, the passively cooled CP6002 featuring up to 8 GByte of soldered RAM with ECC and a CompactFlash socket for industrial grade flash modules comes in the rugged levels – defined as R1 and R2.

The R1 version is designed for standard application requirements in air-cooled environments.

Air cooled Version R2 is available in extended temperature range from -40° C to +70° C. It is designed for high shock and vibration requirements as defined in VITA 47 EAC3/EAC6 (EAC6 requires special system components). The CP6002 features energy efficient embedded Intel® dual core processors. With the 2.53 GHz Intel® Core™ i7-610E and the LV 2.0 GHz Intel® Core™i7-620LE, the CP6002 has extraordinary performance per watt values. Up to 8 GByte of soldered DDR3 1066 MHz memory with ECC provide the basis for demanding software applications.

Based on the Intel® Mobile QM57 IO controller hub the CP6002 provides high graphics performance for VGA and two independent digital video outputs to the rear I/O as well as HDA audio capabilities.

» **Comprehensive Versatility**

The CP6002 offers comprehensive I/O capability with 4 x 1Gb Ethernet, 4 x rear IO SATA with RAID 0/1/5/10 functionality, a local SATA hard disk and SATA Flash disk connector, a CompactFlash socket as well as 6 x USB 2.0, 2 x COM, VGA and/or DVI.

It can also accommodate a PMC/XMC slot and onboard 2.5” SATA HDD. A CP6002 with two PMC / XMC sockets is available for IO intensive applications.

The CP6002 enables construction of a highly shock and vibration resistant systems with non-rotating, nonvolatile – write protectable - memory.

» **Unique Security**

The board provides safety and security via a trusted platform module, (TPM) 1.2, two redundant firmware hubs (failover) and IPMI (Intelligent Platform Management Interface) support (PICMG 2.9 R1.0).

» **Long-term Availability**

Delivering a stable product based on Intel®’s embedded product line the CP6002 ensures long-term availability.
Technical Information

Processor
Intel® Core™i7 Processor (32nm):
- Core™ i7-610E, Dual Core, 2.53 GHz, 4 MB cache,
- Core™i7-620LE, Dual Core, 2.0 GHz, 4 MB cache, (LV)
- Celeron Processor P4505, Dual Core, 2MB cache
1066 MHz dual-channel DDR-3 memory controller with ECC
Note: Versions incorporating other CPUs available on project request. Please contact us for further assistance.

I/O Hub
- Intel® QM57, internal graphics controller w. dual independent graphic channels
  (front VGA or DVI and rear dual DVI/HDMI)
- 6 SATA II controllers, 12 x USB 2.0 (6 used), 8 x PCIe 2.0 x1, 1 x LPC

Memory
- Up to 8 GByte DDR-3, 1066 MHz, with ECC, dual channel 4 or 8 GB soldered
- Up to 32 GB NAND flash module with SATA interface
- CompactFlash socket (CP6002-R2: SATA flash disk only)
- Two redundant 8 Mbit SPI Flash
- Serial EEPROM

Onboard Controller
Four Gigabit Ethernet Intel® 82574L PCI Express bus controllers:
- 2x front I/O
- 2x rear I/O to support PICMG 2.16
- Watchdog: FPGA-based, software configurable, two-stage watchdog w. programmable timeout ranging from 125 ms to 256 s in 12 steps
- RTC
- IPMI Controller w. Flash and RAM: ext. 1 MB SPI Flash, 64 kbit EEPROM
- Super I/O: LPC Super I/O, 2x UART, HW-Monitor, fan control
- Trusted Platform Module (TPM 1.2) optional

System Interconnect
- Serial ports: two COM ports (transceivers onboard)
- COM1 as RS232 on front
- COM2 as RS422 on the rear I/O interface
- SATA NAND Flash: One SATA port of the QM57 is routed to a dedicated onboard connector, where SATA-NAND-Flash modules can be connected
- SATA: Five Serial ATA II ports
- Four ports are routed to rear I/O
- One available as 2.5" onboard HDD (not for dual XMC versions)
- PMC: one 64-bit / 66 MHz PCI PMC slot with slot with rear I/O support or XMC (PCIe x8) slot
- 6 SATA II controllers, 12 x USB 2.0 (6 used), 8 x PCIe 2.0 x1, 1 x LPC

Front Panel Functions
Ethernet
- 2 x 1000/100/10 Base Ethernet on RJ45

VGA
- 1 x 15-Pin D-Sub connector for standard analog displays

COM
- 1x RS232 UART interface on RJ45 connector

USB
- 2x 4-pin connectors

PMC
- Opening for PMC front panel

LEDs
- 2x LAN activity (yellow) and speed (green), one blue control LED for hot swap, 2x for IPMI, 1x watchdog, 1x thermal control, 4-LED-field for BIOS POST code or general purpose

Reset
- Reset button, guarded

Micro switch
For hot swap

I/O Table Summary (CP6002-R1)

<table>
<thead>
<tr>
<th>Front I/O</th>
<th>Rear I/O</th>
<th>Onboard Connector</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video *</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>USB</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Serial *</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Ethernet *</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>SATA</td>
<td>-</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>PMC / XMC</td>
<td>1 or 2</td>
<td>34</td>
<td>1/1 or 2/2 max. 2</td>
</tr>
</tbody>
</table>

*) Dual PMC/XMC versions with reduced front I/O

CompactPCI Bus Interface
- PICMG 2.0, 32/64-bit / 66 MHz
- Universal signaling, REQ/GNT for 7 slots
- Operating in system slot as system master and in peripheral slot in PCI passive mode (no communication to CPCI bus)

Rear I/O via J3/J4/J5
- J3: PICMG 2.16, VGA, COM 1/2, keyboard, mouse, USB 3-6, HDA, speaker, FAN sense
- J4: PMC I/O
- J5: SATA 2-4, HDMI

IPMI
IPMI 1.5 compliant

Compliance
- CompactPCI Core Specification PICMG 2.0 Rev. 3.0
- CompactPCI Hot Swap Specification PICMG 2.1 R2.0
- CompactPCI Packet Switching Backplane PICMG 2.16 R1.0
- Designed to meet or exceed:
  - Safety: UL 1950, UL 94, CSA 22.2 No 950, EN 60950, IEC 950
  - EMC/EMC: EN 55022 / EN 65024, EN 50081-1 / EN 61000-6-2

General
- Dimensions: 233 x 160 x 20.5 mm, 6U, 4HP
- Weight: R1: approx. 500g; R2: approx. 720g

Software Support
- APTIO EFI (BIOS)
- Setup console redirection to serial port (VT100 mode)
- BIOS parameters saved in Flash device
- Diskless, keyboardless, videoless operation, LAN boot support
- Board identification number accessible via EEPROM
- Support for Windows® Server 2003, 2008, 7, XP, XP Embedded, Linux®, VxWorks® VMWare (others on request)

Power Consumption
Intel® Core™i7 Processor (32nm):
- Core™ i7-610E, 2.53 GHz: 52W max.
- Core™i7-620LE, 2.0 GHz: 42W max.
- Celeron P4505, 1.86 GHz: 35W max.

Environmental
- CP6002-R1: IE 60068-2-6/29/27 (0°C to 60°C, Celeron Version <55°C, forced air cooling required)
- CP6002-R2: VITA 47, EAC5 (<40°C to +70°C, forced air cooling required)
- Coating on request
# Article Boards

<table>
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<th>Article Description</th>
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<td>CP6002-R1-2.53-4G</td>
<td>R1-Level, Intel® Core™ i7 610E 2.53 GHz, 4MB Cache, 4GB soldered Memory, 1 PMC / XMC socket 0°C to +60°C operating temperature</td>
</tr>
<tr>
<td>CP6002-R1-2.53-8G</td>
<td>R1-Level, Intel® Core™ i7 610E 2.53 GHz, 4MB Cache, 8GB soldered Memory, 1 PMC / XMC socket 0°C to +60°C operating temperature</td>
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<tr>
<td>CP6002-R1-2.00-4G</td>
<td>R1-Level, Intel® Core™ i7 620E 2.00 GHz, 4GB soldered Memory, 1 PMC / XMC socket 0°C to +60°C operating temperature</td>
</tr>
<tr>
<td>CP6002-R1-MC-2.00-4G</td>
<td>R1-Level, Intel® Core™ i7 610E 2.00 GHz, 4MB Cache, 4GB soldered Memory, 2 PMC / 2 XMC sockets 0°C to +60°C operating temperature</td>
</tr>
<tr>
<td>CP6002-R1-1.86-4G-V</td>
<td>R1-Level, Intel® Celeron P4505 1.86 GHz, 2MB Cache, 4GB soldered Memory, 1 PMC / XMC socket 0°C to +55°C operating temperature</td>
</tr>
<tr>
<td>CP6002-R1-2.00-4G</td>
<td>R1-Level, Intel® Core™ i7 620E 2.00 GHz, 4MB Cache, 4GB soldered Memory, 1 PMC / XMC socket 0°C to +60°C operating temperature</td>
</tr>
<tr>
<td>CP6002-R1-1.86-4G-V</td>
<td>R1-Level, Intel® Celeron P4505 1.86 GHz, 2MB Cache, 4GB soldered Memory, 1 PMC / XMC socket 0°C to +55°C operating temperature</td>
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# Accessories

<table>
<thead>
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<th>Article Description</th>
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<tr>
<td>CP6002-MK2.5SATA</td>
<td>Mounting kit for 2.5&quot; SATA-HDD onboard, mounting within 4HP</td>
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<tr>
<td>CABLE-GRAPHIC-DP-TO-DVI</td>
<td>Adapter cable DisplayPort to DVI, 19 cm</td>
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# Rear Transition Modules

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<tr>
<td>CP-RIO6-001</td>
<td>4HP Rear I/O Module for CP6002 with 1x DVI-D, 2x USB2.0, 2x GbE; socket for SATA 2.5&quot; disk; headers for 2x COM, Flash, SATA, fan</td>
</tr>
<tr>
<td>CP-RIO6-001-HD-216</td>
<td>4HP Rear I/O Module for CP6002 with 1x DVI-D, 2x USB2.0, 2x GbE, 4x SATA; socket for SATA 2.5&quot; disk; headers for 2x COM, Flash, SATA, fan</td>
</tr>
<tr>
<td>CP-RIO6-B</td>
<td>4HP Rear I/O Module for CP6002 with 1x DVI-D, 2x USB2.0, 2x GbE, 4x SATA; connected on USB Flash, 4x SATA, Fan, 0°C to 60°C</td>
</tr>
<tr>
<td>CP-RIO6-B-216</td>
<td>4HP Rear I/O Module for CP6002 with 1x DVI-D, 2x USB2.0, 2x GbE, 4x SATA; connected on USB Flash, 4x SATA, Fan, 0°C to 60°C</td>
</tr>
<tr>
<td>CP-RIO6-A</td>
<td>4HP Rear I/O Module for CP6002 with 1x DVI-D, 2x USB2.0, 2x GbE, 4x SATA; connected on USB Flash, 4x SATA, Fan, 0°C to 60°C</td>
</tr>
<tr>
<td>CP-RIO6-A216</td>
<td>4HP Rear I/O Module for CP6002 with 1x DVI-D, 2x USB2.0, 2x GbE, 4x SATA; connected on USB Flash, 4x SATA, Fan, 0°C to 60°C, PICMG 2.16 Support</td>
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# Software Support

<table>
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<tr>
<td>KIT-CP6002</td>
<td>Documentation and Windows driver kit</td>
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<tr>
<td>WXPE-BSP-CP6002</td>
<td>Windows XP Embedded BSP CP6002</td>
</tr>
<tr>
<td>LIN-BSP-CP6002</td>
<td>Linux BSP CP6002 for Suse and RedHat</td>
</tr>
<tr>
<td>VXW-BSP-CP6002</td>
<td>VxWorks BSP 6.x SMP support</td>
</tr>
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All available on the Web.