CP3005-SA

3U CompactPCI CPU Board with 8th/9th Gen Intel® Core™ and Xeon® for Industrial Control, Defense, Oil&Gas, Mining

- More performance-per-watt with up to 6 cores
- Long term programs: 10 years or more
- Expansions for I/O, storage, XMC, M.2 flash
- Rugged VITA47 EAC3, extended temperature
**CP3005-SA**

8th/9th Gen Intel® Core™ 3U CompactPCI CPU Board

- **Performance-per-watt**
  - Intel® Core™ i7/i5 and Intel® Xeon® version up to 6 cores

- **4K video experience**
  - Intel® UHD Graphics P630
  - Frequency 350 MHz base, > 1 GHz max.
  - DirectX® 12 and OpenGL 4.5

- **Flash capacities**
  - 30 – 512 GByte M.2 SATA flash even good for mass storage

- **Memory bandwidth**
  - 32/16/8 GByte dual-channel up to 2666 DDR4 speeds, ECC option

- **Connectivity**
  - USB 3.0, SATA 6Gbit/s, PCI Express®, 3x Gbit Ethernet/WOL

- **Variety of Extensions**
  - Mezzanines for 2.5” HDD/SSD, XMC, additional M.2
  - Rear I/O, backward compatible

- **Robustness**
  - Temperature option -40 °C up to +70 °C
  - Designed for VITA47 EAC3

- **Security**
  - Hardware based encryption / TPM2.0
  - Kontron APPROTECT based on WIBU Systems technology

CP3005-SA is the perfect choice for high performance applications, with an improved performance-per-watt compared to predecessors. The single-slot master CPU cards are based on 8th/9th Gen Intel® Core™ processors, Intel’s newest refresh of the 14 nanometer technology with up to 6 cores. Combined with Intel® UHD Graphics P630, it provides a new level of graphics performance compared to previous platform designs.

CP3005-SA, when assembled with the 8th/9th Gen Xeon® E processor, is selected for typical server applications and whenever error-correcting code (ECC) memory is a must.

CP3005-SA is built to be used in demanding and harsh environments. It is designed for VITA47 EAC3 and a temperature range of -40 °C up to +70 °C. The processor’s TDP can be adjusted dynamically to a desired performance and power envelope. The maturity and future-openness of the CompactPCI formfactor is proven in all ECT markets. Typical applications can be found in:

- **Defense**
- **Industrial Plant Control, Machine Control**
- **Energy, Oil&Gas, Mining**
- **Transportation**

8th/9th Gen Intel® Core™ and 4K video experience

CP3005-SA comes with a 2.5 GHz Intel® Core™ i5-8400H quad core vPro, no ECC, with 8 MByte Cache, and with a 2.7 GHz Intel® Xeon® E-2176M six core vPro with ECC and 12 MByte Cache. Other CPU options will follow. The Intel® UHD Graphics P630 provides three independent graphics outputs and supports DirectX® 12 and OpenGL 4.5. 4K video experience enables UHD streaming and high quality video for applications such as digital signage, and digital security and surveillance.

Revolutionary flash capacities and doubled memory

Up to 32 GByte SDRAM of 2666 DDR4 speeds serve applications with high memory demands. Error Checking and Correction (ECC) is supported in conjunction with the Xeon processor. A SATA flash can be used as storage device for onboard data or operating system data. Typically, capacities of 32 GByte are sufficient for this purpose. But thanks to the formfactor M.2, revolutionary flash capacities of up to 512 GByte at 22x42 mm module size are market-available and enable use even for mass storage! Qualified M.2 SATA Flash modules are available as CP3005-SA accessories by Kontron.

**Variety of Interfaces and Options**

The CP3005-SA comes with a comprehensive I/O feature set supporting up to three graphic ports VGA and 2x DVI, several USB 2.0 and 3.0, Gigabit Ethernet with Wake-over-LAN (WOL) option and three ports, as well as serial ports, GPIO, and SATA 6Gb/s. Backwards compatibility is also granted - the optional Rear I/O interface is compatible with previous CPU board series, so that Kontron’s available Rear Transition Modules can be re-used. Expansion options are provided to carry a XMC module, or a 2.5” HDD or SSD, and another M.2 SATA SSD module of 80mm size. PCI passive mode to run in peripheral slots, opens the door for Multi-CPU systems.

**Ready for Kontron APPROTECT/WIBU Security and TPM**

CP3005-SA is ready to be used with Kontron APPROTECT, based on Wibu-Systems technology. Kontron APPROTECT is a complementary product and may be purchased separately as an option. The related security chip is soldered onto the PCB which is important for many field deployments. It provides copy protection, IP protection, license model enforcement, license handling, implementation of license models, assignment of privileges or access levels.

In addition, CP3005-SA is equipped with a Trusted Platform Module (TPM 2.0) for enhanced hardware and software based data and system security, such as secure boot and trusted boot. TPM access is disabled by default.

10 years lifetime of CP3005-SA or even more, and Kontron’s commitment to a rich CompactPCI portfolio, make CP3005-SA a safe investment with low total-cost-of-ownership.
**CP3005: Intel 8th Core i7 (Coffee Lake) 3U cPCI Processor Board**

**Processor**
- 8th Gen Intel® processor (14nm technology):
  - Intel® Xeon® E-2176M, 6-Core, 2.7 GHz (base), 4.4 GHz (max), with ECC, 12 MByte Cache
  - Intel® Core™ i7-8700, 4-Core, 2.9 GHz (base), 4.7 GHz (max), with ECC, 8 MByte Cache
  - Others may be following

**Memory**
- DDR4 SDRAM at 2400 MT/s, via two SODIMM sockets, ECC support by Intel® Xeon® only
- Up to 32 GByte dual channel DDR4 SDRAM at 2400 MT/s, via two SODIMM sockets, ECC support by Intel® Xeon® only

**SATA Flash**
- Two redundant 16 MByte SPI boot flashes with fail-over functionality
- M.2 socket for 2280 M.2 SATA modules, enabling 32 GByte up to 1 TB flash capacity, available for 4HP and BHP variants of CP3005-5A
- M.2 socket for 2280 M.2 SATA modules, enabling 32 GByte up to 1 TB flash capacity, available for 4HP and BHP variants of CP3005-5A

**Boot Flash (UEFI)**
- Two redundant 16 MByte SPI boot flashes with fail-over functionality
- M.2 socket for 2280 M.2 SATA modules, enabling 32 GByte up to 1 TB flash capacity, available for 4HP and BHP variants of CP3005-5A

**Graphics**
- Intel® UHD Graphics P630 integrated
- Maximum resolutions:
  - VGA with a CRT monitor: tbd
  - VGA with a LCD monitor: tbd
  - DisplayPort: 4096 x 2304 pixels @ 60 Hz

**Gigabit Ethernet**
- Intel® i210 and i219LM Ethernet controller: Up to three 1000BASE-T interfaces, two front/rear switchable with WOL (Wake-on-LAN), third available via BHP extension CP3005-5A
- Dual UART, EXAR XR16L2750
- FPGA-based, timeout ranging from 125ms to 4096s programmable in 16 steps, IRQ, reset, dual-stage configuration

**Platform Controller Hub**
- Mobile Intel® QM370 Platform Controller Hub (Core branded CPU’s)
- Mobile Intel® CM246 Platform Controller Hub (Xeon branded CPU’s)
- Both featuring:
  - PCI Express® max. 20 resp. 24 lanes with x1, x2, x4 configurations
  - USB hub interface with 14 ports USB 3.1/2.0
  - SATA 6 Gb/s max. 4 ports with RAID 0/1/5/10 support
  - Intel® UHD Graphics P630 integrated
  - Support for display resolutions
  - VGA with a CRT monitor: tbd
  - VGA with a LCD monitor: tbd
  - DisplayPort: 4096 x 2304 pixels @ 60 Hz

**Onboard Controller**
- Mobile Intel® QM370 Platform Controller Hub (Core branded CPU’s)
- Mobile Intel® CM246 Platform Controller Hub (Xeon branded CPU’s)
- Both featuring:
  - PCI Express® max. 20 resp. 24 lanes with x1, x2, x4 configurations
  - USB hub interface with 14 ports USB 3.1/2.0
  - SATA 6 Gb/s max. 4 ports with RAID 0/1/5/10 support
  - Intel® UHD Graphics P630 integrated
  - Support for display resolutions
  - VGA with a CRT monitor: tbd
  - VGA with a LCD monitor: tbd
  - DisplayPort: 4096 x 2304 pixels @ 60 Hz

**RTC**
- FPGA-based, timeout ranging from 125ms to 4096s programmable in 16 steps, IRQ, reset, dual-stage configuration

**Watchdog**
- FPGA-based, timeout ranging from 125ms to 4096s programmable in 16 steps, IRQ, reset, dual-stage configuration

**Trusted Platform Module (TPM)**
- Infineon SLB9670 TPM 2.0 controller
- WIBU CodeMeter ASIC 1504-03 for Kontron APPROTECT
TECHNICAL INFORMATION (PRELIMINARY)

FRONT INTERFACES 4HP

<table>
<thead>
<tr>
<th>VGA</th>
<th>1x VGA-CRT 15-pin D-Sub connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB</td>
<td>2x USB 2.0 ports, 4-pin standard USB connectors</td>
</tr>
<tr>
<td>ETHERNET</td>
<td>2x RJ-45 with integrated LEDs (ACT, SPEED)</td>
</tr>
<tr>
<td>LED’S</td>
<td>6x LEDs: 4x POST Code or General Purpose, WD, TH</td>
</tr>
</tbody>
</table>

ONBOARD INTERFACES

<table>
<thead>
<tr>
<th>SATA CABLE CONNECTOR</th>
<th>1x onboard standard 7-pin SATA connector with locking mechanism, Sata 6Gb/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>SATA EXTENSION CONNECTOR</td>
<td>M.2 connector holding one SATA port for a M.2 SATA 22x42 Flash module</td>
</tr>
<tr>
<td>HIGH-SPEED EXTENSION CONNECTORS</td>
<td>2x high-speed connectors (used for expansion mezzanines of 8HP boards), holding:</td>
</tr>
<tr>
<td></td>
<td>- PCI Express®</td>
</tr>
<tr>
<td></td>
<td>- One SATA 3Gb/s</td>
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<tr>
<td></td>
<td>- One SATA 6Gb/s</td>
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<tr>
<td></td>
<td>- 2x USB 2.0/3.0</td>
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<td></td>
<td>- 2x DisplayPort</td>
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<td></td>
<td>- CDMI (TTL)</td>
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<td></td>
<td>- HDA</td>
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<tr>
<td></td>
<td>- LPC</td>
</tr>
</tbody>
</table>

REAR I/O VIA J2

<table>
<thead>
<tr>
<th>2x SATA 3Gb/s ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x Gigabit Ethernet ports without LED signals</td>
</tr>
<tr>
<td>2x USB 2.0 ports</td>
</tr>
<tr>
<td>1x VGA analog port</td>
</tr>
<tr>
<td>2x COM port RS-232 (LVTTL signal level)</td>
</tr>
<tr>
<td>5x GPIs and 3x GPOs (LVTTL signal level)</td>
</tr>
<tr>
<td>Reset and Power Management signals</td>
</tr>
<tr>
<td>Option to write protect non-volatile RAMs via a special pin</td>
</tr>
</tbody>
</table>

COMPACTPCI BUS INTERFACE

| PICMG 2.0 Rev. 3.0 compatible, 32-bit/33MHz (66MHz on request), rear I/O version via J2 |
| Universal 5V and 3.3V PCI signalling voltage supported, 7 Req/Gnt & clock lines |
| Operating in system slot as system master and in peripheral slot in PCI passive mode |

SUPERVISORY FUNCTIONS

Watchdog, software configurable, 125ms to 4096s in 16 steps, generates IRQ or hardware reset or dual-stage configuration

SOFTWARE SUPPORT

- AMI uEFI, setup console redirection to serial port (VT100 mode) with CMOS setup access, EFI Shell support, board configuration via Shell, diskless, keyboardless, videoless operation
- LAN boot support
- Board identification number accessible via EEPROM
- Support for Windows® 10 IoT Enterprise LTSB 2016 (64 bit), Windows® Server 2016, Linux, VxWorks® 7.x
  (Other OSs may also be used with the CP3005. Please contact Kontron)

COMPLIANCE

- CompactPCI Core Specification PICMG 2.0 Rev. 3.0
- CompactPCI Hot Swap Specification PICMG 2.1 Rev. 2.0

Designed to meet or exceed:
- Safety: UL 60950-1, CSA 22.2 No 60950, EN 60950-1, IEC 60950-1
- EMI/EMC: EN 55022 Class B / EN 55024

GENERAL

<table>
<thead>
<tr>
<th>DIMENSIONS WEIGHT MTBF</th>
</tr>
</thead>
<tbody>
<tr>
<td>3U 4HP/BPH/12HP CompactPCI, 100 x 160 mm CP3005-5A 4HP: 320 g tbd acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30 °C</td>
</tr>
</tbody>
</table>

POWER CONSUMPTION

| CP3005-5A with Xeon® E-2176M: typ. W tbd |
| CP3005-5A with Core™ i5-8400H: typ.W tbd |

ENVIRONMENTAL

<table>
<thead>
<tr>
<th>OPERATING TEMPERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 °C to +60 °C, standard</td>
</tr>
<tr>
<td>-40 °C to +70 °C, extended temp.</td>
</tr>
<tr>
<td>-40 °C to +85 °C (without additional components)</td>
</tr>
<tr>
<td>93 % RH at 40 °C, non-condensing (acc. to IEC 60068-2-78)</td>
</tr>
</tbody>
</table>

CP3005-5A EXPANSION CAPABILITIES

Two expansion mezzanines, the CP3005-HDD module and the CP3005-XMC module, are available as part of respective BHP size CP3005-5A variants. The CP3005-XMC module provides one x8 (or less) PCI Express 2.0-compliant interface with up to 5 GT/s for one XMC module. In addition, the CP3005-XMC module is capable of accommodating a M.2 SATA Solid State Drive of 22 x 80 mm size, enabling 32 Gigabyte up to 1 TByte flash capacity.

If more interfaces to the front are needed, the CP3005-HDD is the right choice. This module provides one USB 3.0 port, one Gigabit Ethernet interface, two DisplayPorts, and one COM interface on the front panel. In addition, the CP3005-HDD module provides support for a 2.5” SATA HDD or SSD and a M.2 SATA Solid State Drive of 22 x 80 mm size.
CP3005-HDD

TECHNICAL INFORMATION

FRONT INTERFACES 8HP

- DEFAULT INTERFACES
  - DisplayPort: 2x 20-pin DisplayPort connectors, DVI/HDMI capable through passive cable adapter
  - GbE: 1x RJ-45 with integrated LEDs (ACT, SPEED)
  - USB: 1x USB 3.0 port, 9-pin type-A connector
  - SERIAL PORT: 1x 16C550-compatible serial port, RS232 signalling, RJ-45
  - Reset button and HDD activity LED

ONBOARD INTERFACES

- SATA: 1x SATA connector for connecting a SATA 2.5’’ HDD/SSD (SATA 6Gb/s)
- M.2 SATA: 1x M.2 Socket for optional SATA Solid State Drive 22 x 80 mm

GENERAL

- WEIGHT: CP3005-8A BHP: 460 g
- MTBF: 1120/659 h acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30 °C typ. 0.5 W, without peripheral devices connected
- POWER CONSUMPTION:
  - OPERATING TEMPERATURE: 0 °C to +60 °C, standard
  - STORAGE TEMPERATURE: -40 °C to +85 °C (without additional components)
  - CLIMATIC HUMIDITY: 93 % RH at 40 °C, non-condensing (acc. to IEC 60068-2-78, acc. to MIL-STD-810G)

ENVIRONMENTAL

- POWER SUPPLY:
  - M.2 Socket

High-Speed I/O Extension Connector (120-pin)
### TECHNICAL INFORMATION

| FRONT INTERFACES 8HP | XMC CONTROL | XMC front panel bezel cutout  
|---------------------|-------------|-----------------------------  
|                     |             | Reset button and SATA LED  
| ONBOARD INTERFACES  | XMC         | 1x onboard XMC connector (P15),  
|                     | M.2 SATA    | 1x x8 PCI Express 2.0-compliant interface with up to 5 GT/s  
|                     |             | 1x M.2 Socket for optional SATA Solid State Drive 22 x 80 mm  
| GENERAL             | WEIGHT      | CP3005-SA BHP: 430 g  
|                     | MTBF        | 2,017,352 h acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30 °C  
|                     | POWER CONSUMPTION | Depends on XMC module, typ. 0 W without XMC  
| ENVIRONMENTAL       | OPERATING TEMPERATURE | 0 °C to +60 °C, standard  
|                     | STORAGE TEMPERATURE | -40 °C to +85 °C, extended temperature  
|                     | CLIMATIC HUMIDITY | -40 °C to +85 °C (without additional components)  
|                     |             | 93 % RH at 40 °C, non-condensing (acc. to IEC 60068-2-78)  

![Diagram of CP3005-XMC](image-url)
### ORDERING INFORMATION

<table>
<thead>
<tr>
<th>ARTICLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP3005-SA</td>
<td>Please ask</td>
</tr>
<tr>
<td><strong>INITIAL CONFIGURATIONS</strong></td>
<td></td>
</tr>
<tr>
<td>CP3005-SA-2.5Q-8-4F-T</td>
<td>CP3005-SA Quad Core™ i5, 8 GByte, 4HP, Front IO only, TPM</td>
</tr>
<tr>
<td>CP3005-SA-2.5Q-8-8F-T</td>
<td>CP3005-SA Quad Core™ i5, 8 GByte, 8HP, Front IO only, CP3005-HDD Mezzanine, TPM</td>
</tr>
<tr>
<td>CP3005-SA-2.5Q-8-8R-T</td>
<td>CP3005-SA Quad Core™ i5, 8 GByte, 8HP, with Rear IO, TPM</td>
</tr>
<tr>
<td>CP3005-SA-2.7S-32-4R-T</td>
<td>CP3005-SA Six Core™ Xeon® E, 32 GByte, 4HP, with Rear IO, TPM</td>
</tr>
<tr>
<td>CP3005-SA-2.7S-32-8XR-T</td>
<td>CP3005-SA Six Core™ Xeon® E, 32 GByte, with Rear IO, XMC carrier, TPM</td>
</tr>
<tr>
<td><strong>MORE CONFIGURATIONS COMING</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Please contact your local sales representative for other configuration options:</td>
</tr>
<tr>
<td></td>
<td>(CPU variant, RAM size, rear I/O support, HDD I/O mezzanine option, XMC mezzanine option, extended temperature option, conformal coating option)</td>
</tr>
<tr>
<td><strong>FLASH STORAGE</strong></td>
<td>(as separate items, not mounted on the CPU card)</td>
</tr>
<tr>
<td>CP-SSD-M2-2242-XXXGB-E2</td>
<td>M.2 SATA Flash module 22 x 42 mm, various sizes available, extended temperature -40 °C to +85 °C</td>
</tr>
<tr>
<td>CP-SSD-M2-2280-XXXGB-E2</td>
<td>M.2 SATA Flash module 22 x 80 mm, various sizes available, extended temperature -40 °C to +85 °C</td>
</tr>
<tr>
<td><strong>REAR TRANSITION MODULES</strong></td>
<td></td>
</tr>
<tr>
<td>CP-RIO3-04</td>
<td>4HP rear I/O module (2x Ethernet, 2x USB, VGA, 2x SATA connectors)</td>
</tr>
<tr>
<td>CP-RIO3-08</td>
<td>8HP rear I/O module (additional to 4HP COM1/2)</td>
</tr>
<tr>
<td>CP-RIO3-04S</td>
<td>4HP rear I/O module (2x Ethernet, COM, VGA, 2x SATA connectors)</td>
</tr>
<tr>
<td><strong>SOFTWARE</strong></td>
<td>VxWorks 7.x Board Support Package</td>
</tr>
<tr>
<td>VXW-BSP-CP3005-SA-V7.X</td>
<td>VIA download from the website</td>
</tr>
<tr>
<td>LINUX BSP</td>
<td>Via download from the website</td>
</tr>
<tr>
<td>WINDOWS PACKAGES</td>
<td>Via download from the website</td>
</tr>
</tbody>
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### GLOBAL HEADQUARTERS

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