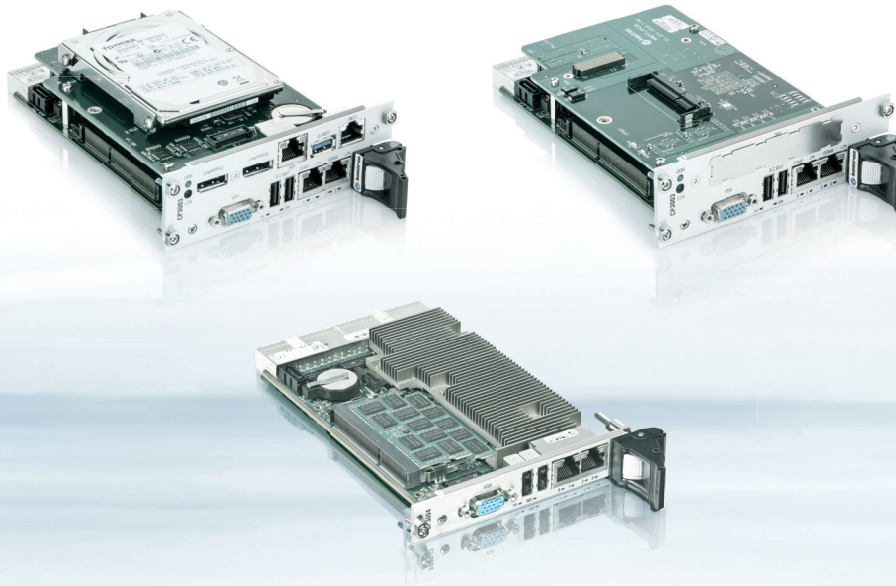# CP3004-SA

5TH GEN. Intel® Core™ 3U CompactPCI CPU BOARD
HIGH PERFORMANCE RANGE, HIGH-END GRAPHICS, HIGH CONNECTIVITY

▶ Core™ i7 Quadcore and Dualcore (4th gen) versions
▶ DirectX® 11, OpenGL 4, three independent outputs
▶ USB 3.0, SATA 6Gbit/s, 3x Gbit Ethernet, PCI Express
▶ rugged VITA47 EAC3, extended temperature

POSSIBILITIES START HERE   **kontron**

CP3004-SA
FIFTH GENERATION INTEL® CORE™ 3U COMPACTPCI CPU BOARD

With CP3004-SA, the fifth Generation of Intel® Core™ technology has been made available in Kontron's CompactPCI product portfolio. The high density design offers extraordinary performance-per-watt values based on the 14 nanometer technology, and is an ideal backbone for powerful network-intensive applications providing virtualization (VT-X, VT-D) and highest graphics performance. The new-generation graphics controller has up to 40 execution units providing OpenCL 1.2 / OpenGL 4 and triple independent display support. The Intel® Advanced Vector Extensions AVX 2.0 enhancements provide a huge performance improvement in floating-point-intensive computations, which are a key part of digital signal and image processing applications.

CP3004-SA is prepared to be used in demanding and harsh environments. Dual-Core versions (4th gen CPU) provide for low heat dissipation. The processor's TDP can be adjusted dynamically to a desired performance and power envelope. Typical applications can be found in the markets

- Military / Defence: radar, sonar, general
- Industrial Automation: plant control, machine control
- Energy: demanding environments
- Medical: imaging

Long term availability and Kontron's commitment to a rich CompactPCI portfolio make CP3004-SA a safe investment with low total-cost-of-ownership.

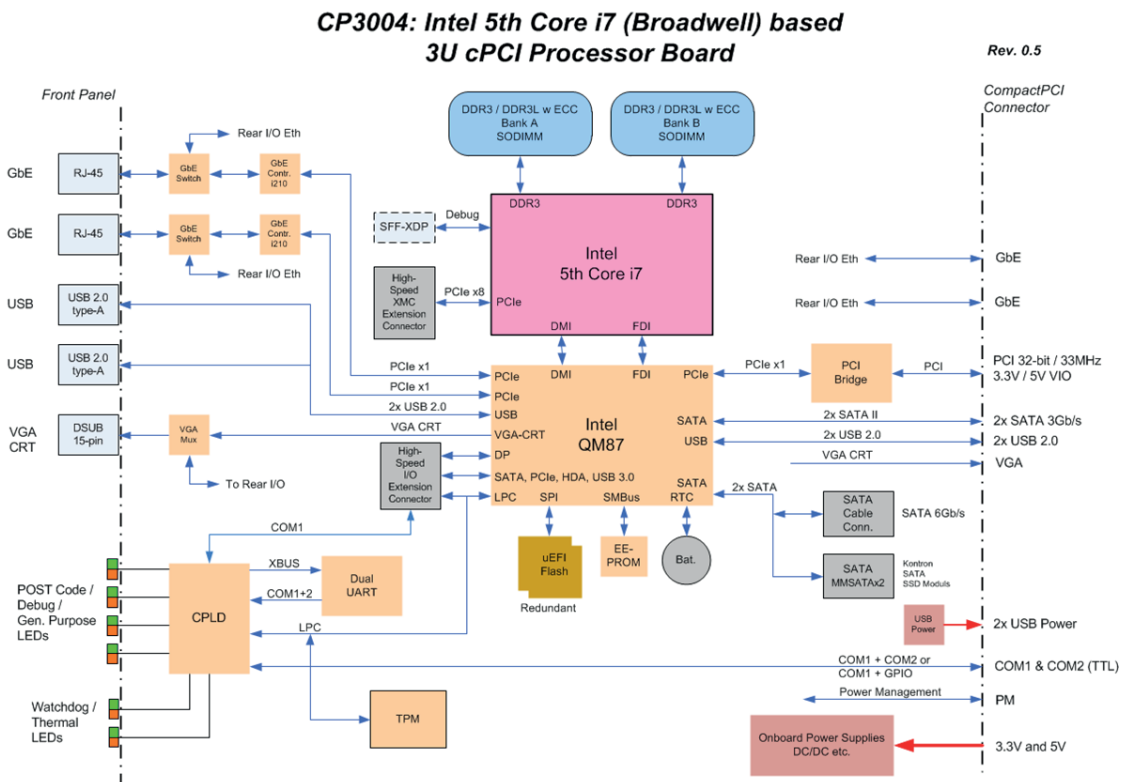CP3004-SA is available with dual- and quad-core CPU performance scalable from the 1.8 GHz Intel® Core™ i3-4112E up to the 2.6 GHz i7-5700EQ processor. Intel® Celeron® processors will be off ered on request. Memory-demanding applications can make use of up to 16GB 1600 MT/s DDR3 SDRAM with Error Checking and Correction (ECC). For onboard data storage, the CP3004-SA off ers up to 32GB on a dedicated SLC SATA Flash module or a HDD/SSD and CFast option on the 8HP extension module. On the system side, CP3004-SA supports a PCI 32-bit, 33MHz (66MHz on request) CompactPCI interface, enabling the peripheral mode feature. When installed in a system master slot, the CompactPCI interface is enabled, whereas the CompactPCI interface will be isolated when installed in a peripheral slot.

Variety of Interfaces and Options
The CP3004-SA comes with a comprehensive I/O feature set supporting known and established interfaces such as VGA, USB2.0, Gigabit Ethernet and serial ports as well as the new high-speed interfaces USB3.0 and SATA 6Gb/s. By adding one of the three extension modules - XMC Carrier, Legacy I/O or SATA/USB extension – the CP3004-SA's I/O capabilities will be further extended. Backwards compatibiliy is also granted - the optional Rear I/O interface is compatible with previous CPU board series.

System Security
Options for write protection and TPM1.2 are provided. The Trusted Platform Module (TPM) provides hardware-based encryption mechanisms to create, seal or store keys, passwords and or other critical data.

CP3004: Intel 5th Core i7 (Broadwell) based 3U cPCI Processor Board   Rev. 0.5

► **TECHNICAL INFORMATION**

PROCESSOR		5th Generation Intel® Core™ i7 processor (14nm technology): - i7-5700EQ Quad-Core up to 2.6 GHz, 6MB L3 cache Moreover 4th generation: - i5-4410E: Dual-Core 2.9 GHz, 3MB L3 cache - i3-4112E: Dual-Core 1.8 GHz, 3MB L3 cache All boards are passive cooled with a heatsink in 4HP height Forced air cooling at specific fl ow rate is required depending on the processor version
MEMORY	**SYSTEM MEMORY** **BOOT FLASH (UEFI)** **SATA NAND FLASH** **HDD** **CFAST**	Up to 16GB dual channel DDR3L SDRAM running at 1600 MHz, with ECC, via two SODIMM sockets Two redundant 16 MB SPI boot fl ashes with fail-over functionality Up to 32GB SLC NAND Flash on a dedicated SATA NAND Flash module The SATA NAND Flash option is only available on a 4HP CP3004-SA Onboard 2.5" SATA SSD/HDD installation via CP3004-HDD extension, optionally available with two SSD/HDD Onboard CFast installation via 8HP extension

ONBOARD CONTROLLER	**PLATFORM CONTROLLER HUB**
	
	GRAPHICS
	
	GIGABIT ETHERNET
	
	UART
	WATCHDOG
	
	RTC
	TRUSTED PLATFORM MODULE (TPM)
		Mobile Intel® QM87 Platform Controller Hub featuring:
		- USB host interface with eight USB2.0 and six USB3.0 ports
		  (5x USB2.0 and 1x USB3.0 ports are used)
		- SATA host controller with six SATA total (max four ports SATA 6Gb/s)
		  with RAID 0/1/5/10 support
		
		Intel® HD Graphics 5600 integrated (Quad-Core).
		- Supports DirectX ® 11.2, OpenGL® 4.3
		Intel® HD Graphics 4600 integrated (Dual-Core).
		- Supports DirectX ® 11.1, OpenGL® 4.0
		Maximum resolutions:
		- VGA with a CRT monitor: 1600 x 1200 pixels @ 75 Hz
		- VGA with a LCD monitor: 1920 x 1200 pixels @ 60 Hz
		- DisplayPort: 3840 x 2160 pixels @ 60 Hz
		
		Up to three 1000BASE-T interfaces, two front/rear switchable with WOL (Wake-on-LAN) support, third available via extension CP3004-HDD, Intel® i210 Ethernet controller
		dual UART, 16C550-compatible
		FPGA-based, timeout ranging from 125ms to 4096s programmable in 16 steps, IRQ, reset, dual-stage configuration
		Integrated in PCH, with 256 Byte CMOS RAM
		Atmel AT97SC3204 TPM 1.2 controller

FRONT INTERFACES 4HP	**VGA** **USB** **ETHERNET** **LED's**	1x VGA-CRT 15-pin D-Sub connector 2x USB 2.0 ports, 4-pin standard USB connectors 2x RJ-45 with integrated LEDs (ACT, SPEED) 6x LEDs: 4x POST Code or General Purpose, WD, TH
ONBOARD INTERFACES	**SATA CABLE CONNECTOR** **HIGH-SPEED EXTENSION CONNECTORS** **SATA EXTENSION CONNECTOR**	1x onboard standard 7-pin SATA connector with locking mechanism, SATA 6Gb/s 2x high-speed connectors holding: - PCI Express - One SATA 3Gb/s - One SATA 6Gb/s - 2x USB 2.0/3.0 - 2x DisplayPort - COM1 (TTL) - HDA - LPC 1x 18-pin connector holding one SATA port for the SATA NAND Flash module
REAR I/O VIA J2		The CP3004-SA supports: - 2x SATA 3Gb/s ports - 2x Gigabit Ethernet ports without LED signals - 2x USB 2.0 ports - 1x VGA analog port - 2x COM port RS-232 (LVTTL signal level) - 5x GPIs and 3x GPOs (LVTTL signal level) - Reset and Power Management signals - Option to write protect non-volatile RAMs via a special pin
COMPACTPCI BUS INTERFACE		PICMG 2.0 Rev. 3.0 compatible, 32-bit/33MHz (66MHz on request), version with rear I/O 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		- AMIuEFI,setupconsoleredirectiontoserialport(VT100mode)with CMOS setup access, EFI Shell support, board configurationviaShell, diskless, keyboardless, videoless operation - LAN boot support - Board identificationnumberaccessibleviaEEPROM - Support for Windows® 7, ES7, 8, ES8, Windows® Embedded Industry 8.1, Windows® Server 2008R2, 2012, Windows® 10 IoT, Linux, VxWorks® 7 (Other OSs may also be used on request. Please contact Kontron)
COMPLIANCY		- 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 / EN 55024, EN 61000-6-3 / EN 61000-6-2
GENERAL	DIMENSIONS WEIGHT MTBF	3U 4HP/8HP/12HP CompactPCI, 100 x 160 mm CP3004-SA 4HP: 320 g 234 051 hrs acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30°C
POWER CONSUMPTION		CP3004-SA with i3-4112E: Dual-Core 1.8 GHz typ. 21 W CP3004-SA with i5-4410E: Dual-Core 2.9 GHz typ. 47 W CP3004-SA with i7-5700QE QC up to 2.6 GHz typ. 45 W
ENVIRONMENTAL	OPERATING TEMPERATURE STORAGE TEMPERATURE CLIMATIC HUMIDITY OTHER	0°C to +60°C, standard -40° to +85°C, extended temp. E2 depending on CPU and Wattage (ask) -40°C to +85ºC (without additional components) 93% RH at 40°C, non-condensing (acc. to IEC 60068-2-78) #¢Ü²–Å¢› æÉ Ä ¢¢â t 7̃ ' ⱶ

CP3004-SA EXPANSION CAPABILITIES

The CP3004-SA provides various expansion capabilities via specifi cally designed modules such as the SATA Flash Module, the Smart Extension Module, the CP3004-HDD module and the CP3004-XMC module. The 4HP CP3004-SA can accommodate two modules, the SATA Flash Module and the Smart Extension module. The SATA Flash Module is available with up to 32 GB SLC NAND fl ash memory and can be used as storage device for onboard data or operating system data. The SATA Flash Module is specifi cally designed and optimized for embedded systems providing high performance, reliability and security. The Smart Extension Module expands the onboard I/O capability and provides one additional SATA cable connector plus one USB 2.0 connector thereby facilitating the connection to system-internal USB and SATA devices. Furthermore, two extension modules are available to expand the CP3004-SA to a doubleslot 8HP version, the CP3004-HDD module and the CP3004-XMC module.

If more interfaces to the front are needed, the CP3004-HDD is the right choice. This module provides one USB 3.0 port, one Gigabit Ethernet interface, two DiplayPorts, and one COM interface on the front panel. In addition, the CP3004-HDD module provides support for a 2.5" SATA HDD/SSD and a CFast card. As a further extension capability of the CP3004-SA to 12HP, a SATA adapter module is available with the CP3004-HDD to provide an additional SATA connector for 2.5" SATA HDD/SSD devices. The 12 HP CP3004-SA does not provide a CFast socket. The CP3004-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 CP3004-XMC module is capable of accommodating a CFast card.
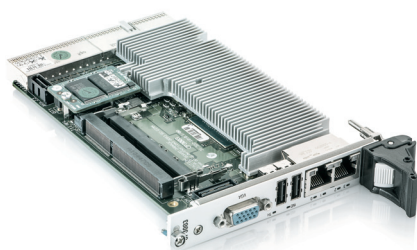
SATA FLASH MODULE

▶ TECHNICAL INFORMATION

MEMORY	CAPACITY NAND FLASH MEMORY BANDWITH	Up to 32 GB SLC-based NAND Flash memory 32nm Toshiba Single Level Cell Components Up to 60 MB/s read rate Up to 55 MB/s write rate
GENERAL	DIMENSIONS WEIGHT MTBF POWER CONSUMPTION	38 x 27mm Ca. 7 grams 3,848,557 h acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30°C Typ. 0.5W, 3.3V supply
ENVIRONMENTAL	OPERATING TEMPERATURE STORAGE TEMPERTURE CLIMATIC HUMIDITY	0°C to +60°C, standard -40°C to +85°C, extended temperature -40°C to +85ºC 93% RH at 40°C, non-condensing (acc. to IEC 60068-2-78)

SMART EXTENSION MODULE

▶ TECHNICAL INFORMATION

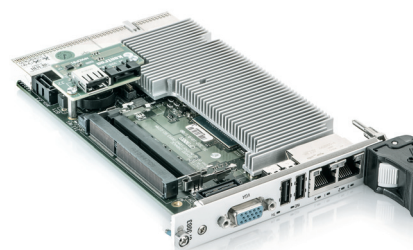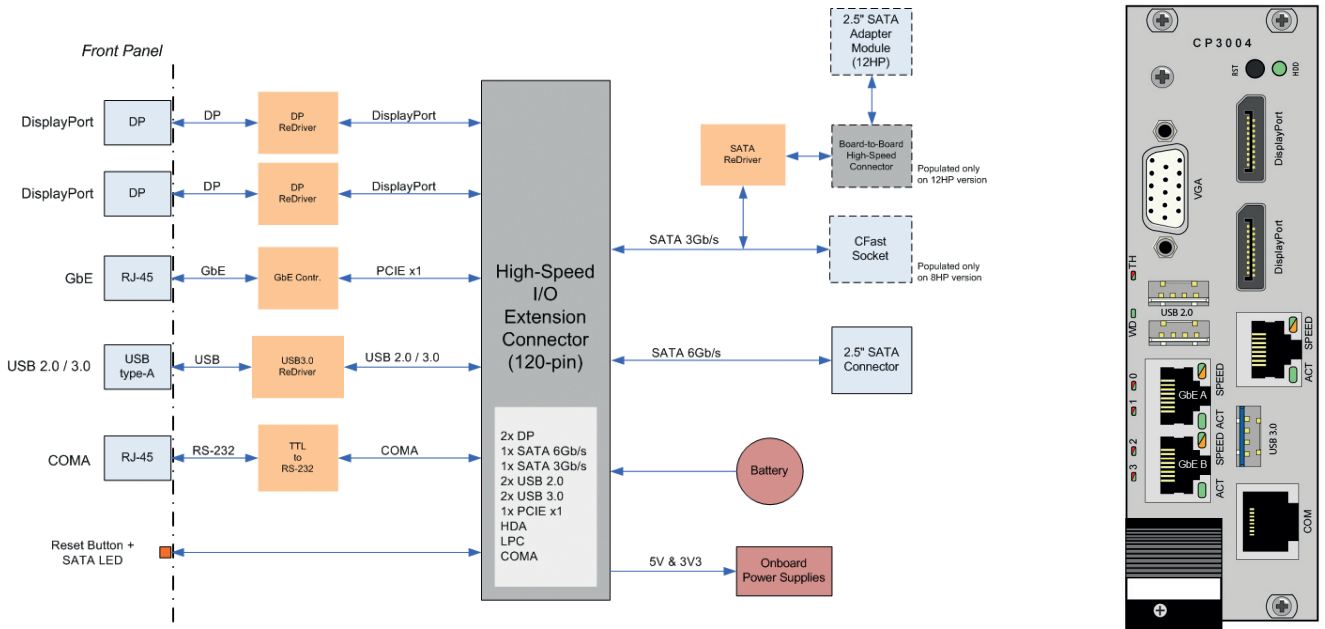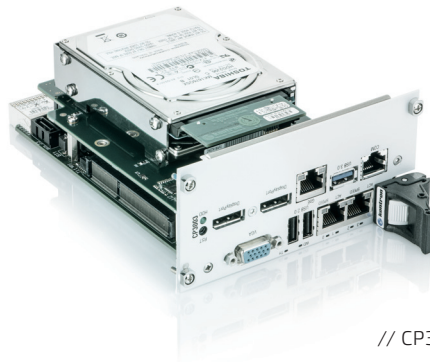| ONBOARD INTERFACES	SATA USB	One onboard angled standard SATA connector One onboard angled standard USB 2.0 connector
GENERAL	DIMENSIONS WEIGHT MTBF	34 x 49 mm Ca. 11 grams 6,534,579 h acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30°C
ENVIRONMENTAL	OPERATING TEMPERATURE STORAGE TEMPERTURE CLIMATIC HUMIDITY	0°C to +60°C, standard -40°C to +85°C, extended temperature -40°C to +85ºC 93% RH at 40°C, non-condensing (acc. to IEC 60068-2-78)

// CP3004-SA WITH SATA FLASH MODULE
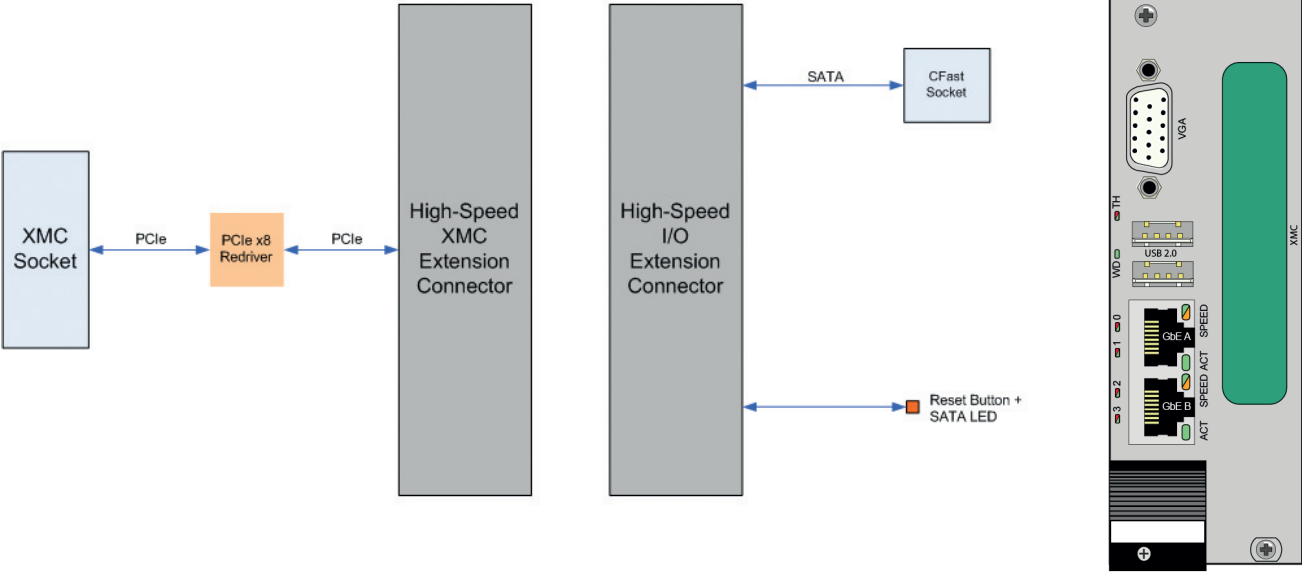
// CP3004-SA WITH SMART EXTENSION MODULE

CP3004-HDD

Front Panel

Block diagram showing: DisplayPort → DP → DP ReDriver → DisplayPort; DisplayPort → DP → DP ReDriver → DisplayPort; GbE → RJ-45 → GbE Contr. → PCIE x1; USB 2.0 / 3.0 → USB type-A → USB3.0 ReDriver → USB 2.0 / 3.0; COMA → RJ-45 → TTL to RS-232 → COMA; Reset Button + SATA LED. Central High-Speed I/O Extension Connector (120-pin): 2x DP, 1x SATA 6Gb/s, 1x SATA 3Gb/s, 2x USB 2.0, 2x USB 3.0, 1x PCIE x1, HDA, LPC, COMA. SATA ReDriver → Board-to-Board High-Speed Connector (Populated only on 12HP version) → 2.5" SATA Adapter Module (12HP); SATA 3Gb/s → CFast Socket (Populated only on 8HP version); SATA 6Gb/s → 2.5" SATA Connector; Battery; 5V & 3V3 → Onboard Power Supplies.

▶ **TECHNICAL INFORMATION**

FRONT INTERFACES (8HP)	**DISPLAYPORT**	2x 20-pin DisplayPort connectors, DVI/HDMI capable through passive cable adapter
	ETHERNET	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
	CONTROL	Reset button and HDD activiy LED
ONBOARD INTERFACES	**SATA**	1x SATA connector for connecting a SATA 2.5" HDD/SSD (SATA 6Gb/s), Option to add 2nd SATA HDD/SSD (results in 12HP stacking height and CFast socket won't be available)
	CFAST	1x CFast card socket
GENERAL	**WEIGHT**	CP3004-SA 8HP: 460 g, CP3004-SA 12HP: 520 g
	MTBF	1,120,458 h acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30°C
	POWER CONSUMPTION	typ. 0.5W, without peripheral devices connected
ENVIRONMENTAL	**OPERATING TEMPERATURE**	0°C to +60°C, standard
		-40°C to +85°C, extended temperature
	STORAGE TEMPERTURE	-40°C to +85°C (without additional components)
	CLIMATIC HUMIDITY	93% RH at 40°C, non-condensing (acc. to IEC 60068-2-78)

// CP3004-SA 12HP

CP3004-XMC

▶ TECHNICAL INFORMATION

FRONT INTERFACES (8HP)	XMC CONTROL	XMC front panel bezel cutout Reset button and CFast activity LED
ONBOARD INTERFACES	XMC CFAST	1x onboard XMC connector (P15), 1x x8 PCI Express 2.0-compliant interface with up to 5 GT/s 1x CFast card socket
GENERAL	WEIGHT MTBF POWER CONSUMPTION	CP3004-SA 8HP: 430 g 2,017,352 h acc. to MIL-HDBK-217 FN2, Ground Benign, controlled at 30°C Depends on XMC module, typ. 0W without XMC
ENVIRONMENTAL	OPERATING TEMPERATURE STORAGE TEMPERTURE CLIMATIC HUMIDITY	0°C to +60°C, standard -40°C to +85°C, extended temperature -40°C to +85°C (without additional components) 93% RH at 40°C, non-condensing (acc. to IEC 60068-2-78)

▶ ORDERING INFORMATION

ARTICLE	DESCRIPTION
CP3003-SA PREFERRED CONFIGURATIONS	
CP3004-SA-1.8D-8-4F-T	CP3004-SA Dual Core i3, 8GB, 4HP, Front IO, TPM
CP3004-SA-1.8D-8-4R-T	CP3004-SA Dual Core i3, 8GB, 4HP, Rear IO, TPM
CP3004-SA-2.9D-8-4F-T	CP3004-SA Dual Core i5, 8GB, 4HP, Front IO, TPM
CP3004-SA-2.9D-8-8R-T	CP3004-SA Dual Core i5, 8GB, 8HP, Rear IO, HDD Mezzanine, TPM
CP3004-SA-2.6Q-16-4F-T	CP3004-SA Quad Core i7, 16GB, 4HP, Front IO, TPM
CP3004-SA-2.6Q-16-4R-T	CP3004-SA Quad Core i7, 16GB, 4HP, Rear IO, TPM
	Please contact your local sales representative for other configuration options: CPU variant, RAM size, rear I/O support, HDD I/O mezzanine option, XMC mezzanine option, extended temperature option, conformal coating option)
FLASH STORAGE	(as separate items, not mounted on the CPU)
FLASH-SATA-XGB-CP300X	SATA NAND Flash module, various sizes available
CFASTx	Industrial grade CFast, various sizes available
REAR TRANSITION MODULES	
CP-RIO3-04	4HP rear I/O module (2x Ethernet, 2x USB, VGA, 2x SATA connectors)
CP-RIO3-04	8HP rear I/O module (in addition to 4HP: COM1/2)
CP-RIO3-04S	4HP rear I/O module (2x Ethernet, COM, VGA, 2x SATA connectors)
SOFTWARE	
VXW-BSP-CP3004-SA-V6.9.x	VxWorks 6.9.x Board Support Package
LINUX BSP	Available as download on the webpage
WINDOWS PACKAGES	Available as download on the webpage
NOTES	The SATA NAND Flash module cannot be used in conjunction with the CP3004-HDD/CP3004-XMC module

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