» Open Modular Platforms «

Flexible, versatile and robust

» AMC / MicroTCA
» CompactPCI®
» VME
» VPX
» Content «

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Today’s demands on industrial PC technology require intelligent, cost-optimized products that are suitable for rugged environments and ensure longevity. These factors, along with many others, are characteristic for the open modular platforms AMC/MicroTCA, CPCI, VME and VPX. Kontron is one of the few companies, whose portfolio is not limited to only one of these standards. As global leader in the embedded computing technology with more than 50 years of experience Kontron delivers platforms proven for many years as well as new and upcoming technologies.

Key features

» Scalable
From single-core SBCs to multiple multi-core platforms

» Compact
Obvious space-saving advantages enable applications in all fields

» Long-term availability
Standard availability 7 years with options to extend

» Rugged design
Excellent shock and vibration capabilities

» Custom design
Customized boards or systems according to your specification

### Characteristics / Form Factor

<table>
<thead>
<tr>
<th>Processor Platforms</th>
<th>AMC</th>
<th>CompactPCI®</th>
<th>CPCI-PICMG® 2.20 based</th>
<th>CompactPCI® Serial</th>
<th>VME</th>
<th>VPX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x86</td>
<td>x86</td>
<td>x86</td>
<td>x86</td>
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<tr>
<td>Form Factor</td>
<td>Single Width &amp; Double Width</td>
<td>3U &amp; 6U</td>
<td>6U</td>
<td>3U</td>
<td></td>
<td></td>
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<tr>
<td>Max CPU Cores</td>
<td>10</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Hot swap (HS) and management</td>
<td>HS &amp; 3PMI on 6U</td>
<td>1GbE/PCIe</td>
<td>1GbE/10GbE/PCIe</td>
<td>1GbE/10GbE/PCIe</td>
<td></td>
<td></td>
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<tr>
<td>Communication Bandwidth Backplane: Ethernet/Bus/others</td>
<td>1 GbE / 10 GbE / PCIe</td>
<td>1 GbE / 10 GbE / PCIe</td>
<td>1 GbE / 10 GbE / PCIe</td>
<td>1 GbE / VME Bus / 10GbE/PCIe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Warranty with options to extend</td>
<td>2 yrs</td>
<td>2 yrs</td>
<td>2 yrs</td>
<td>2 yrs</td>
<td>2 yrs</td>
<td>2 yrs</td>
</tr>
<tr>
<td>Additional</td>
<td>Switches, 10s, Management controllers, Network cards, Storage solutions</td>
<td>Switches, 10s, XMC, PMC cards, Network cards, Storage solutions, PIC cards</td>
<td>XMC / XMM cards, 6U CompactPCI® solutions</td>
<td>10s, XMC cards, Storage solutions</td>
<td>Switches, 10s, XMC, PMC cards, Storage solutions</td>
<td>Switches, 10s, XMC, PMC cards, Storage solutions</td>
</tr>
<tr>
<td>Main applications</td>
<td>Communication Military</td>
<td>Communication Industrial Automation Military Transportation</td>
<td>Communication Industrial Automation Military Transportation</td>
<td>Industrial Automation Military Transportation</td>
<td>Industrial Automation Military Transportation</td>
<td>Military Transportation</td>
</tr>
</tbody>
</table>

» Scalable
From single-core SBCs to multiple multi-core platforms

» Compact
Obvious space-saving advantages enable applications in all fields

» Long-term availability
Standard availability 7 years with options to extend

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Mobile test systems help mobile infrastructure vendors develop their base stations. Based on Kontron MicroTCA systems and AMC boards, mobile test platforms are designed for 3GPP infrastructure development and test. These platforms allow lab-based testing and analysis of WCDMA and HSPA operation from basic channel configuration to complex packet-based services. Due to the high-performance, scalable, and flexible AMC and MicroTCA standard, the test equipment can be configured individually to the measurement tasks.

Benefits:
- High data throughput via high speed serial interconnects
- High manageability via IMPI concept and interoperability check
- High serviceability through hot swap capability

Applications

**Network tester**
Mobile test systems help mobile infrastructure vendors develop their base stations. Based on Kontron MicroTCA systems and AMC boards, mobile test platforms are designed for 3GPP infrastructure development and test. These platforms allow lab-based testing and analysis of WCMA and HSPA operation from basic channel configuration to complex packet-based services. Due to the high-performance, scalable, and flexible AMC and MicroTCA standard, the test equipment can be configured individually to the measurement tasks.

**Digital video broadcasting (IPTV)**
The IPTV hotel and hospital solutions offer guests and patients not just entertainment but also information about the hotel or hospital and its environs. It offers the guest or patient simple, logical, and self-explanatory operation. The highlight is a cinema package with the latest blockbusters from the biggest film studios. No matter whether it’s a large or a small facility, the IPTV solution based on a scalable MicroTCA system always adapts to the individual performance needs. Due to the flexibility MicroTCA and AMC based systems offer, IPTV solutions like this consist of a basic package that can be extended individually with a variety of media packages in accordance with the hotel or hospital operator’s wishes.

**Industrial vision system**
Industrial image processing allows producing goods with high quality. Whether it’s recognizing errors in the surface of a material, measuring parts, identifying glass bottles or jars, or examining the packaging, the surface inspection process doesn’t miss a single detail. Independent of temporal variations. High-performance, high-availability MicroTCA systems from Kontron ensure that production lines with feed speeds from < 10 m/min to > 1,500 m/min, or up to 200 parts per second are able to work 24/7 ensuring highest output quality with a minimum of maintenance time. These systems are also used in optical inspection systems include control of marking devices, cutting, or removal devices as a standard feature.

**AMC form factors:**
- **Single (73.8 mm)**: Mid-Size (4HP) or Full-Size (6HP)
- **Double (148.8 mm)**: Mid-Size (4HP) or Full-Size (6HP)

**Powerful & Small**
On a footprint of 74 mm x 183.5 mm they offer massive data throughput via high speed serial interconnects. With focus on demanding application AMCs offer sophisticated manageability and serviceability via IPMI and hot-swap.

**Fully Featured**
Double AMCs provide graphics, mass-storage and IO, all on a space saving 149 mm x 183.5 mm form factor, with a power envelope of 80W. This enables high performance platforms, focused on applications that demand massive data throughput driven by high speed serial interconnects. Sophisticated manageability and serviceability via IPMI and the hot-swap concept round out the feature set.

**AMC / MicroTCA**
Processor boards

AM4022
AdvancedMC module with 3rd Generation Intel® Core™ processor based platform
» Up to 8 GByte SDRAM memory (soldered) 1600 MHz with ECC
» Graphics interface
» Up to 64 GByte SATA NAND Flash memory module

AM4150
Processor AMC based on Freescale™ QorIQ P5020
» Dual-Core P5020/64 bit up to 2.2 GHz
» Up to 8 GByte SDRAM memory (soldered) 1300 MHz with ECC
» SATA to Backplane and onboard Flash Module (up to 64 GByte)

AM4140
Processor AMC based on Freescale™ QorIQ P4080
» Freescale™ QorIQ P4080 – 8-core CPU @ 1.5 GHz
» Up to 8 GByte SDRAM memory (soldered) 1300 MHz with ECC
» sRIO, PCIe and 1/10GbE fabrics

I/O

AM4211
Next Generation 10-Core Packet Processor AMC module
» 10-Core Cavium OCTEON® II CN6645 MIPS64 processor at 1.1 GHz
» Design for 4G, LTE, WiMAX network applications

AM4320
Dual 10 Gigabit Ethernet AdvancedMC Module
» Provides expanded bandwidth for ATCA node blades (AT8060) and MicroTCA platforms
» Two 10Gigabit Ethernet on SFP+ ports supported by Intel® 82599ES Ethernet controller implementation

AM4311
Extending number of GbE Uplinks
» Quad 1000Base-X SFP
» Cost optimized design
» PICMG® AMC.0/AMC.2 compliant
» Management through IMPI 1.5 implementation

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Storage AMCs

**AM4500 / AM4510**  
**SATA Storage Module**  
» Full-Size / Mid-Size (AMC.0 R2.0)  
» AMC.3 R1.0 compliant  
» AM4500: Up to 500 GByte 2.5" SATA HDD  
» AM4510: Up to 120 GByte 2.5" SATA SSD

**AM4520**  
**SAS Storage Module**  
» Full-Size / Mid-Size (AMC.0 R2.0)  
» AMC.3 R1.0 compliant  
» Up to 600 GByte SAS 2.5" HDD

**AM4530**  
**NAS Storage Module**  
» AMC.0, 1, 2 and AMC.3 compliant  
» AM4530: Up to 500 GByte 2.5" SATA HDD  
» AM4531: Up to 120 GByte 2.5" SATA SSD  
» Base or/and Fabric access via VLAN

**AMC-MMC Developer Kit**

For AMC developers MicroTCA management may represent an obstacle for own AMC designs. The management functions over IPMI on AMCs are contained in a functional entity named MMC (module management controller). The AMC developer’s package provides proven building blocks for MicroTCA management: a hardware building block, MMC management software, as well as a reference implementation on AMC incl. debugging facilities.

» AMC Developer’s Package  
» Proven building blocks for MicroTCA management  
» Reference implementation on AMC incl. debugging facilities  
» Modular Design to facilitate adaption
A MicroTCA Carrier Hub (MCH) is the central management and data switching device in a MicroTCA system. The mandatory and optional functionality is defined in the MicroTCA specification MicroTCA.0, issued by the PICMG®. The design of the MCH is flexible and scalable enough to fulfill the requirements of both, telecom and non-telecom systems. The basic functionality of an MCH is to deliver switching and hub functionality for the various system fabrics as defined in the AMC.x standards such as Gigabit Ethernet, 10 GbE, PCI Express®, Serial Attached SCSI (SAS) and Serial RapidIO (sRIO).

**AM4904/4910**
- High-end MicroTCA Carrier Hub (MCH) with Enterprise Class Ethernet Switching
- High-sophisticated, full-featured MCH
- Supports all popular Fabric implementations for MicroTCA: GbE standalone or combined with 10 GbE or PCIe or sRIO switching
- Powerful Enterprise Class L2 non-blocking managed GbE and 10 GbE switching capabilities (L3 option on both Fabrics)
- Support for MicroTCA.4

**AM4901**
- Cost optimized MCH (MicroTCA Carrier Hub)
- Cost optimized design by focusing to essential requirements
- System management + Ethernet Switching
- Front panel GbE uplink - MCH update and cross-over Channel

**Requirement Summary**
- High performance and throughput
- Multi-Processor
- Advanced Switching Requirements
- Advanced System Management
- Hot-Swap
- Redundant

**Fully-Featured**
- Completely redundant
- Fully featured MCH
- Power Modules
- Cooling Units

**Cost-optimized**
- Simple Power Supplies
- Simple Fans
- Simple MCH

**Lowest Cost**
- Simple Power Supplies
- Simple Fans
- MCM Module on Backplane
» MicroTCA.4 «

The Physics community has primarily used VMEbus based systems in the past. As VMEbus does not support the latest in high-speed serial communication and advanced system management, the need for a next generation system architect was apparent. The Physics community was able to identify that the xTCA architect and specifically MicroTCA meet their needs for a next generation standard, allowing for high-speed serial communication in a small form factor and providing extensive remote management.

To meet some additional requirements they needed, the Physics group initiated the PICMG® working group, „xTCA for Physics“, which defined additional features in the MicroTCA dot specification, MicroTCA.4

» Ruggers MicroTCA «

Levels of ruggedness

Modern warfare systems must blend issues of ruggedness, flexibility, mobility and high-end processing. MicroTCA boards and systems are designed to meet NEBS Level 3 requirements, addressing demands such as thermal margins, fire suppression, emissions and the ability to continue working even during a severe earthquake. As a result, standard MicroTCA systems are beyond rugged enough for environments such as ground installations or on certain types of airborne platforms. MicroTCA systems can offer up to 12 slots, making the platform highly suitable for high-bandwidth, high-performance military applications.

MicroTCA.0
Base Specification
» 7g shock, 0.5g amplitude vibration (DL1, IEC60068-2-6/27)

MicroTCA.1
Rugged Air-Cooled Extended Environment
» Standard AMCs, but fixed on front
» 25g shock, 3g amplitude vibe (DL3, IEC60068-2-6/27)
» Extended temperature -40°C to +70°C

MicroTCA.3
Hardened Conduction-Cooled MIL Environment

ApexAM
» AMC clamshells for conduction cooling
» Up to three AMCs
» Management via MCMC Module (AM2901)

AMC with Clamshell
» Rugged, conduction-cooled single AMC

Main additional features:
» Powered Rear Transition Modules
» IPMI Management for Rear Transition Modules
» Cooling Unit for Rear Transition Modules
» Provisions for high-precision timing signals
» Systems and platforms «

Single Platforms

OM6120
The OM6120 is a compact AMC platform dedicated, but not limited to, industrial automation and medical applications. It supports any standard compliant AMCs and MCH. In comparison to conventional MicroTCA implementations, it achieves significant cost improvements by a simplified design, which does eliminate the need of MicroTCA Power Modules and uses standard PSU instead.

OM6080
» Up to 12 AMCs
» Dual pluggable Power Supplies AC
» Dual star incl. GbE, 10GbE, PCIe and SRIO acc. to SCOPE mapping
» Management options from basic MCH to fully featured MCH
» Dense platform

OM5080
» 2U 19" off the shelf platform for up to 8 AMCs
» Fault resilient design: no single point of failure
» Maximum space efficiency

OM6060
» Up to six AMCs
» Single Star for GbE fabric
» PCIe, SRIO and SATA point-to-point
» Entry level for industrial applications, image processing and packet processing

OM6040
» Up to four AMCs incl. AC power and fans
» Single star for GbE and PCIe/SRIO fabric
» Fully featured MCH
» SATA point-to-point
» Entry level system for MicroTCA development

OM6061/OM6063
» Flexible 1U platform for Central
» Cost-efficient MCH module and six AMC slots
Double Platforms

**OM6090D/7090D**
- Modular platform for high-end multi-core processor AMCs
- 19" rack mountable system (6U) with front-to-back cooling for best usage of shelf space
- Supports double-width, full-size AMCs for high power envelope up to 80W
- 10 GbE fabric with enterprise-class MCH

**OM6040D**
- Compact modular platform for high-end multi-core processor AMCs
- 4x Full-Size, Double-Width Slots for AMCs (max 80W) (e.g. AM5030)
- 10 GbE fabric with enterprise-class MCH

**OM6062**
- Cost Optimized for up to six AMCs
- Pluggable Power Supply AC
- Management and fan control on backplane
- Single star for GbE fabric
- PCIe point-to-point

Starter Kit
For AMC developers, MicroTCA management may represent an obstacle for AMC designs. The AMC developer’s package provides proven building blocks for MicroTCA management: a hardware building block, MMC management software and a reference implementation on AMC incl. debugging facilities. The management functions over IPMI on AMCs are contained in a functional entity named MMC (module management controller).

**OMVIU**
- MicroTCA Configuration Management Software
- Graphical User Interface for system configuration
- Icon based visualisation

» Base system: OM6060 chassis incl. 250 Watts AC Power, Multi-Purpose
» Backplane for six Mid-Size AMCs, AM4901 MCH with GbE Switch
» Intel® architecture options
» Power PC developer’s option
» Packet-processing option
» AMC Developer’s Package

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### Overview AMC «

#### Processor AMCs x86

<table>
<thead>
<tr>
<th>Model</th>
<th>AM4022</th>
<th>AM4020</th>
<th>AM4010/AM4011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form factor</td>
<td>Single, mid-size</td>
<td>Single, mid-size</td>
<td>Single, mid-size</td>
</tr>
<tr>
<td>CPU Support</td>
<td>Core™ 17 Gen3 up to Quad Core 2.1 GHz</td>
<td>Core™ 17 Gen1 up to Dual Core 2.53 GHz</td>
<td>Core2 Duo 1.5 GHz</td>
</tr>
<tr>
<td>Chipset</td>
<td>QM77, TPM, IPMI, RTC, WDT</td>
<td>QM57, TPM, IPMI, RTC, WDT</td>
<td>3100, IPMI, RTC, WDT</td>
</tr>
<tr>
<td>Memory</td>
<td>Dual DDR3 1600 MHz, up to 8GB soldered with ECC</td>
<td>Dual DDR3 1066 MHz, up to 8GB soldered with ECC</td>
<td>Single DDR2 400 MHz, up to 4GB soldered with ECC</td>
</tr>
<tr>
<td>Flash</td>
<td>SATA NAND Flash</td>
<td>SATA NAND Flash</td>
<td>USB NAND Flash</td>
</tr>
<tr>
<td>Graphic</td>
<td>Integrated in QM77</td>
<td>Integrated in QM57</td>
<td>-</td>
</tr>
<tr>
<td>Front I/O</td>
<td>USB / 2x GbE / COM or DisplayPort, 4x User LEDs</td>
<td>USB / 2x GbE / COM or DisplayPort, 4x User LEDs</td>
<td>USB / 1x GbE / COM, 4x User LEDs</td>
</tr>
<tr>
<td>HDD</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AMC GbE</td>
<td>2x GbE ports</td>
<td>2x GbE ports</td>
<td>2x GbE ports</td>
</tr>
<tr>
<td>AMC PCIe</td>
<td>x4 or 1 x8 Gen II/III</td>
<td>2x Gen I</td>
<td>2x Gen I</td>
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<tr>
<td>AMC SATA</td>
<td>2x SATA ports</td>
<td>2x SATA ports</td>
<td>2x SATA ports</td>
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<tr>
<td>AMC 10GbE</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AMC extended</td>
<td>COM / Debug / SATA, 3x USB, DP, GPIO</td>
<td>COM / Debug / 2x SATA, DP</td>
<td>COM / Debug</td>
</tr>
<tr>
<td>Max Power Consumption</td>
<td>2.10C: 44W, DP: 50W, 2.5 DC: 30W, DP: 41W</td>
<td>2.53 DC: 49W, 2.0 DC: 38W</td>
<td>1.5 DC: 36W</td>
</tr>
<tr>
<td>Idle Power Consumption</td>
<td>2.10C: 12W; DP: 12W, 2.5 DC: 12W</td>
<td>2.53 DC: 12W, 2.0 DC: 11W</td>
<td>1.5 DC: 22W</td>
</tr>
</tbody>
</table>

#### Processor AMCs x86

<table>
<thead>
<tr>
<th>Model</th>
<th>AM5030</th>
<th>AM5020</th>
<th>AM5010</th>
</tr>
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<tbody>
<tr>
<td>Form factor</td>
<td>Double, full-size</td>
<td>Double, mid-size</td>
<td>Double, mid-size</td>
</tr>
<tr>
<td>CPU Support</td>
<td>Xeon® up to Quad core 1.73 GHz</td>
<td>Core™ 17 Gen1 up to Dual Core 2.53 GHz</td>
<td>Core2 Duo 1.5 GHz</td>
</tr>
<tr>
<td>Chipset</td>
<td>3420, TPM, PMI; RTC; WDT</td>
<td>QM57, TPM, IPMI, RTC, WDT</td>
<td>3100, IPMI, RTC, WDT</td>
</tr>
<tr>
<td>Memory</td>
<td>Triple DDR3 1066 MHz, up to 24GB, 3x VLP DIMM modules</td>
<td>Dual DDR3 1066 MHz, up to 8GB soldered with ECC</td>
<td>Single DDR2 400 MHz, up to 4GB soldered with ECC</td>
</tr>
<tr>
<td>Flash</td>
<td>SATA NAND Flash</td>
<td>SATA NAND Flash</td>
<td>USB NAND Flash</td>
</tr>
<tr>
<td>Graphic</td>
<td>SM750</td>
<td>Integrated in QM57</td>
<td>-</td>
</tr>
<tr>
<td>Front I/O</td>
<td>2x USB, VGA, 2x GbE, COM, 4x User LEDs</td>
<td>2x GbE ports, 2x DVI, 2x GbE, COM, 4x User LEDs</td>
<td>-</td>
</tr>
<tr>
<td>HDD</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AMC GbE</td>
<td>2x GbE ports</td>
<td>2x GbE ports</td>
<td>2x GbE ports</td>
</tr>
<tr>
<td>AMC PCIe</td>
<td>1 x 4 x8 Gen I</td>
<td>2 x 4 or 8 x1 Gen I</td>
<td>1 x 4 Gen I</td>
</tr>
<tr>
<td>AMC SATA</td>
<td>2x SATA ports</td>
<td>2x SATA ports</td>
<td>4x SATA ports</td>
</tr>
<tr>
<td>AMC 10GbE</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AMC extended</td>
<td>COM / Debug / 2x SATA</td>
<td>COM / Debug / 2x SATA, DP</td>
<td>COM / Debug</td>
</tr>
<tr>
<td>Max Power Consumption</td>
<td>1.73 QC: 60W</td>
<td>2.53 DC: 49W, 2.0 DC: 38W</td>
<td>1.5 DC: 36W</td>
</tr>
<tr>
<td>Idle Power Consumption</td>
<td>1.73 QC: 33W</td>
<td>2.53 DC: 12W, 2.0 DC: 11W</td>
<td>1.5 DC: 22W</td>
</tr>
</tbody>
</table>
## Processor AMCs

### PowerPC

<table>
<thead>
<tr>
<th>AM4150</th>
<th>AM4140</th>
<th>AM4120</th>
<th>AM4100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form factor</strong></td>
<td>Single, mid-size</td>
<td>Single, mid-size</td>
<td>Single, full-size</td>
</tr>
<tr>
<td><strong>CPU Support</strong></td>
<td>Dual Core QorIQ P5020/64bit, 2.0 GHz</td>
<td>8 Core QorIQ P4040/P4080, 1.5 GHz</td>
<td>Dual Core Power PC MPC8641D, 1.5 GHz</td>
</tr>
<tr>
<td><strong>L2 cache</strong></td>
<td>Dedicated 512 kByte to each Core</td>
<td>2 MB shared L3 CoreNet platform cache</td>
<td>Dedicated 128 kByte to each Core</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Up to 8 GByte dual channel, soldered DDR3 1300 MHz with ECC</td>
<td>Up to 8 GByte dual channel, soldered DDR3 1300 MHz with ECC</td>
<td>Up to 4 GByte soldered DDR3 600 MHz with ECC</td>
</tr>
<tr>
<td><strong>Flash</strong></td>
<td>Up to 2 GByte NAND Flash with onboard controller for application code and data, miniSD card socket internally</td>
<td>Up to 2 GByte NAND Flash with onboard controller for application code and data, miniSD card socket internally</td>
<td>512 MByte/2GByte NAND Flash with onboard controller for application code and data</td>
</tr>
<tr>
<td><strong>Front I/O</strong></td>
<td>2x GbE, 1x COM (RJ45), 4 Control/Status LEDs (bi color)</td>
<td>2x GbE, 1x COM (RJ45), 4 Control/Status LEDs (bi color)</td>
<td>2x GbE, 1x COM (RJ45), 4 Control/Status LEDs (bi color)</td>
</tr>
<tr>
<td><strong>AMC Connectivity</strong></td>
<td>Port 0,1: 2x GbE (port 1 routable to front) Port 4-7: 1x PCIe x4 or 1x sRIO x4 Port 8-11: 1x PCIe x4 or 1x sRIO x4 or 3xGbE/SGMII Port 2: SATA Port 15: COM</td>
<td>Port 0,1: 2x GbE (port 1 routable to front) Port 4-7: 1x PCIe x4 or 1x sRIO x4 Port 8-11: 1x PCIe-x4 or 1x sRIO x4 or 4xGbE/SGMII Port 15: COM</td>
<td>Port 0,1: 2x GbE Port 4-7: 1x PCIe-x4 or 1x sRIO x4 Port 15: COM</td>
</tr>
<tr>
<td><strong>Characteristics</strong></td>
<td>High-end single-threaded performance, Control plane oriented</td>
<td>High-end parallelizable multi-threaded performance, Data plane oriented</td>
<td>-</td>
</tr>
<tr>
<td><strong>Max. Power</strong></td>
<td>2.0 DC: 29W</td>
<td>1.5 8-C: 28W</td>
<td>1.2 DC 13W</td>
</tr>
<tr>
<td><strong>Idle Power</strong></td>
<td>2.0 DC: 24W</td>
<td>1.5 8-C: 21W</td>
<td>1.2 DC 10W</td>
</tr>
</tbody>
</table>

**Note:**
- 8-C: 8-Channel configuration
- 13W: 13 Watt operational power

Robust Performance in 3U and 6U Configurations

The robust, modular and standardized CompactPCI® platforms perfectly meet today’s increasing requirements for robust and scaleable high-performance products. Available in both 3U and 6U form factors, this technology offers the latest and fastest Intel® Core™ processor technology for applications across all-market spaces. CompactPCI® provides solutions for high density integrated systems, excellent EMI shielding, optimized cooling, robust and highly available systems. Kontron integrates all these characteristics into a wide range of CompactPCI® products with advantageous features.

Benefits:

- Latest high-performance, low-power processor technology
- Robust and fully modular international standard
- Hot swap and management support with highly reliable connectors
- Scalable platforms for air- and conduction-cooled environments
- Rear I/O support option to allow fast replacements and upgrades

Applications

Communications

TETRA - Digital Trunk Radio over IP

TETRA infrastructure systems operate in arctic Siberian Yekaterinburg and in tropical Brazil. Digital trunk radio is designed for professional communication within organizations and businesses. TETRA, or Terrestrial Trunked Radio is rapidly becoming the technical standard for digital radio and it offers a few “specialties” which are of particular interest to public and commercial organizations. The responsible Product Managers said: “CompactPCI® is the only technology that can guarantee the quality and stability which will ensure fail-safe operation under the extreme climatic conditions which prevail in the tropics or on the frozen steppes of Russia. 6U CompactPCI® was chosen because of its robustness, the necessary performance and scalability.”

Defence

Sonar in submarines

Submarines today, are increasingly required to operate in shallow coastal waters, where the acoustic environment is complex and noisy. Their missions are also more varied, ranging from maritime surveillance in littoral waters to ISR, etc. This change in operating conditions calls for modular acoustic systems with very high levels of performance. Sonar suites that accommodate future capabilities are based on high-performance PICMG® 2.16 6U CompactPCI® systems. Equipped with up to 34 CompactPCI® CPU boards with the latest processor generation and up to two CompactPCI® switch boards these systems process the massive data provided by the acoustic sensors.

Transportation

Railway Control system

For Italy’s new high-speed/high-capacity railway network, Kontron developed two scalable CompactPCI® systems. These platforms include the central post unit for interlocking, alarm and reporting as well as the operator interface which is the key physical interface between the signaler and the central unit. For both systems, the customer was looking for an embedded hardware platform that not only offered high performance and reliability but also cost efficiency and scalability.

Industrial automation

Image processing

Sophisticated image processing systems are becoming an increasingly indispensable part of quality control on automated filling and packaging lines that require zero failure tolerance. The embedded computer technology used in the systems needs to offer price-optimized, highly reliable real-time performance in a rugged environment. To meet these demands, one of the world’s leading designers and suppliers of filling lines and control systems has developed a highly flexible image processing system based on 3U CompactPCI® CPU boards from Kontron.
CompactPCI® Performance Line

To meet the growing demand of computing power, Kontron always offers the latest technologies available in the market. The use of high-performance components from Intel®’s Embedded Roadmap ensures the longest product lifespan possible. Kontron’s 3U and 6U boards with Intel® Core™ processors deliver power-packed performance that guarantees a presence in both today’s and tomorrow’s markets. Furthermore, customers that have chosen these products, benefit from features such as a broad range of board versions, versions for the extended temperature range, rear I/O support, hot swap capability and system management via IPMI.

3U processor boards

- **CP3003-SA**
  - 3rd Generation Intel® Core™ 3U CompactPCI® CPU
  - Latest Intel® Core™ technology, quad- and dual-core processors
  - Up to 16GB DDR3 memory and 32GB SATA Flash
  - High-speed connectivity - USB3.0, SATA 6GB/s and PCI Express®
  - Operating as system master or peripheral board

- **CP3002**
  - High-End Intel® Core™ i7 CPU
  - Scalable performance - from Celeron® 1.07 GHz up to Core™ i7 2.53 GHz
  - Up to 8GB DDR3 memory and 32GB SATA Flash
  - Comprehensive I/O capabilities
  - Operating as system master or peripheral board

6U processor boards

- **CP6004-SA**
  - CompactPCI®/PICMG® 2.16 3rd Generation Intel® Core™
  - Processor based System/Peripheral CPU
  - 4HP, single slot processor board with passive cooling
  - Scalable dual and quad core processors up to 2.7 GHz
  - Up to 16GB DDR3 memory with ECC; up to 64GB SSD solutions

- **CP6003-SA**
  - CompactPCI®/PICMG® 2.16 2nd Generation Intel® Core™
  - Processor based System/Peripheral CPU
  - 4HP, single slot processor board with passive cooling
  - Scalable dual and quad core processors up to 2.5 GHz
  - Up to 16GB DDR3 memory with ECC; up to 64GB SSD solutions
Switches

**CP6930**
6U High-End CompactPCI® 10G PICMG® 2.16 / VITA 31.1 Switch

- Fully managed non-blocking Layer 2/3 switching and routing
- 24x GbE Ports, 6x 10 GbE SFP+, 2x 1 GbE SFP
- Forced air-cooled

**CP6923**
6U CompactPCI® GbE Switch, PICMG® 2.16 and VITA 31.1 compliant

- 24x Gigabit Ethernet Ports, optional 2x 10GbE
- Non-blocking layer 2 & 3 switching & routing
- Copper & optical interfaces, air- and conduction-cooled

**CP6930-RM**
High-End Rack Mount Switch

- Modular switch family, based on CP6930
- Up to 24x GbE Ports, 6x 10 GbE SFP+, 2x 1 GbE SFP
- Optionally redundant power supply, processor card slot for L4-7 switching

**CP3923**
16-Port Layer2/Layer3 3U CompactPCI® Switch

- Fully managed layer 2/3 switching and routing
- Leading edge technology based on BCM56226
- Versatile design with RJ45 or M12-D front options
» CompactPCI® Systems and Platforms «

Chassis

CP-ASM3, CP-ASM6
Ready Available Card Cages for 3U and 6U CompactPCI
- 19" racks with rear-I/O and fan options
- Industrial power supplies from 14 VDC to 260 VAC
- Backplanes with 2 to 8 slot segments
- EMI protected and CE compliant

CP-XL Series
1U, 2U, 3U, 4U CompactPCI® Racks with H.110 Options
- For robust and cost effective solutions
- Efficient side-to-side cooling
- 250 W redundant power supplies (loadsharing/hot swappable)

CP-ASM4-TT
3U CompactPCI® Table Top Rack
- Universal card cage for the labor desk
- Ready integrated with mounting feet, fans, AC supply
- 5 slot backplane with rear I/O option

CP-ASM10-PSB
PICMG® 2.16 Compliant 10U CompactPCI® System
- High power hot swap fans
- Optionally up to 6 redundant power supplies (1500 Watt)
- 14 node slots within two 7 slot CPCi segments
- 2 switch slots for Gigabit Ethernet Switches

I/O & Controller Boards

CP384
Digital-In/Relay Out Controller
- 16 channels digital in, 8 channels Relay out

CP383
Digital-In/Out Controller
- 16 channels digital in, 16 channels digital out

CP372
Analog-Out Controller
- 8 channels, 12-bit analog out

CP346
4-channel serial controller
- RS232, RS422 and RS485 modes, each channel individually configurable
Application-Ready Platforms

Hardware Platform for solution providers
By use of the BASE platform and respective mounting options, with INTERPARLO/OBSERVO, the OEM has a readily equipped hardware platform to immediately start application development. A ready-to-run sample image for Linux or Windows, and respective “getting-started” documentation, makes development comfortable from the very first.

OBSERVO
The rugged data server platform is ideally suited for recording of radar, sonar, or video data in harsh environments, where high volume mass storage and data integrity is requested. The 19" 3U system platform is equipped with a high performance RAID controller module. Numerous data scalability and recovery functions are supported by the RAID levels 0,1,5,0+1,50 or JBOD (just a bunch of disks). Furthermore, a hot spare disk can be provided, for automated use during runtime in case necessary. The unique feature: OBSERVO enables automated maintenance for long term missions. Several kind of powerful utilities handle events of disk defects during runtime and take care that the storage of data can proceed in a safe way. Additional utilities make the disk status transparent, for optimized maintenance planning. Platform variants of eight and of four disks are available, with a CPU blade out of Kontron’s rich portfolio, leaving free slots for custom options. A power management module option enables power up or shut down via LAN, and monitoring of operating temperatures.

INTERPARLO
The modular hardware platform for Internet On Train is ideally suited for passenger infotainment services and any application where wireless communication is needed.

The benefits:
» “All in one”: all hardware functions for Passenger Infotainment and WiFi connection in only one rack
» Open for today’s wireless communication options
» Flexible for project adaptations
» Enhanced lifetime program
» Future updates of CPU or any hardware function
» Open to incorporate future networking standards
» Local support and project management worldwide
» Minimized total cost of ownership

The 19" platform is equipped with an EN50155 wide range DC power supply. Options for the main controller board like Intel® Core™ i7 Dual-Core 1.7 GHz ULV, Intel® Celeron® 807UE 1.0 GHz, Intel® Celeron®M 1.06 GHz, or Intel® Atom 1.6 GHz provide maximum performance at minimum power consumption. The system can be provided with conformal coating as option, for EN50155 compliancy and final deployment in trains.
Kontron is constantly evolving its line of reliable and powerful rugged CompactPCI® boards to ensure our customers can develop leading edge applications that work under extreme temperatures and high levels of physical stress. From communication systems on the ground to in-flight systems, the highest requirements must be met without compromise. Examples of other applications include defense flight combat simulators, on-board vehicle systems, shelter applications and in-flight entertainment. Kontron’s rugged, forced air- or conduction-cooled, processor boards and switches are a perfect combination for applications that demand the highest levels of performance and ruggedization.

Processor boards and Switches

**CP6004-RA/RC**
Rugged Air-/Conduction-cooled Core™ i7 3rd Generation
» CompactPCI®/PICMG® 2.16 System / Peripheral CPU with versatile IO
» Scalable processor speed, Intel® Core™ i7 dual and quad core, up to 2.5 GHz
» Up to 16GB DDR3 soldered memory
» SSD and Coating option

**CP6003-RA/RC**
Rugged Air-/Conduction-cooled Core™ i7 2nd Generation
» CompactPCI®/PICMG® 2.16 System / Peripheral CPU with versatile IO
» Intel® Core™ i7 dual and quad core, up to 2.2 GHz
» Up to 16GB DDR3 soldered memory
» SSD and Coating option

**CP3002-RA/RC**
Rugged Air-/Conduction-cooled Core™ i7 CPU
» High performance based on Core i7-620LE 2.0 GHz
» Up to 8GB soldered DDR3 memory and 32GB SATA Flash
» VITA 47 compliant
» Comprehensive I/O capabilities - Ethernet, USB, SATA, serial ports ...

**CP6923-R2/R3**
High-End CompactPCI® Switch
» PICMG® 2.16 Layer 2/3 switching and routing
» 24x Gigabit Ethernet Ports
» Air - and conduction-cooled, VITA 47 compliant

**CP3923-RC**
Rugged Conduction-cooled 8-Port Switch
» Fully managed layer 2 and layer 3 switching and routing
» Leading edge technology based on Broadcom BCM56226
» VITA 47 compliant

**ApexCP**
Multi-Mission Rugged Computer Platform
» Pre-qualified Solution based on COTS Building Blocks
» Flexible design for easy customization
» 5-slot 3U CompactPCI® system
» Small form factor based ATR chassis
» Conduction-cooled with blow-through sidewalls
» Environmentally Sealed Enclosure
» CompactPCI® Value Line «

Cost sensitivity plays a major role in industrial applications. To meet this market demand and protect future investments, in addition to the customer’s technical requirements, Kontron develops 3U CompactPCI® and 6U CompactPCI® value line products. These products come with high product availability and competitive pricing for applications in all industrial sectors. Complete systems such as the CP-POCKET line provide a cost-optimized solution for CompactPCI®.

**CP3003-V**
3U CompactPCI® Intel® Celeron® Value Line CPU
- Optimized price-performance ratio - based on Celeron® 807UE CPU and QM77 PCH
- Up to 4GB 1333 MHz DDR3
- 3x Gigabit Ethernet with WOL support
- SATA 6Gb/s and USB3.0 support

**CP6925**
16 Port 6U CompactPCI® unmanaged Gigabit Ethernet Switch
- Cost optimized unmanaged solution- 14x Port Gigabit to Rear + 2x Port Gigabit to Front
- Auto-negotiation
- Three speed operations: 10/100/1000 Mbit/s
- Compliant to PICMG® 2.16

**CP6002-V**
CompactPCI® PICMG® 2.16 Intel® Celeron®
- Celeron® P4505, 1.86GHz based
- 4 GByte soldered DDR3 memory
- Single slot 4HP CPU with passive cooling
- Hard disk and SSD options

**CP-POCKET**
For demands beyond a Box PC
- Open, modular, robust, long-lasting
- Cost optimized 28HP platform
- Flexible system expansion
- Celeron® 807UE, Celeron® M or Atom™ CPU blade

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### Overview 3U CompactPCI®

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<th>3U CompactPCI®</th>
<th>CP3003-SA</th>
<th>CP3002-RA/RC</th>
<th>CP3002-SA</th>
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<tbody>
<tr>
<td><strong>CPU Support</strong></td>
<td>3rd Gen Core™ i7 up to 2.1 GHz QC, 6MB L3</td>
<td>Core™ i7 Gen1 2.0 GHz 4MB L3</td>
<td>Core™ i7 Gen1 up to 2.53 GHz, 4MB L3</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Up to 16GB DDR3 1600 MHz SODIMM with ECC</td>
<td>Up to 8GB DDR3 1066 MHz soldered with ECC</td>
<td>Up to 8GB DDR3 1066 MHz SODIMM with ECC</td>
</tr>
<tr>
<td><strong>Flash</strong></td>
<td>SATA NAND Flash, CFAST(8HP)</td>
<td>SATA NAND Flash</td>
<td>SATA NAND Flash, CFAST(8HP)</td>
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<tr>
<td><strong>Chipset</strong></td>
<td>QM77, TPM, RTC, WDT</td>
<td>QM57, TPM, RTC, WDT</td>
<td>QM57, TPM, RTC, WDT</td>
</tr>
<tr>
<td><strong>HDD</strong></td>
<td>6x SATA (incl. 2x SATA 6Gb/s) w. RAID, 1x Flash, 1x onboard, 2x rear, 2x for 8HP mezzanine</td>
<td>3x SATA 3Gb/s w. RAID, incl. 1x SATA Flash, 2x rear</td>
<td>6x SATA 3Gb/s w. RAID, incl. 1x Flash, 1x onboard, 2x rear, 2x for 8HP mezzanine</td>
</tr>
<tr>
<td><strong>Front panel I/O (8HP)</strong></td>
<td>VGA, 2x USB2.0, 2x GbE, 2x DP, 2x USB3.0, COM, Reset, 2x GbE, alternative XMC carrier mezzanine</td>
<td>n/a</td>
<td>VGA, 2x USB2.0, 2x GbE, DVI-D, 2x USB2.0, COM, Reset</td>
</tr>
<tr>
<td><strong>Rear I/O</strong></td>
<td>VGA, 2x USB2.0, 2x COM, 2x GbE, 6x SATA 3Gb/s, 8x GbE, Power ctrl, Write protection optional</td>
<td>VGA, 2x USB2.0, 2x COM, 4x GbE, 2x SATA 3Gb/s, 8x GbE, Battery input</td>
<td>VGA, 2x USB2.0, 2x COM, 6x GbE, 2x SATA 3Gb/s, 8x GbE, Power ctrl</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>QM77, 3x independent graphics outputs</td>
<td>QM57 (up to 352MB dynamic)</td>
<td>QM57 (up to 352MB dynamic)</td>
</tr>
<tr>
<td><strong>Ethernet</strong></td>
<td>3x GbE, Wl. support</td>
<td>4x GbE, basic Wol support (w/o power off)</td>
<td>2x GbE, Wol support</td>
</tr>
<tr>
<td><strong>cPCI Interface</strong></td>
<td>32b/33 MHz, System and Peripheral board, 66 MHz on request</td>
<td>32b/66 MHz System</td>
<td>32b/33 MHz, System and Peripheral board</td>
</tr>
<tr>
<td><strong>Power (typ)</strong></td>
<td>29W @ 2.1 GHz</td>
<td>31W @ 2.0 GHz</td>
<td>28W @ 2.0 GHz</td>
</tr>
<tr>
<td><strong>Ruggedization (VITA47 class)</strong></td>
<td>Air-cooled -40°C to +85°C (EAC3)</td>
<td>Cond.-cooled (ECC4) Air-cooled (EAC6)</td>
<td>Air-cooled -40°C to +70°C (EAC3)</td>
</tr>
</tbody>
</table>

### 3U CompactPCI®

<table>
<thead>
<tr>
<th>3U CompactPCI®</th>
<th>CP308</th>
<th>CP305</th>
<th>CP3003-V (8HP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Support</strong></td>
<td>Core™ 2 Duo up to 2.66 GHz, 6MB L2</td>
<td>Atom™ N270 1.6 GHz, 512KB L2</td>
<td>Celeron® Single Core 1.0GHz, 1MB</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Up to 8GB DDR3 1066 MHz SODIMM, no ECC</td>
<td>Up to 2GB 533 MHz DDR2 soldered, no ECC</td>
<td>Up to 4GB DDR3 1333 MHz SODIMM with ECC</td>
</tr>
<tr>
<td><strong>Flash</strong></td>
<td>USB Flash, CompactFlash (8HP)</td>
<td>CF Type II</td>
<td>CFAST</td>
</tr>
<tr>
<td><strong>Chipset</strong></td>
<td>GS45 &amp; ICH9HM, IPMI, ITPM, RTC, WDT</td>
<td>945GSE &amp; ICH7-M, RTC, WDT</td>
<td>QM77, RTC, WDT</td>
</tr>
<tr>
<td><strong>HDD</strong></td>
<td>4x SATA 3Gb/s w. RAID, incl. 2x onboard &amp; 2x on 8HP mezzanine or rear I/O</td>
<td>2x SATA ports, 1x onboard and 1x mezzanine or both rear I/O</td>
<td>3x SATA (incl. 2x SATA 6Gb/s), 1x CFAST, 2x onboard</td>
</tr>
<tr>
<td><strong>Front panel I/O (8HP)</strong></td>
<td>VGA, 2x USB2.0, 2x GbE, DVI-D, 2x USB2.0, COM, PS/2, Reset, alternative Media mezzanine</td>
<td>VGA, 2x USB2.0, 2x GbE, DVI-D, 2x USB2.0, COM, PS/2, Reset</td>
<td>VGA, 2x USB2.0, 2x GbE, DVI-D, 2x USB3.0, COM, Reset, 1x GbE</td>
</tr>
<tr>
<td><strong>Rear I/O</strong></td>
<td>VGA, 2x USB2.0, 2x COM, 2x GbE, 2x SATA 3Gb/s, Fan in, Power ctrl out</td>
<td>VGA, 2x USB2.0, 2x COM, 6x GbE, 2x SATA 3Gb/s, Fan in, Power ctrl out</td>
<td>none</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>GS45 (up to 352MB dynamic)</td>
<td>945GSE (up to 256MB dynamic)</td>
<td>QM77, 2x independ. graphics outputs</td>
</tr>
<tr>
<td><strong>Ethernet</strong></td>
<td>2x GbE, Wl. support</td>
<td>2x GbE</td>
<td>3x GbE, Wol support</td>
</tr>
<tr>
<td><strong>cPCI Interface</strong></td>
<td>32b/33 MHz, System and Peripheral board</td>
<td>32b/33 MHz System</td>
<td>32b/33 MHz, System and Peripheral board</td>
</tr>
<tr>
<td><strong>Power (typ)</strong></td>
<td>18W @ 1.86 GHz</td>
<td>10W @ 1.6 GHz</td>
<td>TBD</td>
</tr>
<tr>
<td><strong>Ruggedization (VITA47 class)</strong></td>
<td>Air-cooled -40°C to +85°C</td>
<td>Air-cooled -40°C to +80°C, 0°C to +55°C fanless</td>
<td>Air-cooled 0°C to +60°C</td>
</tr>
</tbody>
</table>

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### 6U CompactPCI®

#### CPU Support
- **CP6004-SA**: Core™ i7 Gen3 up to Quad Core 2.3 GHz
- **CP6004-RA/RC**: Core™ i7 Gen3 up to Quad Core 2.1 GHz
- **CP6003-SA**: Core™ i7 Gen2 up to Quad Core 2.1 GHz

#### Memory
- **CP6004-SA**: Up to 16GB DDR3, 2x 1600 MHz SDDMM with ECC
- **CP6004-RA/RC**: Up to 16GB DDR3, 2x 1600 MHz SDDMM with ECC
- **CP6003-SA**: Up to 16GB DDR3, 2x 1600 MHz SDDMM with ECC

#### Flash
- **CP6004-SA**: SATA NAND Flash
- **CP6004-RA/RC**: SATA NAND Flash
- **CP6003-SA**: SATA NAND Flash

#### Chipset
- **CP6004-SA**: QM77, TPM, IPMI, RTC, WDT
- **CP6004-RA/RC**: QM77, TPM, IPMI, RTC, WDT
- **CP6003-SA**: QM77, TPM, IPMI, RTC, WDT

#### HDD
- **CP6004-SA**: 2x SATA 6Gb/s, 4x SATA 3Gb/s incl. RAID, SSD option, 4x rear
- **CP6004-RA/RC**: 2x SATA 6Gb/s, 4x SATA 3Gb/s incl. RAID, SSD option, 4x rear
- **CP6003-SA**: 2x SATA 6Gb/s, 4x SATA 3Gb/s incl. RAID, SSD option, 4x rear

#### Front panel I/O
- **CP6004-SA**: VGA, 2x USB2.0, COM, 3x GbE, PMC/XMC, Reset
- **CP6004-RA/RC**: VGA, 2x USB2.0, COM, 3x GbE, PMC/XMC, Reset
- **CP6003-SA**: VGA, 2x USB2.0, COM, 3x GbE, PMC/XMC, Reset

#### Rear I/O
- **CP6004-SA**: 2x DVI/HDMI, VGA, 4x USB2.0, 2x COM, 2x GbE, 4x SATA, Spkr, HDA, 2x GP10, Reset, PMC/XMC
- **CP6004-RA/RC**: 2x DVI/HDMI, VGA, 4x USB2.0, 2x COM, up to 5x GbE, 4x SATA, Spkr, HDA, 4x GP10, Reset, PMC/XMC
- **CP6003-SA**: 2x DVI/HDMI, VGA, 4x USB2.0, 2x COM, 2x GbE, 4x SATA, Spkr, HDA, 2x GP10, Reset, PMC/XMC

#### Graphics
- **CP6004-SA**: QM77 with 3x independent channels
- **CP6004-RA/RC**: QM77 with dual channels
- **CP6003-SA**: QM77 with dual channels

#### Ethernet
- **CP6004-SA**: 5x GbE
- **CP6004-RA/RC**: 5x GbE
- **CP6003-SA**: 5x GbE

#### Mezzanine
- **CP6004-SA**: PMC (64b/66MHz) or XMC (x8)
- **CP6004-RA/RC**: PMC (64b/66MHz) or XMC (x8)
- **CP6003-SA**: PMC (64b/66MHz) or XMC (x8)

#### Power (typ)
- **CP6004-SA**: 60W Quad Core (max.) 40W Dual Core
- **CP6004-RA/RC**: 50W Quad Core (max.) 40W LV Dual Core
- **CP6003-SA**: 60W Quad Core (max.) 40W LV Dual Core

#### Ruggedization (VITA47 class)
- **CP6004-SA**: Air-cooled 0°C to +60°C ext. -40°C to +70°C
- **CP6004-RA/RC**: Air-cooled 0°C to +60°C ext. -40°C to +70°C
- **CP6003-SA**: Air-cooled 0°C to +60°C ext. -40°C to +70°C

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### 6U CompactPCI®

#### CPU Support
- **CP6003-RA/RC**: Core™ i7 Gen2 up to Quad Core 2.1 GHz
- **CP6002**: Core™ i7 Gen1 up to 2.53 GHz
- **CP6016**: 45nm Core 2 Duo 2.53 GHz, 6MB L2

#### Memory
- **CP6003-RA/RC**: Up to 16GB DDR3, 2x 1333 MHz soldered with ECC
- **CP6002**: Up to 8GB DDR3 1066 MHz soldered with ECC
- **CP6016**: Up to 16GB 2x DDR2 667 MHz ECC SODIMM

#### Flash
- **CP6003-RA/RC**: SATA NAND Flash CF Type II
- **CP6002**: SATA NAND Flash CF Type II
- **CP6016**: USB Flash

#### Chipset
- **CP6003-RA/RC**: QM57, TPM, IPMI, RTC, WDT
- **CP6002**: 5100 & ICH9R TPM, IPMI, RTC, WDT
- **CP6016**: 5100 & ICH9R TPM, IPMI, RTC, WDT

#### HDD
- **CP6003-RA/RC**: 4x SATA 3Gb/s incl. RAID, SSD option, 4x rear
- **CP6002**: 6x SATA 3Gb/s incl. RAID, SSD / HDD Option, 4x rear
- **CP6016**: 6x SATA 3Gb/s incl. 1 onboard conn. +HDD, 4x rear

#### Front panel I/O
- **CP6003-RA/RC**: VGA, 2x USB2.0, COM, 2x GbE, up to 2x PMC/XMC
- **CP6002**: VGA, 2x USB2.0, COM, 3x GbE, PMC/XMC, Reset
- **CP6016**: VGA, 4x USB2.0, COM, 3x GbE, PMC/XMC, Reset

#### Rear I/O
- **CP6003-RA/RC**: VGA, 4x USB2.0, 2x COM, 2x GbE, 4x SATA, Audio, PS/2 mouse, PS/2 KB, PMC/XMC
- **CP6002**: ATI ES1000 (64MB, dedicated PCI)
- **CP6016**: BMI1388 (64MB, dedicated PCI)

#### Graphics
- **CP6003-RA/RC**: QM57
- **CP6002**: ATI ES1000 (64MB, dedicated PCI)
- **CP6016**: ATI ES1000 (64MB, dedicated PCI)

#### Ethernet
- **CP6003-RA/RC**: RC: 4x 1Gbps; RA: 5x GbE
- **CP6002**: 4x GbE
- **CP6016**: 5x GbE

#### Mezzanine
- **CP6003-RA/RC**: 2x PMC (64b/100MHz) or XMC (x8)
- **CP6002**: 2x PMC (64b/100MHz) or XMC (x8)
- **CP6016**: 5x GbE

#### Power (typ)
- **CP6003-RA/RC**: 52W @ 2.53GHz
- **CP6002**: 50W @ 2.53GHz
- **CP6016**: 45W @ 2.3GHz

#### Ruggedization
- **CP6003-RA/RC**: Air-cooled 0°C to +60°C ext. -40°C to +70°C
- **CP6002**: Air-cooled 0°C to +60°C ext. -40°C to +70°C
- **CP6016**: Air-cooled 0°C to +60°C ext. -40°C to +70°C

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As computer chipset technologies progressed, the parallel PCI bus was replaced by faster serial point-to-point connections, for example SATA/SAS, USB, Ethernet and PCI Express®. All of these interfaces today coexist in a modern computer and are available directly on the chipset. This move from dedicated peripheral components to a complex chipset with dedicated interfaces changed the structure of a computer from a bus-based system to one with a star topology with serial communication. As SATA, USB or Ethernet use their own communication line, users benefit from higher data rates without the bandwidth losses that can occur with a parallel PCI protocol.

High-end embedded applications require extremely high levels of performance. These applications, which can be found in various industries, are a driving force when it comes to the development of high-end embedded computer technologies. With the “High-Speed CompactPCI®” initiative, Kontron now brings the fast serial interconnects to CompactPCI®. For 3U the solution is CompactPCI® Serial, for 6U it’s PICMG® 2.20 based.

History, status and future of the CompactPCI® technology

Today the difference between CompactPCI® and CompactPCI® Serial bandwidths has increased significantly compared to the first specification.
PICMG® 2.20 based

10 Gigabit Ethernet, PCI Express® 3.0, SATA 6Gb/s
The two basic features of PICMG® 2.20 define everything to provide fast serial connections via backplane: A high speed connector at J4, and the signalling which can be used to define the new interconnects. Kontron selected the multivendor ZD plus connector for enhanced signal integrity, which is compatible to the PICMG® 2.20 specification, but improves the shielding of the original ZD connector. This PICMG® 2.20 based technology is widely backward compatible to popular previous PICMG® specifications.

With the combination of the PICMG® 2.20 based CP6004X-SA and the CP-RAPID3, for the first time, a CompactPCI® system supports 10 Gigabit Ethernet and PCIe over backplane.

Multi-CPU and GPGPU: Platform designs for highest computing power
CP-RAPID3 is the perfect basis to gain a computing platform with extremely high performance. Up to three slots can be populated with powerful CPU blades – say – with three CP6004X Quad Core™ i7 3rd generation 2.3 GHz. Alternatively, for science, or video applications, CP-RAPID3 can be equipped with a market-available GPGPU on an MXM carrier, placed as a 8 HP device into the bottom slot, leaving both upper system slots free for high performance CPU blades.

The result: a formidable computing power packed in only 3U height.

CP6004X-SA
PICMG® 2.20 based Processor board
» Quad-core Intel® Core™ i7-3615QE (2.3GHz)
» Up to 16GB DDR3 memory with ECC via two SODIMM sockets
» 2x 10GB Ethernet, PCIe Gen2 x4, 4x SATA 3Gb/s, SW-RAID
» XMC slot, onboard SATA 6Gb/s for HDD/SSD

CP-RAPID3
PICMG® 2.20 based System
» Ready for 10 GbE, PCIe, SATA 6GB/s on backplane
» 3U high, 4 horizontal 6U CompactPCI® slots
» Redundant power supplies
» Silent cooling front to rear
CompactPCI® Serial

CompactPCI® Serial is the new vendor-independent and market-independent multipurpose platform for bandwidth-hungry applications. CompactPCI® Serial describes a new base standard that is the logical enhancement of the very successful and worldwide-accepted CompactPCI® specifications. It enables a new generation of high-performance installations requiring massive bandwidth and also provides a way to boost performance of any existing CompactPCI® deployments in a wide range of industries.

Benefits:

» Latest interface technologies - PCI Express® 3.0, Ethernet, USB 3.0, SATA 6Gb/s
» Multi-CPU implementations for multiprocessing
» PCIe over backplane for high-end graphics and visualization
» Protects CompactPCI® system know-how
» Migration path saves investment into classic CompactPCI®

From classic CompactPCI® to CompactPCI® Serial - the easy way

Migration path options to CompactPCI® Serial

Migrating from CompactPCI® to CompactPCI® Serial is easy: engineers can simply use two backplanes, one which carries classic CompactPCI® boards and the other CompactPCI® Serial boards. The only additional building block engineers need for this is a PCIe-to-PCI bridge from CompactPCI® Serial to CompactPCI® as an optional feature (variant) of the processor board’s I/O extension card. The PCIe-to-PCI bridge realizes a classic CompactPCI® interface and routes all signals via the J1 and J2 connectors to the CompactPCI® backplane of the system.

This makes it possible to control several (for example four) 32-bit/66MHz classic CompactPCI® peripheral boards in one fully-redged CompactPCI® Serial system. With all the mechanics remaining compatible with IEEE 1101, engineers can choose this flexible layout option as a very convenient migration path to serial system designs. And moreover, CompactPCI® Serial becomes even more flexible thanks to the wealth of options that the rear I/O support has to offer.
CompactPCI® Serial Platforms

Kontron's portfolio offer for CompactPCI® Serial system infrastructure is the perfect basis for nearly any modular robust system solution which needs high signal density and high transmission frequency throughout the system. PCI Express®, SATA, Ethernet, and USB are supported. CompactPCI® Serial is the natural upgrade of the classic CompactPCI® and mechanically compliant. With Kontron's "Hybrid" platforms, even classic periphery can be easily re-used.

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CPS3101
3U CPCI-S.0 Carrier for 2.5” SATA HDD/SSD
» SATA 6 Gb/s and USB 3.0 compliant
» LEDs for status indication
» Hot swap support
» Rugged design, optionally with P6 for improved mechanical stability
» Version for extended temp. range E2 (-40°C up to +85°C)

CPS3105
3U CPCI-S.0 XMC Carrier
» Cost-effective carrier board for a wide range of applications
» XMCs up to x8 PCI Express® 2.1 supported
» Service-friendly design - hot swap capability and power LED

CPS-ASM4
3U CPCI-S.0 System Platform Family
» Rich portfolio of 3U/4U card cages
» Backplanes 9SI and 5SL, RIO option
» Direct, simple migration path by Hybrid systems
» Rear-I/O option for all slots
» Concept consultancy and system integration

Hybrid - Option

Simple bridge to classic CompactPCI® slots for market-available I/Os
» Investment protection for custom I/O
» Access to wide range of market available I/O, fieldbus, e.g.
Long term open system architecture

The VME bus is one of the most commonly used computer architectures in critical embedded applications for which robustness and long term supply are key selection criteria. VME Technology adheres to the open system architecture definition of real-time, modular embedded computing systems. Intensive development and field deployed systems have proven out the concept of VMEbus. The developers within the VMEbus community are committed to technology excellence through evolutionary changes. For more than 25 years, customers have enjoyed unequalled flexibility and VME's vast ecosystem.

Applications

Industrial automation

Safety system in nuclear power station

Safety systems in nuclear power stations require proven, reliable technology that provides the highest level of system availability. The safety shutdown systems must have the highest standards of manufacturing, reliability and safety comparable with those used in aeronautics, military applications and the medical sector. The systems must be based on proven technology and pass rigorous seismic, EMC, temperature, shock, vibration and lifetime tests. That is why Kontron’s customer decided to implement a safety system based on the long established VME technology. The system is working faultlessly in power stations around the world.

Transportation

Driverless automated trains

Kontron produces ultra low power-dissipating 6U VME Single Board Computers (SBCs) for the driverless automated trains that connect air terminals in many airports around the world. Dissipating less than 7 Watts, this SBC, the VCE405 can be used in fanless natural convection environments. For automated train applications, the commercially available VCE405 has been enhanced with an application dedicated features, including a front panel display and a ‘VITAL’ processor reliability feature. Kontron’s design team has integrated these enhancement features into the COTS product as a manufacturing build option for the full benefit of the customer. This COTS-Modified, custom COTS product marries the low cost advantage of COTS products with the advantages of COTS products shipped in volume, namely short lead time, low recurrent costs, best manufacturing quality and permanent obsolescence monitoring, providing the perfect fit to the application needs through the tailoring of the product.

Defense

Mobile Radar System

Mobile Radar Systems are crucial to the artillery radar team to quickly locate enemy long-range artillery and rocket launcher positions. The system technology features include high-speed computing, automatic target recognition, computer-based decision aids and high-speed networks. Kontron’s 6U VME PowerPC boards are part of major Mobile Radar Systems programs. While being available in rugged conduction-cooled for the harshest environments and providing very high Digital Signal Processing performance, the Kontron’s 6U VME Computing Nodes computers are the right choice for this sort of applications.

» Flexible, open-ended bus system using the Eurocard Standard
» Stable platform and long life cycle
» Vast VME ecosystem
» Pinout compatibilities across silicon families
6U Processor Boards

\textbf{x86 Processor Boards}

\textbf{VM6050}

\textit{High Performance Intel® Core™ i7}

- Outstanding performance in VME format with SSE 4.2 CPU instruction set
- Exceptional I/O versatility
- Commercial and Rugged versions
- Extended Life Cycle with adapted long term supply program

\textbf{PENTX2M - PENTX4M}

\textit{Single/Twin Dual Core Intel® Xeon® Processor ULV}

- I/O Versatility with XMC and PMC Slots, PMC Carrier
- Linux 2.6, VxWorks, LynxOS, Windows and QNX Neutrino Support
- Air-Cooled and Conduction-Cooled
- Same architecture available with Core i7 CPU (VM6050)

\textbf{PowerPC}

\textbf{VM6250}

\textit{Single or Dual Core MPC864x with AltiVec}

- Extreme flexibility via XMC, PMC and FMC sites & (opt.) PMC carrier
- Air-Cooled VITA 47-Class AC1 (0°C to 55°C); Conduction-Cooled VITA47-Class CC4 (-40°C to +85°C)

\textbf{Power Node 3+}

\textit{Single or Dual PowerPC 7448 with AltiVec}

- High-end computing node for real-time data and signal processing applications
- VME 2essT capability
- Air-Cooled VITA 47-Class AC1 (0°C to 55°C); Conduction-Cooled VITA47-Class CC4 (-40°C to +85°C)
3U Processor Boards

VMP3
High-End PowerPC Computing Module
» Freescale PowerPC MPC8541 at 660/800 MHz
» 256 Mbyte DDR-SDRAM, 16 Mbyte Flash, 1 Mbyte SDRAM
» Dual Gigabit Ethernet, 1 Fast Ethernet

VMP2
VME PowerPC Computing Module
» Freescale PowerPC MPC8245 at 330 MHz
» 2 serial interfaces
» PCI Expansion connector

VMP1
VME PowerPC Computing Module
» Freescale MPC8240 PowerPC at 250 MHz
» 2 serial interfaces
» PCI Expansion connector

» Overview VME «
New standard in high bandwidth connectivity

VPX is improving the widespread open standards of the embedded world’s most successful standard for open COTS applications - VMEbus - in terms of performance as well as electrical and mechanical ruggedization. With the ratification of OpenVPX™ for multivendor, multi-module, integrated system environments by the VITA Standards Organization, VPX hits the ground running for a broad range of new applications. VPX products are the right solution for application areas typified by space and weight constraints, harsh environments including conduction-cooled environments and highest datbandwidth via the backplane.

VPX benefits:
» Borrowing from 25 years of VME experience VPX systems withstand hardest shock and vibrations constraints
» Designed to allow high frequency signals VPX backplanes support 10 Gigabit Ethernet, PCIe fabric, SATA
» Leveraging the highest computing density of today silicon 3U VPX is the ideal candidate for the next 25 years of Rugged Embedded Modular Computing

Kontron building blocks are ready to create efficient and economical VPX transportation platforms.

Defence
Unmanned systems
VPX is delivering higher performance and lower SWaP solutions for unmanned systems. UAV range, altitude, and form factor requirements demand more performance per watt from embedded computing platforms, and Kontron’s VPX offerings directly address these challenges with compelling solutions. With the role of UAVs constantly expanding, and their payloads becoming increasingly sophisticated, Kontron is able to leverage its extensive industry experience and technology leadership to deliver rugged VPX solutions.

Airborne Radar
Airborne radar application constantly demand more performance with lower size, weight and power (SWaP). Airborne systems also require embedded hardware to meet extended temperature and shock environments. Kontron continually advances rugged PowerPC and Intel® architecture single board computer technology to meet these demanding applications.

Kontron Smart Technologies
VXFabric™
TCP/IP on PCIe solution
» 10GETH type bandwidth without the extra HW
» Available on VPX boards
» Operates within standard Linux TCP/IP Stack
» No change to existing application code

VXControl™
Embedded Computer Health Management solution
» System Management Bus based (i2c)
» CMB (chassis management board) out of band management
» PBIT integration at the system level

Evaluation Platforms for VME and VPX
» Plug and Play, no Hardware Knowledge needed
» Ideal for VME and VPX Evaluation and Software Development
» Air-Cooled Laboratory Environment
» Pre-Installed Linux or VX Works

Chassis Management Board
» Temperature, Fans and PSU
» Alarm through LEDs, and SNMP Traps
» Serial line and TCP/IP interface
» Remote Management through Serial Line, Telnet, HTTP and SNMP

ApexVX
Multi-Mission Rugged Computer System
» Pre-qualified Solution based on COTS Building Blocks
» Flexible Design for Easy Customization
» 5-slot 3U VPX Computer System
» Environmentally Sealed Enclosure
» Support for Kontron VXFabrics™ and VXControl™ Smart Technology

Modular + Pre-Validated + COTS-Based = Time Saving + Cost Saving + Technical Risk Saving

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» VPX products and solutions «

6U Processor Boards

VX6060
Dual Intel® Core™ i7 Computing Node
» Four Cores with Hyperthreading (8 threads total) from 1.67 GHz to 2+ GHz
» Up to 8 GByte on a 4 Channel DDR3-1066 ECC SDRAM
» Six Gigabit Ethernet Links with onboard Switch
» Rugged Conduction-Cooled Version under 100 W Power

VX6080 (3rd Generation)
Intel® Core™ i7 Computing Node
» Eight Cores in 2 processors Intel® Core™ i7 3rd Generation cores Ivy Bridge
» One XMC site with front and rear I/O support
» Multiple Ethernet 10 GBASE-KR/1000BASE-T/1000BASE-BX Connectivity
» Up to 16 GB SDRAM 1600 MHz with ECC per Cpu
» Intel® HD Graphics 4000
» PCI Express® Gen 3.0, with Kontron VXFabric™

3U PowerPC Processor

VX3230
Ultra Low Power 3U VPX Single Board Computer
» 1 GHz Freescale MPC8544 PowerPC Processor
» PCIe (4x), SATA, Gigabit Ethernet on the VPX Backplane
» Air-Cooled and Rugged Conduction-Cooled Builds

VX3240
General Purpose 3U VPX SBC
» 1.2 GHz Freescale QorIQ™ P2041 Processor, Soldered DDR3 SDRAM
» PCIe (4x), SATA, Gigabit Ethernet on the VPX Backplane
» Support for PMC or XMC Mezzanines
» Standard Air- and Rugged Conduction-Cooled Versions
3U Intel® Processor

VX3030  
Intel® Core™ i7-620LE or i7-610E SBC  
- VPX (VITA 46), OpenVPX (VITA65) and VPX REDI (VITA 48)  
- 2 Cores with Hyperthreading from 1.67 GHz to 2+ GHz  
- 8GByte on 2 Channels, DDR3 1066 MHz, ECC registered SDRAM  
- 3 Gigabit Ethernet and x4 PCIe to VPX Backplane  
- Standard Air-Cooled and Rugged Conduction-Cooled Versions under 45W power

VX3035 (2nd Generation)  
Intel® Core™ i7-2655LE SBC  
- 2 Cores with Hyperthreading from 1.67 GHz to 2.2 GHz  
- Support of Kontron VXFabric™  
- Standard air-, rugged air- or rugged conduction-cooled versions  
- Available also as turnkey Evaluation/Development platforms

VX3042 (3rd Generation)  
Dual Core Intel® Core™ i7-3567UE  
- User Configurable TDP 25W/2.2 GHz, 17W/1.7 GHz, 14W/0.8 GHz  
- Multiple 10G Ethernet  
- PCI Express® Gen 3.0, with Kontron VXFabric™  
- Up to 3 simultaneous graphics heads  
- Extended Life Cycle, Air- and Conduction-Cooled Versions

VX3044 (3rd Generation)  
Quad Core Intel® Core™ 36b2QE  
- Ethernet Dual 10G or 1G  
- Up to 16 GB SDRAM with ECC  
- Intel® HD Graphics 4000  
- PCI Express® Gen 3.0, with Kontron VXFabric™  
- Turnkey Evaluation/Development Platforms  
- Extended Life Cycle, Air- and Conduction-Cooled Versions
3U Carrier Boards

VX3800
3U PMC/XMC Carrier
» x4 or x1 PCI-Express XMC Interface
» 32-bit 66 MHz PCI PMC Interface
» Standard Air- and Rugged Conduction-Cooled Versions

VX3830
3U FMC Carrier
» 3U Xilinx® Virtex®-5 FPGA Board with FMC Site
» Increased I/O Flexibility and Scalable Development Solutions
» x4 or x1 PCI-Express Backplane Interface
» Standard Air- and Rugged Conduction-Cooled Versions
» 0.8" (4 HP) or 1" (5 HP) Face Plates

VX3836
3U Xilinx® Virtex®-6 FPGA Board with FMC site
» Perfect fit for high-speed I/O and intensive sensor data processing
» Advanced I/O flexibility through VITA 57 FMC site
» x4 PCI-Express backplane interface
» Air- and conduction-cooled builds

3U Switch Boards

VX3910
3U VPX non blocking Gigabit Ethernet Switch
» Fully managed L2 solution (L3 upgradable)
» A total of 24 Gigabit Ethernet ports
» Quad 1000BASE-T Uplinks on front panel
» Air-Cooled and Rugged Conduction-Cooled Builds

VX3905
3U PCI Express® and Ethernet Hybrid switch
» Compliant with OpenVPX VITA65 profile SLT3-SWH-6F6U-14.4.1
» Up to 24 Ports/32 Lanes PCIe Switch
» 9 Port Giga Ethernet Switch
» Air-Cooled and Conduction-Cooled Builds
### Overview VPX «

#### VPX

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<td>Intel® Core™ i7 @2 GHz LV</td>
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<td>MPC8544 @1 GHz</td>
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<td>23 GFlops FFT</td>
<td>43.5 GFlops FFT</td>
<td>2041 DMIPS</td>
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<td>40W</td>
<td>45W</td>
<td>15W</td>
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<td><strong>SDRAM (max.)</strong></td>
<td>8 GB w ECC</td>
<td>8 GB w ECC</td>
<td>1 GB w ECC</td>
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<td>16 GB USB Module</td>
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<td>3 GETH</td>
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<td>PCIe, GETH</td>
<td>PCIe, 1000 BASE-BX</td>
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<td>VPX &amp; OpenVPX</td>
<td>VPX &amp; OpenVPX</td>
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<td>256-bit SIMD AVX</td>
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<td>SA, RC</td>
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<td>Linux 2.6.38, Windows 7, VxWorks</td>
<td>Linux 2.6.25, VxWorks 6.6</td>
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<td>EZ3-VX3035</td>
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#### CPU

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<th>VX6060</th>
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<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>3rd Gen. Intel® Core™ i7 Dual Core, configurable TDP @800MHz to 2.2 GHz</td>
<td>3rd Generation Intel® Core™ i7 Quad Core @ 2.1 GHz</td>
<td>Intel® Dual Core™ i7 @ GHz LV</td>
</tr>
<tr>
<td><strong>Performances (max.)</strong></td>
<td>43.5 GFlops FFT</td>
<td>83 GFlops FFT</td>
<td>46 GFlops FFT</td>
</tr>
<tr>
<td><strong>Power Cons. (typ.)</strong></td>
<td>14W to 25W</td>
<td>35W</td>
<td>80W</td>
</tr>
<tr>
<td><strong>SDRAM (max.)</strong></td>
<td>16 GB w ECC</td>
<td>16 GB w ECC</td>
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<td><strong>Flash</strong></td>
<td>32 GB Flash SSD</td>
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<td>3 GETH Cooper, 3GETH SerDes</td>
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<td>EZ3-VX304x</td>
<td>EZ3-VX6060</td>
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</tbody>
</table>
Kontron supports an extensive range of COTS PCI Mezzanine Cards (PMCs), Switched Mezzanine Cards (XMCs) and FPGA Mezzanine Cards (FMCs) for VPX, VME and CompactPCI® systems used in Commercial or Harsh environments. Providing cost-effective performance and flexibility, Kontron’s PMC/XMC/FMC products meet the specific requirements for your COTS embedded systems.

**PCI Mezzanine Card (PMC)**

Standardized by the IEEE association, PMC is the de facto standard for mezzanine cards used in the VPX, VME and CompactPCI® ecosystems. PMC offers system designers a reliable form factor with the high-performance of the PCI bus.

**Switched Mezzanine Card (XMC)**

XMC is a PMC with a high-speed serial fabric interconnect defined by the VITA 42 standard. XMC specifies an additional connector (“P5”) that supports PCI Express® (VITA 42.3) or other high speed serial formats such as Serial RapidIO (VITA 42.2) and Parallel RapidIO (VITA 42.1).

**FPGA Mezzanine Card (FMC)**

FPGA Mezzanine Card, or FMC, as defined in VITA 57 provides a specification describing a new 1/0 mezzanine module that will connect to, but not be limited to, 3U and 6U form factor cards. FMC modules use a smaller form factor compared with PMC or XMC modules, and assume connection to an FPGA or other device with reconfigurable I/O capability. The standard describes options to create modules for operating in a range of environments from passively cooled to fully ruggedized conduction-cooled.

### PMC Mezzanines

<table>
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<tr>
<th>PMC Mezzanines</th>
<th>PMC-1553 (Avionics I/O)</th>
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<th>PMC240 (Dual Gigabit Ethernet)</th>
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<tr>
<td>Frontpanel</td>
<td>MIL-STD-1553-B Connector, ARINC429, Serial Lines and GPIO Lines Connector</td>
<td>32/64 bit, 33/66MHz</td>
<td>2x RJ45 copper or 1x SC type fiber + 1x RJ45 copper</td>
<td>9 pin D-Sub for Fieldbus connection</td>
</tr>
<tr>
<td>Interface</td>
<td>MIL-STD-1553B</td>
<td>ARINC-429, MIL-STD-1553, Serial Lines, GPIOs</td>
<td>Host: 32/64 bit, 33/66MHz; copper or fiber to front</td>
<td>Host: 32 bit, 33MHz; Profibus to front opto isolated</td>
</tr>
<tr>
<td>Function</td>
<td>MIL-STD-1553B</td>
<td>-</td>
<td>2 independent Gigabit Ethernet channels</td>
<td>Profibus DP V1 Master</td>
</tr>
<tr>
<td>Data Rate</td>
<td>VITA 47-Class CC4 (-40°C to +85°C)</td>
<td>-</td>
<td>Copper: 10Base-T, 100Base-TX, 1000Base-T; Fiber: 1000Base-SX</td>
<td>up to 12 MB/s</td>
</tr>
<tr>
<td>Signals</td>
<td>ILC-DDC BU-61688</td>
<td>T/R ARINC 429, T/R EIA 485/232</td>
<td>Copper or Fiber or mixed</td>
<td>RS485</td>
</tr>
<tr>
<td>Controller</td>
<td>Intel® 82546GB</td>
<td>Intel® 82546GB</td>
<td>Intel® 82546GB</td>
<td>EC-1 System on Chip</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0°C to +55°C</td>
<td>0°C to +55°C</td>
<td>0°C to +55°C</td>
<td>0°C to +60°C</td>
</tr>
</tbody>
</table>
**XMC Mezzanines**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Frontpanel</th>
<th>Interface</th>
<th>Function</th>
<th>Data Rate</th>
<th>Signals</th>
<th>Controller</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>XMC402</td>
<td>(Dual 10 Gigabit Ethernet)</td>
<td>2x RJ45</td>
<td>Host: PCIe x8; ETH to front</td>
<td>2 independent 10 Gigabit Ethernet channels at front panel</td>
<td>10/100/1000 Base-T / 10GBase-T</td>
<td>Copper &amp; Fiber</td>
<td>Intel® x540</td>
<td>Standard Commercial: 0°C to +55°C</td>
</tr>
<tr>
<td>XMC401</td>
<td>(Dual 10 Gigabit Ethernet)</td>
<td>2x SFP+</td>
<td>Host: PCIe x8; ETH to front</td>
<td>2 independent 1/10 Gigabit Ethernet channels at front panel</td>
<td>Copper: 10 GbE, Fiber: 1/10 Gbe</td>
<td>Copper</td>
<td>Intel® 82599ES</td>
<td>Standard Commercial: 0°C to +55°C</td>
</tr>
<tr>
<td>XMC-ETH2</td>
<td>(Dual Gigabit Ethernet PMC-XMC)</td>
<td>2x RJ-45</td>
<td>Host: PCIe x4 (or PCI 32 bit, 33/66MHz); ETH to front or rear (P4)</td>
<td>2 independent Gigabit Ethernet channels selectable to front or rear</td>
<td>Copper: 10 Base-T, 100Base-Tx, 1000Base-T</td>
<td>Copper</td>
<td>Intel® 82571</td>
<td>Standard Commercial: 0°C to +55°C, Rugged Conduction-Cooled: -40°C to +85°C</td>
</tr>
<tr>
<td>XMC-G72</td>
<td>(Graphics)</td>
<td>Digital DVI and CRT or dual CRT</td>
<td>Host: PCIe x4; front or rear (P4)</td>
<td>Dual Head Graphics XMC; video to front or rear</td>
<td>High throughput interface to host: x8 PCIe up to 2.5 GB/s</td>
<td>Copper</td>
<td>RADEON E2400 (M72-CSP128) graphics controller from ATI-AMD</td>
<td>Standard Commercial: 0°C to +55°C, Rugged Conduction-Cooled: -40°C to +71°C</td>
</tr>
</tbody>
</table>

**FMC Mezzanines**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Interface</th>
<th>Connector</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMC-SERO</td>
<td>(multi-channel interface card)</td>
<td>24 FPGA GPIO front or rear, 16 EIA-232 or 8 EIA-422/EIA-485</td>
<td>High Pin Count (HPC) FMC connector and a 50-pin TYCO 0-787171-5 front connector</td>
<td>Standard Commercial VITA 47-Class AC1 (0°C to +55°C), Rugged Conduction-cooled VITA 47-Class CC4 (-40°C to +85°C)</td>
</tr>
</tbody>
</table>
About Kontron

Kontron is a global leader in embedded computing technology. With more than 40% of its employees in research and development, Kontron creates many of the standards that drive the world’s embedded computing platforms. Kontron’s product longevity, local engineering and support, and value-added services, helps create a sustainable and viable embedded solution for OEMs and system integrators.

Kontron works closely with its customers on their embedded application-ready platforms and custom solutions, enabling them to focus on their core competencies. The result is an accelerated time-to-market, reduced total-cost-of-ownership and an improved overall application with leading-edge, highly-reliable embedded technology.

Kontron is listed on the German TecDAX stock exchanges under the symbol “KBC”. For more information, please visit: www.kontron.com