» Open Communication Platforms «

Streamline your broadband, cable and mobile infrastructure system designs

If it’s embedded, it’s Kontron.
Kontron integrated, standardized platforms ‘future-proof’ TEM’s network applications

In the rush to deploy new network solutions to the carrier market, Telecom Equipment Manufacturers (TEMs) cannot afford to waste valuable resources on non-core competencies. From initial product conception to market deployment, Kontron works with TEMs to alleviate and manage all the challenges of designing and integrating the complex hardware and software components – right up to the application layer.

This enables TEMs to remain focused on developing their value-add application innovations, and to deploy them on the most appropriate carrier grade, integrated off-the-shelf platform. Kontron’s comprehensive lifecycle management and various services to assist clients to seamlessly migrate to next generation platform and bladed technologies ensures the “future proofing” of TEM applications for a much lower overall cost of ownership.

Open Communication Platforms (OCP) deliver highly dense and extreme design flexibility, plus all the required mission-critical RAS features (reliability, availability, serviceability) for wireless, broadband and carrier data center networks.

**Five Steps to a lower TCO with Kontron OCP**

1. **Design with a common network hardware platform**
   - Multi-Core, 10G/40G Fabric, I/O, Storage
2. **Ensure Scalability**
   - Keep pace with higher bandwidth demands
3. **Reduce development costs and timelines**
   - Achieve a faster time to revenue with new network infrastructure
4. **Reduce system-level footprint**
   - Modular design enables multi-functional bladed applications on single platform
5. **Make versus buy**
   - Enhance the value of your innovations when outsourcing integrated platforms
Kontron OCP across the Core, Metro, Carrier Data Center, Access, Edge Networks

» KONTRON IN THE 4G LTE NETWORK «

Carrier Grade Platforms
- ATCA – 10G/40G Platforms
- MicroTCA – 10G Platforms
- CRMS (1U, 2U, 3U Communication Rack Mount Servers)

Mission Critical Platforms
- CRMS (1U, 2U Communication Rack Mount Servers)

M2M
- Smart Services Developer Kit
- Smart Deployment Device
Quality hardware designs backed by superior client support and professional services

All clients expect a ‘best-of-breed’ supplier who can deliver comprehensive services and advantaged pricing. At Kontron, we understand this and work tirelessly to continually improve how we can better meet our customers’ expectations.

Kontron provides TEMs with a range of Professional Services to assist in project conception to full product deployment.

**Kontron is:**
- MULTIFACETED: Hardware/Software design versatility; platform integration (+3rd party HW, SW)
- KNOWLEDGEABLE: Exceptionally responsive and experienced engineering and technical support teams
- LOYAL: Long product life-cycle management
- DEPTH: Broadest standards-based portfolio dedicated to telecom/communications
- PRACTICAL: Complementary AND cross functional (BIOS, FW) implementation of Carrier Grade Platforms
- FLEXIBLE: Customer Focused Designs
- SUPPORTIVE: Standard and extended warranty & support plans; wide range of product support services

**TEMs Like To Work With Kontron:**
- One-stop design resource
- Expert consulting
- High-quality products
- Single point of contact
- Excellent support
- Long-term delivery contracts
- Program Management

**Kontron System Integration:**
- Application ready platforms/systems
- Complete communication server (HA systems)
- Third-party hardware
- Software, middleware and protocol stacks
Eco-system Partners

Kontron has established an active network of key industry partners to better accelerate the project designs of mutual TEM clients. From silicon to carrier-grade OS to HA middleware to protocol stack layers, Kontron offers a seamless integration service of complete pretested, pre-loaded systems that greatly facilitate the design process vis-à-vis the client’s application solution.
**M2M set for massive growth**

“Machine to Machine,” or “M2M,” is steadily gaining traction as new wireless data services such as LTE and WiMAX develop on a larger scale. M2M technology leverages public and managed wireless data networks to provide businesses with back-end data they need to boost operational efficiency and reduce costs.

Berg Insight forecasts that shipments of cellular M2M devices are forecasted to grow at a compound annual growth rate (CAGR) of 19.2 percent to reach 67.0 million units by 2014. During the same period, the number of cellular M2M connections is forecasted to grow at a compound annual growth rate (CAGR) of 25.6 percent to reach 187.1 million.

Developers of emerging smart services need a simple, yet powerful M2M device to test and deploy their application’s connected performance. OEMs can reduce time-to-market by using Kontron’s M2M Smart Services Developer Kit, which was a concept developed in collaboration with Intel and is cost optimized for mass production.

“(M2M) solution is the exchange of real time data between a remote intelligent device and a data centre or server that is designed to capture, process and distribute information derived from that data.”

- Beecham Research
Carrièr Cloud Computing – meeting the carrier requirements for QoS, availability and reliability

Communications Service Providers of all types are looking to telco-based cloud computing to manage their costs and increase revenues with the reliable delivery of new enterprise ‘on-demand’, private/hybrid cloud services.

From unified communications-as-a-service to managing data-centers-in-the-cloud, operators can leverage their high-speed networks and collocation/hosting experience to meet the cloud challenges coming down the pipe.

Analysys Mason says total revenues from enterprise cloud services worldwide will grow from US$12.1 billion last year to $35.6 billion in 2015, with the current focus on software-as-a-service (SaaS) shifting to infrastructure-as-a-service provisioning of infrastructure including network, storage, servers and data center services.

As a starting point, carriers already possess a balanced portfolio of network gear to properly compete in this enterprise services sector. The virtualization of IT and carrier-grade server hardware – a core benefit of cloud services – will lead to larger data centers that require faster connections between carrier facilities and enterprise clients.

Building on common building block platforms – both mission critical servers and NEBS/ETSI carrier-grade servers from Kontron will fulfill the carriers’ need for agility and adaptability in a hotly contested marketspace.
4G LTE and the Connected World

Recent market reports are indicating that in four years mobile operators may discover that their costs will be more than their revenues, which by the way, Juniper Research says will reach US$1 trillion per year, globally, by 2016.

With rapidly increasing mobile network data traffic, backhaul costs are adding up fast. Traffic more than doubled in 2010 and will increase by more than 13 times to 25,000 Petabytes per year by 2015. Action will need to be taken.

Given the high adoption rate of ATCA platforms within the 3G infrastructure market, one can clearly see the advantages of moving forward with 10G and now 40G ATCA systems within an all-IP 4G LTE Evolved Packet Core Network (EPC). To be in a position to create an LTE network element the underlying hardware platform must meet certain requirements, including:

> Standards-based for time to market advantage
> Scalability and extensibility
> Intrinsic low latency packet switching
> IPv6 support
> Beyond 10 GbE backplane support
> IPsec protection of the control plane and the user plane
> MPLS and Sync. E and IEEE-1588 support

» Bandwidth Demand Trends «
Streaming media on any device – IPTV, MobileTV and iPad

Pyramid Research has reported that IPTV service revenues had increased 45% during 2010 for a worldwide total of US$11.8 billion, and by 2015, will reach $36.3 billion, making up only 15% of total pay-TV revenues compared to just 6% today.

As a consequence, Kontron has experienced growth in this sector, with various vendors requiring the high density multicore computing and 10GbE fabric provided by its ATCA, MicroTCA, and mission critical IA rack mount servers.

Kontron Open Communication Platforms help overcome some of the key challenges in producing the various gear for streaming media networks, which require high levels of processing horsepower to handle the high traffic demands, the coding and transcoding of live concurrent and stored video streams, content protection or Digital Right Management (DRM) and BSS/OSS management.

Moreover, recent advances in packet processing will help supply more efficient transport of data to and from applications and will reduce the I/O bottlenecks that free up the other general purpose CPUs for other processing tasks.

Kontron and its partners help vendors design CDN equipment that ensures content service providers can deliver a Quality of Service (QoS) for a better Quality of Experience (QoE).
OCP Application Areas

Commercially available off the shelf platforms for wireless/IMS networks

Telecommunication Networks:
- Call Servers/Gateway Controllers/VoIP-Server
- HLR/HSS, IMS (x-CSCF, MRF)
- Media Gateway/Trunking GW
- Application and Media Server & Proxies
- Packet core – SGSN, GGSN
- Signalling Gateway
- Radio Network Controller (RNC)
- WiMAX Access Controller (WAC)
- Base Station (BTS, Node B; WiMAX)
- Video / IPTV - transcoding/storage
- IP-PBX Media Server

Military (radar, image processing, sonar, communications)
Aerospace (avionics server, infotainment)
Professional Radio (Tetra, P.25)
Medical (image processing, communications)
Enterprise - CPE/data center gateway, security appliances

Telecom vendors preparing for ATCA-based LTE platforms can begin development immediately with new Kontron Open Modular Core ATCA platforms, in either 10G or 40G flavors. Both platforms are integrated with new sophisticated and faster bladed data transport, switching and system management hardware that TEMs can use as a starting point to build multiple new equipment configurations using CPU, NPU, DSP, storage and even specialized 3rd-party ATCA based line cards.
Commercially available off the shelf platforms for streaming media/IPTV networks

Kontron COTS Multi-Core Platforms to support a better Quality of Experience
One of the primary challenges for providers is how to maintain a superior QoS (Quality of Service) and QoE (Quality of Experience) in the delivery of IPTV-based media, content storage for video on demand (VoD), content protection or Digital Right Management (DRM) network management (OSS), and other mobile streaming content services.

From the head-end to the network edge, Kontron enables TEMs to design the required network elements with the necessary high bandwidth and processing performance for end-to-end IP-managed networks.

Multi-Core Processors to Keep Up with Subscriber Growth
For content delivery applications such as IPTV, interactivity involves real-time multimedia that will be used for home entertainment, corporate networks, complex conferencing, and more. The mix of video, voice and data behind the available programming and Video on Demand (VoD) services will require much greater processing horse power.

MicroTCA Platforms
Mix and match of AMC module configurations between Intel, Cavium and Freescale processors.

ATCA Platforms
With inherent high density processing, ATCA platforms may be used for “five-nines+” host media processing (HMP) for voice and video.

CRMS Platforms
For either ruggedized mission critical or carrier grade content delivery environments, Kontron Communication Rack Mount Servers offer maximum Intel-based server density, a shallow 20” depth for flexible installation, and various front and/or rear I/O Options.
Targeted network elements – Mobility Management Entity (MME) and Policy and Charging Rules Function (PCRF)

**MME:** control-plane element responsible for high volume mobility management and connection management; managing thousands of eNodeBs (a potential candidate for ATCA)

**PCRF:** performs network control of flows: detection, gating, QoS and flow-based charging, authorizes networkwide use of QoS resources (manages millions on service data flows) and is a potential candidate for CRMS products.

- IP communications (VoIP, video)
  - Messaging SMS/MMS
  - Internet, Web 2.0
  - Advanced location-based services
    - Mobile TV, IP multimedia
    - Mobile office

Service delivery platforms:
- SGW
- MME
- PDN GW
- PCRF
Targeted network elements – Head End Media Processing, Encoding/Transcoding, and DRM

One of the biggest challenges in content delivery is the ability to process, encode and transcode multiple concurrent IP streams into the MPEG-2, MPEG-4 or other formats for delivery to subscribers, either through home set-top boxes or mobile devices. The encoding of live or stored content takes place at the platform’s head-end of the network which is most suitable in providing high processing capabilities. To enable overall content delivery within the network through a regional Central Office to a Digital Subscriber Line Access Multiplexer, Set-Top-Box or mobile devices, the Media Server within the network requires scalability in regards to the CPU performance for transcoding and bandwidth capacity.

Besides content encoding and transcoding functions, there are other platform requirements which need to be addressed for content storage, network management (OSS) and Digital Rights Management. With this challenge in mind, time to market, cost and network scalability are crucial factors for TEMs to make any content delivery application deployment successful and profitable.

Kontron Open Communication Platforms enable multi-core encoding and transcoding, network processing and media switching with 10GbE and 40GbE (ATCA) for content storage and Digital Rights Management functionality.

Kontron Leverages Various Multi-Core Technologies for QoS, Content-Aware Processing

- **40G ATCA Packet Processor Blade**
  - Cavium OCTEON II cn6845 MIPS64 Processors – 32-Core, Dual-Socket
- **10G ATCA Processor Blades**
  - Intel Xeon E5-2600 Series Processors – 8-Core, Dual-Socket
- **CG2200 Rack Mount Server**
  - Intel Xeon E5-2600 Series Processors – 8-Core, Dual-Socket
- **AM4020 AMC Processor module**
  - Intel® Core™ i7 Processors – 2-Core, Single-Socket
Open Communication Platforms and Components

Our clients rely on Kontron for its real-world experience in the design and integration process of open modular ATCA and MicroTCA platforms that are reliable, flexible, scalable and always the best configuration from the very start. As each Kontron customer will always have very specific needs and system configuration requirements, Kontron ensures many of the steps of any initial design process are effortless and worry-free. Kontron leads the market with a family of xTCA-related components, namely ATCA processor and packet processor, switch and carrier blades, as well as a mix of AdvancedMC modules that run the gamut of multi-core processor, IO packet processor, mass storage, and low to high end MCH modules. All modules can be used for either ATCA or MicroTCA platforms.

Portfolio Overview

**Carrier Grade Platforms**
- ATCA - 40G/10G – 6-slot/14-slot
- MicroTCA - 10G
- CRMS – 1U/2U/3U

**Mission Critical Platforms**
- CRMS – 1U/2U

**M2M Platform - Terminal, Gateway, Sensor**
- M2M Development Kit
- M2M Deployment Device

**Platform Components**
- ATCA Blades
- AMC Modules
OM Series - Open Modular Core Platforms

Platform Feature Set:
- Chassis/mechanical, power and cooling
- Data Transport for Base and Fabric interconnectivity
- Designed to meet NEBS Level 3

Platform Manageability such as Shelf Management and System Management with a standard based HPI
- Optional systems management functionality

**OM9161-40G**
- 5U Platform with 40GbE
- 6-slot: up to 2 switches; 4 nodes

**OM9161-10G**
- 5U Platform with 10GbE
- 6-slot: up to 2 switches; 2 nodes

**OM9141-40G**
- 13U Platform with 40GbE
- 14-slot: up to 2 switches; 12 nodes

**OM9141-10G**
- 13U Platform with 10GbE
- 14-slot: up to 2 switches; 12 nodes

**40 GIGABIT ETHERNET**

**10 GIGABIT ETHERNET**
» CRMS Platforms «

Communications Rack Mount Servers

Carrier Grade Servers
  » NEBS-3 / ETSI compliant
  » Long life support
  » 20-inch depth, ruggedized 3U/ 2U/ 1U platforms
  » Dual, redundant AC or DC power option

FS3100 3U Flexible Platform
  » Dual socket support for six-core Intel® Xeon® Processors 5600 Series
  » Twelve RDIMM/UDIMM memory slots (DDR3-800/1066/1333). Maximum 96 GB memory
  » Up to (8) FH/FL PCI E
  » Up to 12x 2.5” hot swap SAS/SATA drives and (2) internal 2.5” SATA drives

CG2200 2U High Density Server
  » Dual Intel® Xeon® 8-Core E5-2600 Processor Series
  » 16 slot, 4 channel support of DDR3; supports 256GB maximum (with 16GB DIMM)
  » Supports 2 PCI-E risers (4 FL/FH cards) and 2 LP cards; total of 6 PCI-E Gen 3 IO cards
  » Up to 6 Hot-Swap 2.5” SAS/SATA HDDs

CG2100 2U High Density Server Server
  » Dual socket support for 6-core Intel® Xeon® Processors 5600 Series
  » Drive trays for up to 6 hot-swap 2.5-inch SAS/SATA hard disk drives
  » Optional I/O module enables additional Quad GbE ports or Dual 10GbE ports
  » Supports 3 or 5 PCI-E slots, or 3 PCI-E & 2 PCI-X slots.
  » PCI Gen2 supported.

TIGW1U 1U High Density Server
  » Dual socket support for Intel® Xeon® processors L5410 (45nm) OR for Intel®
    Xeon® processors LV 5148 or LV 5128 (65nm)
  » Six DIMM slots supporting FBDIMM memory; Maximum 32GB memory
  » One PCI Super slot supporting either PCI-X 133MHz or optional PCI-Express x8
Mission Critical Servers

» Front and rear I/O flexibility, with up to 8x Gb NICs in front
» Long lifecycle availability and support (3-5 years)

» Short depth (20”- 24”) innovative ruggedized chassis
» Dual, redundant AC or DC power options

**NSC2U 2U Mission Critical Rack Mount Server**

» Two socket support for Quad-Core Intel® Xeon® Processors 5400/5300 Series and Dual-Core Intel® Xeon® Processors 5100 Series
» 8 FB-DIMM slots (240-pin DDR2-533/667 MHz); maximum 64GB memory
» Drive trays for up to six hot-swap 2.5-inch SAS hard disk drives
» Up to five PCI slots (2 low profile; 3 full-height, full-length)

**NSW1U 1U Mission Critical Rack Mount Server**

» Single socket support for Intel Xeon processor 5400 series (L5410 or E5440 (45nm) OR Intel Xeon processor 5100 series (65nm)
» 6 DIMM slots of FBDIMM memory; maximum 32GB memory
» Drive trays for two fixed 3.5-in. SATA hard disk drives
» Optional four or eight front-panel GbE NIC ports (copper or fiber); and four front-panel bypass ports

**NSN2U 2U Mission Critical Rack Mount Server**

» Dual socket support for quad-core Intel® Xeon® Processors 5500 Series and six-core 5600 Series
» 12 RDIMM/UDIMM memory slots DDR3-800/1066/1333; max 96 GB memory
» Drive trays for up to 8 hot-swap 2.5-inch SAS/SATA hard disk drives
» Supports 3 or 5 PCI-E slots, or 3 PCI-E & 2 PCI-X slots; PCI Gen2 supported.
Extreme performance and space efficient carrier grade platforms

OM6090/OM7090 6U MicroTCA Platform (double-width AMCs)
- MicroTCA 4-slot compact system for up to 4 AMC modules
- Includes AC Power and fans, and fully featured MCH incl. managed GbE switch and PCIe/SRI0 switch SAS/SATA on backplane

OM6061 MicroTCA 1U Carrier Grade Platform
- MicroTCA 1U Carrier Grade Platform
- Designed for NEBS compliance
- Cost-efficient MCH module and six (6) AMC slots
- Front-to-back cooling and integrated 360W, -48V or -60V power supply

OM5080 MicroTCA 2U Carrier Grade Platform
- Fault resilient 19" platform for up to 8 AMC modules
Cost optimized and production ready Machine-to-machine (M2M) devices

Kontron’s M2M Smart Services Developer Kit was developed in collaboration with Intel and is cost optimized for mass production. The Kontron M2M System is Wi-Fi and 802.15.4 ready. 3G WWAN is either also installed or can be easily added. Dual HDMI ports support the video intensive functionality needed by many emerging transportation, medical, energy and factory automation applications.

Optimized for immediate application development/testing and deployment to improve ROI
» Pre-integrated wireless for fast time to market:
» 3G WWAN broadband (option)
» 802.11a/b/g/n WLAN
» 802.15.4 WPAN

Deployment Unit for Harsh Environments
» KM2M806XT: extended temperature range up to 85°C.

<table>
<thead>
<tr>
<th>M2M</th>
<th>KM2M810 Smart Services Developer Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis Dimensions (H x W x D)</td>
<td>67mm x 100mm x 27mm (92mm x 100mm x 62mm with mounting brackets)</td>
</tr>
<tr>
<td>Interfaces Top</td>
<td>SIM slot</td>
</tr>
<tr>
<td>Interfaces Left</td>
<td>USB 2.0 (Type A), MicroUSB 2.0 (Type B), Power, RJ-45 Ethernet, 2x antenna connectors</td>
</tr>
<tr>
<td>Interfaces Right</td>
<td>Microphone, Headphone/Line Out, 2x MicroHDMI, MicroSD slot, MicroUSB 2.0, 2x antenna connectors</td>
</tr>
<tr>
<td>Controls on top</td>
<td>Reset button, user input button/software enabled, LED status indicators</td>
</tr>
<tr>
<td>Internal Data Storage capacity</td>
<td>4 GB via internal MicroSD card</td>
</tr>
<tr>
<td>External Power Supply</td>
<td>100-240 VAC, 50/60 Hz input/rating, 12 VDC, 2A operating input/rating (US and Continental Europe power cords included)</td>
</tr>
<tr>
<td>Processor/Chipset</td>
<td>Intel® Atom™ processor E640T 1 GHz/Intel® Platform Controller Hub EG20T</td>
</tr>
<tr>
<td>Cache</td>
<td>32 KB instruction cache + 24 KB L1 cache, 512 KB L2 cache</td>
</tr>
<tr>
<td>Memory</td>
<td>1 GB DDR2</td>
</tr>
<tr>
<td>Wi-Fi WLAN (802.11a/b/g/n)</td>
<td>Intel® Centrino® Advanced N 6205 Wi-Fi module installed</td>
</tr>
<tr>
<td>WPAN (802.15.4)</td>
<td>TI CC2531 SOC; ready for ZigBee® certification or for 6LoPAN or Wireless HART WPAN use</td>
</tr>
<tr>
<td>3G/4G WWAN</td>
<td>Ericsson 5521gw 3G module installed or option to drop-in other PCI Express 3G/4G broadband module</td>
</tr>
</tbody>
</table>

www.kontron.com/OCP
**» ATCA Blades «**

Multi-Core, 10G, 40G bladed technology

<table>
<thead>
<tr>
<th>Processor ATCA Blades</th>
<th>AT8060</th>
<th>AT8050</th>
<th>AT8242</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>Dual Intel® Xeon® 8-Core E5-2600 Processor Series</td>
<td>Intel® Xeon® Quad Core L5518 Processor with integrated DDR3 memory controller</td>
<td>Dual 32-Core Cavium OCTEON II CN6880 MIPS64 v2 Packet Processor</td>
</tr>
<tr>
<td><strong>Bus</strong></td>
<td>Dual 8GT/s QPI interfaces between both CPUs provide 40GByte/s/direction</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>CPU L2 Cache</strong></td>
<td>Up to 20 MB</td>
<td>12 MB (5600), 8 MB (5500)</td>
<td>–</td>
</tr>
<tr>
<td><strong>Chipset</strong></td>
<td>C600 series chipset</td>
<td>Intel® 5520</td>
<td>–</td>
</tr>
<tr>
<td><strong>DRAM</strong></td>
<td>Up to 64GB DDR3 on 4 DIMM per CPU</td>
<td>Up to 48GB on 3-channels, DDR3 1066 MHz, ECC 6 DIMM sockets total</td>
<td>Eight DDR3 DIMM sockets each supporting 32GB address range for up to 256GB</td>
</tr>
<tr>
<td><strong>Flash</strong></td>
<td>Dual eUSB Flash Modules – 16 GB each</td>
<td>Two redundant 1MB BIOS (Field software upgradeable)</td>
<td>USB Flash drive option (16GB): Unit processor is connected to two 128 Mbyte NOR flash with dual image support, and 1GB NAND flash.</td>
</tr>
<tr>
<td><strong>Frontpanel</strong></td>
<td>2x SFP SerDes Ethernet; Serial (RJ-45); 2x USB</td>
<td>Serial (RJ-45), 2 i82576 Management LAN (RJ-45), 2 USB</td>
<td>One PCIe x1 Gen 1 port from the switch management; Two 10/100/1000 Mbps Ethernet (Base Interface) Dual (40G-KR4 / 4x 10G-KR / XAUI / 4x GbE) (Fabric Interf)</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>Two 10/100/1000 Mbps Ethernet (Base Interface); Four 10/100/1000 Mbps Ethernet (FP and RTM); and 10 + 10 Gigabit Ethernet Fabric Interface</td>
<td>2x 10/100/1000 Base-T (Base Interface); 2x 10Gb XAUI (Fabric Interface); Gen 2 PCI Express x4 to Update Channel and to RTM; Telecom clock support in Zone 2 and AMC</td>
<td>40Gbps to each Network processor 2x 40GbE Fabric Interface; Additional 160Gbps for various optional front or rear access 1/0; Independent management processor</td>
</tr>
<tr>
<td><strong>Mezzanine</strong></td>
<td>AMC bay with PCIe x8 Gen2 + SATA connectivity; Rear Transition Module RTM8060 with 2 hot swap 2.5” SAS hard drives</td>
<td>1 x AMC (mid-size); Hot Swap SAS/SATA HDD available via RTM8050</td>
<td>–</td>
</tr>
</tbody>
</table>
# ATCA Blades

## 10G Switch and AMC Carrier Blades

<table>
<thead>
<tr>
<th>ATCA Switch Blades</th>
<th>AT8910 10G Switch</th>
<th>AT8404 Quad AMC Carrier (mid-size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Interface Support</td>
<td>Gigabit Ethernet to 14 Payload Slots</td>
<td>Two Gigabit Ethernet</td>
</tr>
<tr>
<td>Fabric Interface Support</td>
<td>10 Gigabit Ethernet to 14 Payload slots</td>
<td>Two 10 Gigabit Ethernet</td>
</tr>
<tr>
<td>Support for 14 and 16 AMC Slots</td>
<td>Yes</td>
<td>–</td>
</tr>
<tr>
<td>AMC Slots</td>
<td>n/a; support for basic and micro COM Express ETX Modules for system management</td>
<td>4 mid-size bays OR 2 mid-size bays + 1 mid-size double-bay, OR, 2 mid-size double-bays (cut away for SAS drives and enhanced cooling)</td>
</tr>
<tr>
<td>Usage Models for AMC Slots</td>
<td>–</td>
<td>Support for 2x GbE, IPMI, Telco Clock</td>
</tr>
<tr>
<td>Uplinks for Base Interface</td>
<td>4x 10GbE</td>
<td>–</td>
</tr>
<tr>
<td>Uplinks for Fabric Interface</td>
<td>4x 10GbE</td>
<td>–</td>
</tr>
<tr>
<td>Ethernet/Bridging Protocols</td>
<td>Base package including switching, Quality of Service and Management Switching protocols and functions including Ethernet Multicast (GVRP, GARP, RSTP, LAG, IGMP Snooping, DiffServ, ACL ...)</td>
<td>Include VLANs (802.1Q), Link Aggregation (802.3ad), Spanning Tree (802.1D, 802.1w), QoS (802.1p), Flow Control (802.3x), GVRP, GMRP</td>
</tr>
<tr>
<td>RTM Support</td>
<td>Up to 80Gbps uplink capability on Fabric Interface: · 2x QSFP configured as 8x 10G uplinks using 2 active copper cables; · 1x QSFP configured as 4x 10G and 4x SFP+ uplinks</td>
<td>2 x SAS/SATA &amp; SAS/SATA HD on RTM (AT8404) 4x SAS/SATA Storage (AT8400; AT8402), Dual Gb Ethernet, X8 lanes per AMC Rear I/O, out of band Management 10/100/1000Base-T and RS232</td>
</tr>
</tbody>
</table>
### AMC Processor Modules: Intel and Freescale

<table>
<thead>
<tr>
<th>Processor</th>
<th>AM5030</th>
<th>AM4020</th>
<th>AM4140</th>
<th>AM4011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>Intel® XEON Quad Core LC5518 1.73 GHz</td>
<td>Freescale™ QorIQ P4040/80 – 4/8-core CPU @ 1.5GHz</td>
<td>Intel® Core™ i7 with 2.0 GHz or 2.53 GHz</td>
<td>Intel® Core2 Duo 1.5GHz</td>
</tr>
<tr>
<td><strong>CPU L2 Cache</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4 MByte</td>
</tr>
<tr>
<td><strong>Chipset</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Server-class chipset Intel® 3100</td>
</tr>
<tr>
<td><strong>DRAM</strong></td>
<td>Up to 24 GB ECC Memory DDR3 1066 MHz via 3-channel access</td>
<td>Up to 8 GB ECC Memory DDR3 1066 MHz</td>
<td>Fast dual-channel memory (up to 8 GB RAM with ECC)</td>
<td>Up to 4 GByte registered DDR2 400 MHz with ECE</td>
</tr>
<tr>
<td><strong>Flash</strong></td>
<td>Up to 32 GB SLC NAND Flash on a dedicated SATA NAND Flash module</td>
<td>Up to 32 GB NAND Flash</td>
<td>1GB NAND Flash standard or not assembled, up to 2GB on project request; MicroSD card socket</td>
<td>USB NAND Flash socket</td>
</tr>
<tr>
<td><strong>Frontpanel</strong></td>
<td>Two 1000BASE-TX on RJ45 connector; VGA; Two USB 2.0; One RS232 UART interface ATI ES1000</td>
<td>Two 1000BASE-TX on RJ45 connector; One DisplayPort on standard 20-pin DisplayPort connector; 1 x USB 2.0; 1 x RS232 UART</td>
<td>1xGbE; 1xGbE (routable to Port 1, software selectable, default port 1); COM1, RS232</td>
<td>2x GbE, 1x USB 2.0, 1x COM (mini pin-row), 4 Control/Status LEDs (bi color),</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>Silicon Motion SM750 via PCI Express x1 max, resolution of 1920x1440 pixels</td>
<td>Built-in Intel 3D Graphics accelerator; up to 2560 x 1600 pixels @ 60 Hz</td>
<td>Port 0: 1xGbE; Port 1: 1xGbE (routable to front plate, software selectable; Ports 4-7: sRIO x4 or PCIe x4; Ports 8-11: SRIx4 or PCIe x4 or XAU(10GbE) or 4xSGMII(1GbE); Port 14: Debug; Port15: COM2, 3.3V TTL</td>
<td>System Interconnect: 2x GbE, 1x PCI-Express x4, 2x SATA, 1x COM</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>2x 10 GbE (XAUI); 4x GbE, 4x SATA, 1x PCIe x4</td>
<td>4x GbE; 4x SATA, 2x PCIe x4, Graphic or COM</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
## AMC Modules

### Processor – Cavium

<table>
<thead>
<tr>
<th>AMC Module</th>
<th>Interface</th>
<th>Form Factor</th>
<th>Characteristics</th>
<th>Compliance</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM4211</td>
<td>1 SFP+ cage to support multi-rate fiber SFP+ modules; HIROSE for RS232 access to processor</td>
<td>Mid-size</td>
<td>Cavium OCTEON® II CN6335 cnMIPS64® II 6-core processor at 1.3 GHz</td>
<td>AM.C.0 R2.0; AM.C.1 R2.0; AM.C.2 R1.0; AM.C.4 R1.0; MTCA.0 R1.0</td>
<td>n/a</td>
</tr>
<tr>
<td>AM4220</td>
<td>2x SFP+ 10GbE and Serial RJ45</td>
<td>Mid-size</td>
<td>Cavium OCTEON Plus 5650 Network Service Processor provides high-density, high-bandwidth serial I/O for networking: 12x MIPS64 R2 Cores; 600Mhz</td>
<td>AM.C.0 R2.0 Advance Mezzanine Card Base Specification</td>
<td>Dual Gigabit Ethernet Controller Intel® 82571EB</td>
</tr>
<tr>
<td>AM4204</td>
<td>4x SFP GbE</td>
<td>Mid-size</td>
<td>Cavium OCTEON Plus 5650 Network Service Processor provides high-density, high-bandwidth serial I/O for networking: 12x MIPS64 R2 Cores; 600Mhz</td>
<td>AM.C.0 R2.0 Advance Mezzanine Card Base Specification</td>
<td>Dual Gigabit Ethernet Controller Intel® 82571EB</td>
</tr>
<tr>
<td>AM4210</td>
<td>1x SFP+ 10GbE and Serial RJ45</td>
<td>Mid-size</td>
<td>Cavium OCTEON Plus 5650 Network Service Processor provides high-density, high-bandwidth serial I/O for networking: 1x 10G-Base-BX4 (XAUI) on Rear I/O</td>
<td>AM.C.0 R2.0 Advance Mezzanine Card Base Specification</td>
<td>Dual Gigabit Ethernet Controller Intel® 82571EB</td>
</tr>
</tbody>
</table>
## AMC Modules

### Storage – SAS, SATA

**AMC Storage Modules**

<table>
<thead>
<tr>
<th>Model</th>
<th>Interface</th>
<th>Storage Technology</th>
<th>Capacity</th>
<th>Form Factor</th>
<th>Access</th>
<th>Sequential</th>
<th>Bandwidth R/w</th>
<th>Characteristics</th>
<th>Compliance</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM4500</td>
<td>SATA I</td>
<td>Extended Duty Rotating Drive</td>
<td>Up to 250 GByte</td>
<td>Full-size or mid-size</td>
<td>7,200 RPM, avg seek time 12 ms</td>
<td>8MB cache 150MB/s</td>
<td>burst</td>
<td></td>
<td>AMC.0 R2.0 / AMC.3 R1.0</td>
<td>0-55°C</td>
</tr>
<tr>
<td>AM4510</td>
<td>SATA I et SATA II</td>
<td>Solid State Flash Drive</td>
<td>Up to 64GB</td>
<td>Full-size or mid-size</td>
<td>75 microseconds</td>
<td>Sustained 300MB/s</td>
<td>burst</td>
<td></td>
<td>AMC.0 R2.0 / AMC.3 R1.0</td>
<td>0-70°C</td>
</tr>
<tr>
<td>AM4521</td>
<td>SAS</td>
<td>Serial Attached Storage Drive</td>
<td>Up to 164GB</td>
<td>Mid-size only</td>
<td>10,000 RPM, avg seek time 4.1 ms</td>
<td>8MB Cache 300 MB/s</td>
<td>burst</td>
<td></td>
<td>AMC.0 R2.0 / AMC.3 R1.0</td>
<td>0-55°C</td>
</tr>
<tr>
<td>AM4530 NAS</td>
<td>SATA</td>
<td>HDD or SSD</td>
<td>Up to 256GB</td>
<td>Mid-Size</td>
<td>7200 RPM</td>
<td></td>
<td></td>
<td></td>
<td>AMC.0, AMC.1, AMC.2 and AMC.3</td>
<td>0-55°C</td>
</tr>
</tbody>
</table>

**Solid State Flash Drive**

- Up to 64GB
- 10,000 RPM, avg seek time 4.1 ms
- 8MB Cache 300 MB/s
- 24 hours / 7 days operation
- NEBS level 3: 24 hours / 7 days operation
- AMC.0 R2.0 / AMC.3 R1.0
- 0-70°C

**Serial Attached Storage Drive**

- Up to 164GB
- 7200 RPM
- 24 hours / 7 days operation
- AMC.0, AMC.1, AMC.2 and AMC.3
- 0-55°C

**Extended Duty Rotating Drive**

- Up to 250 GByte
- 7,200 RPM, avg seek time 12 ms
- 8MB cache 150MB/s
- 24 hours / 7 days operation
- AMC.0 R2.0 / AMC.3 R1.0
- 0-55°C
**AMC Modules**

**I/O, MCH**

### AMC I/O Modules

<table>
<thead>
<tr>
<th>Interface</th>
<th>AM4320</th>
<th>AM4301</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Gigabit Ethernet SFP+</td>
<td>4x Gigabit Ethernet</td>
<td></td>
</tr>
<tr>
<td>Form Factor</td>
<td>Mid-size</td>
<td>Mid-size</td>
</tr>
<tr>
<td>Characteristics</td>
<td>PCI-Express x8 gen2; Support for jumbo frames of up to 15.5 KB; checksum offloading capabilities, PCIE towards AMC connector; Advanced pass through-compatible management packet transmit/receive support; 802.1q VLAN support; IPv6 support for IP/TCP and IP/UDP receive checksum offload; Fragmented UDP checksum offload for zpacket reassembly; PCIe Base Specification 2.0 (2.5GT/s) or (5GT/s)</td>
<td>Jumbo Frames (9kByte), Advanced packet filtering, Transmit and receive IP, TCP and UDP checksum offloading capabilities, PCIE towards AMC connector</td>
</tr>
<tr>
<td>Compliance</td>
<td>AMC.0 specification R2.0, AMC.1 R2.0</td>
<td>AMC.0 R2.0 / AMC.1 R1.0 Type 4</td>
</tr>
<tr>
<td>Controller</td>
<td>Intel 82599EB Ethernet controller dual 10GbE interface</td>
<td>2x Dual Gigabit Ethernet Intel® Controller Intel® 82571EB</td>
</tr>
</tbody>
</table>

---

**MCH Modules • MicroTCA Carrier Hub – MCH**

A MicroTCA Carrier Hub (MCH) combines the control and management infrastructure and the interconnect fabric resources needed to support up to twelve AdvancedMCs in a MicroTCA Platform. Two MCH modules can used for High Availability (HA) applications.
Always in step with the latest Intel multi-core processor technology, Kontron introduces its next-generation ATCA processor blade featuring the Intel® Xeon® 32nm 8-Core Processor E5-2600 Series.

The Kontron AT8060 supports a dual socket (R) design of up to two 8-core Xeon E5-2600 Series processors, which significantly elevates the performance-per-watt for various high compute, Content Delivery, Security and Broadband applications deployed across data-intensive IPTV, 4G LTE and Carrier Cloud Computing networks.

Great Performance from an innovative architecture and smart platform-level features

Discover new boosts in processor performance and smarter functionality for the best combination of performance, power efficiency, and cost. Achieve further customization with the AdvancedMC bay, open for packet processing and storage modules, and the new dual 10G I/O AMC module, AM4320.

- **Kontron Active Power Management / Intel Node Manager**
  New software interface for clients to intelligently pre-set and regulate the processor power settings via the Intel Node Manager.

- **Intel® Advanced Vector Extensions (AVX)**
  Accelerate floating point intensive applications

- **Intel® Turbo Boost 2.0 technology**
  Delivers more turbo upside potential

- **40 lanes (2S: 80 lanes total) of integrated PCIe Express**
  For better I/O latency and bandwidth

- **High bandwidth, low latency**
  Bi-directional ring interconnect allows faster access to the 20MB multi-banked last level cache

- **Intel® Hyper-Threading technology**
  Enables up to 16 computational threads per CPU (2S: 32 Threads)

- **Integrated memory controller**
  Up to 64 GB (128 GB total) DDR3 memory on 4 channels of DDR3 for greater memory capacity

- **Up to 8-Core Intel Xeon LP Processors (16 Cores Total)**
  Dual 8GT/s QPI interfaces between both CPUs provide 40GByte/s/direction
Already onto its third generation of Cavium-based products, Kontron offers a market-leading bladed solution for extreme Deep Packet Inspection (DPI)-related applications.

Consider the powerful Kontron AT8242 40G ATCA Packet Processor Blade featuring two 32-core Cavium OCTEON® II MIPS64 processors combined with a Cavium TurboDPI software package as an “out-of-the-box” DPI bladed solution.

Application system developers who require 40GbE wire-speed performance of various deep packet inspection (DPI) functions can scale their system designs with a Kontron 14-slot ATCA 40G platform for up to 1 Tbps per rack of DPI performance that includes: protocol analysis/application recognition; anti-malware/anti-virus; application performance management; network intrusion detection and prevention (IDS/IPS); and URL filtering.

**Supports Layers 2- through 7 functions and full deterministic processing of LTE EPC, DPI, IPTV network traffic at wire speed**

- Two OCTEON II CN6880 processors, each one integrating 32 enhanced cnMIPS64 v2 cores with up to 48GHz of 64-bit compute power in a single chip.
- Combines over 85 L3-L7 application acceleration engines, virtualization features, 100Gbps of connectivity, and a Real Time Power Optimizer™ that dynamically adjusts power depending upon the application-level processing requirement.

**Cavium TurboDPI**

- TurboDPI is a network-based multi-functional platform that helps TEMs rapidly develop DPI applications that require protocol detection, malware protection, and intrusion detection and prevention. TurboDPI can perform multiple detections within a single packet scan because it takes advantage of the OCTEON II chip’s HFA engine. This hardware-assisted approach can deliver three times the performance of traditional software only packet scanning techniques.
Applications
» SNOW 3G and KASUMI
» TCP/IP packet processing acceleration
» QoS for Content Delivery and IPTV networks
» LTE EPC - Packet Data Network Gateways (PGW), Serving Gateways (SGW)
About Kontron

Kontron is a global leader in embedded computing technology. With more than 30% 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 exchange under the symbol “KBC”. For more information, please visit: http://www.kontron.com/

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