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Computer

The Company

- Founded in 1993
- Headquartered in Burgwedel / Hannover
- Share holder: Susanne Görke
- Managing director: Thomas Hannemann
- Products from world leading manufacturers
- Own lab and integration facility for customer specific products and systems
- Expertise in the real-time world

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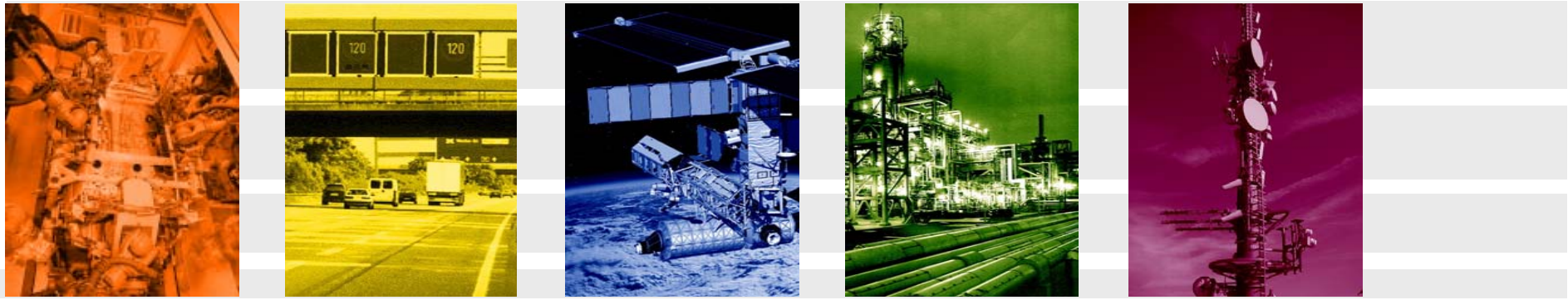
Core Competences



- Distribution of computer boards and systems into telecom, industrial automation, traffic control, and defence applications
- Deliver complete high quality systems based on standard industrial components
- Deliver customer specific and customer ready products into the industrial market
- Consultancy and support by own experienced engineers

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Product Lines

- aculab
- ADLINK
- CM
- Interphase
- Ikon
- Motorola ECC Group
- Schroff
- TEWS
- Thales Computer

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Products

- AdvancedTCA boards, chassis, systems, and HA solutions
- CompactPCI/PICMG 2.16 boards, chassis, systems, and HA solutions
- VMEbus boards, chassis, and systems
- AMC, PMC, PTMC, PrPMC and IndustryPack mezzanine modules
- Consulting, system integration, and custom design
- Development systems, drivers, protocols, and protocol integration
- Operating systems: real-time, embedded, high-availability

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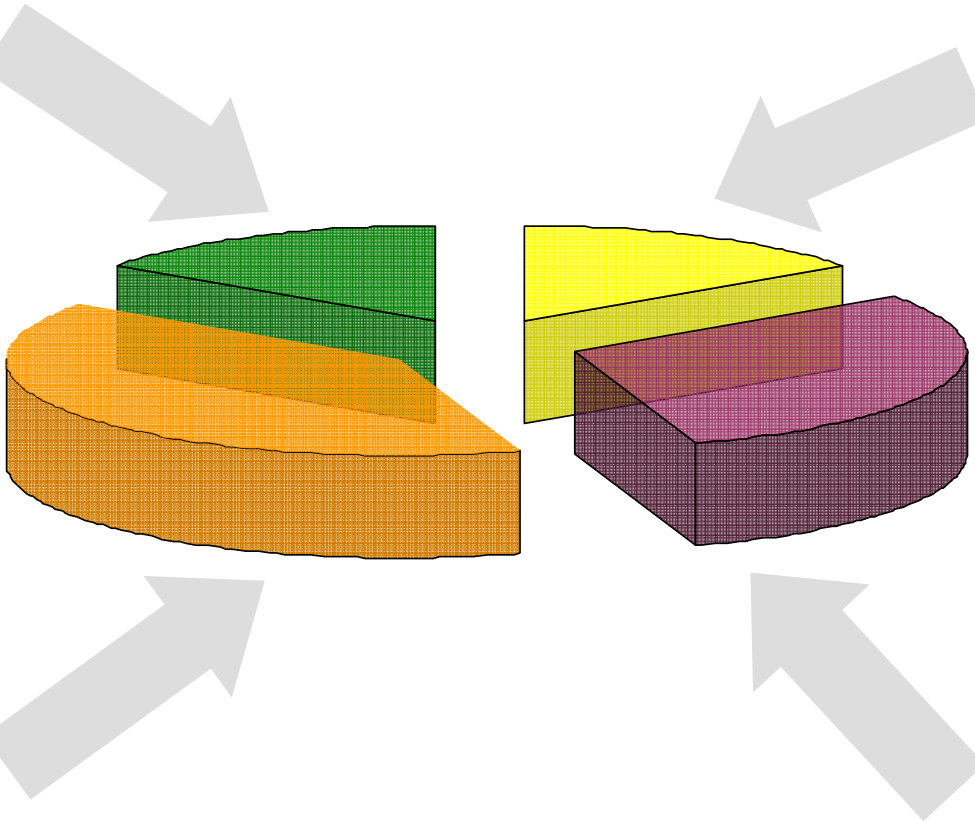
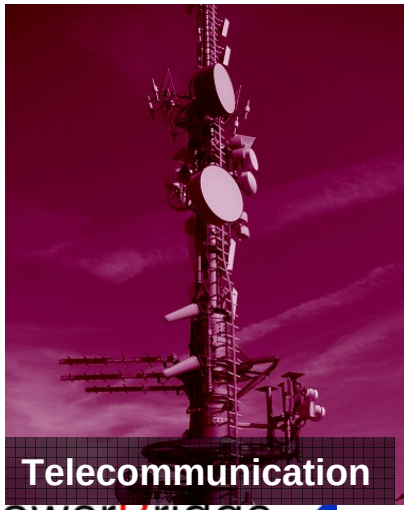
Market Segments





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AdvancedMC und uTCA

Raimund Storck, powerBridge Computer

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What is MicroTCA™ ?

Micro Telecommunications Computing Architecture

- **Micro TCA is a new standard for a wide range of embedded systems for telecom, industrial, medical and defence applications.**
- **The base for this new standard are hot swap Advanced Mezzanine card modules designed for AdvancedTCA carrier.**
- **AMC modules will fit into carrier cards as well as into backplanes with up to 12 modules per node.**
- **Supported backplane interconnect:**
  - **- Gigabit Ethernet,**
  - **- PCI-Express**
  - **- Fibre-Channel**
  - **- Rappid –I/O**

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MicroTCA: Virtual Carrier Concept

The logic behind that standard:

AMC modules were definded as mezzanine cards for ATCA Carrier.

- A virtual carrier makes the environment around an AdvancedMC appear similar to that of an AdvancedTCA carrier.
- The MicroTCA environment consists of the backplane into which the modules are plugged, and a matched Virtual Carrier Manager (VCM) that performs shelf management, power control and fabric switching functions.
- The VCM interface is defined as part of the MicroTCA standard to allow an ecosystem to build for that component as well as for individual AdvancedMC modules.

Overview to AdvancedTCA

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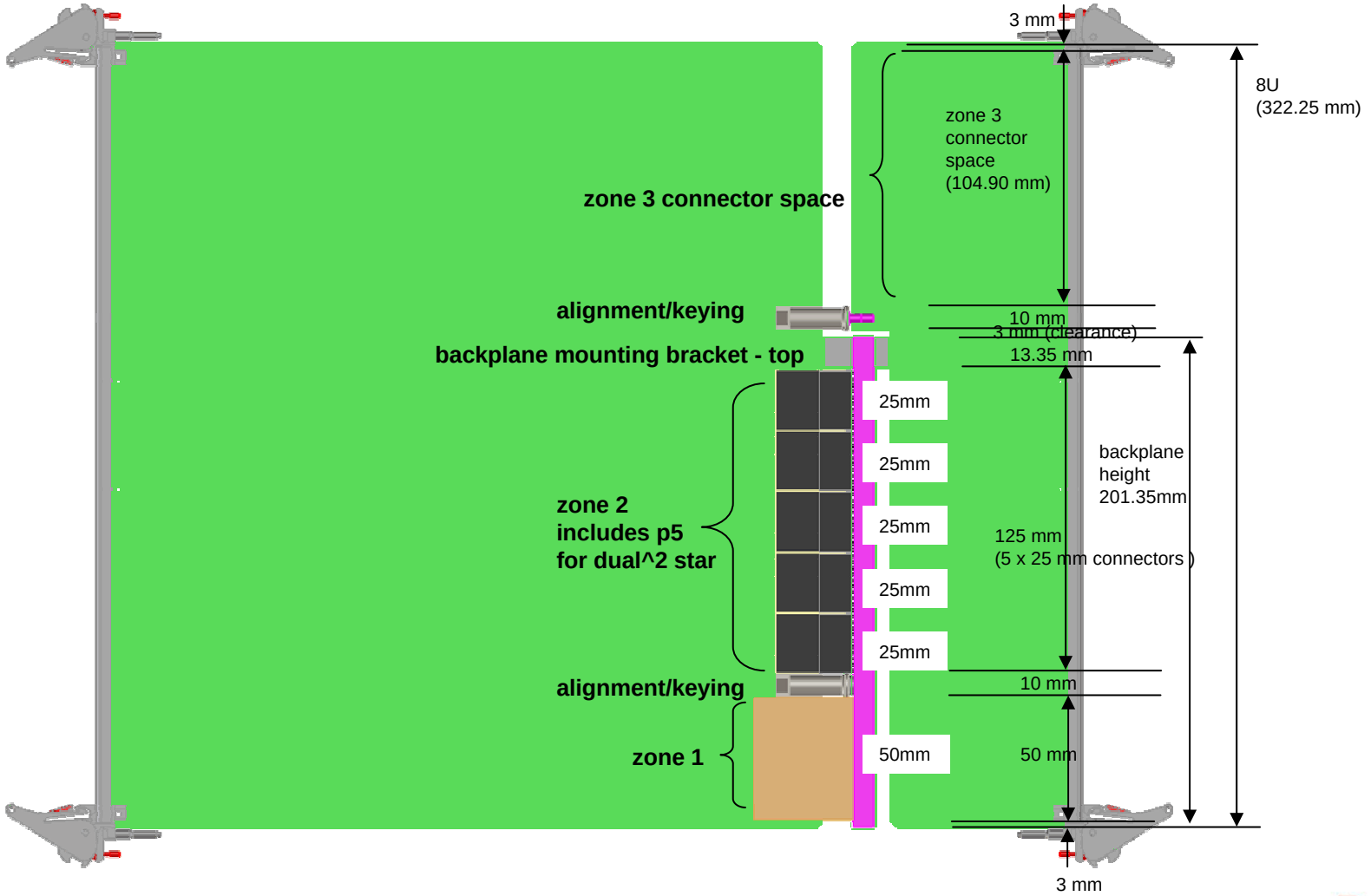
ATCA Formfactor



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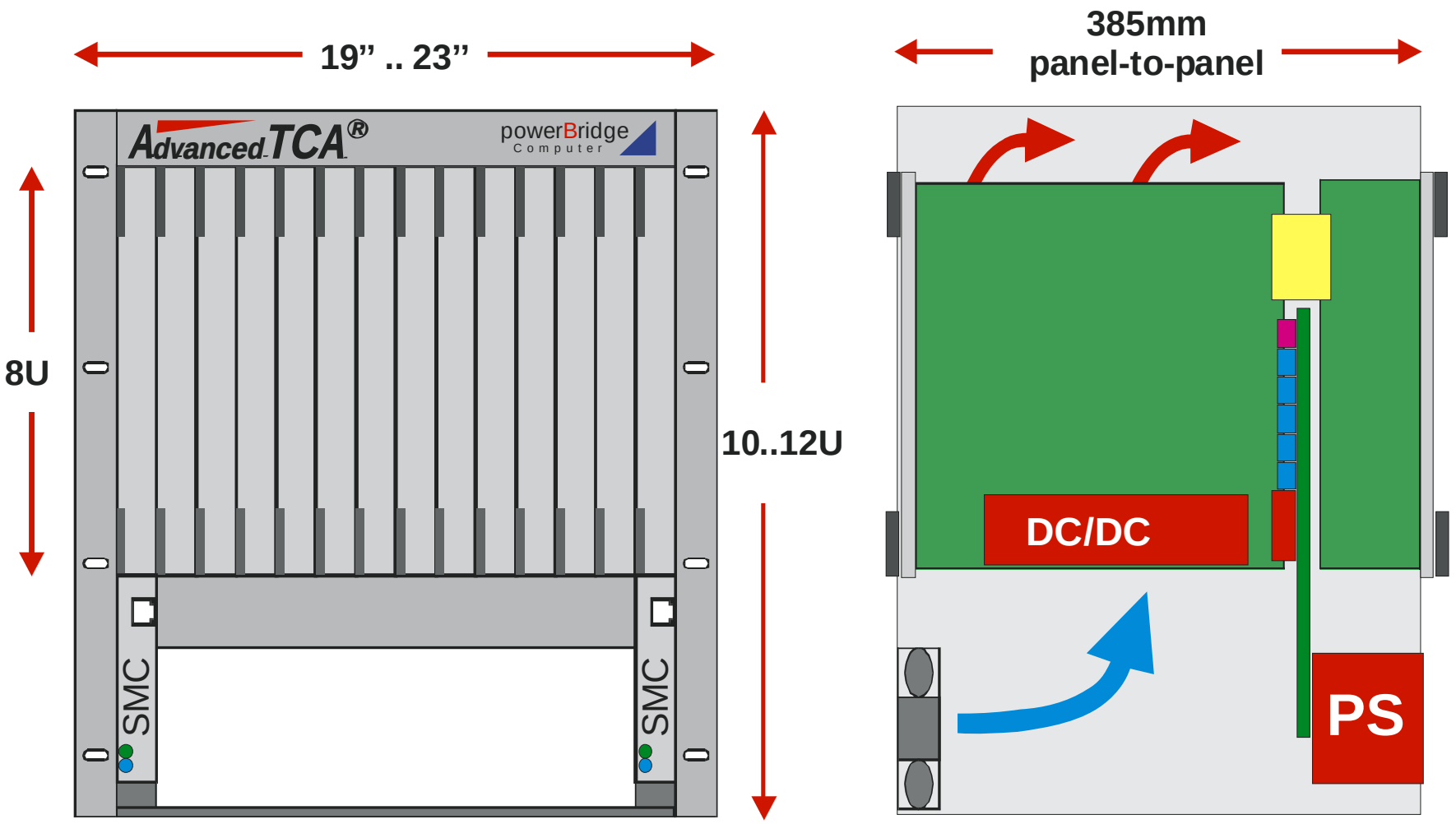
Why ATCA/ ATCA Advantages

- ATCA delivers highest availability and processing power
- 200W power dissipation per slot and bigger board form factor (8Ux280mm) enables high-end CPUs and switches
- Originally proposed for telecom applications, ATCA penetrates new applications fields like simulation, and medicine and real-time processing of fast signals
- Worldwide accepted standard (more than 100 companies)

Networkconnection		AdvancedTCA PICMG 3.0	
Description	Topology	PICMG 3.x	Bandwidth
Ethernet und Fibre-Ch	Dual Star	3.1	10Gbits/s
Infiniband	Dual Star or Full Mesh	3.2	30Gbits/s
StarFabric	Dual Star or Partial Mesh	3.3	10Gbits/s
PCI Express/AS	Dual Star or Full Mesh	3.4	10Gbits/s/Lane
Serial RapidIO	Dual Star or Partial Mesh	3.5	10Gbits/s

ATCA Chassis



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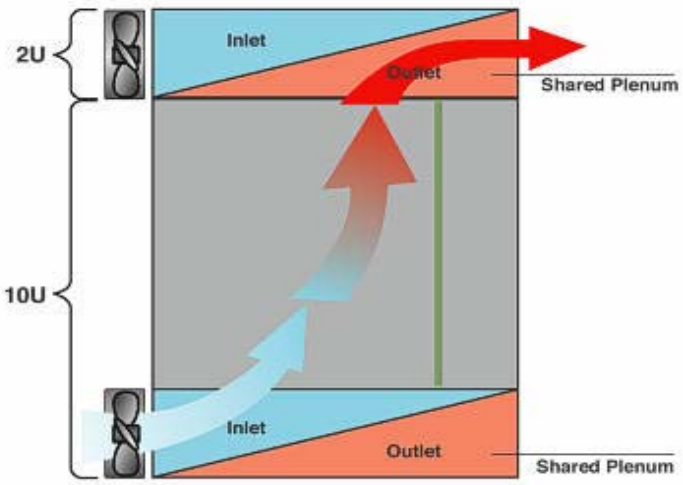
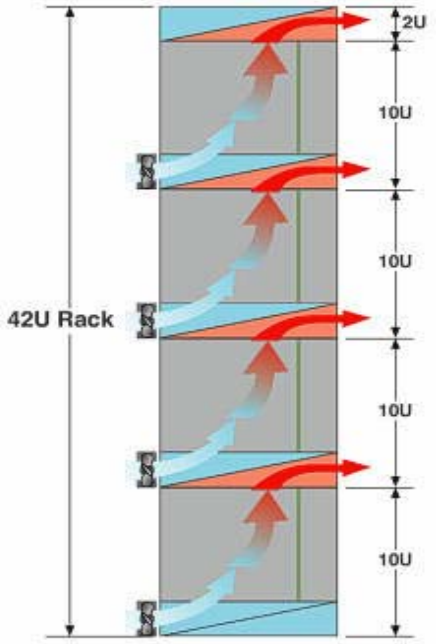
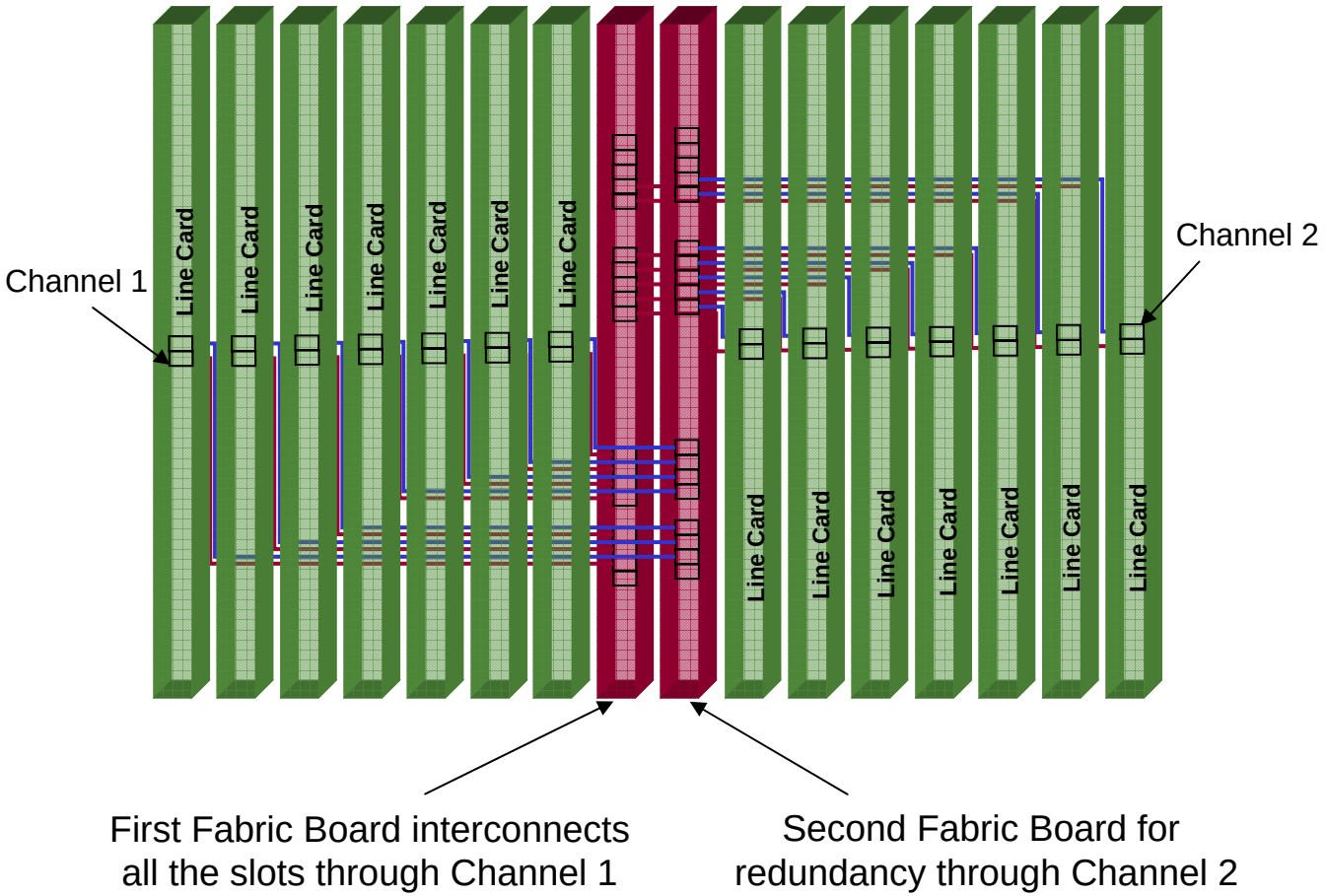
ATCA-8014 AdvancedTCA Rack

- Key Features
  - 10HE AdvancedTCA Chassis, Hot-Swap Support, PICMG 3.0 R1 kompatibel,
  - Bis zu 4 Chassis pro 19"-Schrank möglich
  - 12 Payload und zwei Switch Steckplätze
  - Dual-Star, Dual-Dual-Star oder Full-Mesh 10/100/1000BaseT Backplane
  - Redundante Stromversorgung: -48 V oder optional 110/240 V
  - 200 W pro Slot





Dual Star topology, PICMG 3.3/3.4



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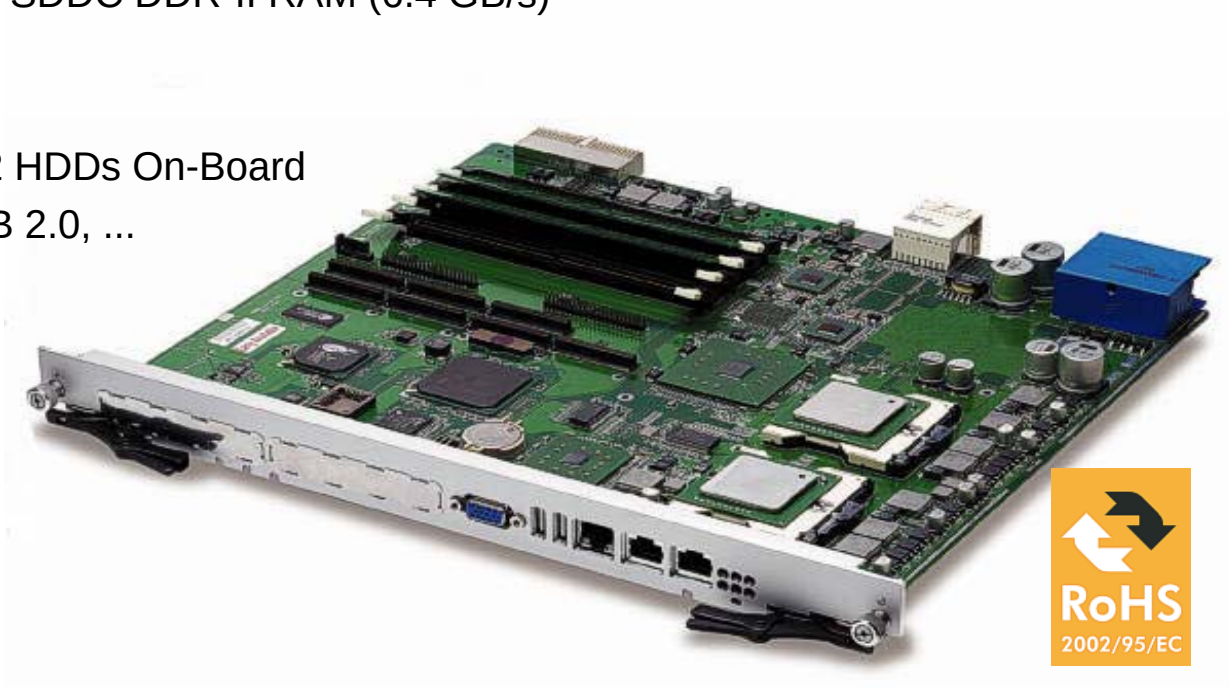
ATCA-6890 High-End AdvancedTCA CPU

- Key Features
  - 8HE/4TE High-Performance CPU-Board
  - Dual 3.7 GHz Xeon / NG Xeon Prozessor
  - Intel 7520 Server Chipsatz, 800 MHz FSB
  - Up to 16 GB Dual Channel SDDC DDR-II RAM (6.4 GB/s)
  - two 64-bit PMC-X slots
  - 7 Gigabit Ethernet ports
  - two SATA Ports, optional 2 HDDs On-Board
  - ATI-Rage-XL Grafik, 4 USB 2.0, ...
- Software Support
  - LINUX
  - VxWorks
- Available product



RoHS 2002/95/EC

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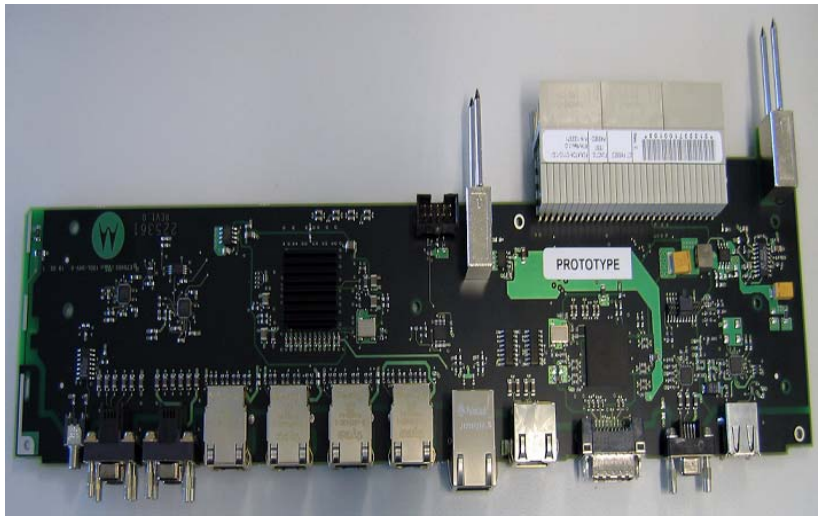
Motorola ATCA-C110

- 4x AMC Sites
- Fabric Interface Module
  - PCI-Express Control Plane
  - 24x Gbe and 2x XAUI Ethernet Switch
    - PICMG 3.0
    - PICMG 3.1
  - S-ATA Mux
- 1GHz 8540 Service Processor
  - 512MB DDR SDRAM
  - 128MB User Flash
  - CompactFlash Interface
- MV CGE Linux 4.0 (2.6)
- BBS Release 2.3 (Centellis Release 3.0)
- Netplane Core Services Release 3.0
- Optional RTM
- Qualified and Tested with PrAMC-7201



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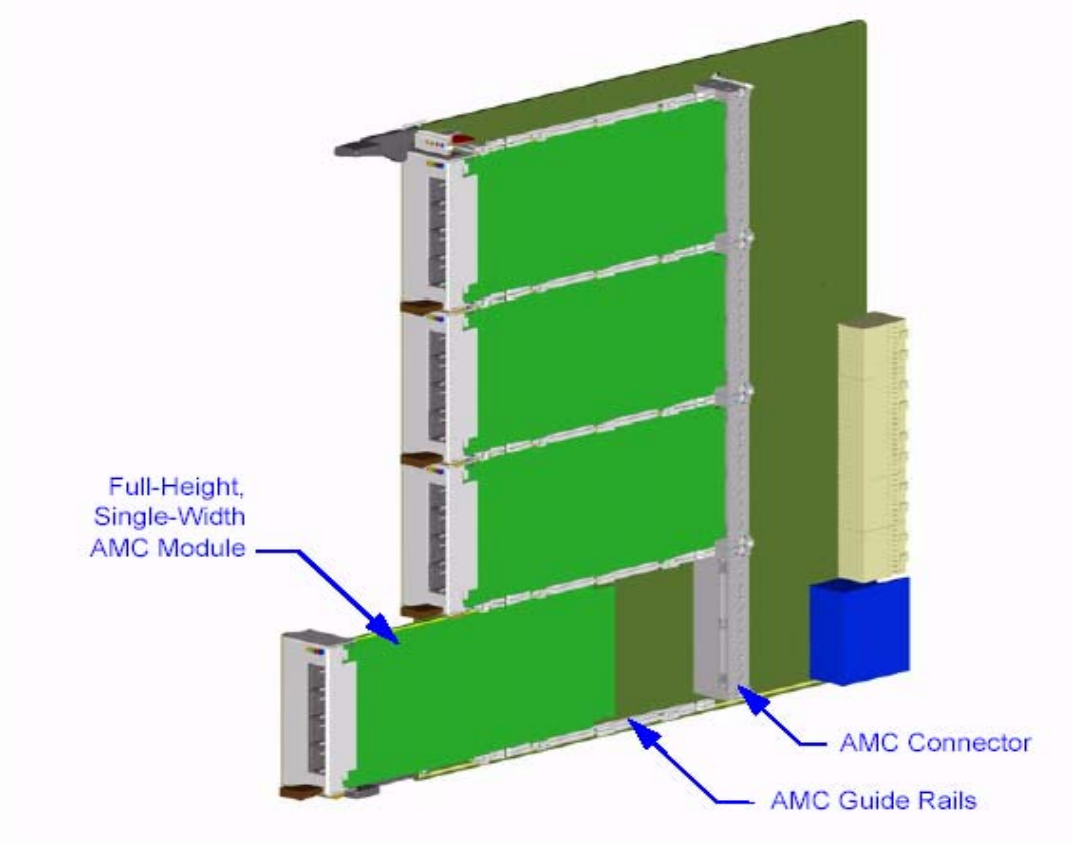
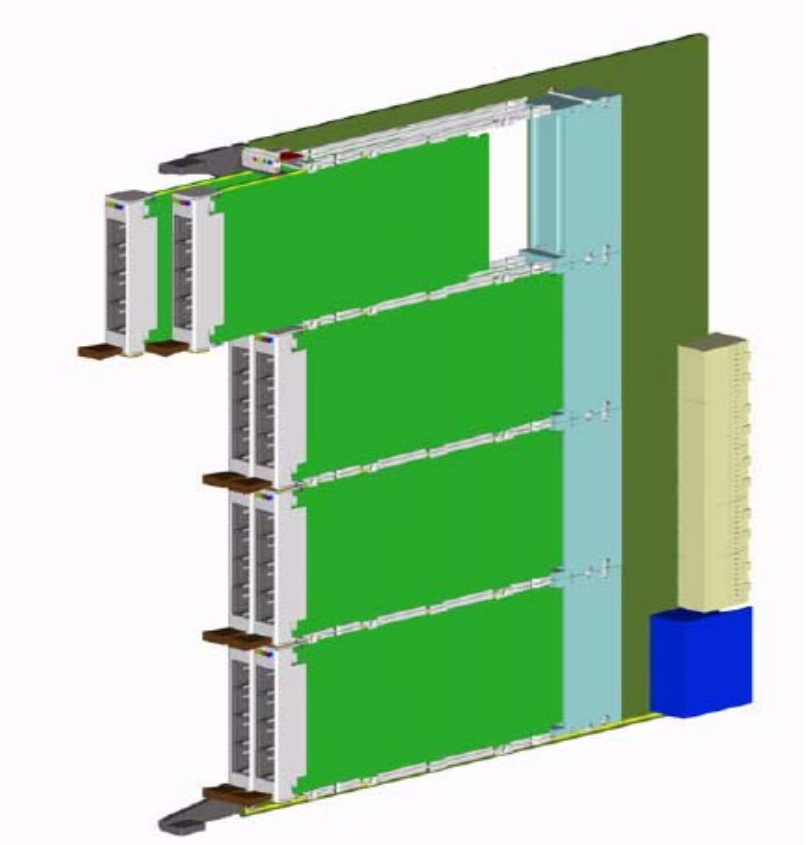
ATCA Carrier Card in Conjunction with AMC Modules





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System hardware management

- Chassis Management/System Management Controller
  - Handles complete chassis incl. fans, PSUs
  - IPMI serial bus for access to shelf resources
  - E.g. Pigeon Point SW/ OS independant
  - Manageable via SNMP or local console
- Payload/Device management
  - Hot-swap management
  - Reset and power supply control
  - Thermal and voltage monitoring

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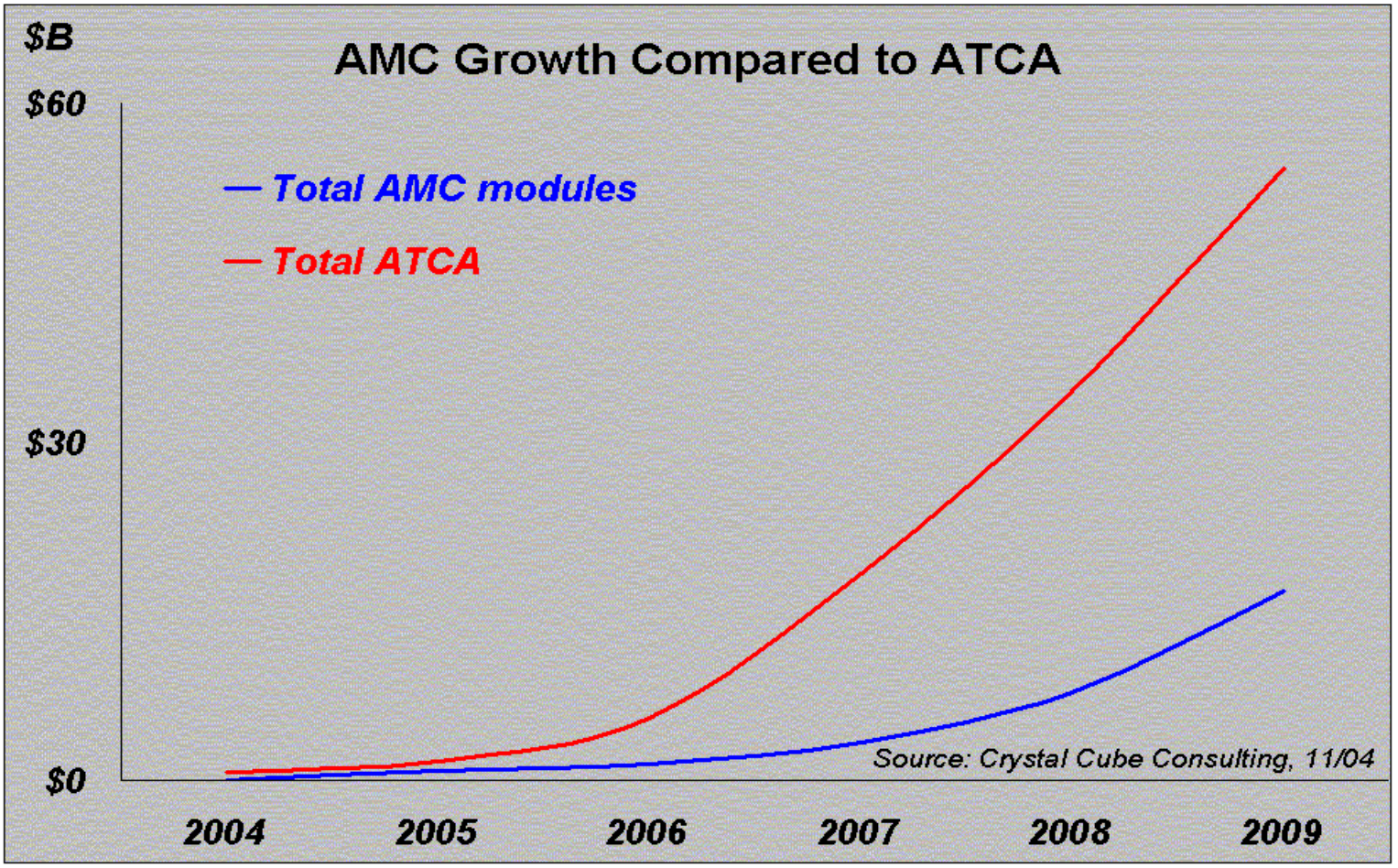
Expected Growth



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Network connections

- InfiniBand
  - Point-to-point connection
  - Switchable connection (no Hubs)
  - Bandwidth not shared
  - “Unlimited” nodes (Size of VC memory is the only limitation)
- PCI-Express
  - Point-to-point connection
  - Switchable connection
  - Limited nodes (limited resources)
- Serial RapidIO
  - High performance, low pin count
  - Intrasystem interface for memory/storage or board-to-board connection
- Ethernet
  - Fast Ethernet
    - Mature/legacy technology
  - GbE
    - Defacto standard in computing
  - 10GbE
    - Uplink/Interlink function in ATCA switches and backbones

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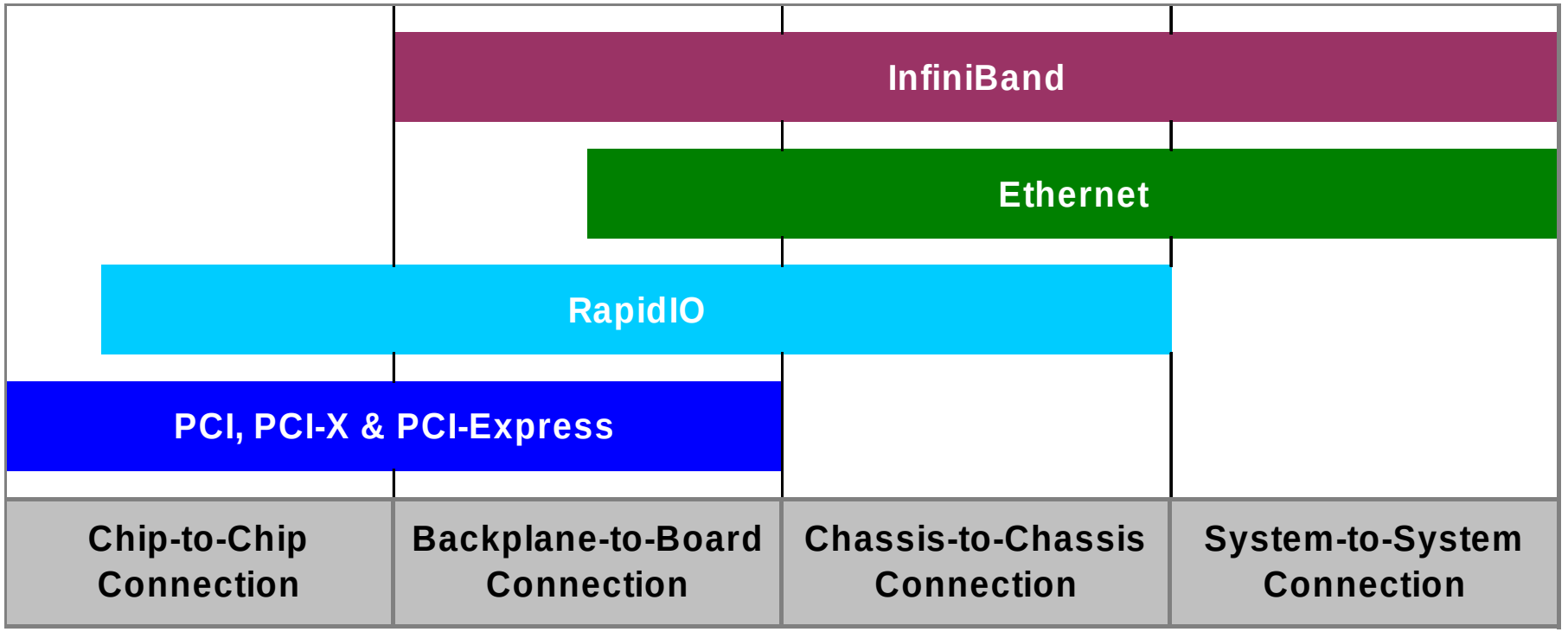
Bus connection overview



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Architecture

- AdvancedTCA **(Advanced Telecommunication Computing Architecture)**
  - Architecture: Ethernet, InfiniBand™, Star Fabric™, PCI-Express
- AMC **(Advanced Mezzanine Card)**
  - Architecture: Ethernet, serial Rapid IO, PCI-Express (advanced switching)
  - Wide range of I/O-functions
- µTCA **(Micro Telecommunication Computing Architecture)**
  - Defines a system architecture for AMC plugged into a backplane

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Standardization Organisations

- **PCI-Bus (Peripheral Component Interconnect Bus)**
  - Standardization: done by PICMG (PCI Industrial Manufacturers Group)
  - Bus architecture: Parallel 1 to 8 Slots, 32-bit/64-bit, 33/66 MHz
  - Standards: PCI, cPCI, PICMG 2.16 / CompactTCA, PXI
  - Mezzanines: PMC, PrPMC, PTMC, PC104+, MiniPCI
  - Data rate: 132 .. 528MByte/s
- **AdvancedTCA (Advanced Telecommunication Computing Architecture)**
  - Standardization: done by PICMG
  - Bus architecture: Serial communication via Ethernet, InfiniBand, ATM, FC, .. 1 to 24 Slots
  - Mezzanines: AMC (Advanced Mezzanine Card)
  - Data rate: up to 40Gbit/s per Slot

Standardization

- AMC.0 (Advanced Mezzanine Module)
  - Define a mezzanine building block approach for the addition of crucial functionality to a PICMG 3.0 carrier card available from a number of third party suppliers.
- AMC.1 (Advanced Mezzanine Module PCI Express and Advanced Switching)
  - Defines port usage for PCI Express and Advanced Switching environments on AMC.0
- AMC.2 (Advanced Mezzanine Module Ethernet)
  - Defines port usage for Ethernet on AMC.0
- AMC.3 (Advanced Mezzanine Module Storage)
  - Defines port usage for Fibre Channel on AMC.0
- AMC.4 (Advanced Mezzanine Module Serial RapidIO)
  - Defines port usage for Serial RapidIO on AMC.0

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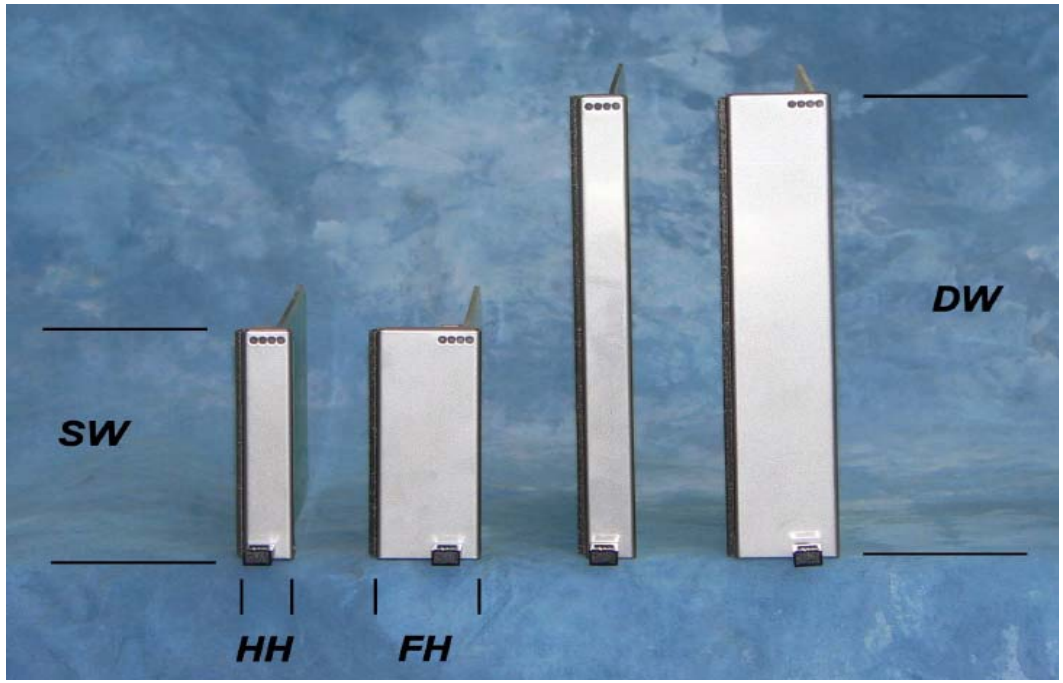
AMC Module Form Factors

- 6 different form factors are available
  - SW (single width) (73,5 mm)
  - DW (double width) (149 mm)
  - HH (half height) (13,88 mm)
  - FH (full height) (28,95 mm)
  - Two midsize formfactors still in discussion
- Modules depth 181,5 mm



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Comparison PMC vs. AMC

Comparison	PMC	AMC
Form Factor	Single & Double Wide	Single & Double wide Full height or stacked half height
Connectors	Unshielded P1386	Shielded differential pairs (21 duplex ports)
Interconnect	PCI (66/64) PCI-X (133/64) Ethernet	1 GbE, FC, PCI-Express, IBX, XAUI, 10GbE
Interconnect Speed	PCI: 1 – 4 Gb/s Ethernet: 1 Gb/s	1 to N+12.5 Gb/s
IPMI	None	Dedicated IPMI bus
Hot Swap	Not available	Yes
Power	7,5 – 12 Watts	20/40/60 Watts SW/HH; SW/FH; DW/HH/FH

AMC Benefits

- Modularity and flexibility
- Reduced development time and cost (COTS)
- Hot Swap support
- High Speed serial interconnect (LVDS)
- Includes IPMI (limited management functions)
- Max. 60W power dissipation
- Single 12VDC power supply

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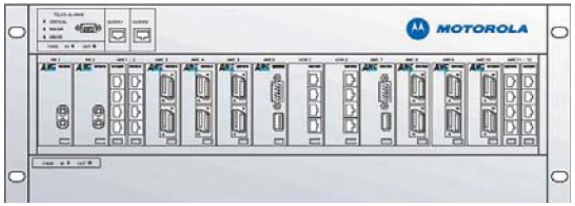
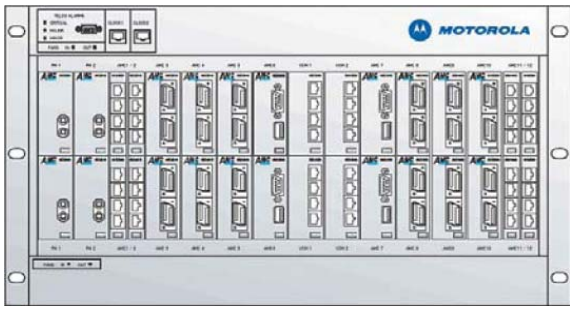
µTCA

- µTCA is new
- It’s a small form-factor
- It’s high volume, low-cost
- Will become an industrial standard
- It’s plugged directly into a chassis and backplane
- Are Advanced Mezzanine Cards (as used on ATCA carriers)
- Currently under development (final expect 07/2006)





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AMC Functions

- Processors
  - CPUs, DSPs, FPGA
- Telecom connectivity
  - ATM/POS (OC3, OC12, OC48), E1/T1, VoIP, GbE,…
- Network processors
  - NPUs
- Communications Co-processors
  - Security, intrusion detection, classification
- Mass Storage
- Connectivity
  - Digital I/O, Analog I/O, serial ports, Fieldbus and others

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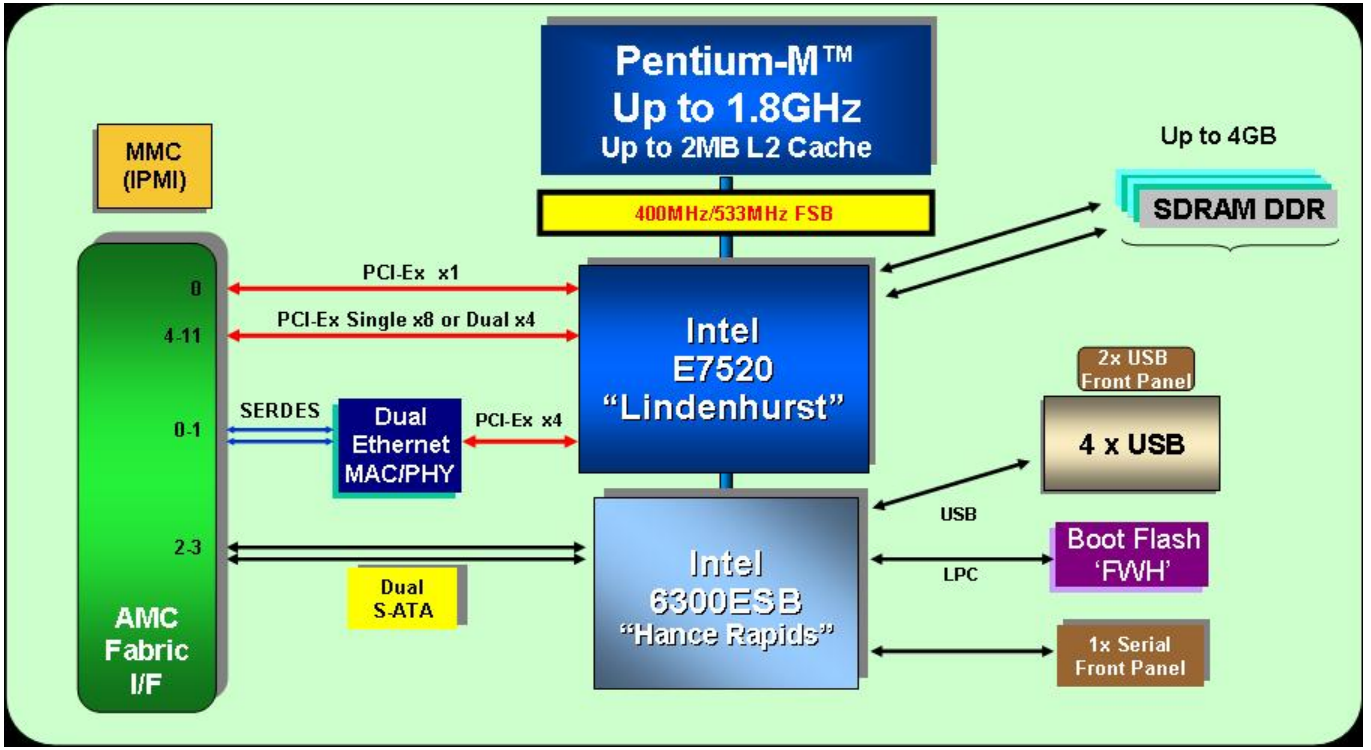
Motorola prAMC-7201

- **prAMC-7201**
  - **1.4 – 1.8GHz CPU speed**
  - **Up to 2GB DDR2 memory**
  - **PCI-e, GbE and SATA fabric ports**
  - **Linux OS**



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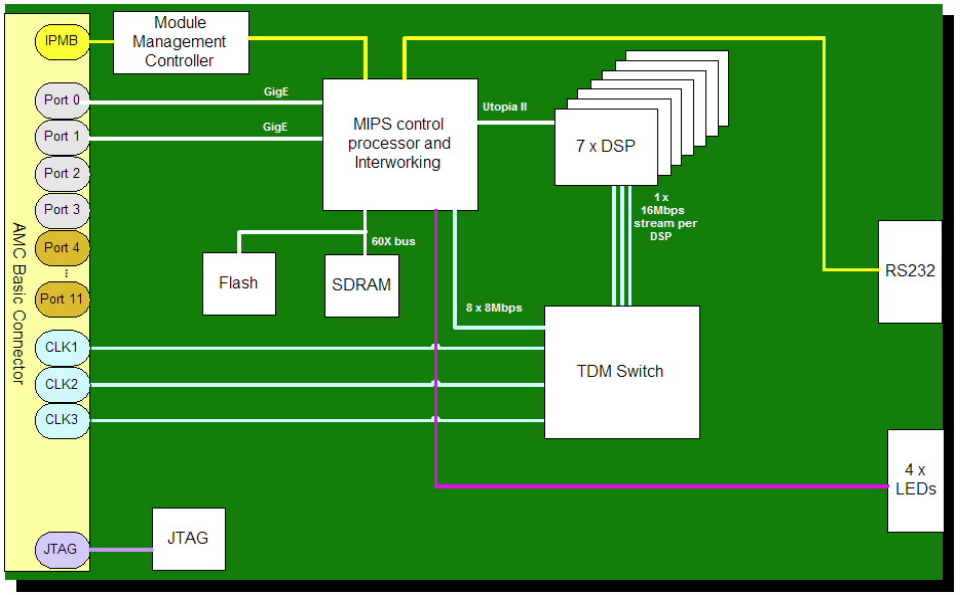
Motorola VOIP AMC-8222

- Software
  - Embedded SIP User Agent
  - Separate control and data IP addresses
- Channel Density
  - Full VoIP channels:
    - 672 channels G.711
    - 672 channels G.729
    - 504 channels GSM-AMR
    - 336 channels SMV
- AMC I/O
  - Compliant with PICMG SFP.1 Internal TDM support
- Management
  - SNMP MIB
  - Web configuration



Motorola Storage AMC-S301

- **AMC-S301** Single Disk Module
  - **Extended duty SATA disk, 80GB**

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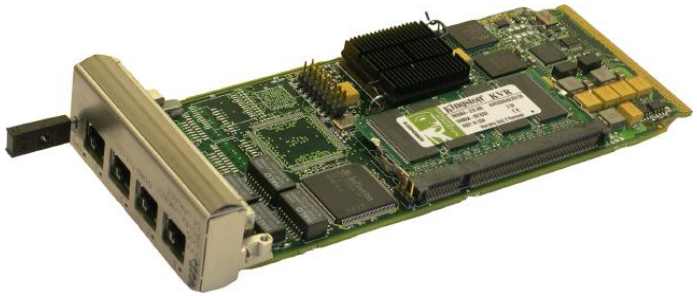
Interphase AMC Roadmap

- AMC portfolio
  - iSPAN 3639 – quad/octal T1/E1 controller (GA 1Q06)
  - SlotOptimizer 364G – quad GE (GA 1Q06)
  - iSPAN 3677 – quad OC3/single OC12 interface adapter, WinPath
  - iSPAN 3650 – quad OC3/single OC12 plus WinPath, applications SW
    - Possible 3650C for channelized OC3
  - iSPAN 3632C – Channelized OC3, quad port
  - iSPAN 36NP – Intel IXP 2350 NP with dual GE front and dual GE rear
  - iSPAN 3676 – dual active OC3 based on dual Mindspeed
  - iSPAN 3683 – Network security processor with Hifn 8350



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Summary

- MicroTCA specification currently under development
- connects Advanced Mezzanine Card (AdvancedMC) modules through a backplane
- it builds on the hot-swap and switch fabric capabilities
- define a modular scaleable computing platform
- capable of addressing applications that require up to 5 NINES service availability
- be cost-effective in less demanding applications
- same basic architecture between AMC, ATCA, and uTCA
- manageability of MicroTCA systems
- software migration between platforms (uTCA and ATCA) very easy
- reuseability of hard- and software
- improved cost efficiency through economie of scale

“We see MicroTCA being used in telecom edge applications where small physical size and low entry cost are key requirements, such as WiMAX access points, DSLAMs and VoIP access gateways,” said Shlomo Pri-Tal, chief technology officer, Embedded Communications Computing, Motorola. “It can also support a variety of applications in medical, industrial and defense segments. The MicroTCA and AdvancedTCA standards will complement each other and together they will be able to address a very broad spectrum of applications with standards-based platforms.”

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Sources

- www.advancedTCA.org
- www.pcisig.com
- www.picmg.org
- www.powerbridge.de
- www.rapidio.org
- www.saforum.org
- www.starfabric.org

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