



powerBridge

Computer

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- Founded in 1993, Headquartered in Burgwedel / Hannover
- Distribution of computer boards and systems into telecom, industrial automation, traffic control, and defence applications
- World Leading Manufacturers:

  ADLINK, Interface Concept, Interphase, Motorola Embedded Communication Computing Group, Schroff, TEWS, Thales Computers
- Products: Boards, Systems, Systemintegration, OEM-Solutions, Driver, Protocolls, Operating systems
- Standards: AdvancedTCA, VMEbus, CompactPCI, microTCA, AMC, PMC, IndustryPack

ADLINK TECHNOLOGY INC. IC INTERFACE CONCEPT INTERPHASE® MOTOROLA Computer Group

SURF Schroff® TEWS TECHNOLOGIES THALES

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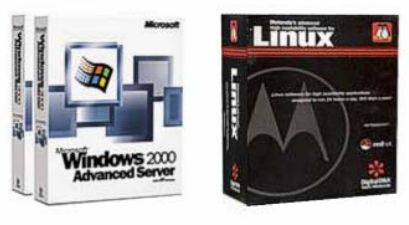
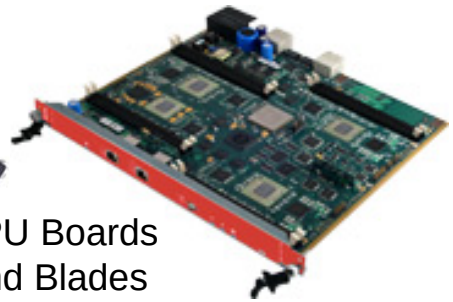
Boards & Systems for Industrial Applications

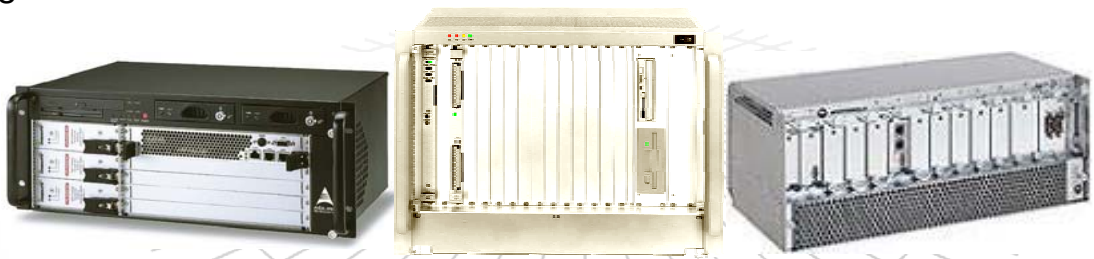


Software

I/O Boards

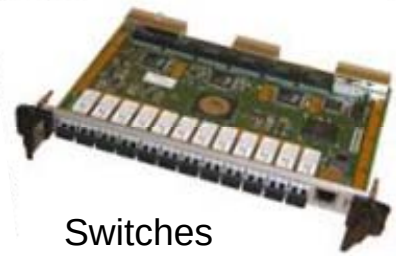


CPU Boards
and Blades



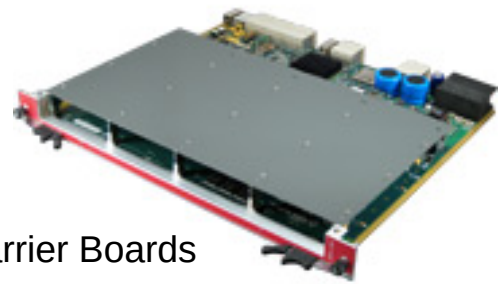
AdvancedTCA, VMEbus,
CompactPCI and µTCA Chassis

System Development
and Integration



Switches

Industrial PCs



Carrier Boards

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Industrial Standards for Embedded Computer

By Kay Klockmann

Industrial Bus Standards for Computer Systems

PCI-Bus (Peripheral Component Interconnect Bus)

- Standardization: Through 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 Measurement-Bus
- Mezzanines: PMC, PrPMC, PTMC, PC104+, MiniPCI
- Data Rates: 132 .. 528 MB/s

VMEbus (VERSAmodule Europe Bus)

- Standardization: Through VITA (VMEbus International Trade Association)
- Bus Architecture: Parallel, 1 to 21 Slots, 8/16/32/64-bit
- Standards: VMEbus, VME64, VME2eSST (VME320)
- Data Rates: 10 .. 320 MB/s

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Industrial Bus Standards for Computer Systems

- AdvancedTCA (Advanced Telecommunication Computing Architecture)
  - Standardization: Through PICMG
  - Bus Architecture: Serial Communication over Ethernet, Infiniband, ATM, FC, .. 1 to 24 Slots
  - Data Rates: up to 40 Gbit/s per Slot

- MicroTCA (Micro Telecommunication Computing Architecture)
  - Standardization: Through PICMG
  - Defines a system architecture for AMC plugged into a backplane

- AMC (Advanced Mezzanine Card)
  - Standardization: Through PICMG
  - Bus Architecture: Serial Communication over Ethernet, serial RapidIO, PCI Express (advanced switching), FC
  - Data Rates: up to 40 Gbit/s per Slot

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Comparison VMEbus, CPCI, µTCA, SMTCA

	VMEbus	CompactPCI	MicroTCA	Simple MicroTCA
Bus Architecture	Parallel	Parallel	Serial	Serial
System Architecture	Multi Master	Master/Slave	Multi Master, switched fabric	Multi Master, fixed connections
Interconnect	VME32, VME64, VME320, Ethernet	PCI (32/64-bit), Ethernet	PCI Express, Ethernet, serial RapidIO, FC, SATA, SAS	PCI Express, Ethernet, serial RapidIO, FC, SATA, SAS
Bandwidth	Up to 320 MB/s	Up to 500 MB/s	Up to 5 GB/s	Up to 5 GB/s
IPMI	No	Yes	Yes	Yes
Hot Swap	No	Yes	Yes	Yes
Power	Max. 93W	Max. 50/100W	20-80W	20-80W, low power option

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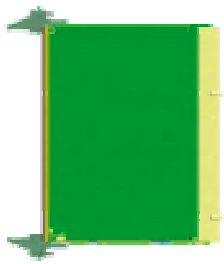
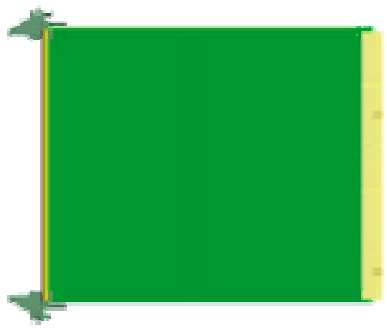
Comparison ATCA vs. CPCI

- PICMG 2.X Limitations
  - Max. power per slot 50/100W (cTCA)
  - Card format limits functions
  - Rear I/O not usable for optical connections
  - Weak connectors
- PICMG 3.X Advantages
  - Max. power per slot 200W
  - Bigger form factor 8Ux280mm
  - No dedicated rear I/O format
  - Robust connectors

CompactPCI®



AdvancedTCA™



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Comparison PMC vs. AMC

	PMC	AMC
Form Factor	Single & Double Wide	Single & Double wide Compact, Mid-size or Full-size
Connectors	Unshielded P1386	Shielded differential pairs (21 duplex ports)
Interconnect	PCI (66/64) PCI-X (133/64) Ethernet	Ethernet (GbE, 10GbE, …) Fibre Channel, SATA, SAS, PCI Express, Serial RapidIO
Interconnect Speed	PCI: 1 – 4 Gb/s Ethernet: 1 Gb/s	1 to N+12.5 Gb/s
IPMI	None	Yes
Hot Swap	Not available	Yes
Power	7,5 – 12 Watts	20/40/80 Watts C/DC, MS/DMS, FS/DFS

Standardization AMC

- AMC.0 (Advanced Mezzanine Module)
  - Defines 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, SATA or SAS on AMC.0
- AMC.4 (Advanced Mezzanine Module Serial RapidIO)
  - Defines port usage for Serial RapidIO on AMC.0

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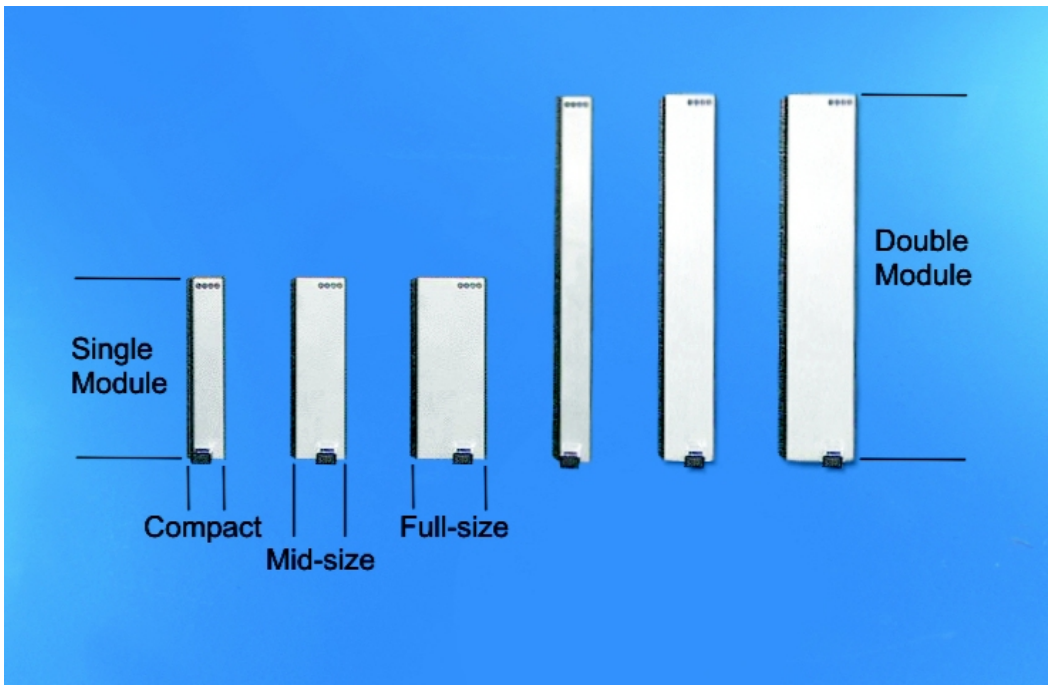
AMC Module Form Factors

- 6 different form factors are available
  - Compact (C)
  - Double Compact (DC)
  - Mid-Size (MS)
  - Double Mid-Size (DMS)
  - Full-size (FS)
  - Double Full-size (DFS)
- Modules depth 181,5 mm



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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. 80W power dissipation
- Single 12VDC power supply

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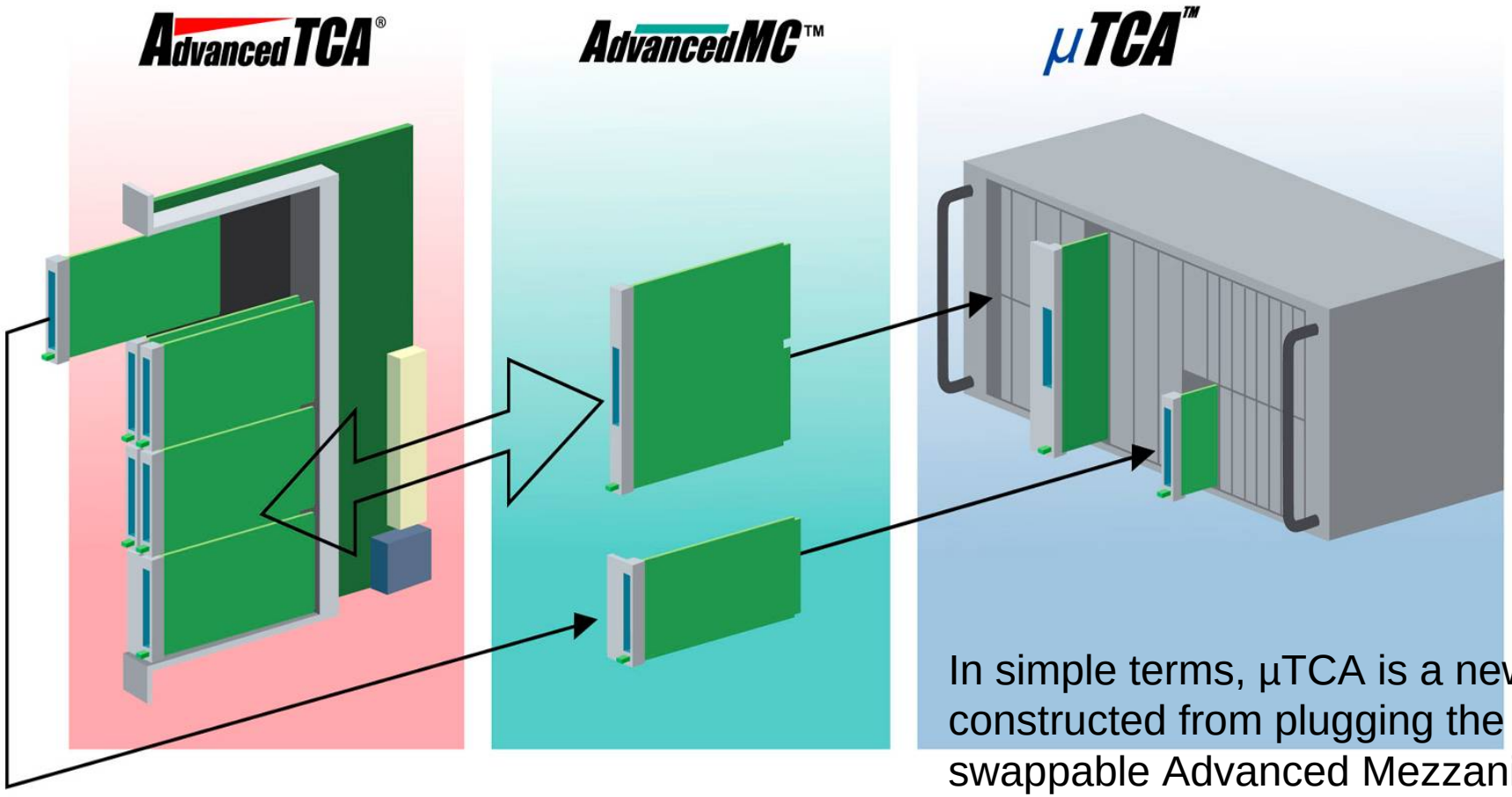
What is µTCA ?



In simple terms, µTCA is a new system constructed from plugging the hot swappable Advanced Mezzanine Cards into a chassis and backplane

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µTCA in Industrial Applications

- Advantages for Industrial Systems

  - Small, high density form factor
  - Easy service and upgrade
  - Very good support for extended operating conditions
  - High throughput backplane
  - System management
  - Platform for the next 10 years

- Disadvantages

  - The MCH has features that are not required in many applications
    the costs are inacceptable high
  - The PM carries also features which create inacceptable costs
  - To many options

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Simple MicroTCA®

How to Use µTCA in Industrial Applications

What is ‘Simple MicroTCA‘?

- Simple MicroTCA defines a reduced and clear functionality for a µTCA system, following these rules:

  Simplifying, Cost Reduction, Full AMC Compability

- The result: Cost reduction to 1/3 of a standard µTCA system

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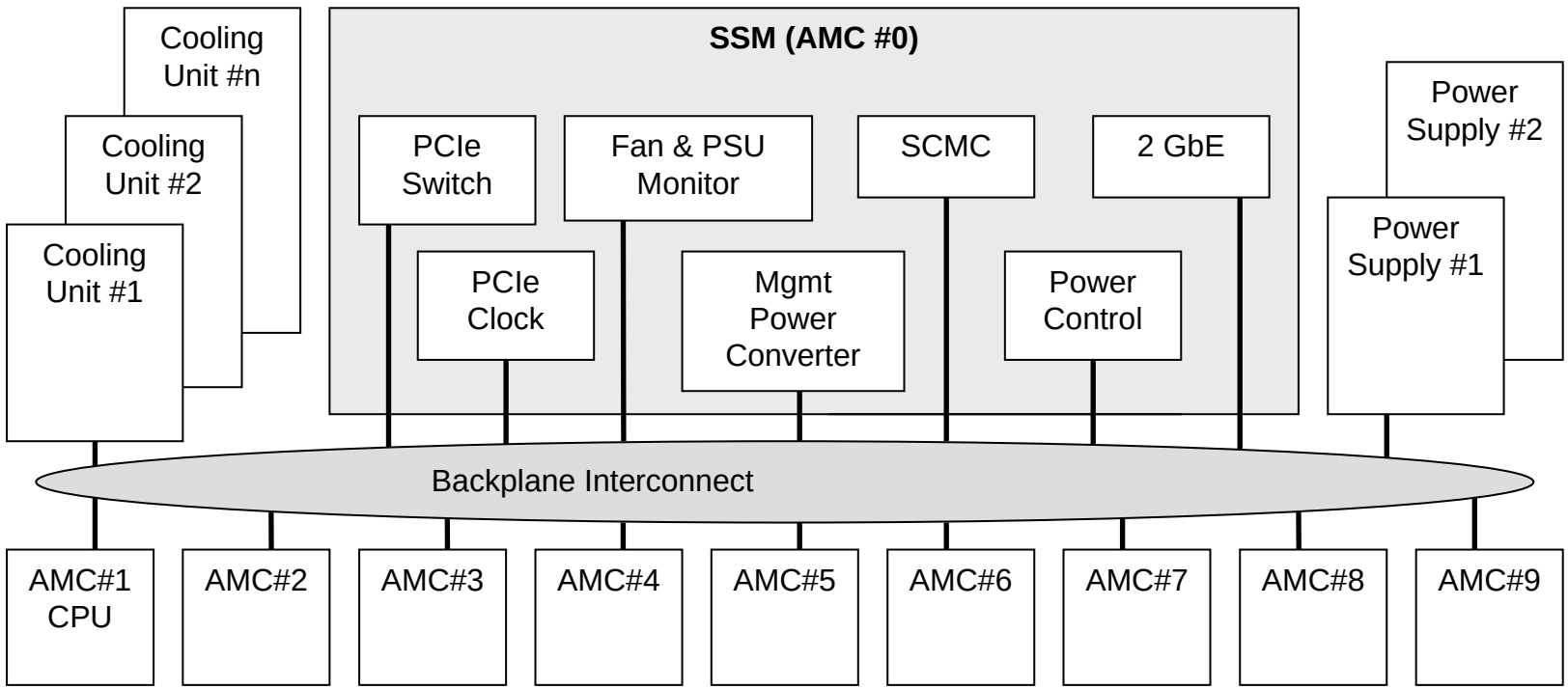
µTCA System without MCH and PM

- Simple MicroTCA (SMTCA) describes a computer system with AMC module slots that can operate without MCH and PM



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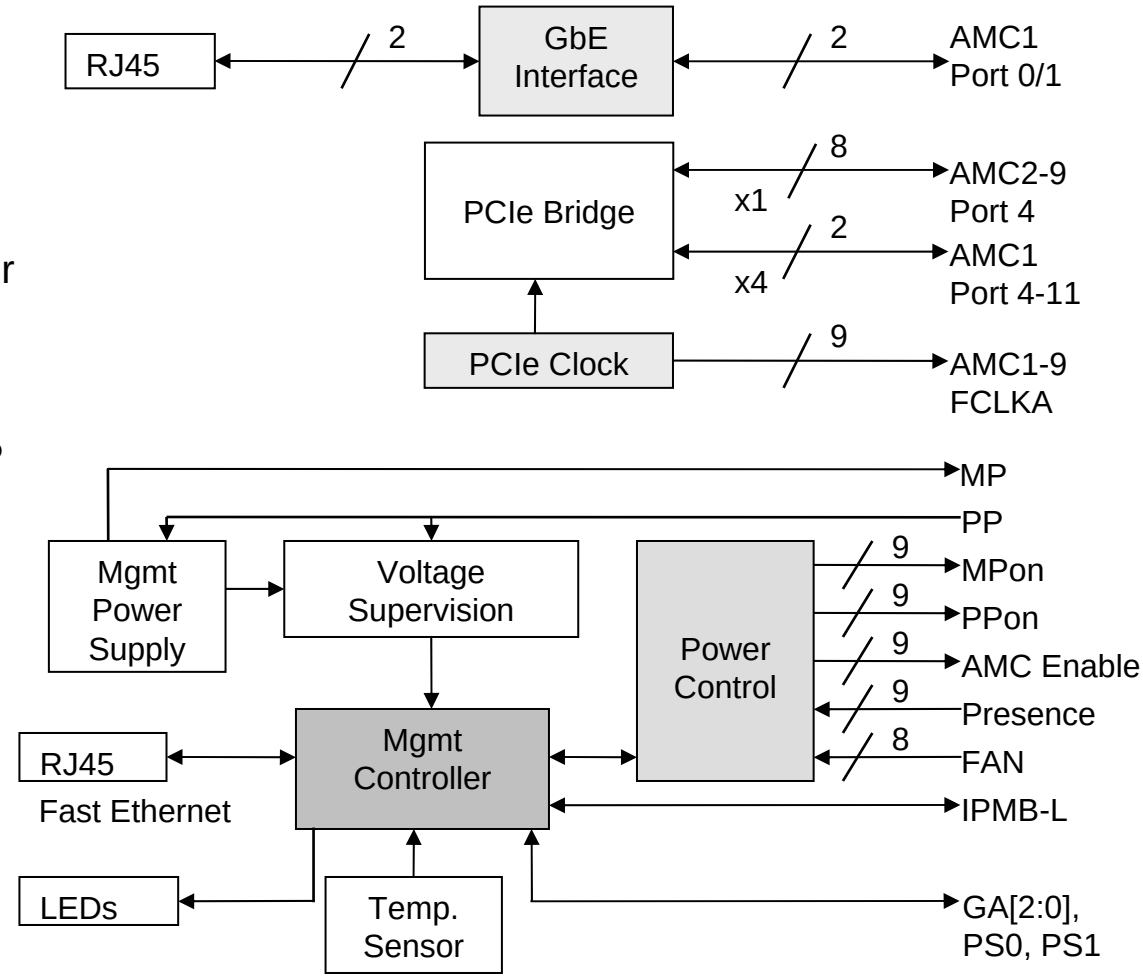
Differences between SMTCA and µTCA

1. Dedicated slots for one CPU module and I/O modules
2. PCIe x1 links AMC I/O slots
3. Fixed connections, no switched fabric
4. Support of 8 AMC I/O slots
5. Cost optimized Simple MicroTCA Support Module (SSM) replaces MCH and PM functions
6. PM replaced by simple AC power supply, or DC/DC converter, or ext. 12V supply
7. No redundancy supported
8. Small power supply, optional standard power supply

Simple MicroTCA Support Module

- AMC mid-size form factor
- PCIe switch x8 to 8 x1
- PCIe CLK generation
- DC/DC converter for management power supply
- Fan and power supply monitor
- Management controller with Ethernet FP interface
- Two GbE FP interfaces for CPU AMC ports 0 and 1



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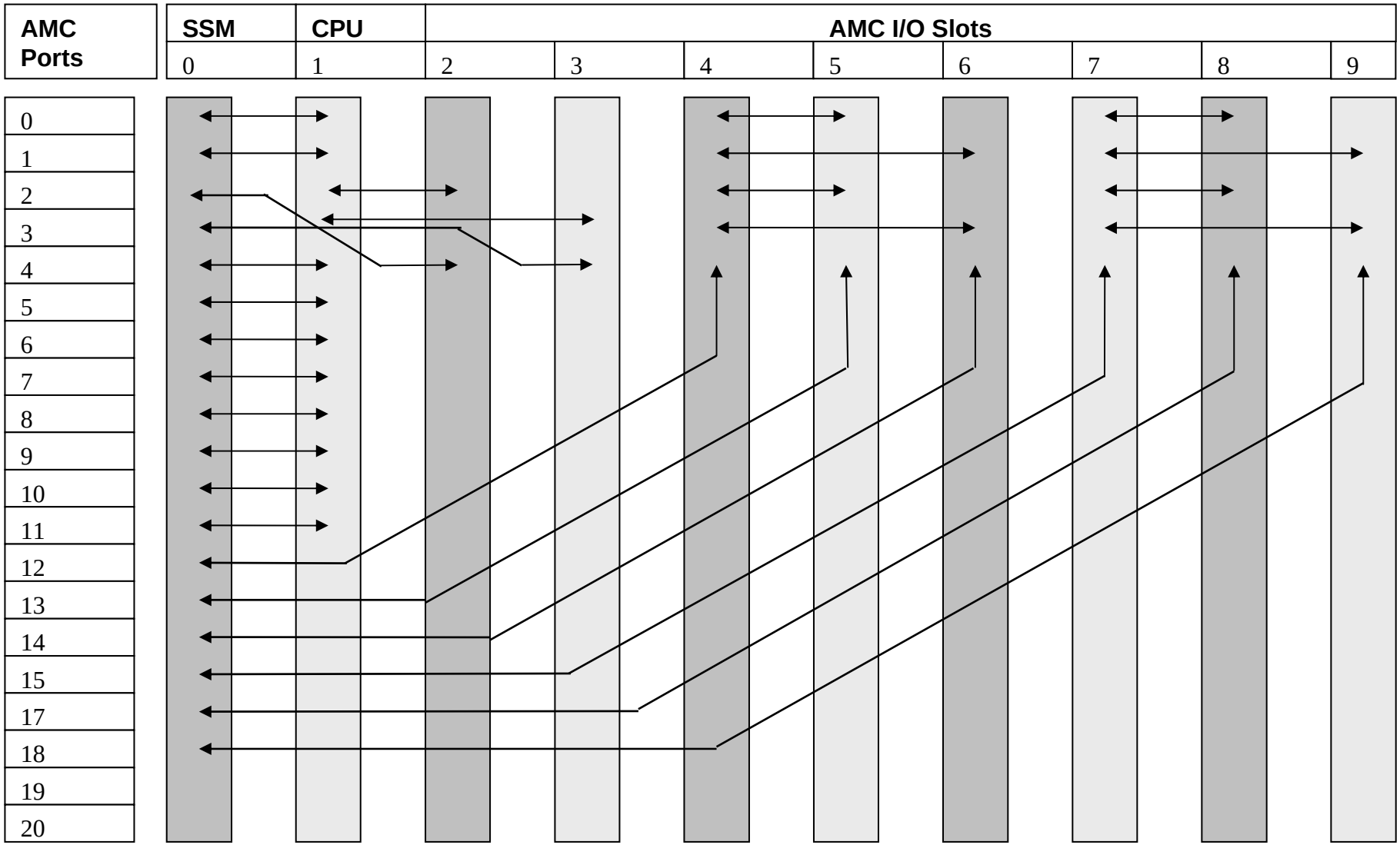
Simple MicroTCA Backplane



AMC ports 12 to 20 are reserved for rear I/O

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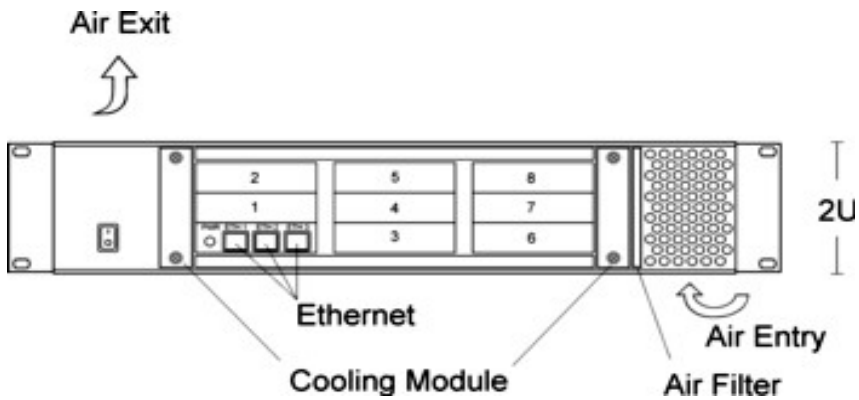
µTCA Chassis for Industrial Use

- 2U 19“ Rack Mount Chassis with 8 Mid-Size Slots

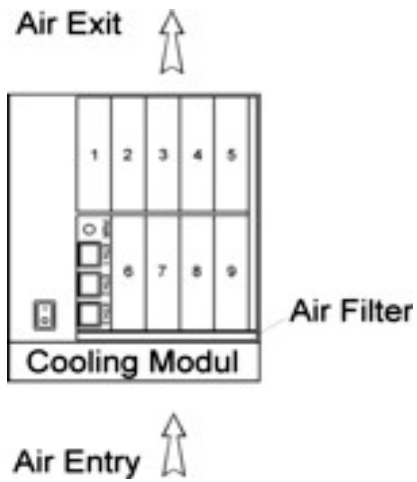
  No MCH slot, no PM slot, open frame AC PSU, front air inlet and rear air outlet, two hot-swap fan units, opt. DC PSU



2U Rack Mount Chassis, pBC

- Wall Mount Cube with 9 Mid-Size Slots

  No MCH slot, no PM slot, open frame AC PSU, hot-swap fan unit, opt. DC PSU



9 Slot Wall Mount Chassis, pBC

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SMTCA Perfectly Supports Industrial Needs

- Cost reduction to 3.300 EUR for a basic SMTCA system with CPU module and power supply
- Applications in transportation, defense & aerospace, medical, robotics, and high-end machine control

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Legals

PICMG, AdvancedTCA, ATCA, AdvancedMC, µTCA and their logos are trademarks of the PCI Industrial Computers Manufacturers Group

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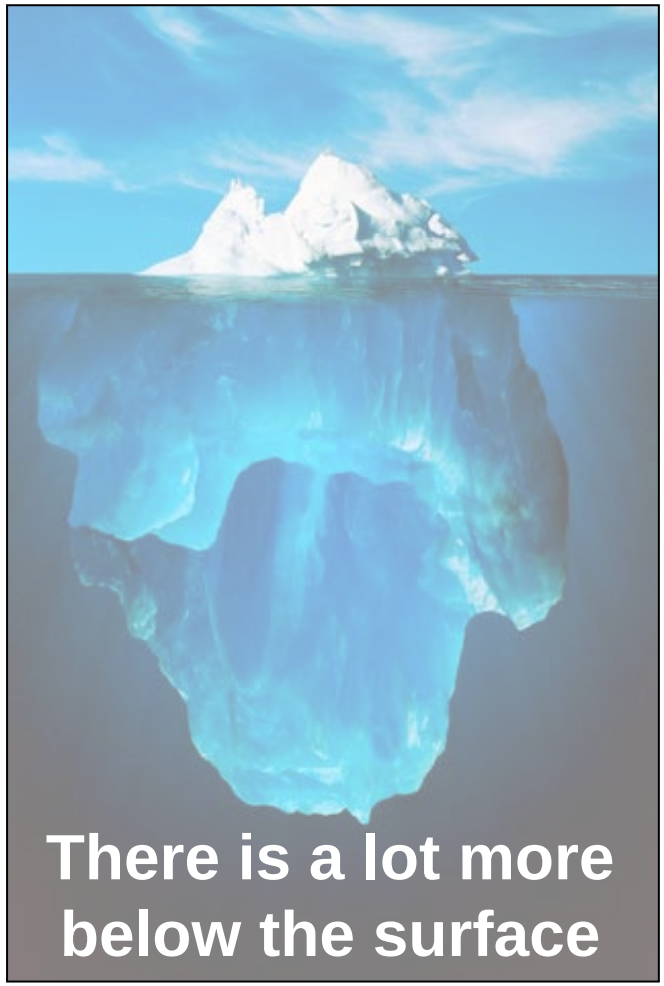
Thank you



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