



PICMG Update

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PICMG® *

PCI Industrial Computer Manufacturer's Group

- **Founded 1994 as a non-profit consortium**
 - Focus on open standards for embedded computing
 - Over 250 members companies
- **Deep engineering expertise in member companies:**
 - Electronic, mechanical, packaging, and thermal design
 - High speed signaling and simulation
 - Software and High Availability skills
- **Rigorous Intellectual Property policies**
 - Patent landscape known to implementers
 - No PICMG standard requires a license to implement (so far)
- **45 standards released to date**
 - More than \$10B in global revenue
 - Wide range of technologies including small form factor, networking, high-availability architectures, rugged computing and management

*Pronounced “Pick-M-G” or “Pick-Mig”

Special thanks to PICMG member companies Artesyn Embedded Technologies, Kontron, N.A.T, Pentair/Schroff and Radisys for providing photos used in this presentation



Value of Open Standards

Proprietary Solution

- Typically developed, built, and maintained by a single vendor
 - Little or no collaboration
- Generally expensive and rarely the latest technology
- Only the largest companies have all of the requisite skills to be experts on all elements
- Upgrades developed on vendor's timetable – the vendor “owns” you

Open Standard Solution

- Generally developed by non-profit consortia with many members that have a wide range of skills
- Multiple vendors provide price and feature competition
- If customers don't like their vendor(s) they can go someplace else
- Technology and improvements developed on industry timetable

Open Standards encourage innovation and differentiation amongst multiple vendors – interoperability is key



PICMG Technologies – CompactPCI®

- **CompactPCI Evolution**
 - First ratified in 1995
 - Switched fabric backplane in 2000
 - New versions have high speed serial interfaces
- **Popular and rugged Eurocard mechanics (3U and 6U)**
- **Used in a wide variety of industrial control telecommunications, transportation and automation applications**



CompactPCI®

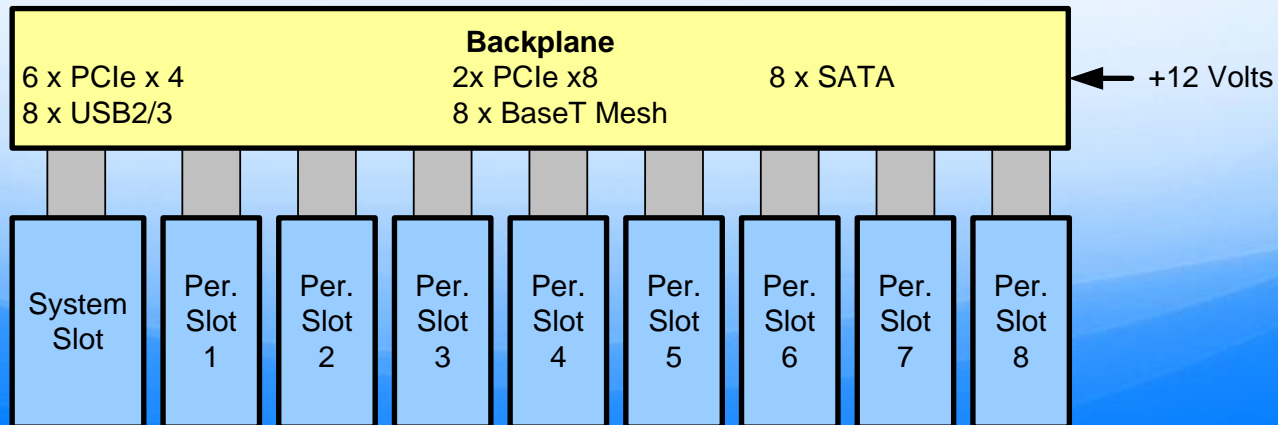




PICMG Technologies – CompactPCI® Serial

- Latest version of CompactPCI replaces older parallel buses with modern, high speed serial interfaces
- Can be used with older CompactPCI cards if needed
- Ethernet mesh, PCI Express, SATA, USB interfaces
- Hot swappable and can be either convection or conduction cooled
- Builds on 20 years of CompactPCI experience and familiarity

CompactPCI® Serial





PICMG Technologies - AdvancedTCA®

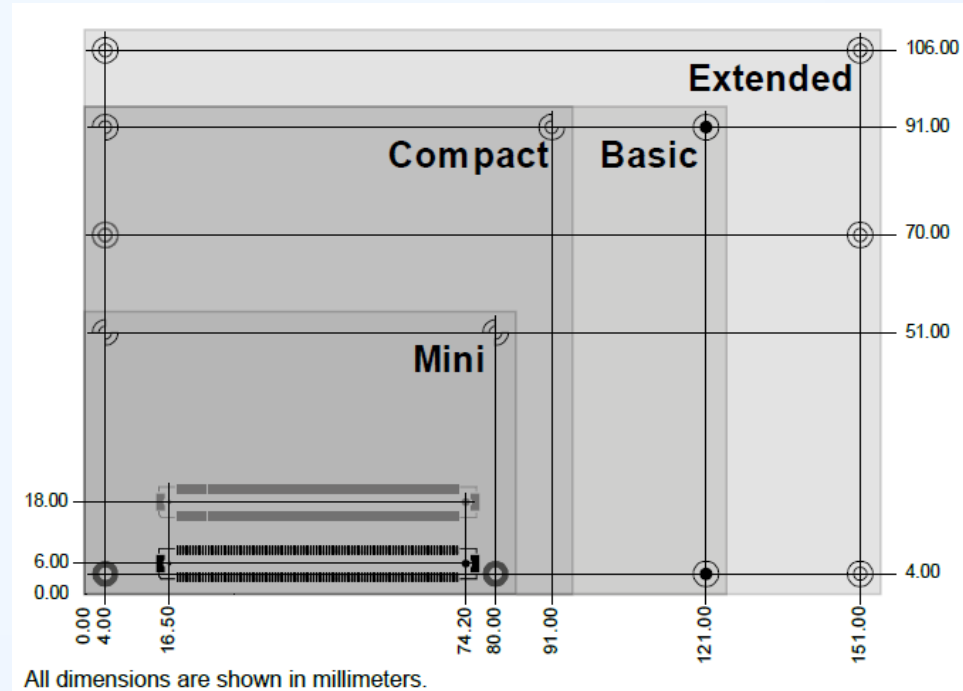
- The global standard for high end telecom equipment
- Modular, rugged, NEBS compliant
- Architected for High Availability
 - keeps running in the event of single item failures.
 - The only open architecture to offer this
- Global revenue greater than \$2B USD/year
- AdvancedMC® and MicroTCA® spinoff specifications
 - customization and miniaturization
 - Rugged versions available
- **VITA adopting ATCA Platform Management architecture for VITA 46 (VPX) with PICMG's blessing.**





PICMG Technologies – COM Express®

- COM Express® : small single board computer “engines”
- Variety of sizes supported
- One of the most popular high performance Small Form Factor architectures
- Can be plugged into a customer-supplied carrier containing application specific I/O – customer does not have to be a high speed signaling expert – that is done on the COM Express engine
- Carrier Design Guide freely available from PICMG web site



COM Express® basic



COM Express® compact



COM Express® mini





Evolution and Revolution

- **PICMG has developed roadmaps for the future of key technologies:**
 - **AdvancedTCA: add 100G backplane bandwidth, improved cooling, higher power capability, SDN and NFV, improved applicability for data centers (PICMG 3.7)**
 - **GEN4™ - a next generation platform with 10x system and module throughput, improved SWaP, reduced CAPEX & OPEX. Improved scalability and recognition of convergence of telecom central office and data center requirements.**



Conclusion

- **PICMG well established with significant track record of successful standards**
- **Extremely talented and diverse member base**
- **Strong Intellectual Property policies**
- **Low membership dues and not dominated by any single company**
- **Continuing evolution of key technologies**