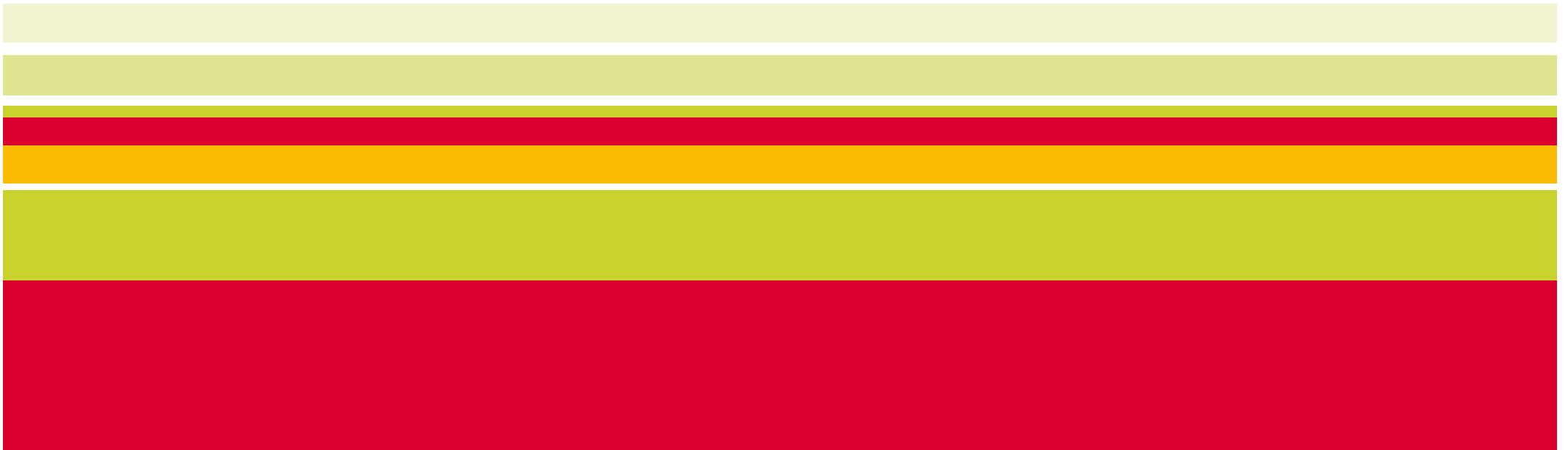




(microTCA)

A new emerging building practice standard



- Building practice standard (PICMG):
 - Open standard;
 - Smaller than ATCA™
 - More cost effective than ATCA
 - Multiple applications, including outdoor cabinets (telecom)
 - Status: Specification ratified (August 2006)
 - Supporting committee members: Ericsson, Lucent, Intel, Artesyn, Schroff and Agere, supported by Siemens, Rittal, Force and Radisys
- The μTCA concept is centered around AMC™ modules (Advanced Mezzanine Card) being plugged straight into a back panel.

PICMG Specification Series

AMC Market Segments
ATCA Carriers
Proprietary Carriers
MicroTCA

When the technology market collapsed in 2001 it left the telecomm market with a lot of dark fiber and without the capital to light it up. The solution was standardized hardware platforms produced in much higher volumes and commensurately lower cost.



Targeted Telecommunications Core Applications of the Highest Reliability



AMC Carriers and Hot Swappable Mezzanine Card for use in ATCA and proprietary architectures



Shelf and Infrastructure to Support the direct use of AMC Modules into the backplane

Courtesy Continuous Computing

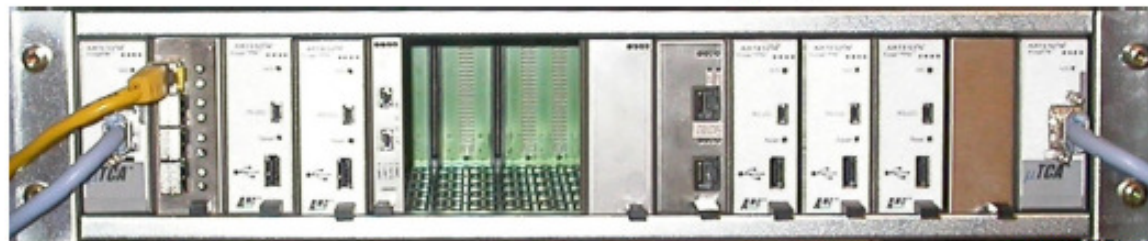


Courtesy Artesyn



μ TCA™ 75mm Shelf

2

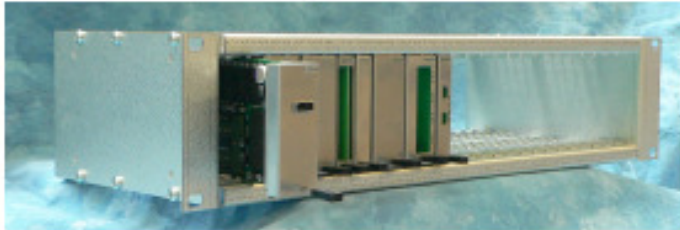


Courtesy Ericsson



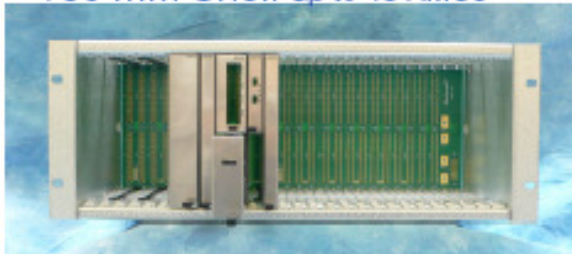
MicroTCA Form Factors

75 mm Shelf up to 24 AMC's



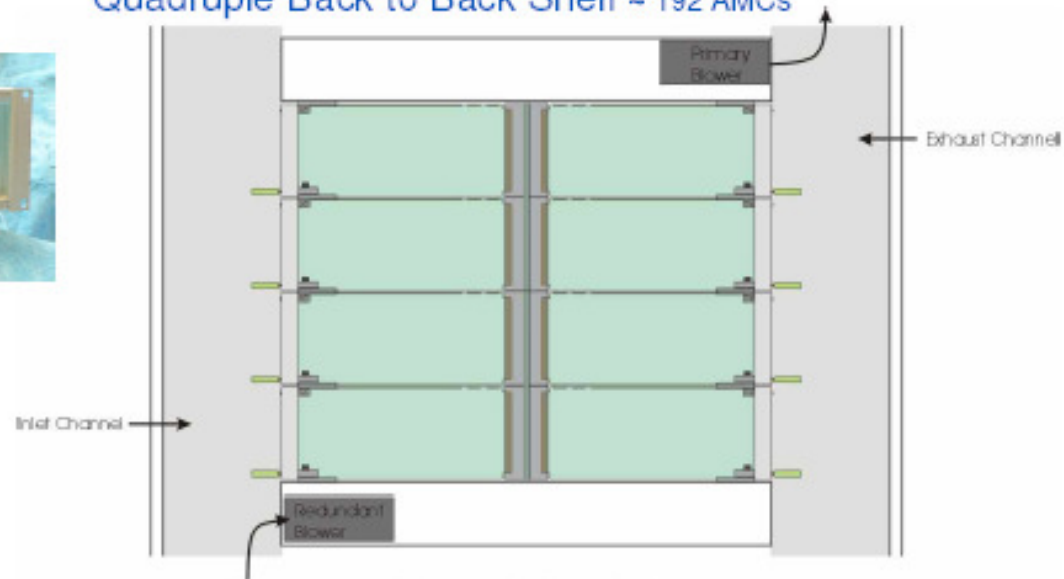
Courtesy Schroff / Pentair

150 mm Shelf up to 48 AMC's



Courtesy Schroff / Pentair

Quadruple Back to Back Shelf \approx 192 AMC's



Concept by Chuck Byers - Lucent

Cube up to 12 AMC's



Courtesy Schroff / Pentair

Pico \approx 2-4 AMC's



Courtesy Ericsson



- **Footprint supports Low Cost Connector Design**

- Low manufacturing cost
- Proven connector mfg processes
- Low cost materials
- Minimal number of components
- No proprietary design or manufacturing processes required

- **Low applied cost**

- Low cost press-fit or surface mount installation
- No costly hardware required
- No secondary mechanical retention devices
- No compensating board stiffeners



- **Multiple Sources of Supply**

- Non-proprietary footprints

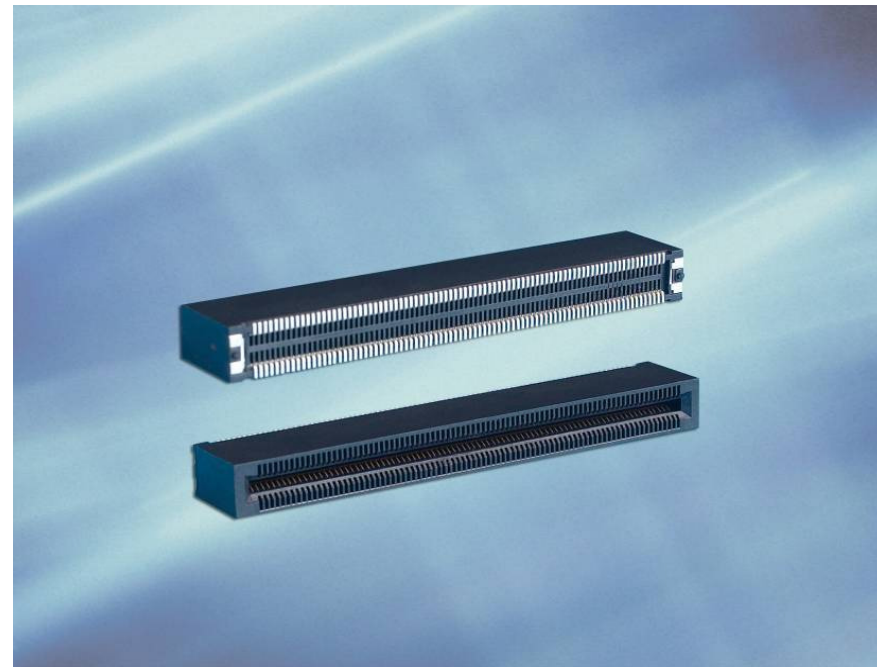
- **Flexible Routing**

- Multiple widths
- Multiple configurations

- **Balanced Signal Integrity Characteristics**

- Low noise/cross-talk

- *Compliant with Telcordia GR1217, Perf Level 4, Qual Level III*
- *Expected durability rating of 250 cycles minimum*
- *Support lead-free processing*
- *Low-cost manufacturing*



SI Performance: (simulated data)



Parameter	FCI solution Press Fit version 20 layer board	FCI solution SMT version(*) 20 layer board	FCI solution SMT version(*) 8 layer board
Throughput per lane (LVDS pair)	> 12.5 Gbps	> 12.5 Gbps	> 12.5 Gbps
Differential impedance (peak value 30ps @Tr 10-90%)	63.5-109.7Ω	73.1-109.9Ω	87.9-110Ω
Differential return loss	< -8.0dB 0-5GHz < -8.0dB 5-8GHz < -3.0dB 8-18GHz	< -12dB 0-5GHz < -12dB 5-8GHz < -2dB 8-18GHz	< -21dB 0-5GHz < -21dB 5-8GHz < -4dB 8-18GHz
Differential insertion loss	< -0.8dB 0-5GHz < -0.8dB 5-8GHz < -6.3dB 8-18GHz	< -0.2dB 0-5GHz < -0.2dB 5-8GHz < -4.5dB 8-18GHz	< -0.1dB 0-5GHz < -0.1dB 5-8GHz < -2.3dB 8-18GHz
Diff pair Far End Noise (5 lines active @Tr 10-90%)	< 10.4% (30ps)	< 0.7% (30ps)	< 0.3% (30ps)
Diff pair Near End Noise (5 lines active @Tr 10-90%)	< 7.1% (30ps)	< 1.1% (30ps)	< 1.0% (30ps)
Propagation delay skew (differential pair)	within: < 1ps between: < 1ps facing: < 5ps	< 1ps < 1ps < 5ps	< 1ps < 1ps < 5ps

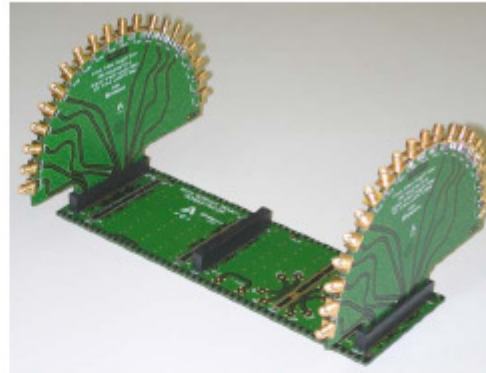
FCI MicroTCA Backplane passes signals to 12.5Gbps

Introduction

FCI has introduced card edge connectors to enable implementation of the MicroTCA standard under development within PICMG. The backplane connectors provide 170 contacts on 0.75 mm pitch, so any standard AdvancedMC card can be plugged directly to a MicroTCA backplane. The surface-mount connectors utilize an optimized PCB footprint and will support differential signaling at data rates of 12.5 Gbps per lane with very low loss and crosstalk.

Features

- Dual-row, 170-position card-edge interface with 0.75 mm contact pitch
- Surface-mount (SMT) termination optimized for electrical performance, cost and availability
- Very low loss and crosstalk for low-voltage differential signaling at data rates of 12.5 Gbps per lane
- SMT footprint allows for increased flexibility in routing PCB traces
- Metal retention clips at connector ends provide additional mechanical strength after soldering
- Lead-free and RoHS-compatible
- Designed to be compliant with Telecordia Uncontrolled Environment (UE) requirements

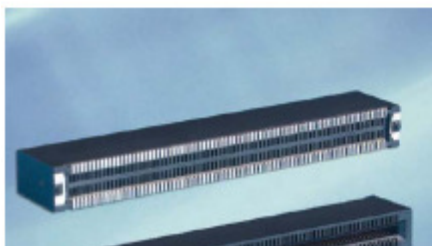
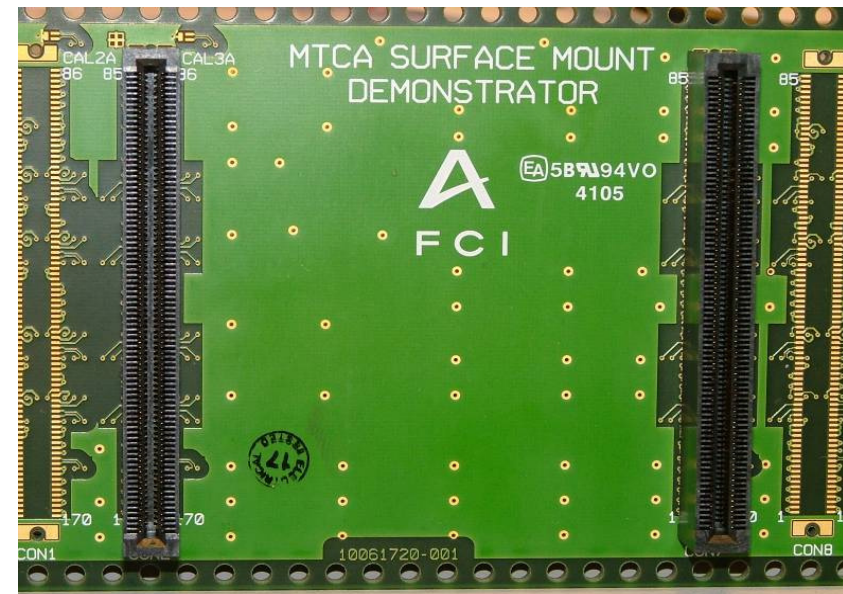


Demonstrator System Description

The MicroTCA backplane system was constructed to demonstrate the performance characteristics of the MicroTCA connector over two different FR4 trace lengths (12cm/4.7" and 24cm/9.4"), and two trace widths (150um/6mils and 210um/8mils) with gap widths of 150um/6mils and 288um/11mils, respectively. All traces are routed on layer 7, and no back-drilling was performed. The daughter card traces are 99mm/3.9". Total channel lengths of 32cm and 44 cm can be evaluated.

Application

MicroTCA is a modular, open system needed for constrained applications where ATCA is not a good fit due to size, cost and equipment practices. It is a draft system architecture specification that gained status as a subcommittee under the PICMG® organization in October 2004. ATCA™, AMC™ and MicroTCA™ provide an end-to-end framework that meets the requirements of a full spectrum of high-availability telecom applications, from core routers and IP-gateways, radio base stations and switching centers to converged customer premises equipment.



- Product specification:
 - GS – 12 - 362
- SPICE model:
 - MTCA_COMMPOLES_PASS_pole.cir
- 3D view models:
 - STP;
 - IGES;
- Packaging specification:
 - GS – 14 -1047;
- Customer print:
 - 10058835 (SMT);
 - 10058831 (PF);
- Data sheet:
 - FEMITCA0506E, website;
- Back plane demonstrator hand out: → product manager.

μTCA™ Connectors

> Description

MicroTCA[®], as developed under PICMG6, is based on the Advanced Mezzanine Card[®] concept, in which AMC cards plug directly into a backplane, creating a physically small but very powerful system in 4U height and 900mm in depth. This not only reduces size, but also cost, making it suitable for a much wider range of applications such as core routers and IP gateways, radio base stations and switching centers as well as customer premises equipment.

By interconnecting a number of these AMCs into a single backplane, MicroTCA will serve as an optimal platform for many different applications. All mezzanines conforming to the AMC standard fit directly into MicroTCA without modification. MicroTCA is optimized for smaller scale and more price sensitive applications and is therefore complementary to AdvancedTCA[®].

FCI provides MicroTCA connectors in full compliance with the standard: a press fit version for those applications with speeds up to 10 Gb/s and a surface mount version supporting speeds of 10 Gb/s and greater. Both connector types are designed to allow for low manufacturing cost achieved by using proven connector manufacturing processes, low cost materials and a minimal number of components. This connector contains no proprietary design, and no proprietary manufacturing processes are required. A low applied cost is achieved by low cost surface mount installation, the fact that no costly hardware is required, nor are any secondary mechanical retention devices and compensating board stiffeners needed.

> Features & Benefits

- Shieldless technology saves cost
- 170 position card edge interface with 0.75 mm contact pitch
- SMT type with lead free 100% Tin plated solder tail and 2 metal hold down features at both sides
- RoHS compatible
- Excellent electrical performance (12.5 Gb/s demonstrated)
- SMT footprint allows for flexible PCB routing
- Telectra UE compliant
- Coplanarity < 0.1 mm

> Target Markets & Applications

- Telecommunications:
 - Radio Base Stations;
 - RF antenna units;
 - IP gateways;
- Datacommunications:
 - Enterprise switches;
 - Customer premises equipment (CPE)



YOUR CONNECTION TO INNOVATION™