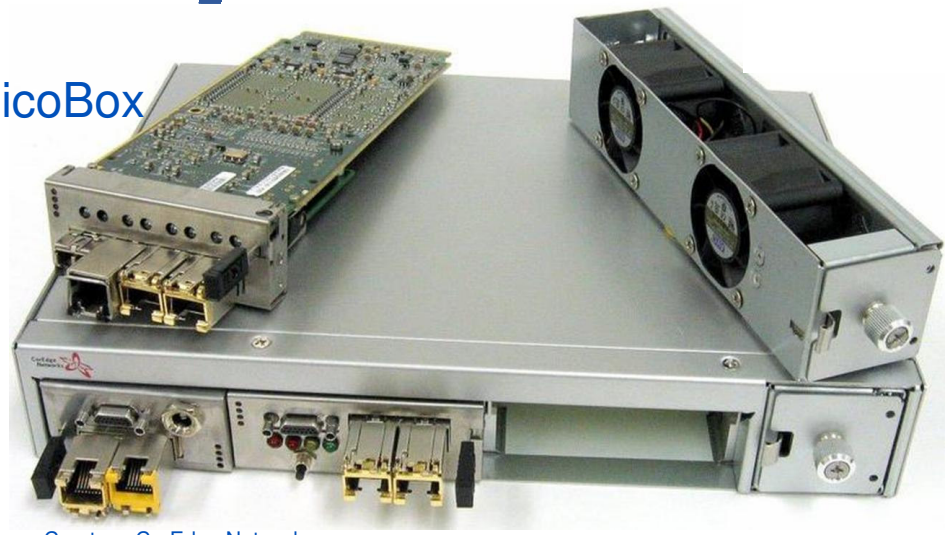
Introduction to MicroTCA

µTCA™

µTCA™ PicoBox



Courtesy CorEdge Networks

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.

AdvancedTCA®

Targeted Telecommunications Core Applications of the Highest Reliability

Courtesy Continuous Computing

AdvancedMC™

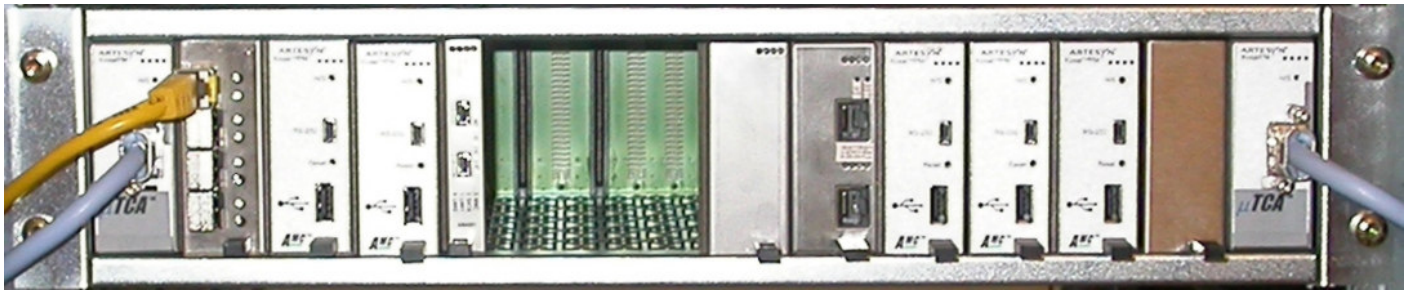
AMC Carriers and Hot Swappable Mezzanine Card for use in ATCA and proprietary architectures

Courtesy Artesyn

µTCA™

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

µTCA™ 75mm Shelf



Courtesy Ericsson

MicroTCA Guiding Concepts

Courtesy
Schroff/Pentair

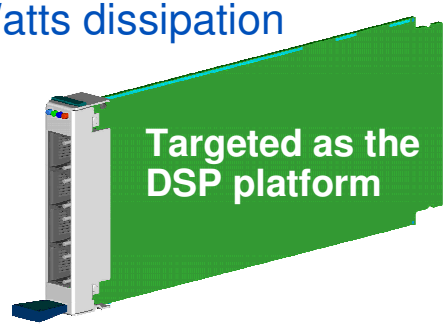
- Low Cost /High Volume
  - $500 for Cube Common Components
    without redundancy 50K pcs in 2007
- Overhead to Payload ratio
  - Cost & Component Volume
- Broad Range of Applications /Configurability
  - Necessary to achieve extremely high volumes
- Markets
  - Telecom Edge Applications and Customer Premise Equipment
  - Medical
  - Enterprise & Data
  - Industrial
  - Digital Imaging

Component Height

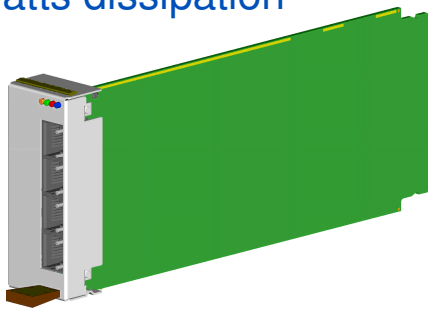
AMC Form Factors

Single-Width/Half-Height
up to 20 Watts dissipation

≈ 3″ x 7″

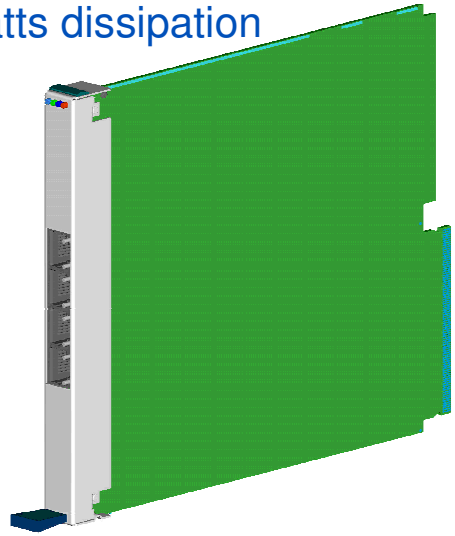


Single-Width/Full-Height
up to 40 Watts dissipation

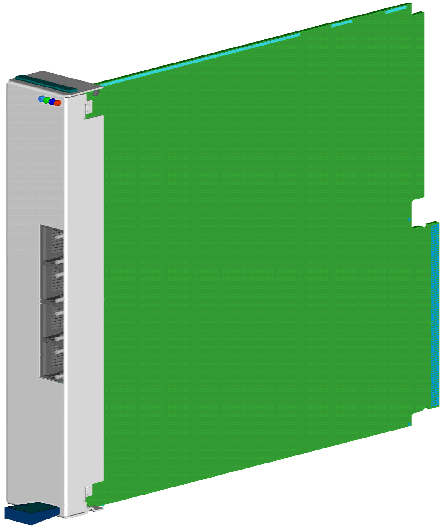


Double-Width/Half-Height
up to 40 Watts dissipation

≈ 6″ x 7″



Double-Width/Full-Height
up to 80 Watts dissipation



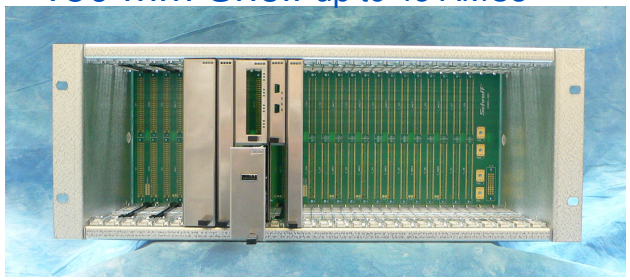
The AMC ECN committee is planning to introduce the mid-size form factor

MicroTCA Form Factors

75 mm Shelf up to 24 AMCs

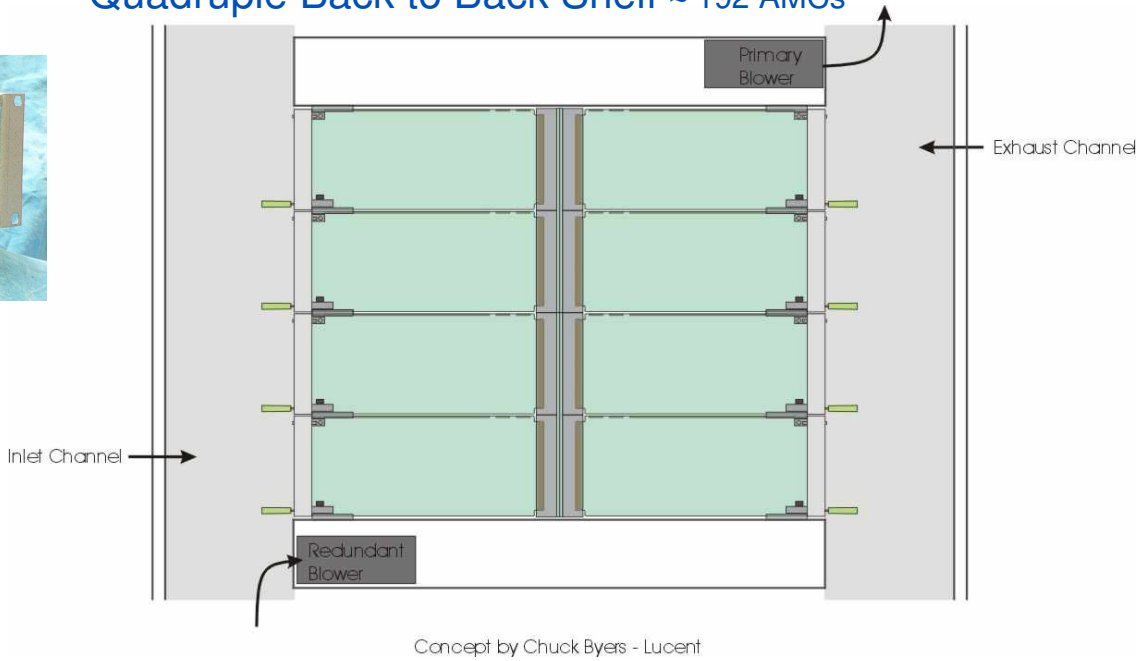
Courtesy Schroff /Pentair

150 mm Shelf up to 48 AMCs



Courtesy Schroff/Pentair

Quadruple Back to Back Shelf ≈ 192 AMCs



Concept by Chuck Byers - Lucent

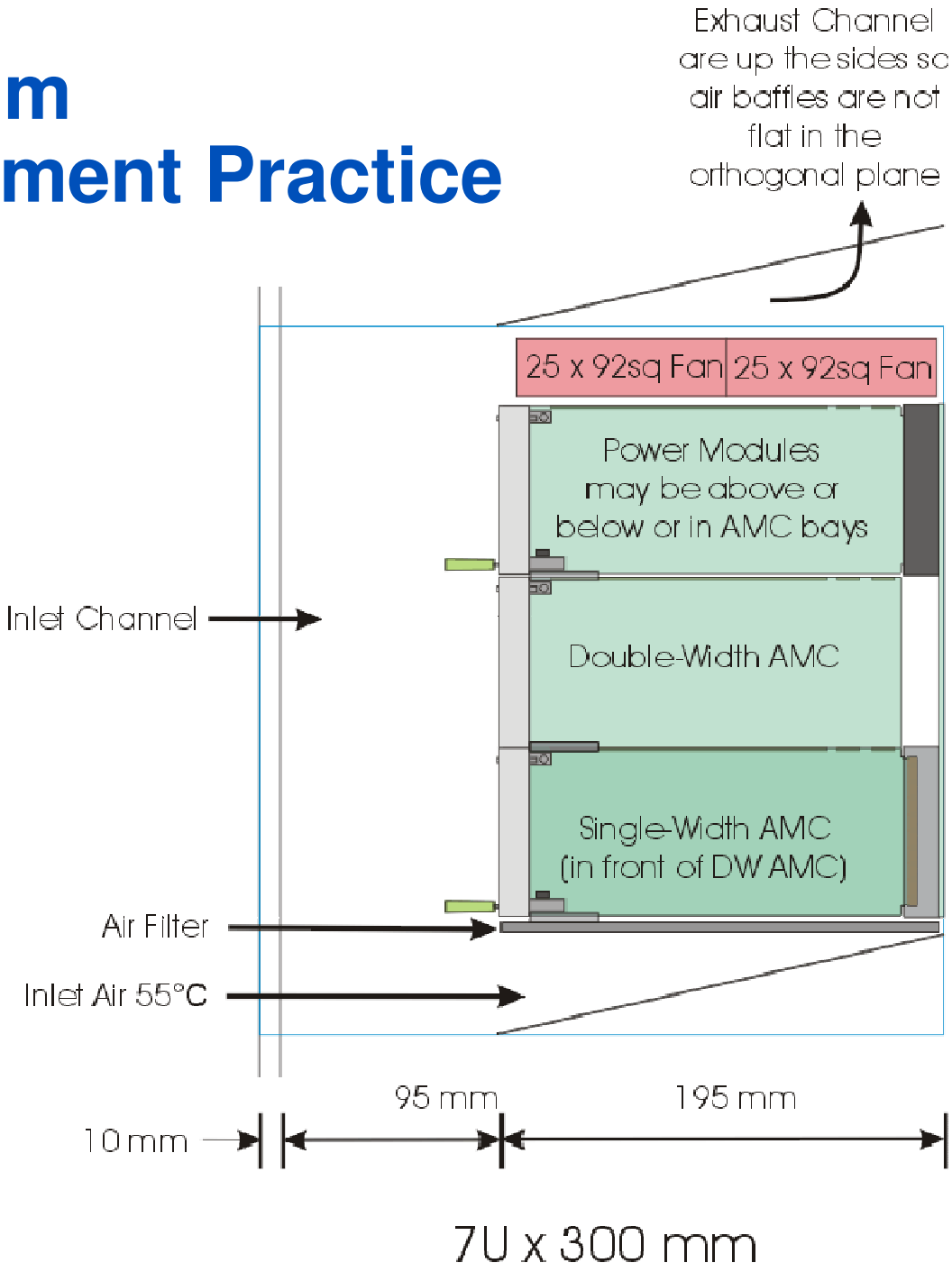
Cube up to 12 AMCs

Courtesy Schroff/Pentair

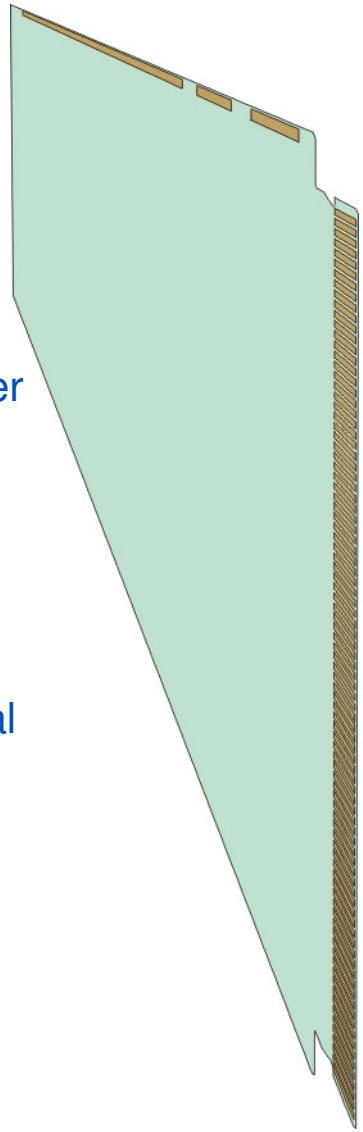
Pico ≈ 2-4 AMCs

Courtesy Ericsson

300 mm Equipment Practice



AMC I/O



Port 0 Gig-E

Port 1 Gig-E or PCI-E

use as redundant pairs
in High Reliability uTCA Configurations

+12 Volt Payload Power
3.3 Volt Management Power

Port 2&3 SATA, SAS or FC

Non-Redundant IPMI
System Management

Port 4-7 Fat Pipes
XAUI, PCI-E/AS or SRIO

Port 8-11 Fat Pipes
XAUI, PCI-E/AS or SRIO

use as redundant pairs
in High Reliability uTCA Configurations

Clocks 1, 2 & 3 Bidirectional

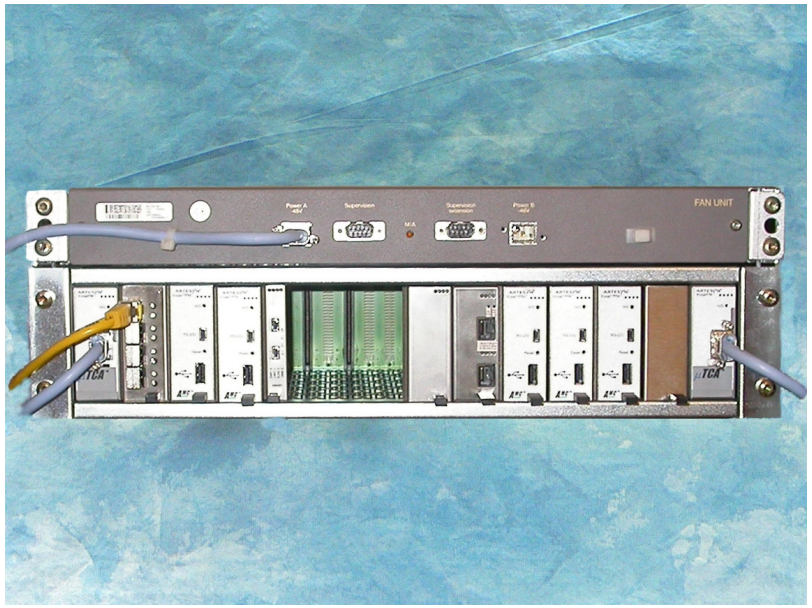
Port 12-20 Extended Options

Each of the 21 Ports is capable 10 Gbps

MicroTCA Conceptual Elements

μTCA™ 75mm Shelf

- Each Virtual Carrier Group
- Up to 12 AMC Modules
  - 10 Modules in Slots 3 to 12
- 1 or 2 MCH (pka VCM)
  - 1 in slot 2 (slot 13 filler panel)
- Power Module
- 0 to 2 Cooling Units
  - One above

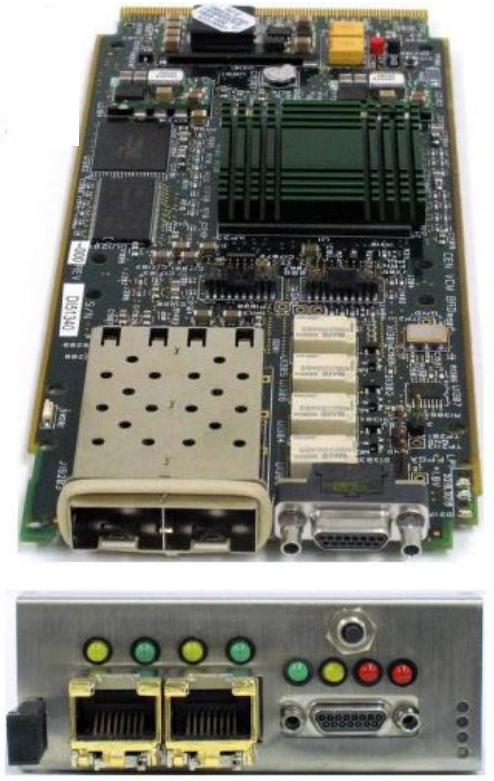


Courtesy of Ericsson & Rittal Kaparel

MCH MicroTCA Controller & Hub
previously known as VCM (Virtual Carrier Manager)

- Fabric Switching for up to 60 Ports
  - 12 GbE minimum
  - 12 x 4 lanes XAUI, PCI-E or SRIO
- IPMI Management for 12 AMC modules
- Management for up to 4 Power Modules
- Management for up to 2 Cooling Units
- Optionally provides Shelf Management
- Front Panel Alarms
- Clock Distribution system
- Fabric Channel Uplink

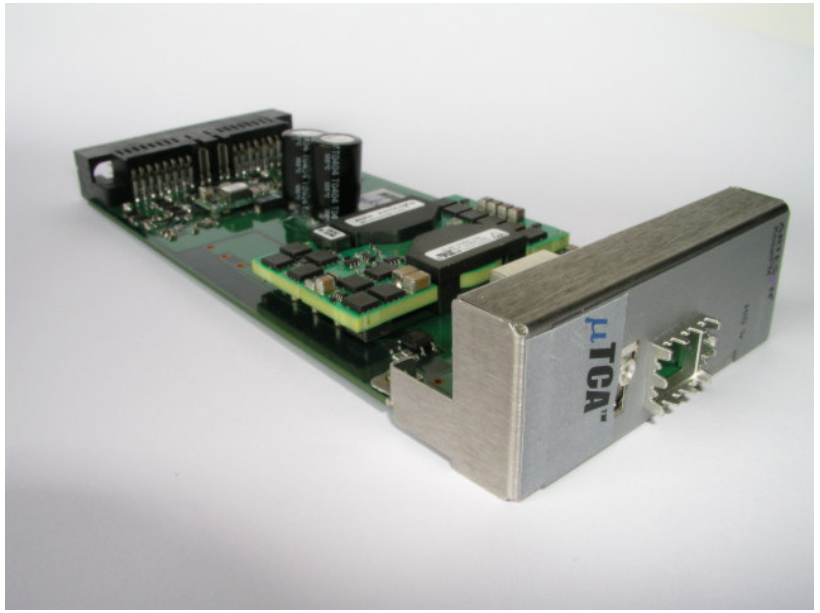
µTCA™ MCH



Courtesy CorEdge Networks

Power Modules

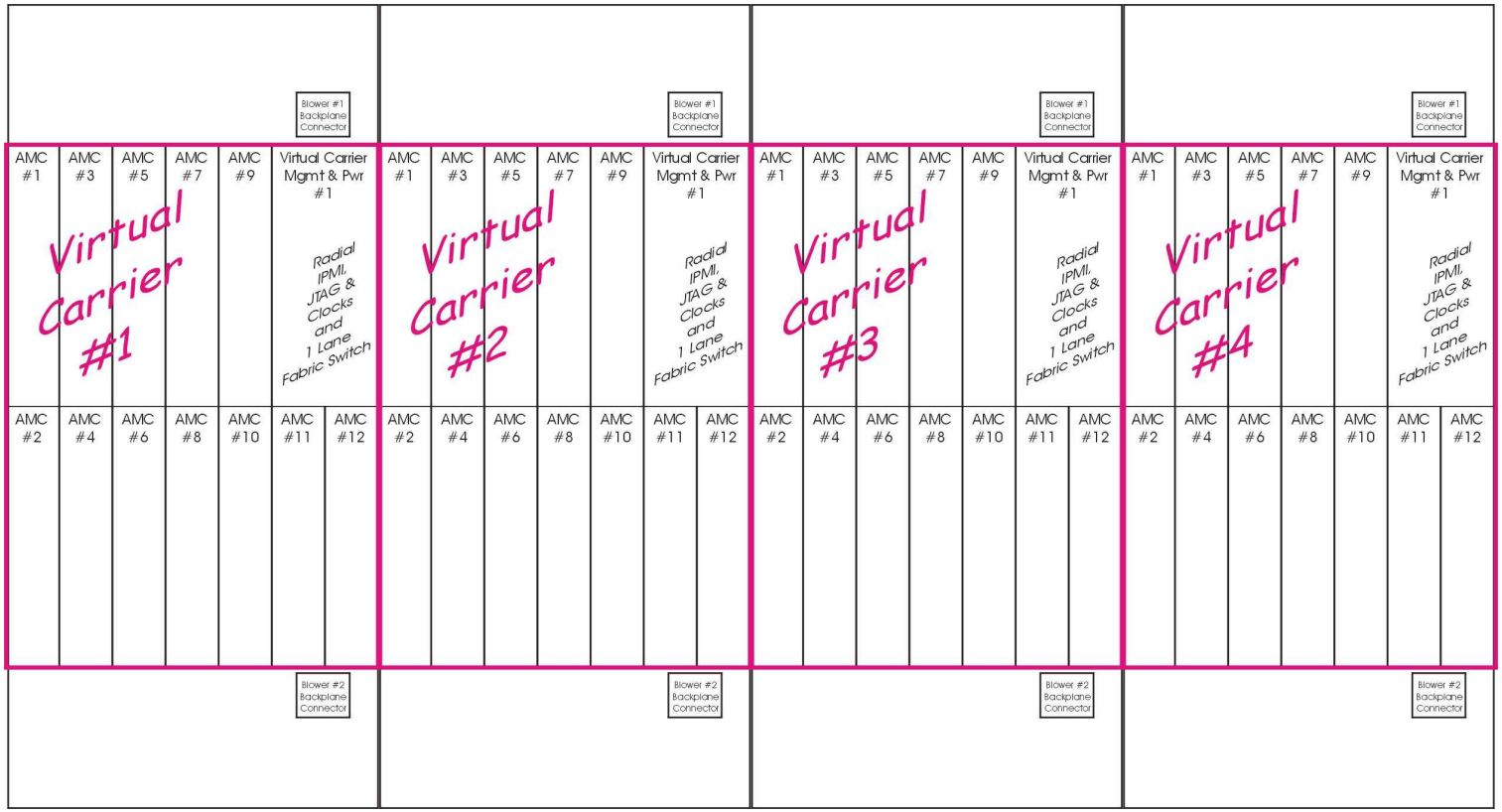
- 300 to 600 Watts
- 16 Output Channels
  - 12 AMC Modules
  - 2 MCH (pka VCM)
  - 2 optional Cooling Units
- N+1 Optional Redundancy
- Minimum 1 per Virtual Carrier up to 4 maximum
- Maximum load per Virtual Carrier 1120 Watts
- Custom ICs for output channel current limiting, hot swap control and power good underway



MicroTCA Prototype Power Module 6/05
Courtesy Artesyn Power

Single & Multiple Virtual Carriers Shelves

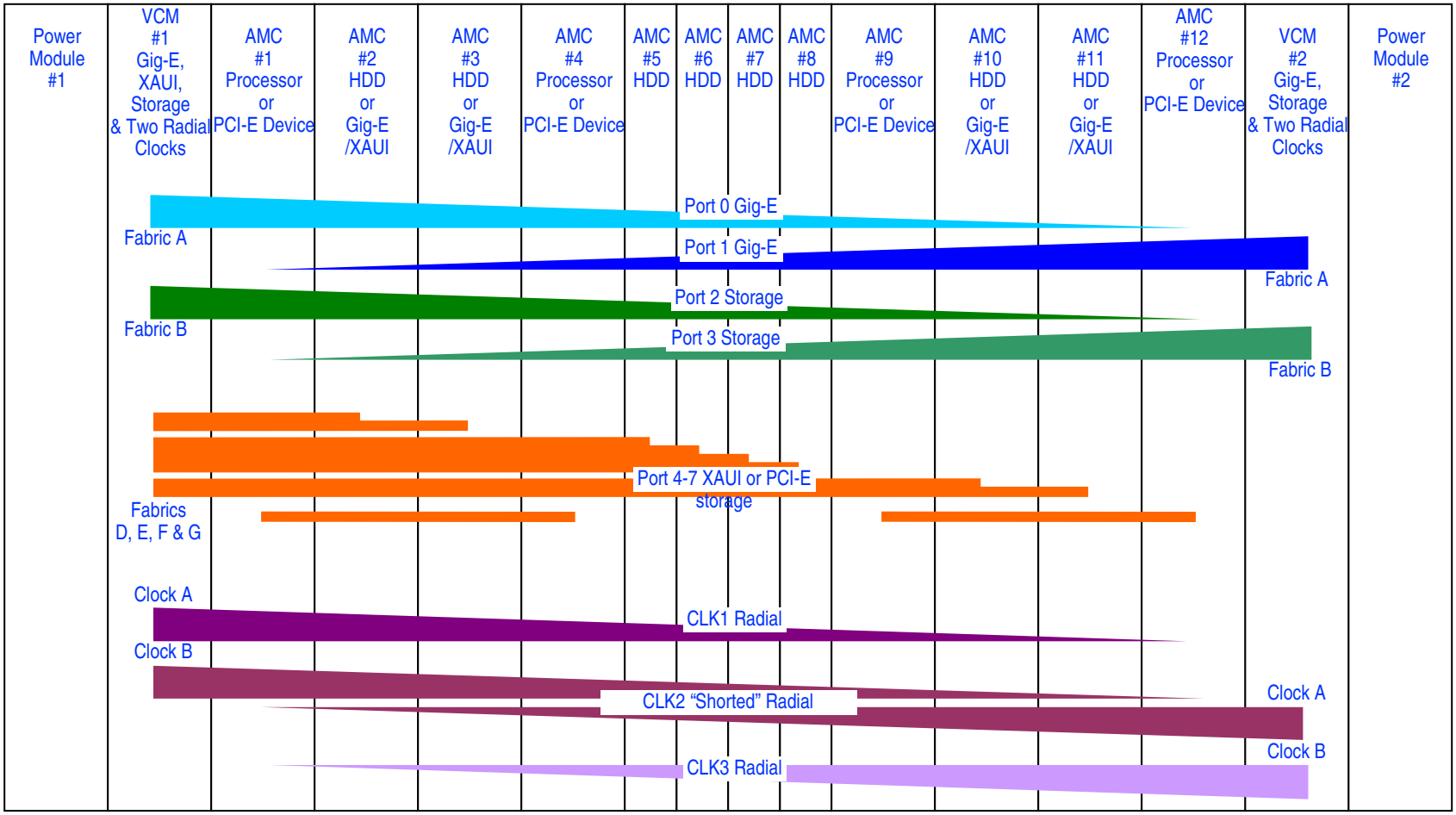
- 1 to 16 Carriers per Shelf
- Each VC has it's own power and MCH (pka VCM)
- Interconnected via up link fabric channels, which contain management traffic
- Clocks may also be interconnected between VCs



High Availability

- .999 to .99999
- Optional from none to fully redundant
  - Power & System Management – use tri-stated connection for resources that are in the standby condition
  - Fabric – can be redundant but require AMCs that are designed for this type of service
  - Clocks - 1 & 3 are radial, 2 is radial and if redundant terminated at both ends at the MCHs
- Shelves can be designed with replaceable VC assemblies (sometimes referred to as Hot Swappable Cubes)

MicroTCA Topologies



MicroTCA Prototype for Bus & Board 1/06 Connectivity Diagram

Current Status & Timeline

- 1 Vendor is currently showing and selling prototype MCH (pka VCM) at least two other vendors have prototypes in development
- 2 Companies have prototypes in development
- Two companies prototype 75 & 150 mm shelves and Cubes
- A functional system running a wireless application was demonstrated at SuperComm 6/05 shown at right
- Several more prototypes shown at 3 GSM 3/06

Courtesy Ericsson

- Specification approval by the executive committee is scheduled for end of May

About the Author

Michael Franco is the President & CEO of Signal Stream Technologies, LLC a consulting services company.

Chairman of the PICMG MicroTCA Subcommittee and former draft editor of the PICMG.AMC specification. Other standards work includes authorship of the mechanical, power and thermal sections of the AMC spec and chairman of the AMC Connector Workgroup and Vita 39 Subcommittee.