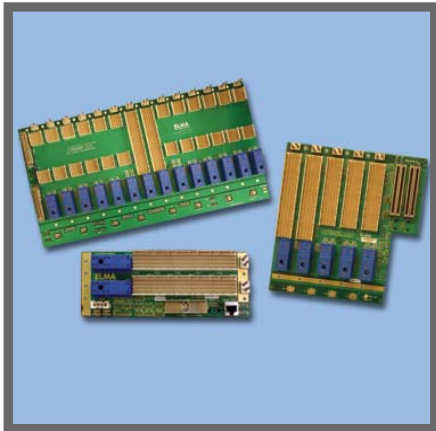


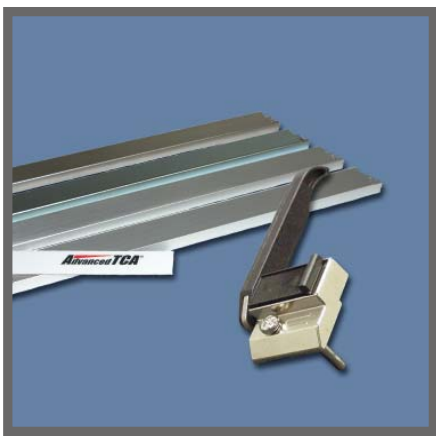
SYSTEM PLATFORMS

BACKPLANES



CABINETS

COMPONENTS



ACCESSORIES

SIMULATION SERVICES

## AdvancedTCA: Products and Services

# Elma Electronic

## ABOUT ELMA

Founded in 1962, Elma is an industry innovator in the design and manufacture of electronic enclosures and passive electronic components. Elma enjoys a leading position in the VME/VME64x, VXI, VXS, VPX, cPCI, ATCA, MicroTCA and Rugged COTS packaging markets.

Based in Wetzikon, Switzerland and Fremont, California, Elma is a global leader in electronic enclosures and components. The company has facilities and representatives in over 24 countries. Elma has a broad base of customers in diverse industries such as telecommunications, industrial control, medical electronics, military and defense.

Elma strives to provide products superior in quality, reliability, performance, and consistently presents new, innovative designs to the market. Elma's product line encompasses well over 16,000 parts, including enclosures, cabinets, high quality switches, LED arrays, knobs and much more. Elma also offers design and integration services backed by responsive and knowledgeable technical support. Elma's leading quality level is reached through training of all employees and following of systematic procedures per ISO 9001 standards to which Elma has been registered.

## CUSTOM SOLUTIONS

Customization is the standard at Elma Electronic. With an extensive offering of modular products as a foundation, Elma is able to leverage existing solutions and proven design concepts to meet any custom application. This approach ensures that Elma will provide a quality, compliant solution with significantly, reduced lead time, cost, and risk.

Elma leads the industry in modifying standard ATCA backplanes and chassis to meet customer's exact needs.

## TECHNICAL CAPABILITIES

- Agency Certification
- Verification Testing
- EMC Testing
- Thermal Testing
- System Integration
- Simulation/Characterization

## WHY CHOOSE ELMA

### Flexibility

Elma tailors solutions to individual applications to ensure fast and cost-effective results.

### Experience

Extensive practical experience in packaging electronic systems is used to minimize the time taken to develop new customized solutions without compromising system performance or reliability.

### Compatibility

Because the two key electromechanical components - enclosures and backplanes - are made in-house, Elma guarantees compatibility, consistency and reliability.

### Global Resources

With manufacturing in Europe, Asia and the USA, customers benefit from local service backed by global resources.

## ELMA PRODUCT DIVISIONS

### Enclosures & Components



### Backplanes



### System Platforms



### Switches, Knobs & LEDs



### Cabinets



# About AdvancedTCA Products

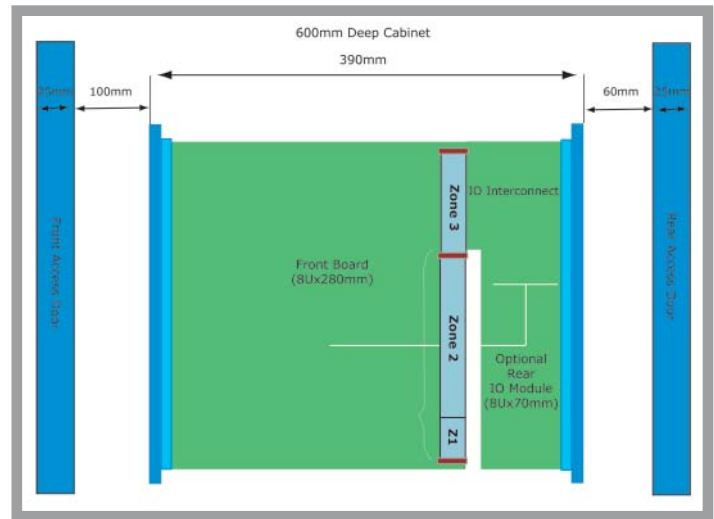


## ADVANCEDTCA SPECIFICATION

AdvancedTCA has several key features including Gigabit/Terabit per second bandwidth across each shelf, 150-250W per board and 3 Kilowatts per chassis power. It accommodates larger (8U x 280mm) boards on a 1.2mm pitch which allows larger/taller components and more space on each board. Over 100 companies participated in developing the ATCA specification.

The specification is focused on the definition of an architecture that can:

- Enable reduced development time and costs
- Apply to edge core, transport and data center
- Apply to wireless, wireline, and optical network elements
- Support a rich mix of processors, digital signal processors (DSPs), network processors (NPs), storage, and input/output (I/O)
- Integrate with multiple network elements
- Provide multi-protocol support for interfaces up to 40 Gb/s
- Offer high levels of modularity and configurability
- Improve volumetric efficiency, power distribution and management
- Offer an advanced software infrastructure providing operating systems (OSs), application programming interface (API), and operation, administration, management, and provisioning (OAM&P)
- Provide high levels of service availability (99.999%) through the integration of features for resiliency, redundancy, servicability and manageability
- Support appropriate scalability of system performance and capacity



The PICMG 3.0 specification has several features geared towards carrier-grade and high-end enterprise applications:

- 8U high by 280mm deep, with 6HP slot pitch, to support higher levels of integration at the Front Board level. I/O boards 8U high by 70mm deep
- Bulk -48 VDC distribution with Front Board level power conditioning to better support the evolution of silicon technology
- Elimination of the PCI legacy and reallocation of connectivity to serial interconnects
- Flexible user IO
- Mandatory use of IPMI management
- Power and thermal management guidelines enforced by the management infrastructure

## ELMA ATCA PRODUCTS AND SERVICES

### Capabilities

- Simulation
- 3D Solid Modeling
- NEBS Certification
- Manufacturing
- Customization
- Integration

### Systems

- 2U, 4U, 5U, 12U & 13U
- Redundant 48VDC input (AC input options available)
- Optimized via thermal simulation studies
- IPM Sentry shelf management options

### Backplanes

- 2, 5, 6, 14 & 16 slots
- Dual Star, Mesh or Replicated Mesh
- Compliant to PICMG 3.0
- Optimized via signal integrity studies

### Accessories

- Front Panels
- Handles
- Shelf Managers
- Extender Boards

# AdvancedTCA System Platforms

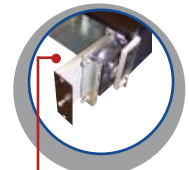
## OVERVIEW

Elma offers six enclosure models with various configurations. The ATCA platforms come in 2U, 4U, 5U, 12U, and 13U heights and include a wide range of backplane, shelf management, and other options. Pluggable and redundant fan trays, PEMs and shelf managers provide the highest level of availability (99.999%). Chassis have been optimized via backplane signal integrity studies and chassis thermal simulation. Customization is our specialty. Contact Elma for your custom solution.



## Horizontal Chassis

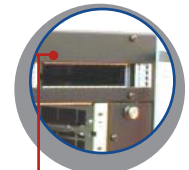
- Available in 2U, 4U, 5U and custom heights
- Various backplane options
- Pluggable or integrated shelf management
- Side-to-side airflow configuration
- Dual fan trays optional



Pluggable dual fan trays

## A/C Power Chassis

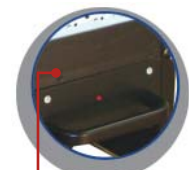
- Available in 2U, 5U and custom heights
- A/C input option, up to 700W
- Pluggable to a conventional A/C wall outlet
- Ideal for prototypes, demos, or applications using A/C power



Pluggable shelf managers  
• A/C power supply options

## Vertical Chassis

- 19" and 23" ETSI formats
- Available in 12U, 13U and custom heights
- Pluggable fan trays and power entry modules
- Pluggable shelf manager
- Redundant cooling, shelf management, power entry



Even airflow distribution across all 4 regions of chassis  
• Optimized cooling

## 13U Carrier Grade

- 13U Carrier Grade features dual star, 14 slot Full Mesh for maximum performance
- Fully pluggable: fans, PEMs, shelf managers
- Optimized cooling

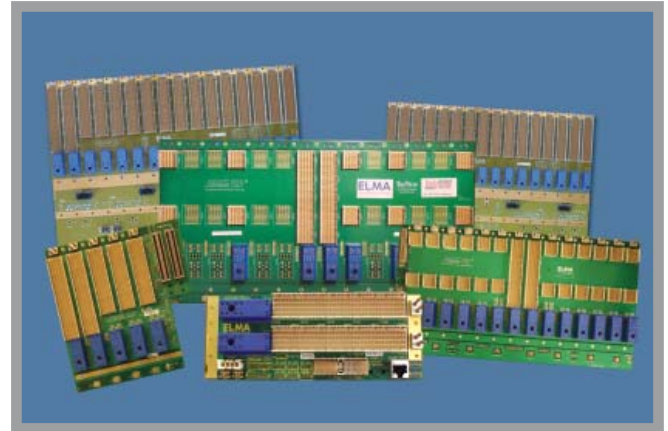
## 13U ETSI

- 4x removable dual fan trays below card cage, 4 single fans above
- 16-slot backplane in 23" rack

# AdvancedTCA Backplanes

## OVERVIEW

Through its backplane division Elma Bustronic, Elma Electronic Inc. offers a wide range of ATCA backplanes. Standard sizes include 2, 5, 6, 14 and 16 slot AdvancedTCA backplanes in Dual Star, Mesh and Replicated Mesh topologies. All backplanes are optimized via signal integrity studies and feature pluggable shelf management connections. Fully pluggable versions are also available. All Elma ATCA backplanes are compliant to the PICMG 3.0 specification. Custom versions are available.



## Mesh

The Elma Mesh ATCA backplane line currently comes in a 2-slot point-to-point Mesh and a 5-slot Mesh. The 5-slot has a 3X Replicated Mesh topology. Dual Star and Full Mesh topologies are implementable. There are connectors for optional plugging of the IPM Sentry Shelf Manager. Simulation/characterization studies confirm excellent signal integrity and performance.

### 2-slot Replicated Mesh

- Point-to-point connections
- Pluggable shelf manager
- Up to 15x Replicated Mesh

### 5-slot Replicated Mesh

- Up to 3x Replicated Mesh
- Pluggable shelf manager
- Dual Star or standard Full Mesh implementable

### 6-slot Replicated Mesh

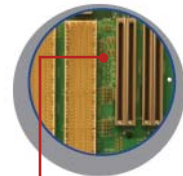
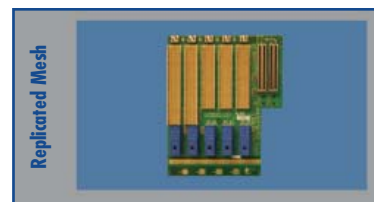
- Maximum performance in 6-slot size
- Up to 3x Replicated Mesh
- Dual Star or standard Full Mesh implementable

### 14-slot Full Mesh

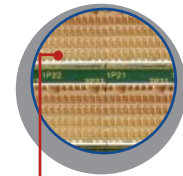
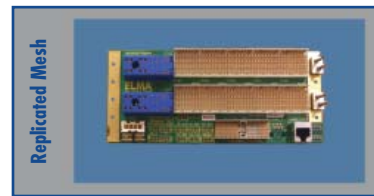
- Maximum performance in a 19" rack
- Dual Star implementable
- Pluggable to shelf managers, fan trays, PEMs

### 16-slot Full Mesh

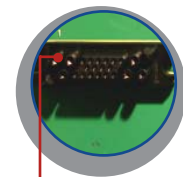
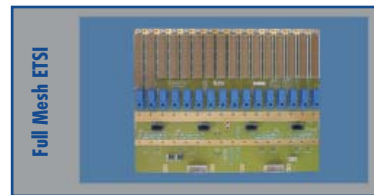
- Maximum performance in 23" ETSI rack
- Dual Star implementable
- Pluggable to shelf managers, fan trays, PEMs



Pluggable shelf managers



Optimized via signal integrity studies



Pluggable PEM Modules w/ flexible power configuration

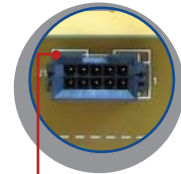
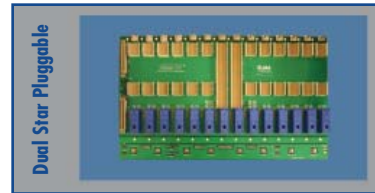
# AdvancedTCA Backplanes

## Dual Star

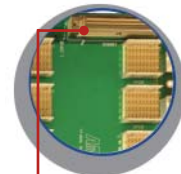
The Dual Star ATCA Backplane is designed for "redundancy and pluggability everywhere". The backplane features pluggable modules for fan trays, power entry, and shelf managers. Simulation/Characterization studies confirm excellent signal integrity and performance.

### 14-slot Dual Star - Pluggable

- 5U height
- Pluggable fan trays, shelf manager and power entry modules



Pluggable fan trays

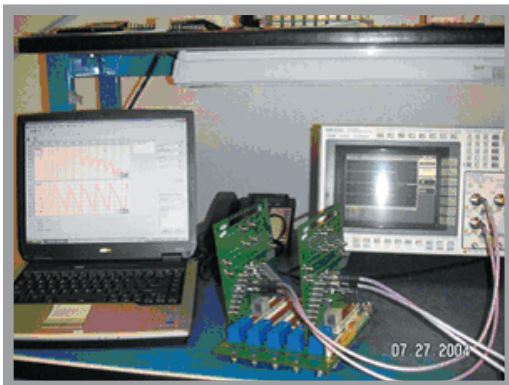


Pluggable shelf manager

## Backplane Signal Integrity Studies

Elma Bustronic's signal integrity analysis and simulation services ensure efficient cost-effective design solutions that work superbly the first time, every time. And we continue to expand our technical resources with new high-speed measurement technology, interconnect model extraction, and software to support measurement-driven design. The simulations predict the characteristics of a custom design and eliminate "trial and error," resulting in faster turnaround and guaranteeing that our products meet or exceed your specifications.

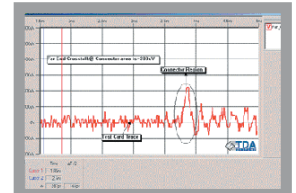
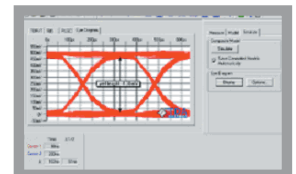
Faster PCB designs are by nature more sophisticated and delicate. At higher clock speeds, the PCB demands cleaner signal transmission without compromising the stability of the system. This is where Signal Integrity engineering comes into play. Simply put, signal integrity studies the design of high-speed circuits that can accommodate cleaner signals passing through them. Cleaner signals, in turn, enable Elma Bustronic's engineers to identify and minimize sources of distortion in data transmission, which could otherwise disrupt timing of the digital logic. Signal integrity issues such as reflections, cross talk, frequency dependent transmission line loss and dispersion can significantly lead to poorer system performance propagating through the interconnect. These SI issues arise from via, power/ground coupling, RLC effects in signal lines, etc. With 3.125 Gbps to 6.250 Gbps signal speeds across the backplane and beyond, an AdvancedTCA backplane is very susceptible to these types of issues. Contact Elma Bustronic at (510) 490-7388 or [techsupport@elmabustronic.com](mailto:techsupport@elmabustronic.com) for questions on how our SI services can ensure optimal backplane performance.



Left: Characterization of 5-slot ATCA backplane using Elma Bustronic's unique probe card.

Top Right: Crosstalk measurement of 5-slot ATCA backplane.

Bottom Right: Eye diagram of 5-slot ATCA backplane.



# AdvancedTCA Components & Accessories

## OVERVIEW

Elma has a wide range of components & accessories available including a Shelf Manager, Extender Board, Handles, Front Panels, Guide Pins, ESD Clips, and more.

## SHELF MANAGERS

The Elma Intelligent Platform Management Sentry goes beyond basic monitoring of fans, voltages and temperature. It helps ensure “five nines” reliability by adjusting the speed the fans, sending remote alarms, and managing all of the line cards. The IPM Sentry is based on a modular design to save costs and reduce production time.

- 2.5U x 280mm deep, slim design
- Radial IPMI version available
- Incorporates Pigeon Point Shmm500 module

## ATCA Test Extender

- 8U x 400mm
- Test all points on ZD connectors
- Secure metal frame

## 2nd GEN HANDLE

- Slide motion, more ergonomic
- Rugged microswitch won't inadvertently trip
- One piece, no assembly

## PANELS

### Front Panel

- 8U x 6HP with Handles
- Conform to the PICMG 3.0 specification
- For boards with thicknesses of 1.6 mm to 2.4 mm

### Filler Panels

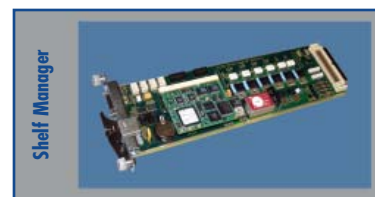
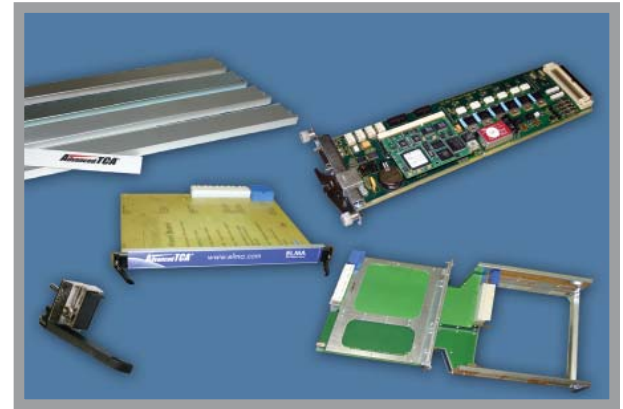
- 8U x 6HP

### Filler Front Panel with Baffles

- 8U x 6HP x 271 deep

## Other Accessories

- Safety Ground Pin Receptacle (To be sold with enclosures only)
- ESD Pins
- ESD Clip
- Dummy Board



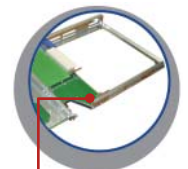
Shelf Manager



Bussed or radial IPMB options



ATCA Test Extender



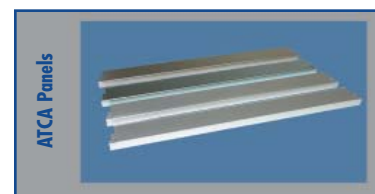
Frame securely holds board under test in place



ATCA Handles



Slide motion opens handle 30°, more ergonomic



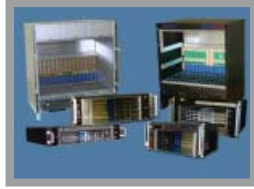
ATCA Panels



Panel channels prevent overlay peeling, ensure alignment

# AdvancedTCA Product Ordering Information

## System Platforms



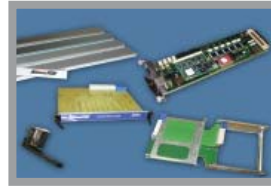
## Integrated System



## Backplanes



## Components & Accessories



## Cabinets



### System Platforms

Type	Size	Description	Part Number
DC	2U	Dual 48VDC input, 2 slot mesh backplane	11A02GJB28Y4HMXX
AC rear IO	2U	250 watt AC input, 2 slot mesh backplane	11A02GJB28Y4HC2X
AC no rear IO	2U	500 watt AC input, 2 slot mesh backplane	11A02GJB28N4HC5X
DC	4U	Dual 170 CFM Fans, Dual 48VDC, 5 slot mesh backplane	11A05GJX48Y4HMXX
DC	5U	Redundant cooled, 5 slot mesh backplane	11A05GJB58Y3HCBX
AC	5U	Redundant cooled, 1200 watt AC input, 5 slot mesh backplane	11A05HJB58Y4HGBX
Dual AC	5U	Redundant cooled, dual 1200 watt AC, 5 slot mesh backplane	11A05GJB58Y4HPGX
Carrier Grade	13U	Fully pluggable & redundant, 14 slot dual star backplane	11A14FGXD8Y4VMXX
ETSI	13U	23" wide, 16-slot mesh backplane, pluggable	11A16FHXD9Y4VMXX

### Integrated System

Type	Size	Description	Part Number
AC, Dual AC	5U	Single or dual AC, integrated ZNYX switch card, 2 x SBC cards, shelf manager, software included	89A-5ZD-ZS-IP-1

### Backplanes

Type	Size	Description	Part Number
Mesh	2 slots	10-layer, mesh, 5U high	109ATCA502
Mesh (3x)	5 slots	18-layer, mesh, pluggable to shelf managers, 5U high	109ATCA505
Dual Star	14 slots	18-layer, dual star, pluggable to shelf managers, 5U high	109ATCA714
Mesh	14 slots	18-layer, mesh, pluggable to shelf managers, 5U high	1900001778
Mesh	16 slots	18-layer, mesh, pluggable to shelf managers, 5U high	1900001495

### Components

Type	Size	Description	Part Number
EMC Front Panel	8U x 64HP	Extruded aluminum, clear passivated	66-AT535-28
EMC Front Panel	8U x 64HP	Extruded aluminum, pinhole for microswitch	66-AT535-38
Handle 2nd Gen	Top	Pre-assembled, Top handle	AT-300-00
Handle 2nd Gen	Bottom	Pre-assembled, Bottom handle	AT-301-00
Handle 2nd Gen	Top	Pre-assembled, with pin for microswitch	AT-300-01
Handle 2nd Gen	Bottom	Pre-assembled, with pin for microswitch	AT-301-01
Filler Panel	8U x 64HP	With captive M3 screws, EMC gasketing	CAS000039
Filler Panel	8U x 64HP	Front panel with air baffles, EMC gasketing	CAS000105
Filler Panel	8U x 64HP	Rear RTM panel with air baffles, EMC gasketing	CAS000106

### Accessories

Type	Size	Description	Part Number
Extender Card	8U x 400mm	Tests all lines on ZD connectors, metal frame	114EXT8040-OXXX
Shelf Manager	2.5U x 280mm	Uses ShMM 500 Pigeon Point, bussed IPMI, hot swap	CAE018540

### Cabinet Enclosures

Type	Size	Description	Part Number
Cabinet-ATCA	44U	60mm W x 600mm D, 4 x 235CFM, high volume fans	ATHDE15ADXXJX1

\* Contact factory for other configurations or custom solutions. \*



# AdvancedTCA: Integration

## 5U E-Z ATCA Integrated System

System integration for AdvancedTCA can be challenging, particularly when it involves highly-available, network-centric applications. Interoperability of vendor's cards is a critical issue, so Elma and our partners have done the heavy lifting for you. Plus, we can help you optimize the modular solution to your exact requirements.

The 5U E-Z ATCA Integrated System is fully integrated, tested, and ready-to-run. The unit features 1 x ZX7000 switch card from ZNYX Networks and 2 x SBC cards. The ZNYX and SBC cards are both compliant to the PICMG 3.0 base specification and PICMG 3.1 fabric interface for Gigabit Ethernet. Elma's IPM Sentry shelf manager is also included.

The chassis features full redundancy with dual redundant fan trays, shelf managers, and A/C power supplies. It can be configured quickly for AC or DC input via removable patch panels. Redundant side-to-side cooling is achieved with fan trays on each side of the card cage. The left side fan tray has (8x) 80mm fans at 52 CFM each and provides cooling to front card cage and rear modules. The other fan tray has (6x) 80mm fans for only the front cards ensuring a push/pull configuration and redundancy. The fan trays have tach output. Chassis configurations with dual redundant shelf managers are optional.

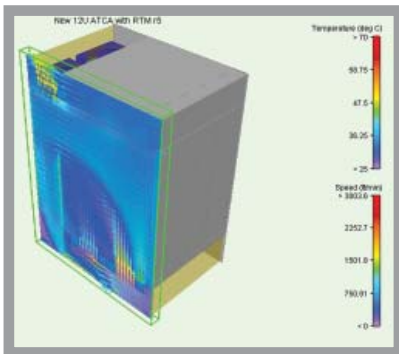
### Features

- 19" rack mount in 5U redundant cooled chassis
- Integrated ZNYX switch card, 2 x SBC cards, and Elma shelf manager
- Single or dual 1200W AC input PSU providing 48V @ 25A
- Demo Application Software included



# AdvancedTCA: Thermal Simulation

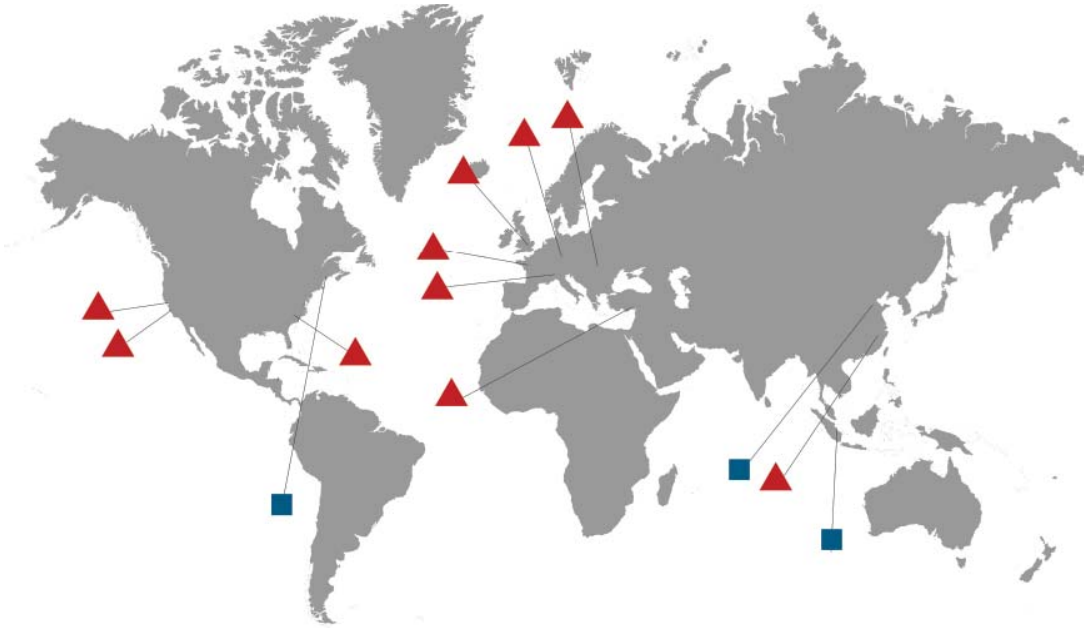
Elma's Thermal Simulation can be extremely helpful in coming up with an optimal ATCA chassis cooling solution. Elma can simulate specifically how your boards interact with the chassis in regards to the cooling. After modeling your card, Elma's designers can verify the cooling and make sure the hotter components of the card are placed in cooler parts of the chassis. If the per slot loading is provided, thermal simulation could be performed where baffles or extra fans could be added to ensure proper cooling for all boards.



Above: 12U ATCA Thermal Simulation

Using CFD-based (Computation Fluid Dynamics) thermal modeling software like FlowTherm, Elma can change the intake and exhaust areas, change fans and fan configuration, add and optimize baffling and monitor the temperature at critical locations before fabricating and testing a chassis. Simulation can help determine the proper fans to use in order to ensure proper chassis cooling as well as keeping the audible noise level at a minimum. Other ways to optimize the chassis thermal management are the spacing for air intake and exhaust, types of fans and blowers, the plenum space above or below the fans, the placement of air filters and use of baffles. Locating hot spots in the chassis, the designer can simulate options to rectify the situation. For example, a baffle can be placed in a particular area to direct airflow, or changing a fan's position to increase or decrease the air plenum. A different type of fan or blower can also be used to improve the results.

Simulation can also help maximize the usefulness of the shelf managers. Thermal analysis can show how a shelf manager can tie or group fans together to optimize airflow when it senses a problem. It can also help determine the ideal sequence in timing solution for shutting down cards, which signals to send, and when it is absolutely necessary to shut down the entire system. For example, if there is a problem, perhaps only a few cards need to be shut down instead of all of them. Contact Elma at (510) 656-3400 for more information on our Thermal Simulation services.



Elma Sales Office



Elma Production/Assembly/Sales

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