

Katana[®] 2000

Commercial ATCA Bladed Server

Embedded Computing for
Business-Critical Continuity[™]

PRELIMINARY DATA SHEET

Ideal for data processing applications, the Katana 2000 server features high performance compute blades in an open standards-based architecture

- 3U, 19" dual server platform based on ATCA technology for high performance, high reliability computing
- Supplied with one or two server blades each with two quad-core Intel[®] Xeon[®] 5500 series processor
- Front-to-rear cooling to meet ASHRAE and IT best practice requirements
- Support for power saving features enhancing energy efficiency
- Pre-integrated software package

The Katana[®] 2000 bladed server from Emerson Network Power offers scalable, high-performance computing for tasks that store, process and forward large amounts of data for applications where reliability or bill-per-minute are critical.

Target applications include:

- Internet-based media and content provisioning
- Data processing and logging in industrial installations and oil and gas exploration
- Surveillance infrastructure in security applications
- Server platform for electronic warfare
- Image processing and data management in medical applications
- Data retrieving, processing and storing in scientific or large physics experiments

Katana 2000 is based on open-standards AdvancedTCA[®] technology to provide commercial IT applications with improved serviceability, power and space efficiency over typical rack mount server-based solutions. The low-profile system can be supplied with one or two high performance server blades, each featuring two of the latest quad-core Intel[®] Xeon[®] 5500 series processor devices with up to 48GB DDR3 memory and two individually hot-swappable mass storage units.

By basing the server on ATCA[®] technology, Emerson also enables you to reuse existing ATCA server blade hardware and software providing a significant reduction in development cost and reducing time-to-market for new systems. The open standards-based architecture gives you freedom of choice and doesn't lock you into any particular vendor.

Optionally, pre-integrated software including Emerson's SpiderWare[®]M³ graphical system management application and Red Hat Enterprise Linux can deliver a smooth out-of-the-box experience.

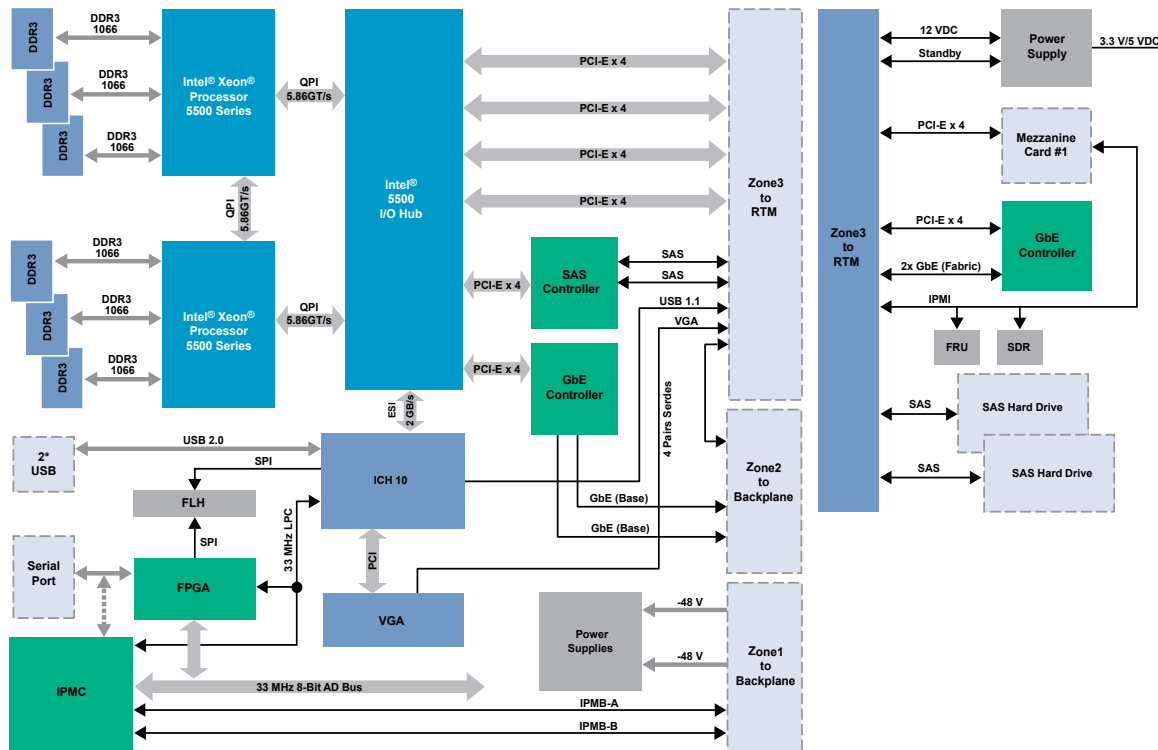
Emerson intends to certify Katana 2000 with EMC CLARiiON CX4 and AX4 storage equipment to enable you to easily extend your application with external mass storage solutions



AdvancedTCA[®]

EMERSON[™]
Network Power

Block Diagram



Server Overview

With an architecture designed for high availability, the Katana 2000 enables scalable reliability through the use of either independent or redundant functions throughout the chassis. All electronic modules, blades and cards are field replaceable units (FRUs). Katana 2000 is highly serviceable and provides front maintenance and rear cabling. The platform minimizes both planned and unplanned downtime and can provide continuous service during fault recovery. In addition to redundancy of all active system components, the Katana 2000 supports high availability through hot-swappable key system components. The integrated shelf management provides access to inventory data, remote upgrade, thermal management and enables remote access via network.

The Katana 2000 shelf provides sufficient cooling for two server blades plus integrated rear transition modules (RTMs) and can be operated in climate controlled environments within an ambient temperature range of +5° C to +35° C.

The system can be supplied to support either DC or AC power. Power modules can be installed singularly for the most cost-effective implementation or with redundancy, offering the highest level of system reliability and network up-time.

The Katana 2000 bladed server is integrated with one or two high performance server blades, each featuring two of the latest quad-core Intel® Xeon® processor 5500 series devices to deliver the right amount of performance needed for data center applications. Data center thermal environments allow these server blades to operate at increased performance compared to the processor variants typically used in NEBS L3 environments. Up to 48GB of DDR3 memory is supported that connects via multiple high speed memory channels directly to both CPUs.

Featuring power saving technology the server blade comes with flexible options to dynamically adapt the blade to performance and energy saving requirements. This technology makes Katana 2000 the ideal platform for addressing green initiatives which are becoming a priority in data center management.

Key features of the server blade are:

- Two quad-core next generation Intel® Xeon® 5500 series processors up to 2.53 GHz, 80 W, different speed grades possible
- Six DDR3 DIMM sockets for up to 48GB main memory, 800/1066
- Each DIMM connects to a separate CPU memory channel for optimized throughput
- Redundant centralized Ethernet access via the system backplane, 1 and 2Gbps
- Dual hot-swappable hard disks connected to a RAID0 and RAID1 capable storage controller
- Flexible I/O solutions thru I/O daughter card modules

System Hardware

CHASSIS

- 3U chassis for 19" racks
- Two (2) slots for 8U server blades (based on the AdvancedTCA specification)
- Two (2) slots for 8U RTMs for I/O extensions
- Two (2) user card slots
- Front-to-rear air flow
- Rear connection for power cables
- Dimensions (overall): 132 mm high; 445 mm wide; 420 mm deep

BACKPLANE

Besides power distribution and intelligent platform management interface (IPMI) busses for shelf management, the backplane provides the following connections for communication between blades:

- Redundant centralized 1Gbps Ethernet access from each server blade slot (according to ATCA Base I/F)
- Ethernet access to both hubs implemented on the shelf manager boards (ShMB)
- Direct 1Gbps Ethernet access between the two server blade slots (according to ATCA Fabric I/F)
- Additional 1Gbps Ethernet access from each server blade slot to the user card slots

COOLING

- Speed-controlled fan trays with thermal sensors for front blade and RTM cooling
- Fault-tolerant design covering the loss of a single fan
- Sufficient cooling for fully equipped system (two Katana 2000 server blades plus RTMs) at +5° C to +35° C

USER CARD SLOT

- Designed to support addition of user-specific functionality
- Two (2) slots for custom cards in chassis rear
- PCB size approx. 110 mm x 70 mm
- 20 mm front panel
- Direct connection to backplane:
 - ▲ Redundant -48 V
 - ▲ Redundant IMB0 and redundant intelligent peripheral management controllers (IPMC) power
 - ▲ Redundant clocks for synchronization purposes
 - ▲ Each user card has access to 1Gbps Ethernet available from one server blade

SHELF MANAGEMENT

- Remote access to shelf and field replaceable units (FRUs) for inventory management, alarming, and control
- HPI-B based remote access via C-library
- Service Availability Forum™ (SA Forum) compliant protocol: SAI-HPI-B.01.01
- SA Forum compliant ATCA mapping: SAIM-HPI-B.01.01-ATCA

Power Distribution

The rear power inlet area provides redundant DC or AC power connections. One or two DC power entry modules (PEM) or AC power supply units (PSU) can be installed from the front feeding the redundant power rails of the system backplane. Redundant and non-redundant configurations are possible. The power inlet is located in the back of the chassis and for safety reasons is a fixed, non-field replaceable unit. No user serviceable parts are contained in the power inlet. The AC PSUs or DC PEMs are installed from the front and are independently hot-swappable and replaceable.

The working DC voltage levels are -39.4 V to -57.6 V supporting nominal voltages of -48 V. Each PEM contains a circuit breaker and a filter to reduce conducted emissions. The working AC voltage levels are 90-250 V. One or two power supply units can be specified.

Chassis Layout and Dimensions

FRONT

- Two (2) horizontal 8U server blade slots for front blades
- Air inlet, fan tray, air filter
- One (1) or two (2) DC PEMs or AC PSUs

KATANA 2000 CHASSIS DIMENSIONS

- Height: 132 mm
- Width: 445 mm (without mounting flanges)
- Depth: 420 mm
- Supports mounting in both 19" and 23" racks

REAR

- Air outlet, fan tray
- Two (2) horizontal 8U slots for RTMs
- One (1) or two (2) power inlets
- One (1) or two (2) shelf management cards with hub switches
- Two (2) user card slots

Cooling

The Katana 2000 provides fault-tolerant cooling to front mounted server blades and to RTMs based on a front maintainable and a rear maintainable fan tray. The front fans blow air into the slot area while the rear fans pull the air through the slot area. The cooling system is designed to cool two fully equipped Katana 2000 server blade and RTMs when operated in network data center environments (+5° C to +35° C). The shelf manager (ShM) monitors and controls the speed of each individual fan. The ShM bases its control decisions on air intake temperature, the air exhaust temperature and standard thermal data provided by the blades. A system management instance can consider additional sensor data as provided by the individual blades and can take over control of the cooling subsystem through the ShM. All fans automatically run at full speed if they lose their connection to the ShM.

Shelf Management

The purpose of System Management is to assure proper operation of server blades and other shelf components within one or several shelves. The ShM is a shelf functionality providing the system manager with appropriate information (inventory, sensor, and status data) as well as control access. Beyond this interfacing task, it also automatically administrates the power budget, checks for compatibility of newly inserted components, monitors the overall stability of the system, and reports anomalies. Thermal management is also a task of the ShM as described above. Shelf Management is a distributed functionality, which is based on two redundant ShM cards, a redundant IPMI network, and IPMCs on each intelligent FRU within the

shelf. Furthermore, the ShM cards with integrated ShM Controller (ShMC), redundant IPM bus, and IPMCs on each provides inventory data (manufacturer, serial number, etc.) and remote upgrade functionality of all intelligent field replaceable units.

Shelf Manager Card

The Katana 2000 contains one or two rear serviceable ShM cards supporting non-redundant or redundant shelf management. In addition, the ShM cards host the Base Hub Board functionality that allow redundant access to the centralized 1Gbps Ethernet network. The active ShM can access all intelligent FRUs within the shelf via two redundant IPMI busses (IPMB). For redundant configurations, the standby ShM permanently monitors the physical condition of the currently active counterpart and takes over service and IP address automatically in the case of a failure. The result is a fault-tolerant and continuous remote access to the shelf for System Management.

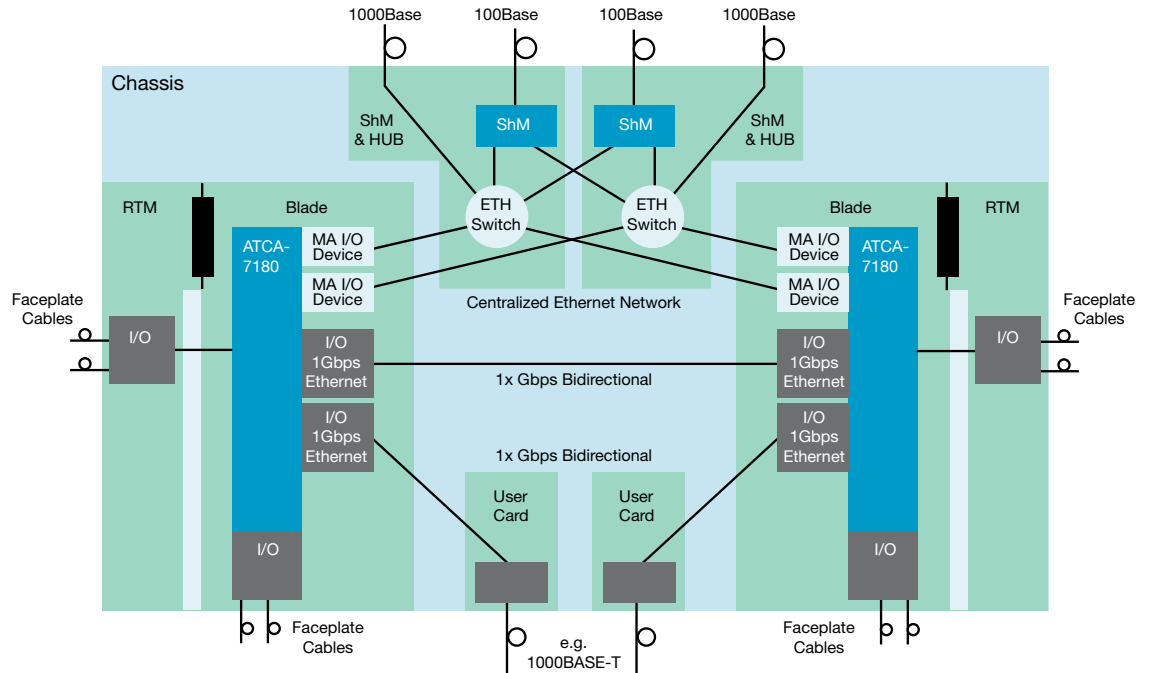
Remote access is provided either via network cable plugged to the ShM, or via the centralized 1Gbps Ethernet network of the shelf. The hardware platform interface (HPI) is accessible via an HPI client library which can be used on remote Intel® Pentium®/Linux nodes. The protocol interface to the ShM is HPI-B.01. HPI provides access to shelf-internal IPMI objects in accordance with PICMG® 3.0 defined rules.

The ShM is also responsible for validating each newly inserted server blade before it is powered. This insures new server blades do not exceed the power budget or the cooling capabilities of a slot. Additionally the ShM checks the compatibility of the server blades' connection channels across the backplane.

Centralized Ethernet Network

Access to the centralized Ethernet network is provided with a hub integrated in the shelf manager board. It is based on the ATCA Base I/F. With both ShM cards installed, redundant Hubs are available. The switches support IEEE 802.3xxx 1000BASE-T, 100BASE-TX, 10BASE-T to both server blade slots as required by PICMG 3.0. The switches are unmanaged. Additional Ethernet channels are used for the implementation of the ShM card cross connect to support redundant operation of the dedicated shelf managers. One external 1000BASE-T Ethernet connection is available on the face plate of each ShM card connected to the hub of the respective centralized Ethernet network part.

Network Logical Diagram with Redundant Blades



Additional Ethernet Backplane Access

When two Katana 2000 server blades are installed, they directly connect via 1Gbps Ethernet over the backplane.

Each Katana server blade is connected via 1Gbps Ethernet to one User Card slot.

User Cards

Two slots are provided to allow users the ability to integrate custom functions into their system. Examples of user-added functions include clock generators, 1GbE fabric uplinks, or system alarms. Each card can be 110 mm deep x 70 mm wide x 20 mm high. Each card accesses redundant power, IPMC, and clock connections. The fabric channel from blade one is connected to user card one; the fabric channel from blade two is connected to user card two.

Pre-integrated Katana 2000 Server Blade

The Katana 2000 platform comes with one or two pre-integrated Katana 2000 server blades based on the powerful ATCA-7180 processing blade. The blade features the latest Intel® Xeon® processor 5500 series based architecture.

Blade Standard Networking Support

The Katana 2000 server blade provides PICMG 3.0 base interface connectivity in a dual star configuration using standard Gigabit Ethernet (GbE) technology. Over the base interface, the processor blade can communicate with other devices connected to the centralized Ethernet network including a second blade installed in the shelf, the shelf manager blade and devices connected externally to the hub.

The PICMG 3.1 fabric interface features dual 1Gbps (option 1) Ethernet capability. Note that for 1Gbps fabric interface support, the RTM-ATCA-7180 needs to be installed.

The server blade can communicate over one fabric interface channel with a second blade. The server blade is connected with the second fabric interface channel to the user slot and may be used for communicating with a user card.

Processor Complex

Surrounding the quad-core processors is an array of high performance components that combine to form a powerful processor complex. Features include:

- Next generation Intel® Xeon® 5500 series processors
- Intel® 5500 chipset I/O hub (IOH)
- Broadcom BCM 5715C/S Gigabit Ethernet controllers
- LSI Logic LSI1064 SAS RAID controller

Software Offerings

Katana 2000 is offered with pre-integrated software including operating system, management software and Katana 2000 blade firmware. Katana 2000 comes with optional pre-integrated Red Hat Enterprise Linux 5.3 and is Red Hat certified. Blade-level firmware is included supporting BIOS, boot firmware and IPMC.

SUPPORTED OPERATING SYSTEMS

- Red Hat RHEL 5.3 certified

Board Support Package includes:

- Firmware upgrade utility

SpiderWare®M³ platform management software is included. SpiderWareM³ runs on Linux and can be hosted locally (on the Katana 2000 server blade) or externally. SpiderwareM³ provides a convenient tool for platform management visualization. It allows remote inspection and control of field replaceable units and shelves installed at remote locations. See the SpiderWareM³ data sheet for more details.

DHCP service is provided by the shelf manager for each of the blades installed into the system.

Rear Transition Module

An optional RTM is available to support different I/O configurations. RTM-ATCA-7180 includes:

- Two (2) Gigabit Ethernet interfaces (optional)
- One (1) monitor interface
- One (1) USB 1.1 management interface
- Two (2) Fibre Channel interfaces 2Gbps (optional)
- Two (2) drive bays hosting individually hot swappable SAS disk drives
- Up to 300GB disk capacity per disk bay
- SAS HW RAID 0 and 1
- Further face plate I/O options planned supporting external SAS, SCSI, PCI Express

External Storage

The Katana 2000 server blade provides optional Fibre Channel connectivity to external storage. In addition external storage can be accessed via Ethernet using iSCSI protocol. Katana 2000 is planned for full certification with EMC CLARiiON CX4 and CLARiiON AX4 storage equipment that allow building large RAID arrays.

Intelligent Platform Management Control

The Katana 2000 server blade provides an intelligent platform management controller (IPMC). The IPMC is a management subsystem providing monitoring, event logging, and recovery control. The IPMC serves as the gateway for management applications to access the platform hardware. Features include:

- Compliance with PICMG 3.0
- Rollback capability if an operational BIOS or IPMC image upgrade failed
- Firmware upgradable from IPMI interface (IPMB)

Blade Hardware

PROCESSOR

- Two next generation quad-core Intel® Xeon® 5500 series processors up to 2.53 GHz, different speed grades possible
- 2 threads per core
- Intel® QuickPath Interconnect (Intel® QPI) data link between processors and to IOH controller
- 8MB L2 cache (per processor)
- 64-bit mode extension (EM64T)
- SMP support
- Flexible power-saving features

MEMORY

- Memory controller integrated into processors, low latency
- Three independent DDR3 memory channels per processor
- Six (6) DIMM sockets supporting 800 and 1066 memory speed grades
- 2GB up to 48GB memory configurations supported
- 1.0MB BIOS flash

COUNTERS /TIMERS

- Real-time clock
- Programmable watchdog timer

BASE AND FABRIC INTERFACES

- Dual star configuration
- PICMG 3.0 base interface compliant, redundant Gigabit Ethernet (1.0Gbps)
- PICMG 3.1 Option 1 fabric interface compliant, redundant Gigabit Ethernet (1.0Gbps)*
 - * Requires presence of RTM-ATCA-7180

EXTERNAL INTERFACES

- Front panel
 - ▲ Serial, RJ-45 (1)
 - ▲ USB 2.0 (2)
- Rear transition module
 - ▲ USB 1.1 (1)
 - ▲ Monitor interface (1)
 - ▲ Gigabit Ethernet interfaces (2), optional
 - ▲ 2.0Gbps Fibre Channel interfaces (2), optional

SYSTEM POWER REQUIREMENTS

- Dual-redundant –48 V rail
- System input range: –39.4 V to –57.6 VDC
- Power consumption (blade): 260 W typical, 320 W max.
- Power consumption (system): TBD

THERMAL CHARACTERISTICS

- Operating range: +5° C to 35° C

BLADE SIZE

- 8U form factor, 280 mm X 322.5 mm, single slot

RELEVANT STANDARDS

- PICMG 3.0 (form factor, IPMI, base interface, hot swap, RTM)
- PICMG 3.1, Option 1

Ordering Information

Part Number	Description
KATSVR -2000-DC1	2-slot ATCA chassis, 1X DC PEM, 1X ATCA-7180-12GB, 1X RTM-7180 W/ HDD and 2X GE (See Note 1)
KATSVR -2000-DC2	2-slot ATCA chassis, 2X DC PEM, 2X ATCA-7180-24GB, 2X RTM-7180 W/ HDD and 2X GE
KATSVR-2000-AC1	2-slot ATCA chassis, 1X AC PSU, 1X ATCA-7180-12GB, 1X RTM-7180 W/ HDD and 2X GE (See Note 1 and 2)
KATSVR -2000-AC2	2-slot ATCA chassis, 2X AC PSU, 2X ATCA-7180-24GB, 2X RTM-7180 W/ HDD and 2X GE (See Note 2)
SPARE-ATCA-7180-12GB	Spare ATCA processor blade for KATSVR, dual Intel Xeon 5500 series CPU (2.26 GHz), 6x 2GB (RoHS 5/6)
SPARE-ATCA-7180-24GB	Spare ATCA processor blade for KATSVR, dual Intel Xeon 5500 series CPU (2.26 GHz), 6x 4GB (RoHS 5/6)
SPARE-RTM-7180-HDGE	Spare RTM-7180 for KATSVR, 1X 147GB SAS HDD (2X HDD slots), 2X GE interfaces (RoHS 5/6)
RTM-7180-HDD-KIT	1X 147GB SAS HDD kit for the RTM-7180 (RoHS 6/6)

Note 1: Non-redundant configuration with one shelf manager
Note 2: Future Variant

Regulatory Compliance

Item	Description
EMC	ETSI EN 300 386 (Europe); FCC part 15 (US) , EN 55022, EN 55024
Safety	IEC 60950-1; EN 60950-1; UL 60950-1/CAN/CSA C22.2 No. 60950-1

SOLUTION SERVICES

Emerson Network Power provides a portfolio of solution services optimized to meet your needs throughout the product lifecycle. Design services help speed time-to-market. Deployment services include global 24x7 technical support. Renewal services enable product longevity and technology refresh.

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