ATCA-S201

Installation and Use

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Trademarks

Notice

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Contact Address

Emerson Network Power - Embedded Computing
2900 South Diablo Way, Suite 190
Tempe, AZ 85282
USA

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Preface

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

The safety precautions listed below represent warnings of certain dangers of which Emerson is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

GROUND THE INSTRUMENT. To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. If the equipment is supplied with a three-conductor AC power cable, the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green/yellow) reliably connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards and local electrical regulatory codes.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE. Do not operate the equipment in any explosive atmosphere such as in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment could result in an explosion and cause injury or damage.

KEEP AWAY FROM LIVE CIRCUITS INSIDE THE EQUIPMENT. Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified service personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Service personnel should not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, such personnel should always disconnect power and discharge circuits before touching components.

USE CAUTION WHEN EXPOSING OR HANDLING A CRT. Breakage of a Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, do not handle the CRT, and avoid rough handling or jarring of the equipment. Handling of a CRT should be done only by qualified service personnel using approved safety mask and gloves.

DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT. Do not install substitute parts or perform any unauthorized modification of the equipment. Contact your local Emerson representative for service and repair to ensure that all safety features are maintained.

OBSERVE WARNINGS IN MANUAL. Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.

Warning

To prevent serious injury or death from dangerous voltages, use extreme caution when handling, testing, and adjusting this equipment and its components.

Flammability

All Emerson PWBs (printed wiring boards) are manufactured with a flammability rating of 94V-0 by UL-recognized manufacturers.

EMI Caution

This equipment generates, uses, and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used with adequate EMI protection.

Safety Statement

The ATCA-S201 is designed to comply with EN60950-1, and is intended to be used with similarly tested ATCA and AMC products that have a user's guide detailing user installation of AMC module accessories.

CE Notice (European Community)

Emerson Networks products with the CE marking comply with the EMC Directive (89/336/EEC). Compliance with this directive implies conformity to the following European Norms:

- EN55022 "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment"; this product tested to Equipment Class A
- EN50082-1:1997 "Electromagnetic Compatibility—Generic Immunity Standard, Part 1. Residential, Commercial and Light Industry"

System products also fulfill EN60950 (product safety), which is essentially the requirement for the Low Voltage Directive (73/23/EEC).

Board products are tested in a representative system to show compliance with the above mentioned requirements. A proper installation in a CE-marked system will maintain the required EMC/safety performance.

In accordance with European Community directives, a "Declaration of Conformity" has been made and is on file within the European Union. The "Declaration of Conformity" is available on request. Please contact your sales representative.

Notice

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About This Manual

This manual supports the following configurations and model numbers.

Part Number	Description
ATCA-S201	10GbE RAID Storage-IP Carrier blade

How this manual is organized

This manual is divided into the following chapters and appendices:

Chapter 1 provides a ATCA-S201 Overview

Chapter 2 provides instructions for Installation

Chapter 3 provides the procedures for a New System configuration

Chapter 4 Provides details regarding Network configuration

Chapter 5 provides details for RAID Volume Configuration

Chapter 6 provides instructions for sharing devices as NAS or iSCSI

Chapter 7 provides information for iSCSI LUN configurations

Chapter 8 provides information for NFS and SMB file sharing configurations

Chapter 9 provides Blade Maintenance and Firmware upgrades

Chapter 10 provides ATCA-S201 Mechanical and Connector Information

Chapter 11 provides overview on RTM-ATCA-SXXX

Chapter 12 provides instructions for installing the RTM-ATCA-SXXX

Chapter 13 provides RTM-ATCA-SXXX connector information

Chapter 14 provides IPMI Functions List

Chapter 15 provides IPMC Firmware Upgrade Procedure

Conventions Used in This Manual

The following typographical conventions are used in this document:

Table 1 Conventions used in this manual

Convention	Is used for
bold	User input that you type just as it appears; it is also used for commands, options and arguments to commands, and names of programs, directories and files.
italic	Names of variables to which you assign values, for function parameters, and for structure names and fields. Italic is also used for comments in screen displays and examples, and to introduce new terms.

courier	System output (for example, screen displays and reports), examples, and system prompts.
ENTER	The carriage return or Enter key.
CTRL	The Control key. Execute control characters by pressing the CTRL key and the letter simultaneously, for example, Ctrl+D.

Hardware Preparation and Installation

Unpacking Instructions

If the shipping carton is damaged upon receipt, request that the carrier's agent be present during the unpacking and inspection of the equipment.

Unpack the equipment from the shipping carton. Refer to the packing list and verify that all items are present. Save the packing material for storing and reshipping of equipment.

Avoid touching areas of integrated circuitry. Static discharge can damage circuits.

After removing the product from the packaging:

- Check for obvious physical damage.
- Make sure that you disconnect the chassis from the main power supply before you continue.

Antistatic Precautions

Emerson strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from its protective wrapper or from the system, place the component flat on a grounded, static-free surface (and, in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

Avoid touching areas of integrated circuitry. Static discharge can damage these circuits.

1 ATCA-S201 Overview

The Emerson ATCA-S201 is an ATCA carrier blade that supplies multi-protocol IP storage services to the chassis Zone-2 backplane using Ethernet connections. The ATCA-S201 virtualizes capacity of AMC SAS/SATA disks and creates multiple logical volumes which are mapped as iSCSI, NFS or SMB targets. Using access control lists, ATCA server blades are given authorization to connect with virtualized volumes via 10 GbE fabric or 1GbE base connections.

The ATCA-S201 carrier can accommodate up to four AMC disk modules. Additional disks may be added using an Advanced ARTM which adheres to the Advanced RTM zone-3 connector pin out.

Users may also deploy the ATCA-S201 to realize gateway functions with external equipment including SAS and/or Fiber channel (FC) storage area networks (SANs). For example, populate with an AMC 4 Gb FC controller modules, and establish gateway services between LUN volumes in the FC data center and the ATCA GbE network.

1.1 Features of the ATCA Storage Module

The ATCA-S201 is single slot carrier board for ATCA shelves. Measuring 8U (280mm) x 325 mm, the carrier includes four advanced mezzanine card (AMC) slots for storage disks or SAN connections. Several on board Ethernet controllers provide connections to the base and fabric interfaces.

The prominent digital components include:

- Freescale® 1.3Ghz, super scalar PowerPC processor
- Intel® dual port 10 GbE Ethernet controller
- LSI® 8 port SAS controller, with RAID
- PLX® 48 Lane PCI Express Switch
- 1GB SODIMM, 533MHz DDR2, with ECC (72b)
- Carrier IPMC, with hot swap and LED control
- FRUID serial EERPORM (note: The FRU ID is not a separate part but rather embedded in the MMC controller.)
- Temperature sensors
- Voltage sensors
- SPI flash memory

The ATCA-S201 is loaded with software which enables it to terminate several IP protocols, and efficiently map these protocols to block I/O storage using SAS/SATA disks, and optional RAID protection. This product can also map IP protocols to Fibre Channel SAN resources, if populated with a 4Gb Fibre channel AMC module.

Key software services include:

- iSCSI service (IETF RFC-3720)
- NFS service version 3 (network file share)
- SMB service (Server Message Block file system)
- Integrated RAID0, RAID1 and RAID1E service
- SNMP
- HTML web configuration client

1.2 I/O PICMG standards compliance

The ATCA-S201 10Gb RAID Storage-IP Carrier ATCA is fully compliant with the following PCI Industrial Computer Manufacturers Group (PICMG) specifications:

- PICMG 3.0 Advanced Telecommunications Computing Architecture (ATCA)
- PICMG 3.1 Ethernet for ATCA Systems
- AMC.0 Advance Mezzanine Card Base Specification
- AMC.1 PCI Express and Advanced Switching
- AMC.3 AMC Storage
- IPMI v1.5 Intelligent Platform Management Interface Specification
- PCI Express 1.0a

1.3 Chassis I/O connections

The ATCA-S201 provides several sockets and slots to facilitate operation in an ATCA chassis. In addition to 4 AMC modules, the module includes chassis backplane connections including ATCA zone-1 (power), zone-2 (fabric) and zone-3 (Advanced rear transition module).

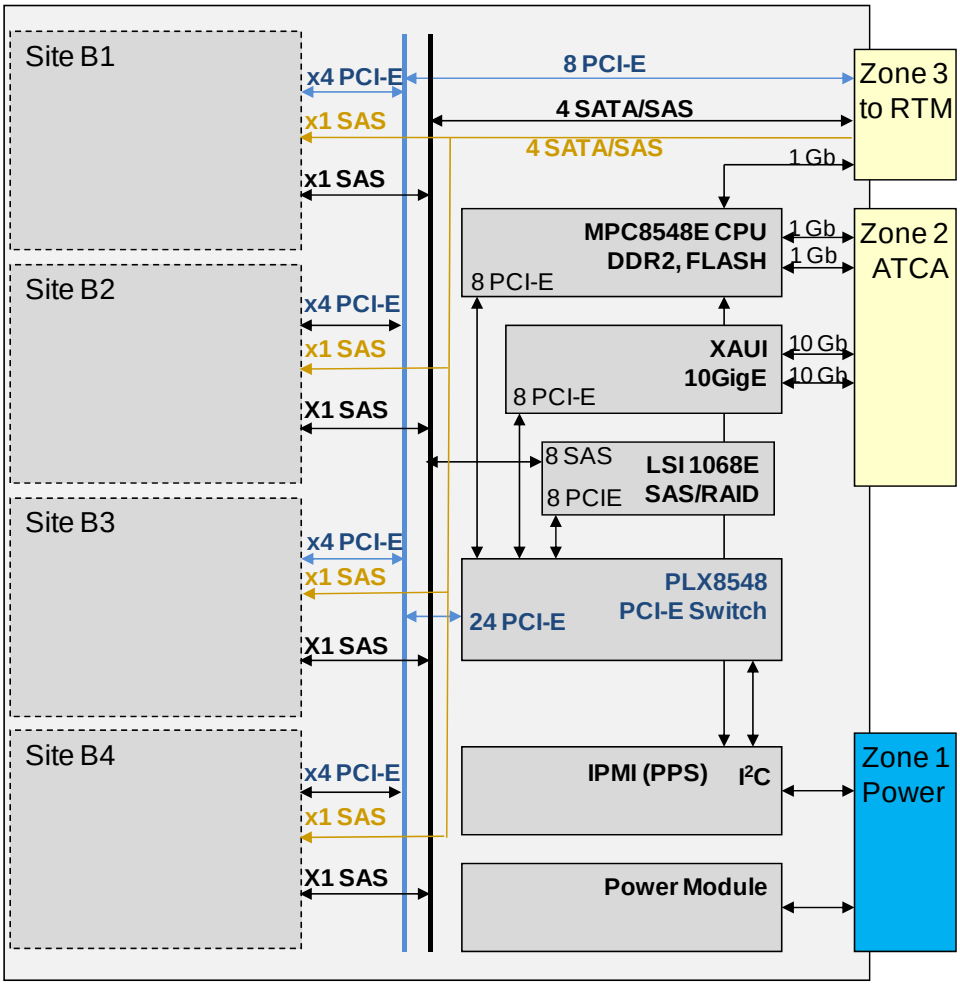


Figure 1, ATCA-S201 functional block diagram

1.3.1 AMC card connections

The four AMC slots have identical features, and each accommodates a half width, mid height module. The ATCA-S201 accepts AMC cards conforming to either PCI express signaling (AMC.1) or Storage signaling options (AMC.3). AMC feature support details:

- PCI-Express x4 on AMC ports 4-7
- PCI reference clock on FCLKA
- 3Gb SAS/SATA on AMC port2
- 3Gb SAS/SATA on AMC port3
- SAS hot swap support
- Face plate height x width, 18.96 x 73.8mm
- IPMB-L
- 72W max each slot (120W shared with all AMC slots)

1.3.2 DDR2 SODIMM

A 72 bit SODIMM socket is populated with a DDR2 memory module, and operated at 533MHz. The ATCA applies ECC (error correction code) algorithms to this memory to ensure data integrity of both the storage and program code stored in it. Single bit errors are automatically detected and corrected by these ECC algorithms.

1.3.3 Zone 1, power backplane connections

The Zone-1 connector brings 48V DC power into the ATCA main board. This power is regulated and split into several lower voltages by discrete components and a pair of power modules that are affixed to the ATCA carrier. Together, these devices convert 48V source and distributes power amongst the ATCA local onboard needs, AMC slots and advanced rear transition module (RTM).

1.3.4 Zone 2, backplane connections

This connector carries the Ethernet links to the chassis backplane. All Ethernet ports on this connector are full duplex and all ports support access to advertised storage resources. This connector includes the following Gigabit Ethernet ports:

- 2 Fabric channels, redundant 10GbE XAUI connections
- 2 Base channels, redundant 1GbE base connections

1.3.5 Zone 3, Advanced RTM connector

This connector conforms to the advanced rear transition module (RTM) 3-row connector standard. The following functions are routed to this connector:

- 8x PCI-express
- 4x SAS/SATA target connections
- 4x SAS/SATA initiator connections
- I^2C support

- 12V and 3.3V supply voltage
- 1GbE management
- RS232 management

1.3.5.1 Ethernet Management port

An Ethernet management port is routed to the Zone 3 connector. An advanced RTM with an RJ-45 connector is needed to access this port. The port auto negotiates to either 10/100/1000BASE-T.

1.3.5.2 Serial Console Port

An RS232 serial management port is routed to the Zone 3 connector. An advanced RTM with an RJ-45 connector is needed to access this port.

1.4 LEDs

Several LEDs are located on the panel of the ATCA-S201 Advanced TCA Carrier.

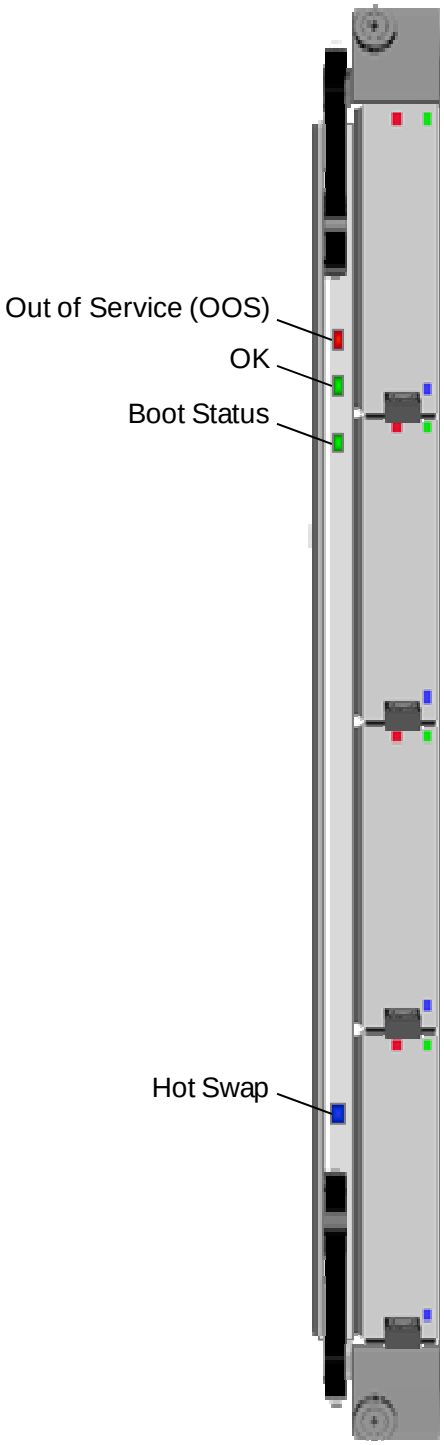


Figure 2 Front view- fully populated ATCA-S201 showing panel LEDs

Table 2 LED functional description

LED	Description
ATCA Hot Swap LED	Off: Normal, default state Blue-Blinking: Preparing for hot swap Blue-ON: ready for hot-swap removal
ATCA Blade OK LED	Green-ON: Blade Optimal
ATCA Boot (Health) status	Amber: Blade is resetting Green: Blade is optimal
ATCA Out of service (OOS)	Off: Normal, default state Yellow-Blinking: firmware update in progress Red-ON: Out of service (PPC/IPMC)

1.5 Software driver support

The ATCA-S201 provides several IP storage services over the 10GbE fabric and 1 GbE base connections. Major services include iSCSI, NFS, and SMB. ATCA node boards with standard OS installations, require no special drives from Emerson. This product is compatible with the following operating systems and services:

- Solaris 10 (SPARC) Operating System, NFS
- Solaris 10 (SPARC) Operating System, iSCSI initiator
- Solaris 10 (x86) Operating system, NFS
- Solaris 10 (x86) Operating system, iSCSI initiator
- SuSE Linux Enterprise Server 10, NFS
- SuSE Linux Enterprise Server 10, iSCSI initiator
- RedHat Enterprise Linux 5.0_u4, NFS
- RedHat Enterprise Linux 5.0_u4, iSCSI initiator
- Windows Server 2003 CIFS (a dialect of SMB)
- Windows Server 2003, iSCSI initiator

1.6 Part Number, Serial Number, and Address Labels

At manufacturing time, several labels are affixed to the ATCA-S201 as shown below. For proper identification of the AMC module, use these barcode labels to determine the module identity. The barcode labels provide the following information:

Table 3 ATCA-S201 Identification Labels

Label	Description
Label 1: Top/Final assembly P/N	For Internal Use Only
Label 2: Sub assembly P/N	For Internal Use Only
Label 3: Serial number (S/N) Format: AAALYMMSSSS (example: 100S8031234)	AAA = Assembly Number (100) L =Location of manufacturer (S) Y = Calendar year of manufacturer (2008 = 8) MM = Calendar month of manufacturer (March = 03) SSSS = Sequence number (reset each month) (1234)

Label 4: Part Numbers (example: 0106826G01A ATCA-S120)	This label contains 2 numbers: Top = Internal Part Number Bottom = Orderable Part Number

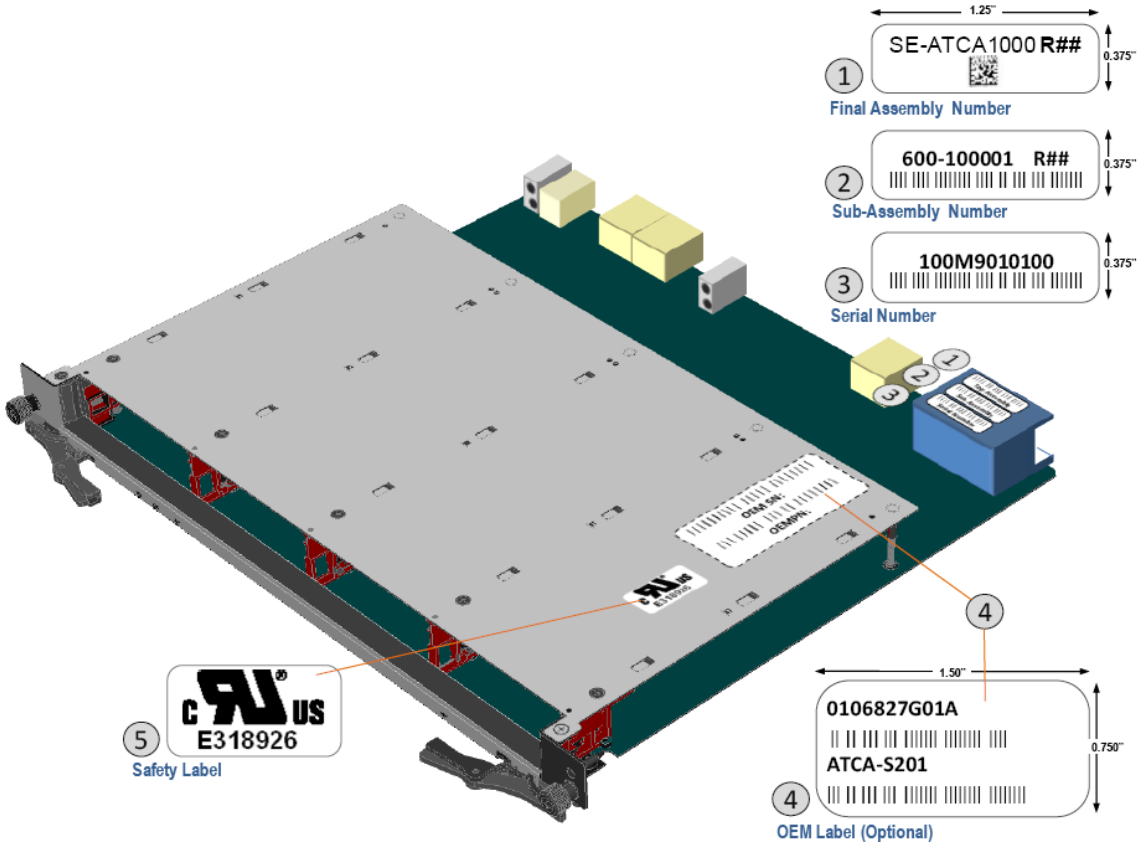


Figure 3 ATCA-S201 Diagram Showing Identification Label Location

2 ATCA-S201 Installation

This chapter contains the procedures for installing and removing the ATCA-S201 10GbE RAID storage services blade.

2.1 Installation and removal of the ATCA carrier blade

The ATCA-S201 10GbE RAID storage services blade can be installed into an ATCA shelf (chassis) with a midplane made for front and rear board installations.

2.2 Important information about your chassis

The Chassis backplane often designates certain slots as hub slots and the others as general purpose node slots. Be certain to select a general purpose node slot for installation. If this installation includes a companion advanced rear transition module (ARTM), install the ARTM first. These back-to-back slots have cut-outs that permit the front carrier board to pass signals to the ARTM via the Zone-3 connector complex.

Before installing the blade module, verify the module's part number to ensure that the correct module is being installed into the system. For information on identifying the blade module, see Section 1.6 Part Number, Serial Number, and Address Labels.

2.3 Safety Statement

The ATCA-S201 is designed to comply with UL60950-1, and is intended to be used with similarly tested ATCA and AMC products that have a user's guide detailing user installation.

2.3.1 Observe maximum module current requirements

Be sure to validate the host chassis, and the host chassis meets the maximum current requirements.

The ATCA-S201 includes a stacked power supply module with maximum rated output of 210W of power. This represents a surplus of power vs. the expected power consumption.

Table 4 Max ATCA-S201 module Current requirements

Module	ATCA-S201	
Max ATCA blade Current Draw (unpopulated)		1.04 @ 48V (50 watts)
Max current draw (each AMC slot)	72 watts (max each)	2.08 @ 48V (100 watts) total shared power pool
Max current draw (ARTM slot)	25 watts (max)	
		3.12 Total Maximum

2.4 Before you install or Remove the ATCA carrier blade

Boards may be damaged if improperly installed or handled. Please read and follow the guidelines in this section to protect your equipment.

2.4.1 Observe ESD Precautions

Emerson strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from its protective wrapper or from the system, place the component flat on a grounded, static-free surface (and, in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.

2.4.2 Watch for Bent Pins or Other Damage

Bent pins or loose components can cause damage to the board, the backplane, or other system components. Carefully inspect your board and the backplane for both pin and component integrity before installation. Our suppliers take significant steps to ensure there are no bent pins on the backplane or connector damage to the boards prior to leaving our factory. Bent pins caused by improper installation or by boards with damaged connectors could void the warranty for the backplane or boards.

If a system contains one or more crushed pins, power off the system and contact your local sales representative to schedule delivery of a replacement chassis assembly.

2.5 Use Caution When installing or removing the ATCA carrier

When installing boards in an empty chassis, we recommend that you start at the left of the card cage and work to the right. This helps to avoid mistakes in matching slots with the intended carrier boards.

When inserting or removing a board in a slot adjacent to other boards, use extra caution to avoid damage to the pins and components located on the primary or secondary sides of the boards.

2.5.1 Preserve EMI Compliance

To preserve compliance with applicable standards and regulations for electromagnetic interference (EMI), during operation all front and rear openings on

the chassis or board faceplates must be filled with an appropriate card or covered with a filler panel. If the EMI barrier is open, devices may cause or be susceptible to excessive interference.

2.5.2 Understand Hot Swap

The ATCA module is electrically designed for hot swap within a fully powered chassis. To facilitate hot swap, there is a blue LED on the front faceplate. This LED is under software control of the IPMC managers.

The manager will illuminate the blue hot swap LED on the front faceplate when software has stopped and it is safe to remove the advanced rear transition module. If the blue-LED is not illuminated or blinking, it is not ready for removal. Powering down or removing a board before the operating system or other software running on the board has been properly shut down may cause corruption of data or file systems.

2.6 Connector Mechanical keying

The ATCA supports mechanical connector keying to help prevent installation with incompatible components and RTM. The ATCA carrier board utilizes an A1/K1 key that is set at for universal)

2.7 Verify Slot Usage

Prevent possible damage to module components by verifying the proper slot usage for your configuration.

In most cases, electronic keying (E-keying) will prevent power on of a board into an incompatible slot. However, as an extra precaution, you should be familiar with the slot purpose.

2.8 Installing the ATCA carrier blade

This section describes a recommended procedure for installing the ATCA carrier module in a chassis.

Before you install your module, please read all cautions, warnings, and instructions presented in this section.

Handling modules and peripherals can result in static damage. Use a grounded wrist strap, static-dissipating work surface, and antistatic containers when handling and storing components.

Insert the board by holding the Module Handles—do not exert unnecessary pressure on the faceplate.

Hot swap compliant modules may be installed while the system is powered on. If a module is not hot swap compliant, you should remove power to the slot or system before installing the module.

1. Verify that you have taken the necessary antistatic precautions.

2. Go to the front of the system and choose an appropriate slot for the ATCA carrier blade.

   If also installing a companion advanced rear transition module (RTM), install it before installing the ATCA node board. For example, if the ATCA node board is planned for slot B4, first install the ARTM at the back of the system in slot B4.

3. Remove the slot filler panel from the selected node board slot, if necessary.

4. Prepare the module by loosening the locking screws and opening the injector/ejector latch at the top and bottom of the module as shown in the figure below.

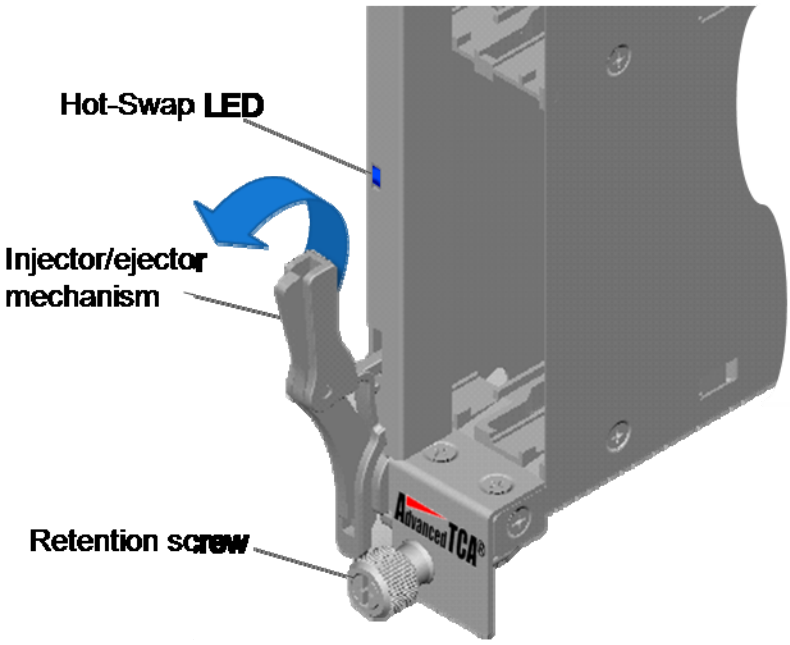


Figure 4 Injector / Ejector latch and locking screw

5. Carefully align the edges of the module with the guides in the appropriate slot.

   It might be helpful to look into the enclosure to verify correct alignment of the rails in the guides. Align the edges of the module with the card cage rail guides in the appropriate slot.

6. Taking care to keep the module aligned in the guides, apply equal and steady pressure and slide the module in until the injector/ejector mechanism engages the retention bars.

7. Position your thumbs at the top and bottom of the ATCA carrier board; simultaneously push in the module and rotate the injector/ejector mechanisms inward to their closed position to seat and secure ATCA carrier blade. DO NOT FORCE THE BOARD INTO THE SLOT.

8. Tighten the two module retention screws to secure the module into the shelf.

9. Power on the system, if necessary. Refer to your system manual for instructions on correctly powering on the system. Once power is applied to the chassis, the internal MMC controller runs a self-test that runs for approximately 10 seconds. Upon a successful power up self-test, the blue hot swap LED will blink and then turn off, indicating that the module has been placed in operation.

2.9 Removing the ATCA carrier blade

The ATCA-S201 ATCA carrier blade is hot-swappable and can be removed from a powered chassis. This section describes a recommended procedure for removing a board module from a chassis.

Before you remove your module, please read all cautions, warnings, and instructions presented in this section. Hot swap compliant modules may be removed while the system is powered on. When the lower ejector handle is partially disengaged, a mechanical switch will assert a signal to notify the IPMC to begin removal preparations. The IPMC will blink the blue hot-swap LED as it transitions the module to the appropriate power-down state. Upon completion and with permission from the ShMC, The blue LED will illuminate steady ON. This is the only indication that safe removal may commence. If the Blue LED is blinking or off, it is not ready for hot plug.

To remove the ATCA module, follow these steps:

1. Loosen the locking screws on the rear transition module.
2. Rotate the lower ejector handle to the half way (HW) position. Do not remove the module immediately.
3. If your host module running hot swap-aware software, the action of rotating the ejector lever will start the shutdown process on the board. The software will slowly blink the blue hot swap LED indicating the module is in the process of being de-activated.
4. Once the module has been de-activated, the Blue LED will illuminate steady. Once this is done you can extract the module by pulling on the module handle.

   Note: Powering down or removing a board before the operating system or other software running on the board has been properly shut down may cause corruption of data or file systems.
5. When the blue LED is illuminated ON, removal of the ATCA carrier board may proceed.
6. Carefully pull the module from the chassis.
7. If the card slot is to remain empty, install a filler panel in the slot.

2.10 Verifying the Hardware Installation

This section provides information to verify the installation of the ATCA-S201 10 GbE RAID storage services module.

2.10.1 To Verify the Hardware Installation

1. After power is applied to the system, wait approximately 45 seconds for firmware to initialize the board.

2. Inspect the LEDs on the front of the ATCA panel. When properly installed and powered, the LEDs will illuminate as follows:
   - ATCA Hot Swap LED — Off: Normal, default state
   - ATCA Health status — Green-blinking: Healthy, OK
   - ATCA Out of service (OOS) — Off: Normal, default state

3. (Optional). There are five Ethernet ports on the ATCA blade:
   - 1 management (on RTM)
   - 2 ATCA base ports (zone-2 connector)
   - 2 ATCA fabric ports (zone-2 connector)

   If DHCP is running on the network, it is possible to immediately ping the Ethernet ports on the ATCA module. Open a command line window on any node, and attempt to ping the ATCA blade.

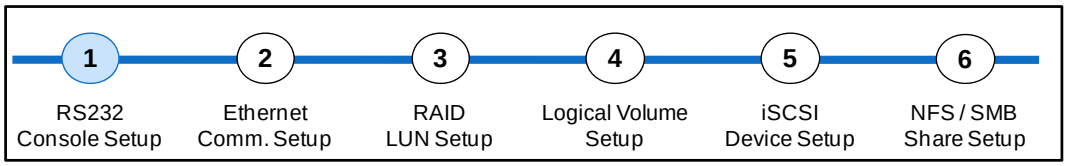
```
ok ping 192.168.1.xxx
```

Note1: Ping requires that you determine the IP address assigned to the blade. The carrier blades MAC address assignments are registered with the IANA public section of the IEEE Standards OUI (Organizational unique identifier) database. The Ethernet ports for the blade can be identified by finding the IP address corresponding to the following MAC address assignments:

MAC address OUI
00-11-0D-xx-xx-xx (hex)

3 New System configuration

Configuration Step:



This chapter describes how to establish management communications with the ATCA-S201 for purposes including initial configuration, administration and monitoring the storage services. A typical ATCA deployment will consist of an ATCA chassis, ATCA carrier blades, Advanced RTM and shelf management controllers (ShMC). Administrators may choose from the following physical access ports to conduct management communications:

- Full configuration capabilities:
  - RS232 on Advanced Rear transition module (ARTM)
  - Ethernet on Advanced Rear transition module (1 GbE on ARTM)
  - Any zone 2 Ethernet connection (base or fabric)

In addition to DHCP, the ARTM Ethernet port offers special protocol services such as TFTP to recover corrupted flash or accidental erasure. All available management communications methods are outlined in this chapter.

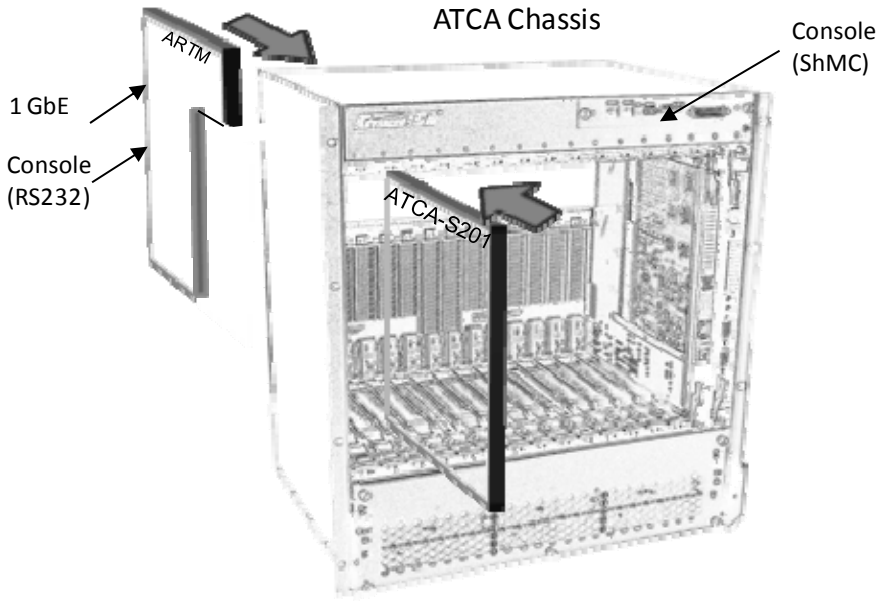


Figure 5 Management communications port location diagram (Typical)

3.1 RS232 Console port

This port is implemented on an RJ45 connector located on the ARTM that supplies RS232 console port access. As the ATCA-S201 boots, its progress can be monitored on the console.

By default, this port is set for VT100 terminal emulation as listed in the table below.

Table 5 Console port, default terminal settings

Baud rate (bits per second)	115200
Data bits	8
Parity	None
Stop bits	1
Flow control	Off

A serial interface can be established using a null modem cable and virtually any terminal communications tool. If using a PC running Microsoft® Windows®, the user may use HyperTerminal. On Linux-based systems, Minicom can be used.

Note: Use U-boot to adjust the default baud rate below the maximum 115200 if desired.

3.1.1 System boot overview

The ATCA-S201 is designed to boot and become ready for management logins without any user intervention. This is possible only if the supporting network offers DHCP. The ATCA-S201 requires no disk drives for initialization. At manufacturing time, two duplicate copies of firmware code are pre-loaded on non-volatile flash components embedded on the carrier board. These firmware images include U-boot, a Linux kernel, and the root file system (rfs) which contains the storage application services. On power-up or reset, the blade inspects jumper positions to decide whether firmware is fetched from the customer flash or a read-only factory flash. This feature allows blade recovery in situations where the customer flash has been accidently erased or corrupted. The blade boot sequence continues as the onboard CPU loads firmware and executes the code contents. If no attempts are made to halt or suspend the boot process, approximately 45 seconds later, the module is able to accept management communication logins and commands. Once booted, the blade runs entirely out of DDR2 SRAM embedded on the blade. All Ethernet ports are configured for DHCP. If DHCP is not used on your network, the ATCA-S201 Ethernet ports must be initialized manually as described in section 3.6 of this manual.

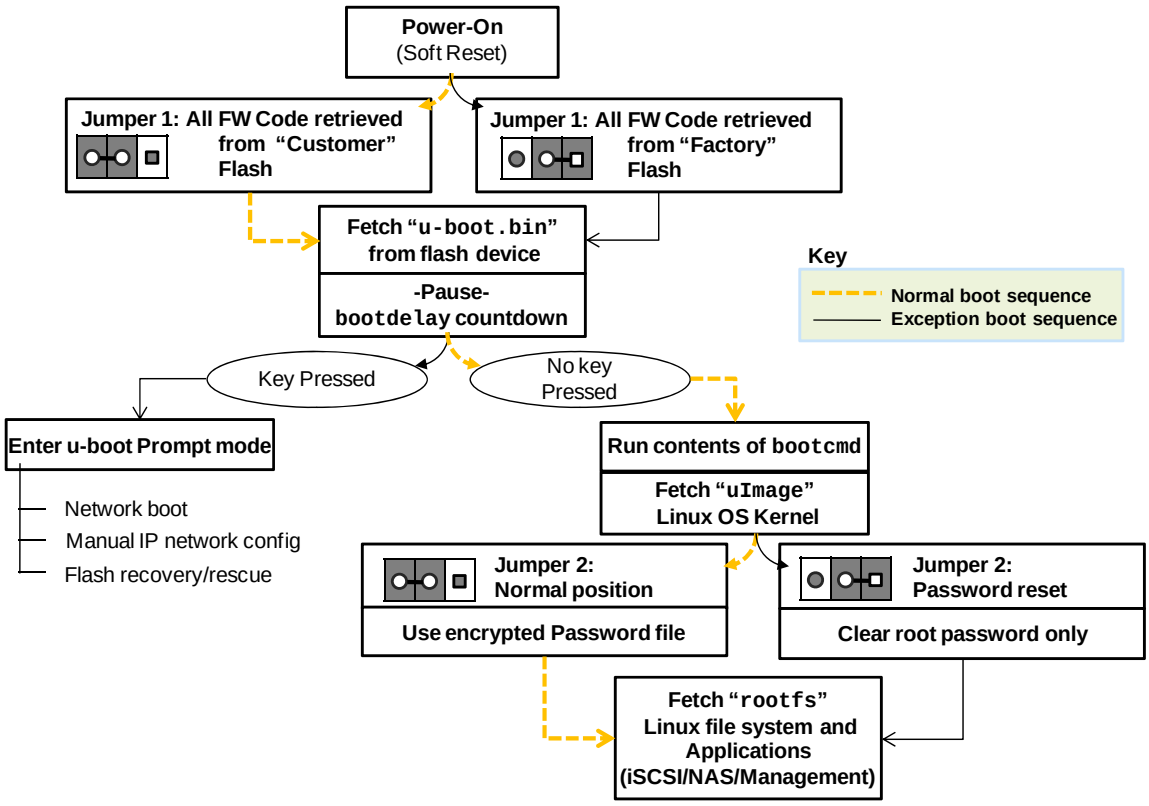


Figure 6 ATCA Blade boot sequence diagram

Note: ATCA-S201 jumper locations are illustrated in chapter 9 of this manual.

3.1.2 Flash boot device contents

As mentioned in the previous section, the ATCA-S201 contains two flash images, which are preloaded with code at manufacturing. Each code image is divided into four major functional sections. Overtime, the customer may periodically updated individual sections with new code revisions, as outlined below:

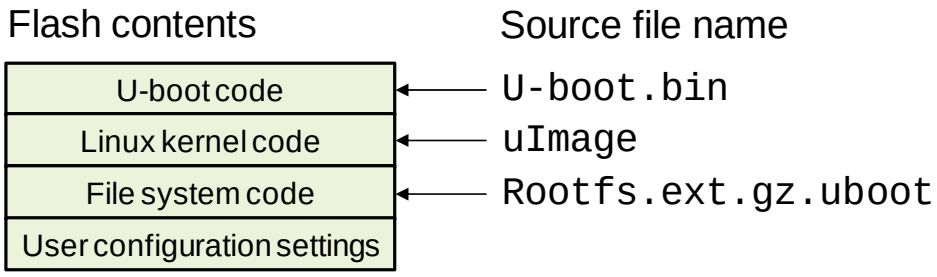


Figure 7 Boot-Flash device contents

3.1.3 Linux serial console shell window

If the boot is not interrupted and has completed, the RS232 port accepts administrator login for Linux shell access, and access to command line configuration tools.

After successful login, the user may run any of the command line configuration tools presented in section 3.4.5.

3.2 Default blade login accounts and passwords

The ATCA-S201 includes two built-in user accounts for maintenance and management activities. Emerson recommends that administrators change the default passwords listed below for security purposes.

Table 6 Built-in user accounts included on a new ATCA-S201

User account	Default password	Description
admin	admin	The admin account was created for blade management activities. This account should be used for all management and configuration activities. Management logins may be performed via (1) Serial console RS232, (2) ssh or (3) secure html on any Ethernet port.
root	root	The root account has master privileges with absolute power to modify the blades Linux OS in any way desired. It is unadvisable to use root as the normal user account because simple typographical errors, accidental file deletions, or generating unintentionally restrictive file permissions could render the blade in-operable, requiring the factory reset procedure. For normal activities, Emerson encourages using the admin user account and judicious use of the **su** command only when root privileges are really needed.

3.2.1 Password change procedure

The login password may be changed using the linux passwd command. For example, if logged in as root, the password change procedure is shown:

```
#passwd
Changing password for root
Enter the new password (minimum of 5, maximum of 8 characters)
Please use a combination of upper and lower case letters and numbers.
Enter new password: xxxxxxx
Re-enter new password: xxxxxxx
Password changed.
#
```

3.2.2 Password recovery procedure

In the event that the administrator login “root” is lost or forgotten, it is possible to clear it using jumpers provided on the ATCA-S201. The jumper location along with

the clear password procedure is explained in section 9.4.3 of this manual. When invoked, the user is prompted to set a new one at first login.

Note: The recovery procedure affects the "root" user only; No other user account passwords are cleared.

3.3 Factory reset

Users can reset the blade to restore factory default settings. This procedure will erase all existing blade configurations (network settings, volumes, shares etc). The procedure is sometimes recommended following a major firmware upgrade.

i. Login into shell window as root

ii. At console prompt, type: **`fw_setenv setfactorydefaults 1`**

3.4 Configuring a new ATCA-S201 blade

Initial configuration and setup of your blade may be conducted over Ethernet or serial (RS232) connections. Select the connection type that supports your preferred management style, either CLI (command line tool) or HTML as outlined below:

Connection type	Command line tool	Secure html tool
Serial/RS232 port on RTM	✓ Yes	
Ethernet port on RTM	✓ Yes	✓ Yes
Base or fabric ports on ATCA Zone-2 connector	✓ Yes	✓ Yes

3.4.1 Serial ports

An RJ45 serial port can be found on RTM panel. The default baud rate and communication settings are listed in Table 5 Console port, default terminal settings in section 3.1.2. The serial port attributes such as baud rate may be changed in the U-boot environment using the bootargs variable (see section 3.6.3 titled U-boot environment variables).

3.4.2 Ethernet ports

An RJ45 Ethernet port can be found on RTM panel. It auto negotiates Ethernet link speed s up to 1Gbps. Additional Ethernet ports (base and fabric) are provided on the ATCA zone-2 connector. By default, all Ethernet ports will attempt to obtain an IP address assignment form the DHCP (Dynamic Host Configuration Protocol) server on the network. Administrators must log into your DHCP server to determine the IP assignment. With the IP address, an administrator may connect to the ATCA-S201 using a secure shell (SSH) or an HTML browser which supports secure http connections. The Ethernet equipment can be identified by finding the IP address(es) corresponding to the following MAC address assignments:

MAC address OUI
00-11-0D-xx-xx-xx (hex)

Note: If no DHCP server is present, the ATCA-S201 will deactivate this port. The serial console must be then used to manually assign an IP address. This manual initialization procedure is described in section 3.6 of this manual.

3.4.3 Management Configuration via HTML browser

Once the IP address of the Ethernet port is known, an administrator may use a web browser to connect to the ATCA-S201 to perform and monitoring or configuration tasks. For security, the browser must support secure https connections on TCP port 443.

Example: Type this address into the address field of your web browser:

```
https://192.168.1.xxx
```

Refer to chapter 4 , which begins the explanation and use of the html configuration tool.

3.4.4 Management configuration via secure shell (SSH)

Once the IP address of the Ethernet port is known, an administrator may use a SSH service to connect to the ATCA-S201 and to facilitate command line management.

For example:

```
ssh 192.168.1.211 –l admin
```

3.4.5 Management configuration via serial console shell

If the boot is not interrupted and has completed, the RS232 port accepts administrator login for Linux shell access, and access to command line configuration tools.

```
        ******************************************************
        *                                                    *
        *   Welcome to the Emerson ATCA-S201 Storage Blade   *
        *                                                    *
        *  Type atca_blade to manage this blade, or use the  *
        *      Web Based Management tool by browsing to:     *
        * https://ipaddr, where ipaddr is the network address *
        *                    of the blade.                   *
        *                                                    *
        ******************************************************
WebHost.WebDomain login: admin
Password:admin
```

After successful login, the user may run any the shell configuration tools presented in section 3.4.5.

3.5 Command line configuration tool

This tool is available from either the RS232 console or a linux secure shell connection. After successful login, the user may run an executable file "**atca_blade**" located in the **/web/cgi-bin** directory. The tool provides the user with a simple menu interface, to perform interactive parameter modifications. A sample session is shown below.

```
#ssh 192.168.1.xxx -l root
root@192.168.1.xxx's password: root
Last login: Tue Nov 20 17:34:30 2007 from 192.168.1.xxx
# cd /web/cgi-bin
/web/cgi-bin # atca_blade
```

3.5.1 Change IP address of any Ethernet resource

The ATCA-S201 provides multiple Ethernet interfaces that host blades may use for initial setup and configuration. These ports are identified with the Linux resource labels shown in the table below

Table 7 Ethernet ports for chassis communications (base/fabric)

Linux interface identifier	description
/dev/eth0	Chassis Base port 0, 1Gb link
/dev/eth1	Chassis Base port 1, 1Gb link
/dev/eth2	RTM, Rear I/O management port.
/dev/eth3	Chassis fabric port 0, 10Gb XAUI link
/dev/eth4	Chassis fabric port 1, 10Gb XAUI link

▼ *Perform manual Interactive changes*

After invoking the command line tool (atca_blade), the user can modify any of the parameters within the functional groupings listed above. For example, select the "2. Network Settings" group. The configuration tool will display the entire list parameters in the group, along with their present values.

```
Main Page for CLI Interface
        1. IPMI Settings (get_status)
        2. Network Settings (set_network)
        3. Hardware Raid Configuration (set_raid)
        4. Logical Volume Mangager LVM2 Configuration (set_lvm2)
        5. Manage Shares (set_shares)
        6. smb Configuration (set_smb)
        7. nfs Configuration (set_nfs)
        8. iSCSI Configuration (set_iscsi)
        9. Web gui enable (set_gui)
       10. Allow Web and CLI at the same time (set_useroverride)
        0. Exit
Enter choice [1-10], 0 to exit: [0]: 2
```

```
-------------- System Identification and TimeZone Active Settings -----
Hostname=[BladeHost]:
DomainName=[Emerson.com]
```

```
Date=[12/19/2007]:
Time=[17:25:07]:
TimeZone=[US/Eastern]:
NTPServer[0]=[209.132.176.4]:
NTPServer[1]=[64.22.86.210]:
NTPServer[2]=[]:
NTPServer[3]=[]:
NTPServer[4]=[]:
Use Network Time Protocol(NTP)=[y]:
------------------------- eth0 Network Configuration -----------------
enable0=[0]:
ipaddr0=[dhcp]:
netmask0=[0.0.0.0]:
broadcast0=[0.0.0.0]:
gateway0=[0.0.0.0]:
nameserver0=[0.0.0.0]:
hwaddr0=[00:08:2b:00:11:22]:
MTU0=[1500]:
------------------------- eth1 Network Configuration -----------------
enable1=[0]:
ipaddr1=[dhcp]:
netmask1=[0.0.0.0]:
broadcast1=[0.0.0.0]:
gateway1=[0.0.0.0]:
nameserver1=[0.0.0.0]:
hwaddr1=[00:08:2b:00:11:23]:
MTU1=[1500]:
------------------------- eth2 Network Configuration -----------------
enable2=[1]:
ipaddr2=[192.168.1.211]:
netmask2=[255.255.255.0]:
broadcast2=[192.168.1.255]:
gateway2=[192.168.1.1]:
nameserver2=[192.168.1.10]:
hwaddr2=[00:08:2b:00:11:24]:
MTU2=[1500]:
------------------------- eth3 Network Configuration -----------------
enable3=[0]:
ipaddr3=[dhcp]:
netmask3=[0.0.0.0]:
broadcast3=[0.0.0.0]:
gateway3=[0.0.0.0]:
nameserver3=[0.0.0.0]:
hwaddr3=[00:08:2b:00:11:25]:
MTU3=[9000]:
------------------------- eth4 Network Configuration -----------------
enable4=[0]:
ipaddr4=[dhcp]:
netmask4=[0.0.0.0]:
broadcast4=[0.0.0.0]:
gateway4=[0.0.0.0]:
nameserver4=[0.0.0.0]:
hwaddr4=[00:08:2b:00:11:26]:
MTU4=[9000]:
------------------------------------------------------------------------
Change Network Settings? [n]:
```

At this point the user may inspect the list. If the user wishes to modify any of the listed values, enter 'y' at the above prompt. The configuration utility will then display each parameter, one at a time. The user may accept the default input by pressing the ENTER key, or enter a replacement value. In the example below, the user will change the Hostname for the blade.

```
Change Network Settings? [n]: y
-------------- System Identification and TimeZone Active Settings -----

0: Hostname=[BladeHost]: STOR200
Changing Hostname= from Emerson1 to STOR200
1: DomainName=[Emerson.com]:
2: Date=[12/19/2007]:
...
48: enable4=[1]:
49: dhcp4=[0]:
50: ipaddr4=[192.168.44.11]:
51: netmask4=[255.255.255.0]:
52: broadcast4=[192.168.44.255]:
53: gateway4=[192.168.44.1]:
54: hwaddr4=[00:11:0D:D0:08:04]:
55: MTU4=[9000]:
```

In the previous example, the user elected to change the hostname from Emerson1 to STOR200. Also note, the tool prints a index number preceding each parameter. Hit the Enter key to proceed through the rest of the list. After displaying the final parameter, the configuration tool presents the user with two questions:

```
Save New Network Settings? [y]: n
Change Network Settings? [n]: n
```

Configuration tool question	Possible responses
Save New Network Settings?	y, changes are immediately applied, and all changes are stored in non-volatile ram flash device. This action ensures the changes are remembered after reboot. n, do not store changes in NVRAM
Change Network Settings?	y, changes are immediately applied, but new values are NOT stored in non-volatile flash device. They will revert to previous stored on rebbot. n, discard the changes, and return to the main menu.

3.5.2 Shell, configuration scripting options

The "**atca_blade**" tool supports scripted invocations, to apply a fixed set of parameter values from a file. Such files would contain a pre-determined set of

responses that are applied to the tool in a macro fashion. A script allows the user to modify one or several parameters in one step.

SYNOPSIS

atca_blade *menu_page_index* <y|n|> *index_skip+* *new_value* [<*index_skip*>+ <new_value>] [+]

DESCRIPTION

atca_blade may be called via shell script or batch file to make "un- manned" changes to parameter values used to configure ATCA-S201 IP and RAID service behaviors.

OPTIONS
menu_page_index: designates the menu subgroup to be modified. The menu sub-group numbers are displayed when the tool is manually invoked with no arguments from the console window. The *menu_group_number* and *index_skip* are combined to create a pointer to a specific parameter position. The following *menu_page_index* syntax may be used interchangeably:

Menu_page_index|equivalent_pagename

1|get_status
2|set_network
3|set_raid
4|set_lvm2
5|set_ms
6|set_smb
7|set_nfs
8|set_iscsi
9|set_gui
10|set_useroverride

y|n: Certain commands require affirmation to make changes. Example: "Change Network Settings? [n]:".

index_skip+: represents index leap ahead. The tool parses this value, and increments the index pointer by the amount indicated.

+: end of input (a plus symbol, with no integer). Indicates that the input line is complete, and requested changes can be committed.

▼ *Example #1: Use this script entry to change the blades Hostname.*

```
atca_blade set_network Y 0+ StorageBlade_99 +
```

▼ *Example #2: Additional references.*

Specific CLI usage and syntax examples are provided within each configuration chapter of this manual.

3.6 New system configuration, No DHCP server

In some deployments, a DHCP server may not exist. In these instances the blades Ethernet resources will require manual initialization.

3.6.1 U-boot console tool

The ATCA-S201 employs a staged boot process that begins with U-boot. U-boot is an open source boot loader program that is the first code executed at system reset. As the boot execution commences, its progress may be monitored via the RS232 console port of the Advanced RTM. U-boot supplies several initialization parameters to the Linux kernel that administrators may elect to modify. U-boot employs a countdown timer with a default setting of *bootdelay* seconds, see table below. If a key is pressed before this time, the auto boot procedure halts and the administrator will see a U-Boot command prompt:

```
...
Hit any key to stop autoboot:  5
uboot=>
```

3.6.1.1 When is U-boot needed?

Users may never need the U-boot environment. U-boot is included to accommodate atypical system maintenance situations such as:

- On site field servicing (must be connected via serial console)
- Network boot (rather than flash boot)
- Environments without a DHCP server
- Flash recovery

3.6.2 Essential U-boot user commands

The U-boot console environment includes a rich set of commands that can be listed on the screen using the following command:

```
uboot=> help
```

Typically, only a handful of commands are needed to configure a new ATCA-S201. The essential commands are covered in the table below.

Table 8 Essential U-boot configuration commands

U-boot command syntax	description
printenv	Displays a list of all U-boot environment variables and their current values. See section 3.6.3 for details.
setenv <*variable_name*> <new_*value*>	Used to create or modify a U-boot environment variable. New variables will be automatically created, existing ones overwritten. When called without a <*new value*>, it will delete the matching <*variable_name*> from the U-boot environment if it exists.
saveenv	Used to saves environment variables to flash device, which is loaded upon subsequent system power cycle or reboot. Variable changes that are not saved exist in RAM only,

U-boot command syntax	description
	and lost if the system is re-booted.
ping *<IP address>*	Sends an icmp echo address to the designated IP address (entered in dotted decimal format)
reset	Perform soft reset of the ATCA cpu, forcing a system reboot.
run *<variable_name>*	Run a sequence of commands defined in the environment <*variable_name*>, for example: uboot=> **run flashboot**
version	Displays the version and build date of the U-boot image running on ATCA blade.

3.6.3 U-boot environment variables

Administrators may display the full list of environment variables using the **printenv command**. U-boot includes the following environment variables with pre-assigned factory default settings.

Table 9 U-boot environment variables shown with printenv

Variable name	Default value	Description
bootcmd	run flashboot	This variable defines a command string that is automatically executed when the initial **bootdelay** countdown is not interrupted.
flashboot		A sequence of commands, set at manufacturing time. If in the U-boot console, use **run flashboot** to boot the ATCA using the images contained in flash. This command sequence is executed automatically by **bootcmd** in a normal power-up.
ramboot		A sequence of commands, set at manufacturing time. If in the U-boot console, use **run ramboot** to boot the ATCA from the **serverip** node.
nfsboot		A series of startup commands, set at manufacturing time. RESERVED for future use.
bootdelay	5	U-boot will wait this number of seconds before it executes the **bootcmd** variable. After reset, a countdown message is printed to the serial console. Pressing any key will interrupt normal boot and display the U-boot console prompt. Value 0 =boot without delay. Value -1 = disable autoboot, always enter U-boot console
baudrate	115200	RS232 Serial port baud rate, default=115200 (decimal) (Max: 115200)
loads_echo	1	If set to 1, all characters received during a serial download (using the loads command) are echoed to the serial console.
rootpath	/nfsroot	RESERVED for future use.
hostname		Not used

Variable name	Default value	Description
bootfile	Uimage	This is the filename name of the Linux kernel image.
loadaddr	1000000	Specifies the starting memory address for storing the **bootfile**
consoledev	ttyS1	Settings for kernel console port.
bootargs	root=/dev/ram rw ramdisk_size=200000 console=ttyS1,9600	Command line passed to the Linux kernel. May contain nested references, which will be resolved at runtime.
Ramdiskaddr	2000000	Specifies the starting memory address of the Linux ramdisk.
ramdisksize	2000000	Specifies the memory size reserved for the Linux ramdisk.
initrd_high	0xffffffff	Forces ramdisk to load at a high memory address (do not modify)
othbootargs		Used to pass Ethernet MAC and SAS address assignments to Linux.
ramdiskfile	rootfs.ext2.gz.uboot	Specifies name of rfs (root file system) image fetched by U-boot when booting from the tftp server (**serverip**).
eth0addr	00:11:0D:xx:xx:xx	MAC address of 1 GbE port on ATCA Zone-2 base-0
eth1addr	00:11:0D:xx:xx:xx	MAC address of 1 GbE port on ATCA Zone-2 base-1
eth2addr	00:11:0D:xx:xx:xx	MAC address of 1 GbE port on ATCA Zone-3 Management port
eth3addr	00:11:0D:xx:xx:xx	MAC address of 10 GbE port on ATCA Zone-2 fabric-0
eth4addr	00:11:0D:xx:xx:xx	MAC address of 10 GbE port on ATCA Zone-2 fabric-1
sasaddr	50:00:00:11:OD:xx:xx:xx	WWN address of SAS controller, port0. Port 1 is WWN+1, Port2 is WWN+2 and so on.
ipaddr	0.0.0.0	Dotted decimal IP address applied to active Ethernet management port (**ethact**)
gatewayip	0.0.0.0	Dotted decimal Default network gateway
netmask	0.0.0.0	Dotted decimal network mask
stdin	serial	Specifies RS232 console port for input messages
stdout	serial	Specifies RS232 console port for output messages
stderr	serial	Specifies RS232 console port for error messages
serverip	0.0.0.0	Dotted decimal IP address of TFTP server
ethact	At boot, ethprime is copied to ethact.	Ethact identifies which Ethernet resource is associated with U-boot services. Permissible values: eTSEC0= Zone2 connector, Base0 Ethernet (1Gbps) eTSEC1= Zone2 connector, Base1 Ethernet (1Gbps) eTSEC2= Zone3 connector, Management port (1Gbps) Note: ethact may be dynamically changed at the U-boot console, but it is not a persistent variable, and will be reloaded at next boot.
netdev	eth2	RESERVED for future use
ethprime	eTSEC2	At boot, ethprime is copied to ethact. Refer to ethact for a list of permissible values.

3.6.4 Manually assign management IP addresses

Administrators may individually modify any of the listed U-boot environment variables. Note these changes are not permanently recorded in the non-volatile flash unless saved using **saveenv**. Extreme care should be taken to ensure new values are valid entries.

To manually establish IP port address, a typical new system configuration might consist of the following commands:

```
uboot=>  setenv ipaddr 192.168.1.211
uboot=>  setenv gatewayip 192.168.10.1
uboot=>  setenv netmask 255.255.255.0
uboot=>  setenv ethprime eTSEC2
```

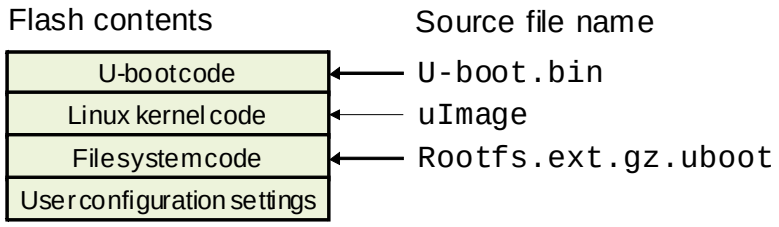
Once all of the environment variables have been modified they persist only if permanently recorded in the flash device. This is accomplished with this command:

```
uboot=>  saveenv
```

This example setup establishes initializes the 1Gb Ethernet port located on the RTM for administrator login and management access.

3.7 Network boot procedure

The ATCA-S201 supports network boot which allows the user to bypass code contained on the embedded flash devices, and instead load code images contained on the network. Network boot does not replace stored user configurations. Network boot requires that the network node supports tftp and must contain the following source files located in directory named **/tftpboot/**:

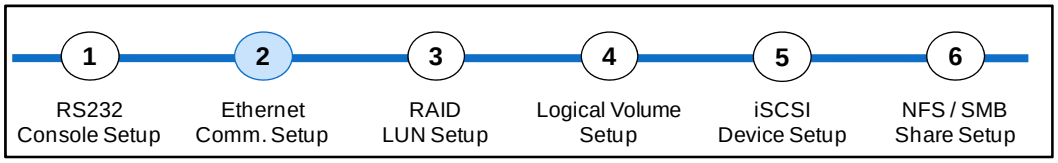



```
...
Hit any key to stop autoboot:  5
uboot=> run ramboot
```

Note1: Network boot defaults to the Ethernet resource on the RTM. Alternatively, the user may designate the zone-2 Base ports. Use **setenv** to change the **ethprime** variable to accomplish this.
Note2: Use **setenv** to change the **serverip** variable to the tftp server IP address.

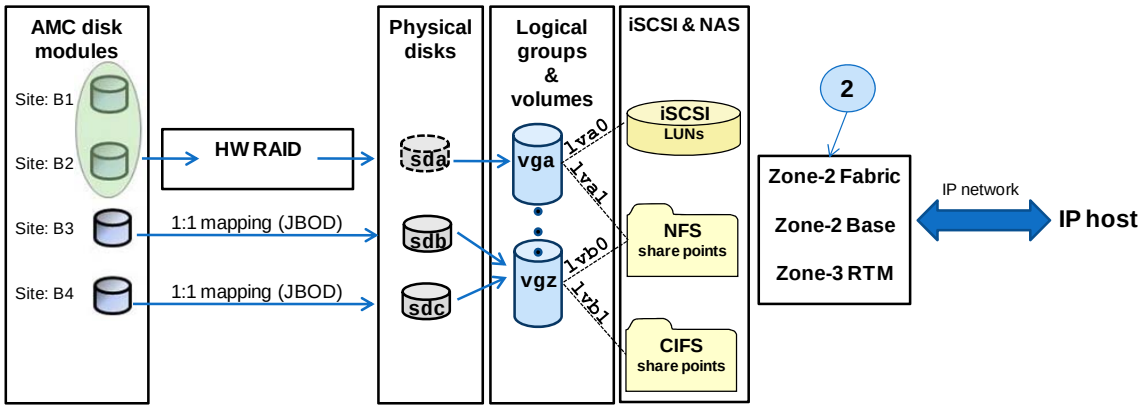
4 Network configuration

Configuration Step:



This chapter explains how to configure the IP ports for external host access. The ATCA-S201 offers 5 Ethernet ports within the ATCA environment, as follows:

- Two 10Gb XAUI fabric ports (zone-2)
- Two 1Gb base ports (zone-2)
- One 1Gb management port (zone-3)



Storage is ultimately served out over these IP ports using iSCSI, NFS and SMB protocols. Administrators may individually enable and configure these ports. Configuration can be done using the serial console port, Telnet or via HTML. This chapter assumes the reader is familiar with internet protocols and TCP/IP networking.

Note: This chapter provides how-to-use details for the secure web configuration tool. Optionally, the user may perform configuration by establishing a login session from a secure shell (ssh) window, and running the command line utility (CLI). Refer to section 3.4.5, titled Command line configuration tool for more information.

4.1 Enable HTML browser access

The web browser configuration tool may be enabled or disabled for security reasons.

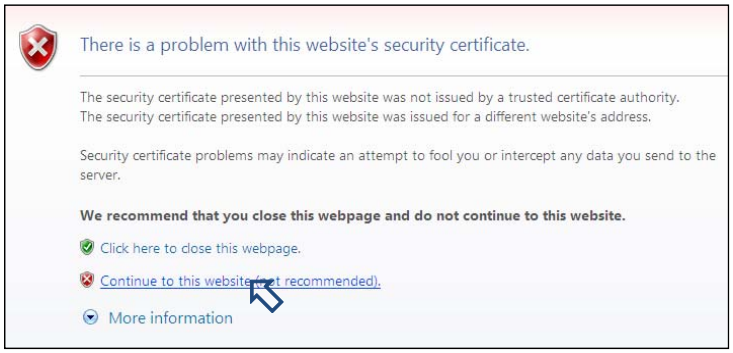
▼ *CLI command syntax*

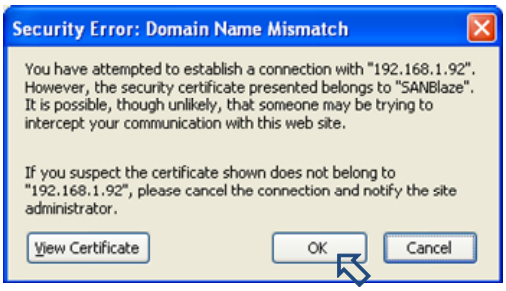
Table 10 CLI command syntax, enable/disable GUI access

Convention	atca_blade set_gui <enable> +
< enable>	0 | 1 Value 0 disables the GUI, value 1 enables the GUI.

4.2 HTML Security certificates (https://)

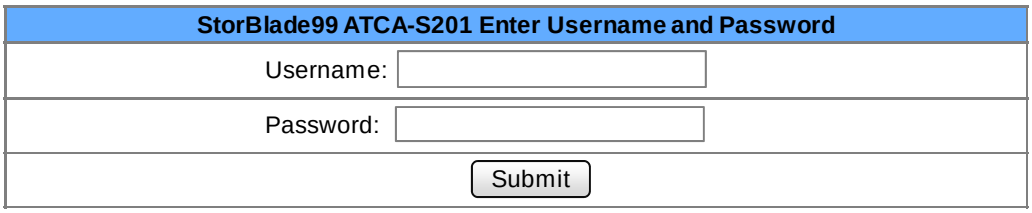
The user may perform HTML configuration with any browser that supports https . Direct your browser to the any active IP port on the ATCA-S201. The ATCA-S201 employs https (encrypted secure sockets layer- SSL) technology to protect configuration activity that occurs over IP links. The ATCA-S201 issues a self-signed certificate, identified as “EMERSON”. This certificate is not registered with a certificate authority, and the browser will pop up a warning as shown below. Users must accept the certificate to proceed.





4.3 HTML login screen

A user login is required to access and operate the ATCA-S201 storage blade. This menu prompts the user for username and password. When shipped from the factory, the default entries are username=admin, password=admin. See section 3.2.1for the information on the Password change procedure.



4.3.1 Auto logout inactivity period

The system will automatically terminate (logout) a remote user after 10 minutes of in-activity. Optionally, the user can create this file to set an alternate inactivity threshold value (expressed in seconds):

```
# echo 60 >/etc/max_inactivity
```

Note: In absence of this file, the value is set to 600 seconds.

4.3.1.1 Forced user logout

A local user may immediately terminate an active management session by deleting the following file:

```
# rm /tmp/curruser
```

The above command will require the remote user to re-login, or allow the administrator to launch the atca_blade CLI tool locally.

4.3.2 Single session management override

Blade management is restricted to one admin user at a time, thus preventing blade configuration conflicts from multiple remote locations. Moreover, a user may not simultaneously operate the atca_blade CLI tool with the web GUI configuration tool.

Users may optionally override this protection mechanism using either of the following mechanisms:

- ***Web GUI command***

  Refer to page 55, Table 24 ATCA status indication, for the instructions to enable this override **"Allow GUI and CLI"**.

- ***CLI command syntax***

Table 11 CLI command syntax, single session management override

Convention	`atca_blade set_useroverride <enable> +`
< enable>	0 | 1 Value 0 disables the GUI, value 1 enables the GUI.

4.4 HTML home page

Once logged in, the user will see the start-up screen shown in the figure below. Left click the folder panel to expand the menu configuration tools.

Figure 8 HTML tool, startup screen

4.5 Essential System Configuration Steps

Once connected to html configuration page, it is essential that the user navigate to both the **Network** and **Shelf** configuration pages. Proper interaction with the blade cannot occur without completing these configuration steps:

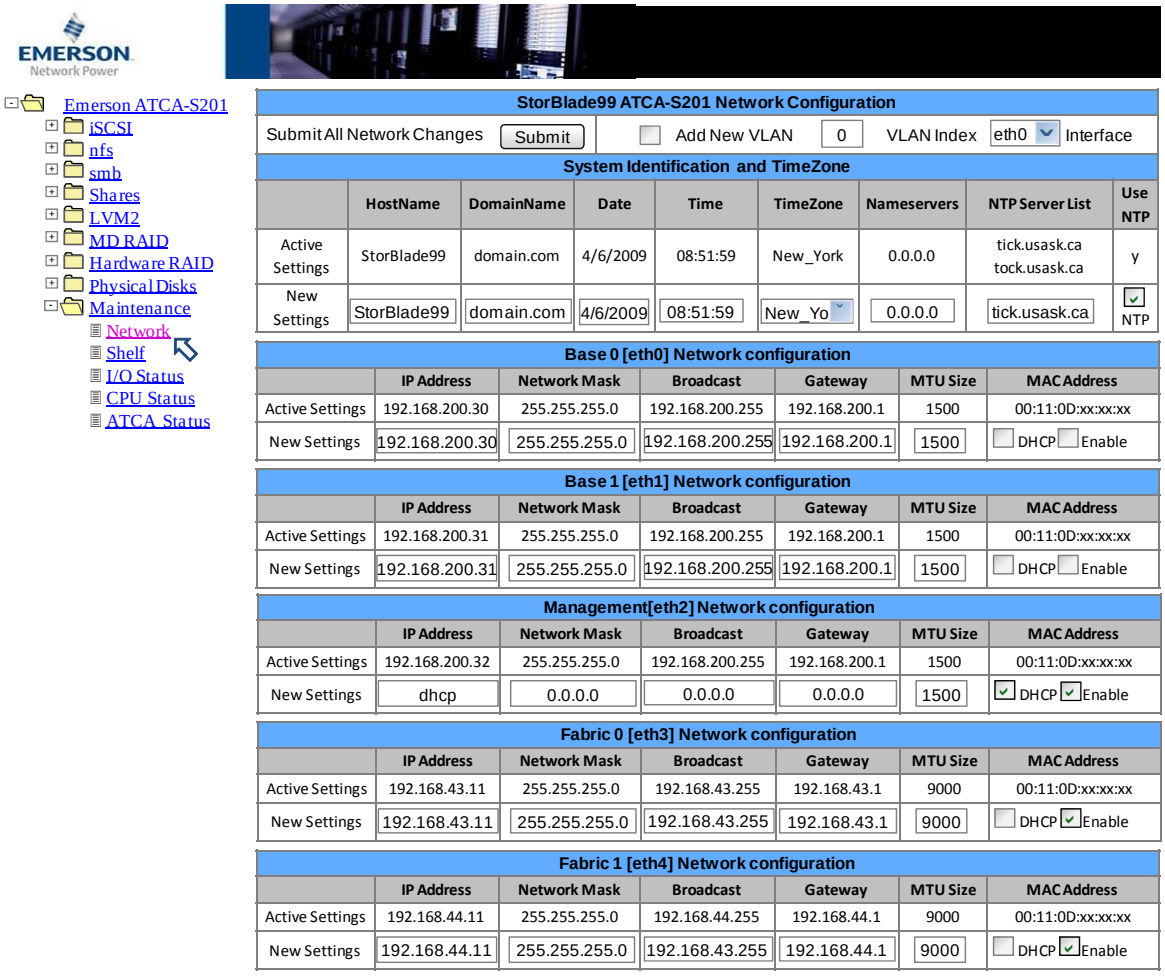


Figure 9 Emerson ATCA-S201 → Maintenance → Network

Use the mouse to navigate and make changes to an item in the "**new settings**" row. Notice that changes made here do not immediately change the "**Active settings**" row. New settings changes are abandoned by navigating away from the page. Changes are committed only when the "submit" button is clicked.

Submit

Note: Care should be taken when altering or disabling an interface being used for HTML management. For example, if you shut down the interface being used for HTML, existing communication is lost, and an alternate Ethernet port or RS232 cable may be needed to re-enable it.

4.6 System Identification and Time Zone attributes

The attributes in this menu grouping establish time reference utilized by all aspects of product operation.

System Identification and TimeZone								
	HostName	DomainName	Date	Time	TimeZone	Nameservers	NTP Server List	Use NTP
Active Settings	StorBlade99	domain.com	4/6/2009	08:51:59	New_York	0.0.0.0	tick.usask.ca tock.usask.ca	y
New Settings	StorBlade99	domain.com	4/6/2009	08:51:59	New_Yo	0.0.0.0	tick.usask.ca	NTP

4.6.1 Hostname

<Read/Write>The user may assign a human friendly name to the ATCA-S201 instance. The **hostname** is printed at the top of all menus, and listed in configuration and logs files. Users are encouraged to assign different hostnames to each blade; however there is no actual requirement to make unique assignments within a namespace.

▼ *CLI command syntax*

Table 12 CLI command syntax, set network property: hostname

Convention	`atca_blade set_network Y 0+ <hostname> +`
< hostname>	Any combination of letters or digits, no spaces

4.6.2 Domain Name

<Read/Write>The user may use this field to specify the registered domain name in which the product will operate (e.g. emerson.com or example.net). In practice, this name should be officially assigned and recorded with the domain name registrar.

▼ *CLI command syntax*

Table 13 CLI command syntax, set network property: domain name

Convention	`atca_blade set_network Y 1+ <domain> +`
<domain>	Argument represents new domain name, e.g. yourdomain.com

4.6.3 Date

<Read/Write> The user may manually adjust the system date, if NTP is NOT enabled. Date must be entered as month/day/year. (e.g. 3/15/2008).

Note: The date will display as Jan 1 2000 when NTP is disabled, or no NTP server is found.

▼ *CLI command syntax*

Table 14 CLI command syntax, set network property: system date

Convention	`atca_blade set_network Y 2+ <date> +`
<date>	Date format MM/DD/YYYY, (month,day,year)

4.6.4 Time

<Read/Write> The user may manually adjust the system time, if NTP is NOT enabled. Date must be entered as hours/minutes/seconds. (e.g. 14:51:59 to indicate 2:51 PM and 59 seconds).

▼ *CLI command syntax*

Table 15 CLI command syntax, set network property: system time

Convention:	`atca_blade set_network Y 3+ <time> +`
<time>	hh:mm:ss (for example, 01:23:45), where hh (00 to 23), mm and ss (00 to 59)

4.6.5 Time Zone

<Read/Write> World Time references are synchronized with GMT. The drop-down time zone field allows the user to choose a city matching the physical deployment region and daylight savings observance. To minimize code size, only one city per world time zone was chosen. The valid list of drop down field are shown in Table 17 Time Zone Selections.

▼ *CLI command syntax*

Table 16 CLI command syntax, set network property: system time zone

Convention:	`atca_blade set_network Y 4+ <zone> +`
<zone>	Pick from list in Table 17 Time Zone Selections. E.g. New_York, Chicago etc.

Table 17 Time Zone Selections

World Zone	Menu item	Daylight savings	World Zone	Menu Item	Daylight savings
GMT	GMT				
	Zulu				
	London	WET -Western European			
GMT+1	Paris	CET – Central European	GMT-1		
GMT+2	Athens	EET – Eastern European	GMT-2		
GMT+3	Moscow	BT - Baghdad	GMT-3	St_Johns	
GMT+4			GMT-4	Halifax	AST - Atlantic Standard
GMT+5			GMT-5	New_York	EST – Eastern Standard
GMT+6			GMT-6	Chicago	CST – Central Standard
GMT+7			GMT-7	Denver	MST - Mountain Standard
				Phoenix	
GMT+8	Taipei	CCT – China Coast	GMT-8	Los_Angeles	PST – Pacific standard
GMT+9	Tokyo	JST – Japan Standard	GMT-9	Anchorage	YST – Yukon Standard
GMT+10	Sydney	GST – Guam Standard	GMT-10	Honolulu	HST - Hawaiian Standard
GMT+11			GMT-11		
GMT+12			GMT-12		

4.6.6 Name Server list

Name servers must be specified using dotted decimal notation. For redundancy purposes, the user may specify up to five servers, each separated by a comma.

▼ *CLI command syntax*

Table 18 CLI command syntax, set network property: assign Name server

Convention:	`atca_blade set_network Y 5+ <server1> … [server5]+`
<server1> … <server5>	Enter one to five name servers, specified as Dotted decimal addresses.

4.6.7 NTP Server list

NTP servers must be specified using dotted decimal notation. For redundancy purposes, the user may specify multiple servers, each separated by a comma. At manufacturing time, this field is seeded with two NTP servers:

- 64.22.86.210
- 209.132.176.4

▼ *CLI command syntax*

Table 19 CLI command syntax, set network property: assign NTP server

Convention:	`atca_blade set_network Y 10+ <server1> … [server5]+`
<server1> … <server5>	Enter one to five NTP servers, specified as Dotted decimal or domain addresses (time.nist.gov)

4.6.8 Network time protocol - NTP (On/Off)

☑ NTP
<Read/Write> Users may enable NTP protocol service to synchronize the ATCA-S201's clocks with a known good reference time source.

4.6.9 Ethernet network port identification

The ATCA-S201 provides multiple Ethernet interfaces that host blades may use to access storage. Whether using the CLI or web based configuration tools, these ports are identified with the Linux resource labels shown in the table below

Table 20 Ethernet ports for chassis communications (base/fabric)

Linux interface identifier	Port Description
/dev/eth0	10/100/1000 – Base 0 (Zone -2)
/dev/eth1	10/100/1000 – Base 1 (Zone -2)
/dev/eth2	10/100/1000 – Management (RTM, Rear I/O management port)
/dev/eth3	10G – Fabric 0 (Zone-2 XAUI)
/dev/eth4	10G – Fabric 1 (Zone-2 XAUI)

The webtool provides a table for each Ethernet resource. Users may enter new settings for any field, and click the **submit** button located at the top of the screen to apply the settings.

Management[eth#] Network configuration						
	IP Address	Network Mask	Broadcast	Gateway	MTU Size	MAC Address
Active Settings	192.168.200.32	255.255.255.0	192.168.200.255	192.168.200.1	1500	00:11:0D:xx:xx:xx
New Settings	dhcp	0.0.0.0	0.0.0.0	0.0.0.0	1500	☑ DHCP ☑ Enable

▼ *CLI command syntax*

Table 21 CLI command syntax, set network property: Ethernet port configuration

Convention:	atca_blade set_network Y <portcode+> <enable> <dhcp> <ipaddr> <netmask> <broadcast> <gateway> <MAC> <MTU> +
<portcode>	Use portcode 16+ to modify eth0 Use portcode 24+ to modify eth1 Use portcode 32+ to modify eth2 Use portcode 40+ to modify eth3 Use portcode 48+ to modify eth4 Use portcode 52+ to modify VLAN
<enable>	0|1 Value 0 disables the port, value 1 enables the port.
<dhcp>	0|1 Value 0 disables dhcp, value 1 enables the dhcp. When enabled, other network input fields are ignored. (ipaddr, netmask etc.)
Remaining inputs	ipaddr, netmask input formats etc. are defined in the sections below

4.6.10 Enable (online/offline)

☑ **Enable**

<Read/Write> The user may set a port online or offline with this menu box. When enabled the port in online, and will terminate IP traffic. When the port is disabled, IP packets are not processed.

4.6.11 DHCP

☑ **DHCP**

<Read/Write> The user may configure any port for Dynamic Host Configuration Protocol (DHCP). If DHCP is enabled, the port will search for a DHCP server to automatically set the IP address, subnet mask, default gateway address.

4.6.12 IP address

<Read/Write> The user may manually assign the IP address of a port, if DHCP is NOT enabled. The address must be entered using dotted decimal notation. (e.g. 192.168.1.211)

4.6.13 Network (Subnet) mask

<Read/Write> The user may manually assign the subnet mask of a port, if DHCP is NOT enabled. The subnet mask must be entered using dotted decimal notation. (e.g. 255.255.255.0)

4.6.14 Broadcast

< Read/Write > The user may manually assign the broadcast address for a port, if DHCP is NOT enabled. The broadcast address must be entered using dotted decimal notation. (e.g. 192.168.1.255)

4.6.15 Gateway

<Read/Write> The user may manually assign the default gateway for a port, if DHCP is NOT enabled. The default gateway must be entered using dotted decimal notation. (e.g. 192.168.1.1)

4.6.16 MTU size

<Read/Write> The MTU defaults to 1500 bytes on each IP interface, but the user can adjusted higher if that size that is also supported by all adapter, switch, and router devices in the path. Any path component with a smaller MTU will break packets into pieces (fragment), which can reduce overall system performance. The user may specify the MTU (Maximum Transmission Unit) for each Ethernet resource.

Linux interface	Port Description	Max MTU size
/dev/eth0	10/100/1000 – Base 0 (Zone -2)	9586
/dev/eth1	10/100/1000 – Base 1 (Zone -2)	9586
/dev/eth2	10/100/1000 – Management (RTM port)	9586
/dev/eth3	10G – Fabric 0 (Zone-2 XAUI)	16110
/dev/eth4	10G – Fabric 1 (Zone-2 XAUI)	16110

MTU defines the maximum size of a packet that the blade may transmit over the network interface without fragmentation. A large MTU permits the system to send fewer packets of a larger size to achieve the same network throughput, with generally less OS and software overhead.

If you are not sure, you can often find the MTU size using a trial-and-error ping command. First set the MTU to the max, then open a console port, and ping the destination port, incrementing the size until no response is received:

```
ping 192.168.1.10 –l 1500 –f
ping 192.168.1.10 –l 4000 –f
ping 192.168.1.10 –l 8000 –f
…
ping 192.168.1.10 –l  16110 –f
```

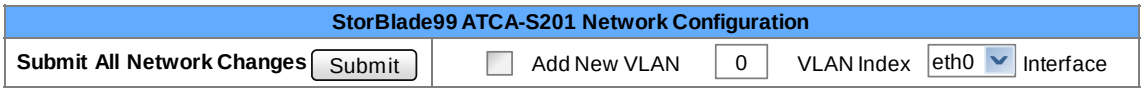
4.6.17 MAC address

<Read Only> The Ethernet **MAC address** is a 48-bit number that identifies the physical source and destination of the Ethernet 802.3 frame. The address is assigned by Emerson during manufacturing, and permanently recorded in nonvolatile memory on the blade.

4.7 VLAN Virtual Local Area Network support

Users may configure assign any of the Ethernet ports available on the ATCA-S201 to a Virtual Local Area Networking (Virtual LAN, IEEE 802.1q).

The webtool provides a entry for to define new VLAN. Users choose a physical interface from the drop down menu (etho, eth1..eth4) and assign a VLAN index. Click the **submit** button to apply the settings.



▼ *CLI command syntax*

Users may also configure VLANs using a console window and the Linux **vconfig** tool.

vconfig offers a rich set of feature options. The section below explains only the minimal options to add or remove a VLAN definition. Consult the Linux manpages for more details.

SYNOPSIS

vconfig [*add*|*rem*] [*options*]

DESCRIPTION

vconfig is a program which enables the user to create and remove vlan devices.

OPTIONS
add [interface-name] [vlan-id]

Creates a vlan-device on [interface-name]. The resulting vlan-device will be called according to the naming convention set. Users should avoid using [vlan-id]= 1. Many hardware products use [vlan-id] 1 as the management vlan. See linux manpage 'vconfig' for more information.

rem [vlan-device]

Removes the named vlan-device.

▼ *Example #1: add a vlan interface to XAUI port 4, ID 66*

```
# vconfig add eth4 66
# ifconfig eth4.66 up
```

Finally, enable the VLAN, and commit to system flash memory:

```
# atca_blade set_network Y 52+ 1
```

Convention:	atca_blade set_network Y <VLANindex+> <enable>
<VLANindex>	Use VLANindex 52+ to modify 1st VLAN definition Use VLANindex 60+ to modify 2nd VLAN definition Use VLANindex 68+ to modify 3rd VLAN definition Increment index by 8 for each additional VLAN definition
<enable>	0|1 Value 0 disables the port, value 1 enables the port.
Other prompts	Other prompts will follow.

▼ *Example #2: Remove vlan interfaces on XAUI port 4, ID 66*

Disable the VLAN port (see notes above for explanation of <VLANindex>)

```
# atca_blade set_network Y <VLANindex> 0 +
# vconfig rem eth4.66
```

Permanently remove VLAN port from system flash memory. Edit file to remove 12 lines for VLAN entry

 # vi /etc/network.conf

Example: remove these 12 lines:

```
# net interface 6
ifconfig eth4 up
if [ `grep eth4.66: /proc/net/dev -c` -ne 1 ]; then vconfig
add eth4 66 ; fi
HWADDR[6]=""
SYSCFG_IFACE[6]=y
INTERFACE[6]="eth4.66"
IPADDR[6]="5.5.5.5"
NETMASK[6]="255.255.255.0"
BROADCAST[6]="4.4.4.255"
GATEWAY[6]="0.0.0.0"
MTU[6]="1500"
IF_NAME[6]="VLAN Network Port 6"
```

4.7.1 Viewing active VLAN

Each VLAN is enumerated within the management web-tool and CLI tools. Open the network page. Each VLAN appears as

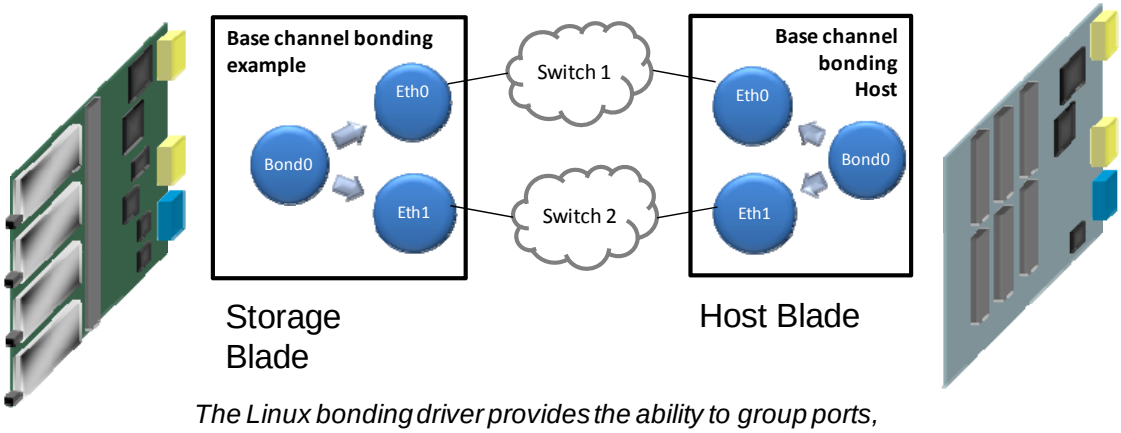
Port Description [eth#].[vlan-id] Network Configuration

▼ *Example #2: list vlan interfaces on XAUI port 4, ID 66*

```
# ifconfig eth4.66
```

4.8 Link aggregation and bonding

The ATCA-S201 supports 802.3ad link aggregation also known as “bonding”. Bonding allows you to aggregate multiple Ethernet ports into a single group, effectively combining the bandwidth into a single connection. For example, you can aggregate the ATCA base channel ports (1 Gb/s each) into a trunk group, providing 2Gb/s cumulative bandwidth, fault tolerance and load balancing.



The Linux bonding driver provides the ability to group ports, detect link failures and reroute traffic to the surviving ports in a manner transparent to the storage participants.

Figure 10 Link aggregation 802.3ad (bonding), theory of operation

4.8.1 Bonding, CLI command syntax

The Linux community has created an extensive man page for **ifenslave**. The subset of essential elements is summarized below.

Create new bond	
Step1:	`ifconfig eth0 down; ifconfig eth1 down`
	Deactivate the Ethernet "slave" ports that will become bond members
Step2:	`modprobe bonding mode=0 miimon=100`
	This loads the bonding module, sets the usage policy mode and sets polling frequency to 100mS. Several mode exist, but these are the most common Valid mode=[ ] options:.
	mode=0 - Round robin packet, or balanced transmit policy. This mode will only work with switches that support trunking.
	mode=1- Active-backup; one slave port is active, the other is passive. This mode should work with any Layer-II switch.
Step3:	`ifconfig bond0 <ip-address> up`
	Define a new bond0, and assign a dotted decimal <ip-address >. Note: the MAC address of the bond0 device will be taken from the first slave device.
Step4:	`ifenslave bond0 eth0; ifenslave bond0 eth1`
	Assign the slave ports that will comprise the new bond.
Preserve new bond attributes	`/etc/rc.d/init.d/userstart`
	This file contains a template for adding commands that will be executed on boot (or shutdown) as required by the user. This file is stored in system flash memory and preserved over reboots. Edit this file and add the entire sequence of bond commands. Example: **ifconfig eth0 down; ifconfig eth1 down** **modprobe bonding mode=0 miimon=100** **ifconfig bond0 <ip-address> up** **ifenslave bond0 eth0; ifenslave bond0 eth1 eth1**

Remove bond	
Step1:	`ifenslave -d bond0 eth0; ifenslave -d bond0 eth1`
	Remove all Ethernet "slave" ports that are bond members
Step2:	`ifconfig eth0 down; ifconfig eth1 down`
	Set the former slave ports as down.
Step3:	`/etc/rc.d/init.d/userstart`
	Remove the relevant bond creation code, and reboot

4.9 Shelf communications

Use these menus to initialize a communication path with the chassis shelf manager, and properly monitor ATCA-S201 hardware.

StorBlade99 ATCA-S201 Shelf Configuration		
Blade 1 (Primary) Configuration		
	Blade Number	**IPMB-Address (Hex)**
Active Settings	**1**	**0x96**
Blade 2 (Expander) Configuration		
Shelf Address		
	Shelf Primary Address	**Shelf Alternate Address**
Active Settings	**192.168.100.32**	**127.0.0.1**
New Settings	192.68.100.32	127.0.0.1
	Blade Number	**IPMB-Address (Hex)**
Active Settings	**2**	**0x84**
New Settings	**2**	84
Submit		

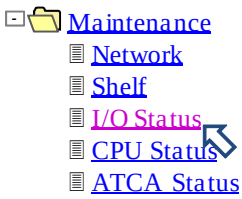
Figure 11 HTML tool, Emerson ATCA-S201 → Maintenance→Shelf

Table 22 Shelf configuration menu parameters

Status item	Description
Shelf Address	**Primary/Secondary Address**
Active Settings	Current IP address of chassis shelf manager
New Settings	This field is used to assign a new IP address for the chassis shelf manager. User must hit "submit" to update the value.
Blade 1 Configuration	**IPMB-Address (Hex) for ATCA-S201**
Active Settings	Slot number and Hex address code corresponds to the physical slot where the ATCA-S201 blade is installed. The value is self-discovered, where Slot0=0x82, Slot1=0x84 … Slot13=0x9C, Slot14=9E
Blade 2 Configuration	**IPMB-Address (Hex) for slave expansion blade**
Active Settings	The ATCA-S201A may be paired with companion blade to add additional hardware resources such as additional hard drives Supported companion blades include the Emerson ATCA1020 JBOD and ATCA1010 PCIe expansion blades. This Hex address code corresponds to the physical slot where the companion blade is installed. Slot0=0x82, Slot1=0x84 … Slot13=0x9C, Slot14=9E.
New Settings	This field is used to assign a slot address for the blade. User must hit "submit" to update the value.

4.10 I/O Status attributes

The items in this menu provide real-time information about the I/O activity occurring on physical disks connected to the ATCA-S201 raid controller. Disks may reside in any of the four AMC slots, RTM, or expansion JBOD products. Disks are identified by the Linux device designation */dev/sdx*, highlighted in gray.



StorBlade99 ATCA-S201 IO Status Page

/dev/sda	Current I/Os / sec	Current MBytes / sec	Total MBytes
Read	100	20MB/s	34349568MB
Write	100	0MB/s	34101760MB
Total	100	20MB/s	68451328MB
/dev/sdb	**Current I/Os / sec**	**Current MBytes / sec**	**Total MBytes**
Read	100	20MB/s	34039808MB
Write	100	0MB/s	34112000MB
Total	100	20MB/s	68151808MB

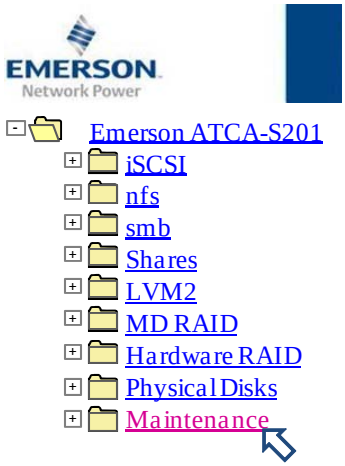
Figure 12 HTML tool, Emerson ATCA-S201 → Maintenance→IO Status

Table 23 Blade, I/O Status indication

Status item	Description
Current I/Os / sec	**Bar graphs provided for each disk**
Read	Displays the number of real-time read I/O per second (read IOPS).
Write	Displays the number of real-time write I/O per second (write IOPS).
Total	Displays the cumulative number of real-time I/O activity (read and write).
Counter Mbytes / sec	**Numeric counters provided for each disk**
Read	Displays the real-time read bandwidth, displayed megabytes/second
Write	Displays the real-time write bandwidth, displayed megabytes/second
Total	Displays the cumlative real-time bandwidth, displayed megabytes/second
Total Mbytes	Numeric counters provided for each disk
Read/write/Total	128 bit counter displays the number of bytes transferred since reset.

4.11 Blade maintenance, miscellaneous operations

These menus provide several miscellaneous operations that are useful for blade management and monitoring. The base page lists detailed versioning information of the loaded software as shown below:



StorBlade99 ATCA-S201 Maintenance Page		
File Name	**Revision**	**Build Date**
Software Release kit	V.1.0rc7	Date: 2009/07/21 20:05:48
U-boot	1.3.0	Apr 27 2009 – 17:44:03
Linux	2.6.23	#28 Wed Jul 1 09:09:29 EDT 2009
atca_blade	Revision: 1.73	Date: 2009/07/21 20:05:48
Reset IO Counters	Rescan SAS topology	Software reset SAS controller

4.11.1 Rescan SAS Topology, disk refresh

The physical disk assignments change as disks become utilized in a RAID definitions. Use the “Re-Draw Tree” button to rescan for physical disks, and refresh the menu view.

Rescan SAS topology

4.11.2 Software Reset SAS Controller

The button will issue a software-reset signal to the embedded SAS controller. If users have hot-swapped many disks, this ensures the SAS controller has completely purged internal tables, and is properly presenting the new or remaining disks to the operating system.

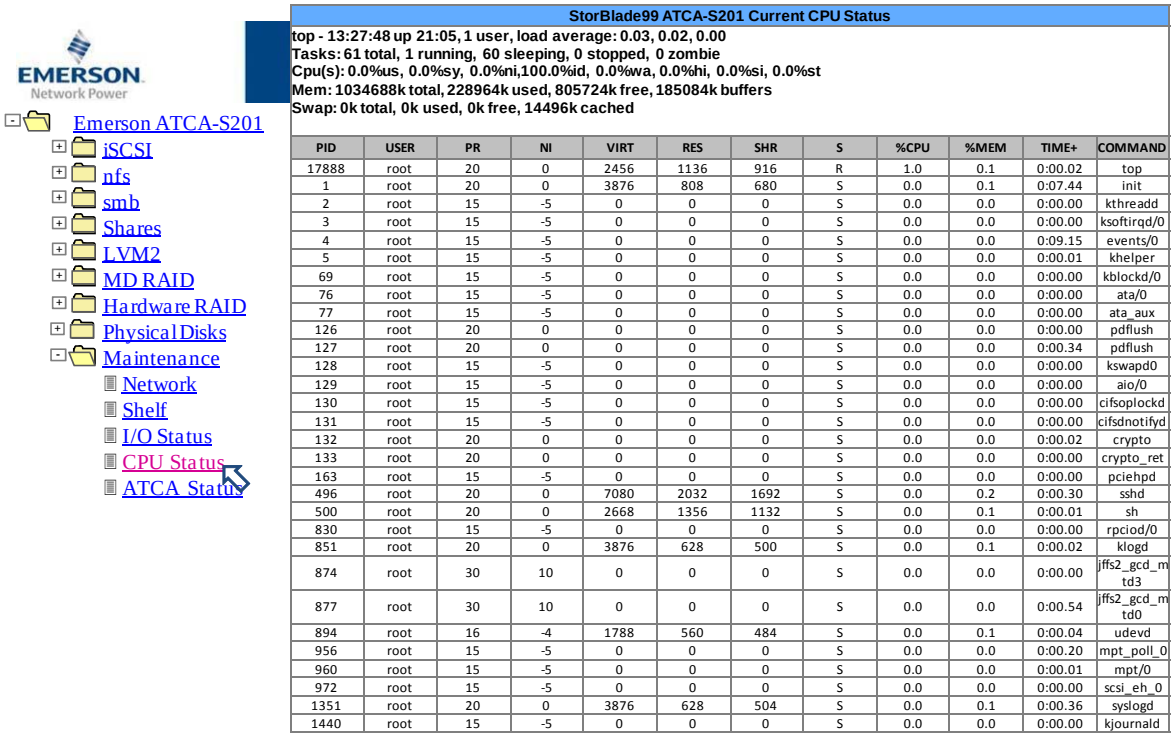
Software reset SAS controller

4.11.3 Reset I/O Status counters

This button will reset all I/O status counters.

4.12 CPU Status attributes

This screen displays real-time statistics for the applications running on ATCA-S201's PowerPC processor. The data on this screen is derived from the Linux **top** command (*man top*), formatted to fit the HTML window. The screen auto refreshes approximately every 6 seconds.



StorBlade99 ATCA-S201 Current CPU Status

top - 13:27:48 up 21:05, 1 user, load average: 0.03, 0.02, 0.00
Tasks: 61 total, 1 running, 60 sleeping, 0 stopped, 0 zombie
Cpu(s): 0.0%us, 0.0%sy, 0.0%ni,100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 1034688k total, 228964k used, 805724k free, 185084k buffers
Swap: 0k total, 0k used, 0k free, 14496k cached

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
17888	root	20	0	2456	1136	916	R	1.0	0.1	0:00.02	top
1	root	20	0	3876	808	680	S	0.0	0.1	0:07.44	init
2	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	kthreadd
3	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	ksoftirqd/0
4	root	15	-5	0	0	0	S	0.0	0.0	0:09.15	events/0
5	root	15	-5	0	0	0	S	0.0	0.0	0:00.01	khelper
69	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	kblockd/0
76	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	ata/0
77	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	ata_aux
126	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pdflush
127	root	20	0	0	0	0	S	0.0	0.0	0:00.34	pdflush
128	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	kswapd0
129	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	aio/0
130	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	cifsoplockd
131	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	cifsdnotifyd
132	root	20	0	0	0	0	S	0.0	0.0	0:00.02	crypto
133	root	20	0	0	0	0	S	0.0	0.0	0:00.00	crypto_ret
163	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	pciehpd
496	root	20	0	7080	2032	1692	S	0.0	0.2	0:00.30	sshd
500	root	20	0	2668	1356	1132	S	0.0	0.1	0:00.01	sh
830	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	rpciod/0
851	root	20	0	3876	628	500	S	0.0	0.1	0:00.02	klogd
874	root	30	10	0	0	0	S	0.0	0.0	0:00.00	jffs2_gcd_mtd3
877	root	30	10	0	0	0	S	0.0	0.0	0:00.54	jffs2_gcd_mtd0
894	root	16	-4	1788	560	484	S	0.0	0.1	0:00.04	udevd
956	root	15	-5	0	0	0	S	0.0	0.0	0:00.20	mpt_poll_0
960	root	15	-5	0	0	0	S	0.0	0.0	0:00.01	mpt/0
972	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	scsi_eh_0
1351	root	20	0	3876	628	504	S	0.0	0.1	0:00.36	syslogd
1440	root	15	-5	0	0	0	S	0.0	0.0	0:00.00	kjournald

Figure 13 HTML tool, Emerson ATCA-S201 → Maintenance→CPU Status

4.13 ATCA Status attributes

The items in this menu provide operational condition of the ATCA-S201 and the four AMC slots and RTM if installed.

- Maintenance
  - Network
  - Shelf
  - I/O Status
  - CPU Status
  - ATCA Status

StorBlade99 ATCA-S201 Blade 1 (0x96) Status							
Vendor	IANA ID	Name	HW Revision	H8 FW Revision	IPMI Rev	Model	Serial
Emerson	65cd	ATCA-S201	0004	01.10	01.50	ATCA-S201	100LYMMSSSS
Refresh		Reboot			Power Off		

AMC Site B1 (0x7a) Configuration										
	Phy Num	Type		SAS Address			Handle		Parent	
Disk	00	SAS		5000cca000784c49			0009		0001	
	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B2 (0x7c) Configuration										
	Phy Num	Type		SAS Address			Handle		Parent	
Disk	01	SAS		500000e016cbd032			000a		0002	
	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B3 (0x7e) Configuration										
	Phy Num	Type		SAS Address			Handle		Parent	
Disk	02	SAS		5000c50005b18665			000b		0003	
	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B4 (0x80) Configuration										
	Phy Num	Type		SAS Address			Handle		Parent	
Disk	03	SAS		500000e016cbd982			000c		0004	
	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B5 (0x8e) Configuration										
	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	RTM	0106828G	401NYMxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

Figure 14 HTML tool, Emerson ATCA-S201 → Maintenance→ATCA Status

Table 24 ATCA status indication

Status item	Description
PCI state	**Collection of values pertaining to AMC modules with PCI devices**
Vendor	4 digit Hex value representing the PCI Vendor ID .
Device	4 digit Hex value representing the PCI device ID .
SVID	4 digit Hex value representing the PCI sub-system vendor ID . (set to 0000 for non-PCI modules)
SSID	4 digit Hex value representing the PCI sub-system device ID . (set to 0000 for non-PCI modules)
Bus/Slot/Func	Displays the OS assignments for bus, slot, and function of the PCIe device. (set to 0000 for non-PCI modules)
AMC state	**Collection of values pertaining to AMC modules with PCI devices**
Vendor	FRU data retrieved from the management device; it indicates the manufacturer of the device.
Product	FRU data retrieved from the management device; it indicates the product name.
Model	FRU data retrieved from the management device; it indicates the model name.
Serial	FRU data retrieved from the management device; it indicates the serial number.
State	Indicates whether the AMC module is enable or disabled.
Present	Indicates the present pin is asserted, indicated the presence of a module
MgEna	Indicates management enable is asserted on the AMC
MgOK	Indicates management power is detected on the AMC
PayEna	Indicates payload enable is asserted on the AMC
PayOK	Indicates payload power is detected on the AMC
Button usage	
☐ Suppress Warnings	'Radio button' when selected will eliminate the majority of 'pop-up' confirmations that precede major configuration changes.
☐ Allow GUI and CLI	'Radio button' will allow an administrator to operate the GUI and CLI simultaneously.
Refresh	This button will redraw the display window.
Reboot	This button will reboot the storage blade, and all storage served by this blade will be unavailable. The Blade will terminate all applications and shutdown its internal OS. The blade will automatically reboot, by executing the uboot, kernel and applications loaded in its flash memory.
Power Off	This button will power down the storage blade, and all storage served by this blade will be unavailable. The Blade will terminate all applications and shutdown its internal OS. When the sequence completes all hot-swap LED indicators will illuminate "Blue". Manual operator action will be required to reboot the blade.
Enable	This button will enable AMC sites. When enabled, the menu will show the AMC state as Enabled.
Disable	This button will disable AMC sites. When disabled, the menu will show the AMC state as Disabled.

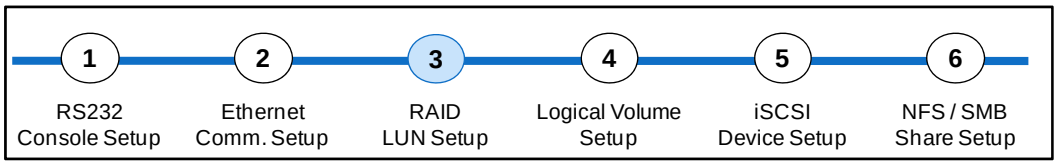
▼ *CLI command syntax*

Table 25 CLI command syntax, blade_status for ATCA and AMC site status

Convention:	**atca_blade get_status 2 +**
	Display ATCA blade revision information
Convention:	**atca_blade get_status 1 <site> +**
<site>	1 |2|3|4|5 Display site status: 1=Site B1, 2=Site B2, 2=Site B3, 2=Site B4, 2=Site B5 (RTM)

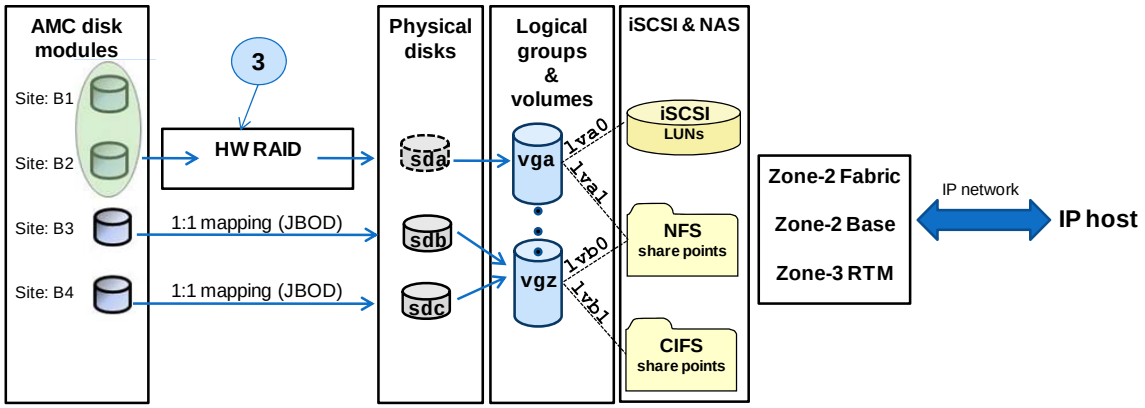
5 RAID Volume Configuration

Configuration Step:



This chapter explains how to prepare and configure RAID volumes that are ultimately mapped to the various IP services advertised on the ATCA-S201 ATCA carrier board. These virtual RAID volumes are created from in-chassis storage pools comprised of AMC modules with SAS or SATA disks. Hardware RAID services are available for disk striping (RAID0) and extended volume mirroring (RAID1, RAID1E). Software RAID services are available for parity based disk striping algorithms including RAID4, RAID5 and RAID6. The Software RAID features of this product can provide better capacity utilization efficiency, but can consume a greater percentage of CPU and system memory bandwidth.

NOTE: If RAID is not needed, please proceed to the next chapter.



5.1 Hardware RAID configuration

Administrators will use two inter-related menus to enable and configure the hardware RAID features of ATCA-S201. These configuration tools appear within the html tool's main navigation panel on the left side as shown in the figure below.

Emerson ATCA-S201 → Hardware RAID
Emerson ATCA-S201 → Physical Disks

NOTE: Hardware RAID should be applied before defining volume groups using the logical volume manager (LVM).

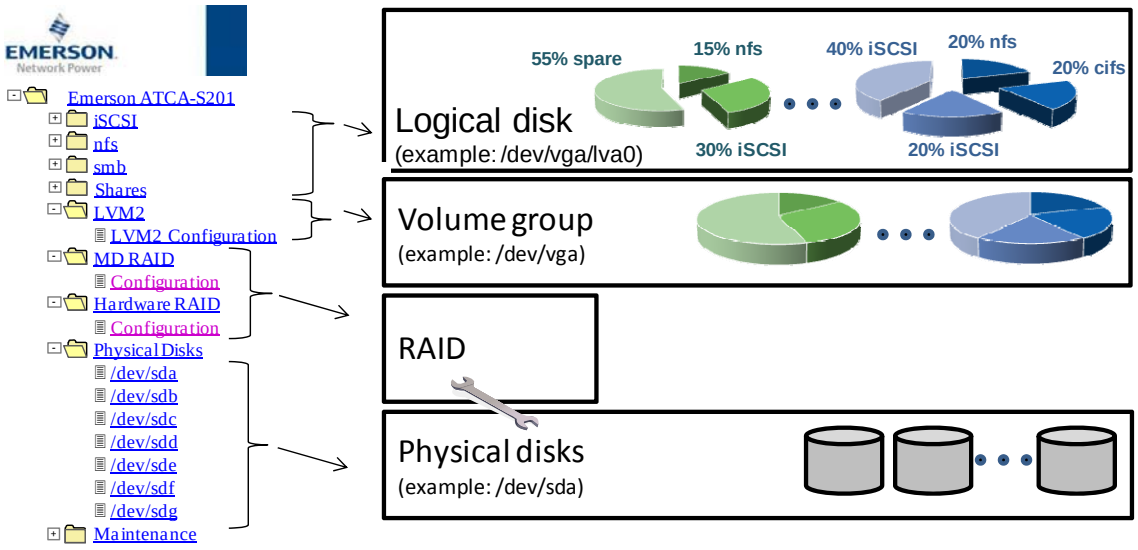


Figure 15 HTML tool, Main navigation side-bar, Hardware RAID->Configuration

These menus are used to view and arrange the hardware disk pool. The hardware disk pool is the raw (unformatted/unassigned) disk capacity or resources available to a ATCA-S201. In SNIA terminology, these are primordial disks. This storage is block I/O comprised of the following:

1. AMC SAS/SATA hard drive(s)
2. RTM SAS/SATA hard drive(s)
3. Disks or volumes accessed via an AMC SAS controller
4. Disks or volumes access via an AMC FC controller

The sum capacity of the hardware disk pool resources equals the total size of storage available to the particular ATCA-S201.

5.1.1 JBOD mode

Just a bunch of disks (JBOD) is a term to describe disks which are not part of a RAID or logical device definition. By default, a new ATCA-S201 will scan and display all discovered disks 1:1 in the physical disk menu. These disks may be used as-is, or grouped using the configuration tools to create RAID or combined logical volumes.

Note: If the installation will use JBOD, and not use RAID, the user may proceed to the next chapter.

5.2 Hardware RAID configuration Menu usage

On a new system installation, this configuration menu enables the creation of RAID disk(s) that will appear in the physical disk menu. Once created, RAID disks are managed in the same manner as other physical disks, but boast benefits including improved performance and redundancy.

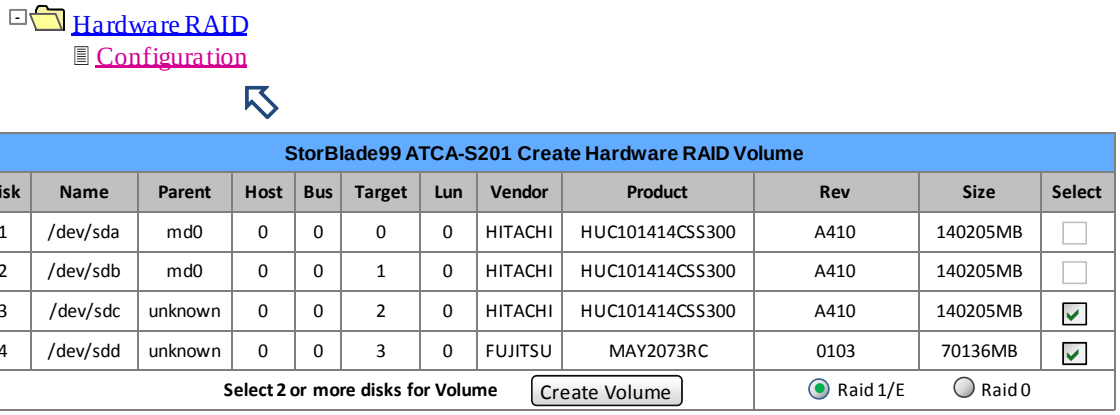


Figure 16 Emerson ATCA-S201 →Hardware RAID (new installation screen-shot)

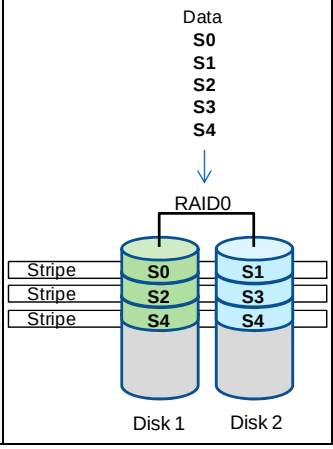
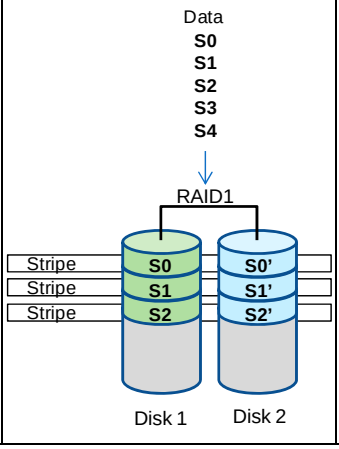
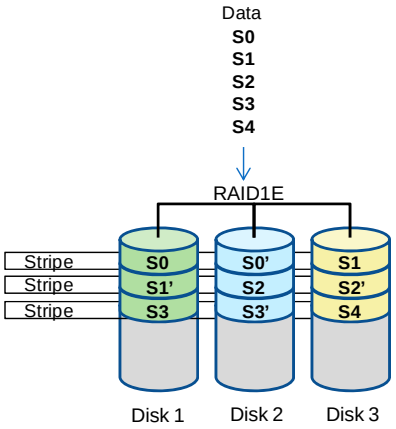
Parameter	Description
Disk	An enumeration of disks that may be used in new RAID LUN definition.
Parent	Identifies the volume that claims ownership to a disk. 'Unknown' indicates no volume ownership.
Host/Bus/Target/Lun	Identifies the SCSI parameters used to address the virtual RAID device
Vendor/Product/Rev	Use these items to identify the physical disk resource.
Size	Capacity of the disk
Select	"Radio button" used to select which disks will participate in the new RAID LUN definition
RAID1/E	Click to create a new RAID1 LUN (mirroring)
RAID0	Click to create a new RAID0 LUN (stripping)
Create Volume	Click to commit the selections and create the new RAID device.

▼ *CLI command syntax*

Table 26 CLI command syntax, set_raid: Add RAID configuration

Convention:	**`atca_blade set_raid Y <diskmask> <RAID_level> Y +`**
<diskmask>	Ydisk|Ndisk … [Ydisk|Ndisk] variable length mask. Must specify one entry for each system disk. Ydisk includes disk in RAID volume, Ndisk exclude disk from RAID volume.
<RAID_level>	0|1 Use value 0 to apply RAID0, and value 1 to apply RAID1
Syntax examples	**`atca_blade set_raid Y Ydisk Ydisk Ydisk Ndisk 1 Y +`**
	System has four disks. Assign the first three disks to new RAID1 volume.

5.2.1 Hardware RAID levels and capabilities

RAID Level	RAID0	RAID1	RAID1E
Description	Two or more disks are grouped to provide a capacity aggregation function. The advantage is the multiplicative performance and capacity effect of up to 10 spindles working in concert to store or retrieve data for the host.	Exactly two disks are grouped to provide a mirror function. By definition, two drives our bounded in a fashion such that every write to one drive is mirrored to the second. If a failure occurs with either drive, data is still accessible via the surviving drive.	Three or more disks are grouped to provide a mirror function using an algorithm extension to permit use with many drives. If a failure occurs with any drive, data is still accessible via the surviving drives.
Data Layout Diagram			

▼ *Important considerations and volume restrictions*

1. A maximum of 2 RAID volumes may be defined on each ATCA-S201.
2. A maximum of 2 global hot spares may be defined for each ATCA-S201.
3. A maximum of 10 disks may be used for a single RAID volume
4. A maximum of 12 disks (cumulative) for both RAID volumes (not including spares)

5.2.2 How new RAID definitions alter device menu display

The number of devices appearing in the Physical Disks menu will change once the user applies RAID services. The figure below illustrates this concept. In this example, there are four AMC disk modules available to the ATCA-S201, but only three disks appear in the physical disk menu.

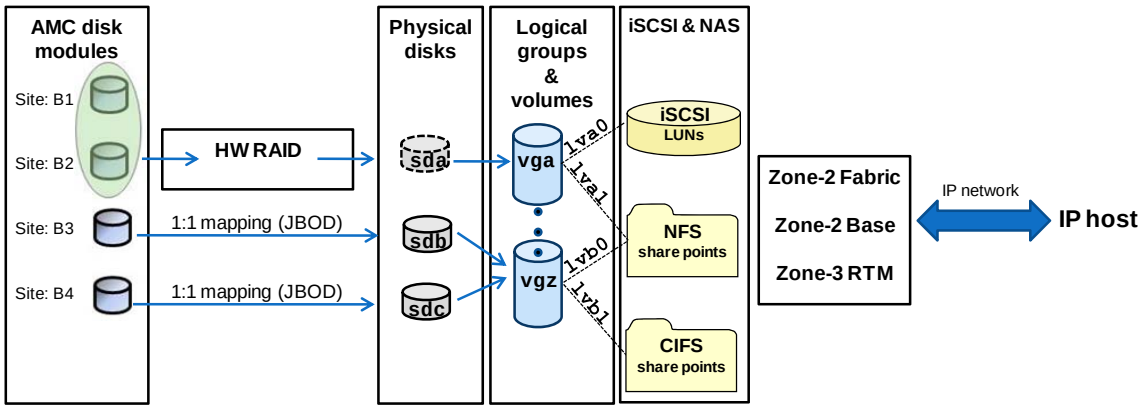


Figure 17 Figure shows how RAID LUN definitions alter physical disk display

5.2.3 Modify existing RAID configurations

After creating a RAID volume, the RAID configuration tool page changes to include several new configuration options. The menu is now comprised of four sections, arranged to facilitate creation and deletion of RAID volumes and global hot spares.

Section 1

StorBlade99 ATCA-S201 Create Hardware RAID Volume

Available Disk	Bus	Target	Lun	Vendor	Product	Rev	Size	Select
1	0	25	0	HITACHI	HUC101414CSS300	A410	140205MB	☐
2	0	27	0	FUJITSU	MAY2073RC	0103	70136MB	☐

Select 2 or more disks for Volume [Create Volume] ◉ Raid 1/E (Mirroring Extended) ○ Raid 0 (Striping)

Section 2

Hardware RAID Status Volume 0

Volume	Bus	Target	Type	WWID	State	Status	Size	Stripe Size
Volume 0	0	6	Raid1	00ba23e977ca6eb7	optimal	enabled	70008	0

Member	Physdisk	Errors	Bus	Target	Lun	Vendor	Product	Rev	Size	State
0	0	0	0	56	0	FUJITSU	MAY2073RC	0103	70136MB	online
1	1	0	0	9	0	SEAGATE	ST9146803SS	0002	140014MB	online

Volume draws from Hot Spare Pools: 0 1 [Delete]

Section 3

Allocate Hot Spare Disks

Available Disk	Bus	Target	Lun	Vendor	Product	Rev	Size	Select
1	0	25	0	HITACHI	HUC101414CSS300	A410	140205MB	☐
2	0	27	0	FUJITSU	MAY2073RC	0103	70136MB	☐

Select 1 disk for use as Hot Spare [Create Hot Spare]

Section 4

Hot Spare Pool Status

No Disks Have Been Allocated to Hot Spare Pools

Figure 18 Hardware RAID configuration screen showing existing RAID volume

Hardware RAID configuration	Description
Section 1 – Create RAID volumes	List of remaining disks available for new RAID volume definition. Click to select disk members. Click to select RAID level Click create Volume Upon completion, the physical disk view will change to display the new Virtual RAID volume while its disk members become hidden.
Section 2 –RAID Status Summary	Provides a detailed status of existing RAID volumes, and details regarding the "hidden" disk members. Click "delete" to erase this volume and return all of the member disks to the pool of available disks.
Section 3 – Allocate Hot Spare	List of disks available for new global hot spare. The ATCA-S201 will use a global hot spare to repair a RAID1 or RAID1E volume that is degraded.
Section 4- Hot spare status	Provides a detailed status of existing global hot spares. Click "delete" to return a spare disk to the pool of available disks.

▼ *Understanding the Hardware RAID status table page*

Once the RAID volume is created, the individual disks comprising a RAID disk are "hidden" from the OS and physical disk view, but are shown in the RAID status table.

Parameter	Description
Volume	The ATCA blade is label string identifies the RAID volume.
Bus/Target	Identifies the SCSI parameters used to address the virtual RAID device
Type	Identifies the RAID level employed by the virtual RAID device. (Raid0, Raid1, or Raid1E)
WWID	The World-Wide Identification, is an eight byte SAS address that uniquely identifies the virtual RAID volume.
State	Optimal – The RAID volume and all comprising disk members are fully operational
	Degraded - The RAID volume is accessible for read/write operation, but one of its underlying disk members is offline.
	Failed - the RAID volume is not accessible for read/write operations. Data loss may have occurred.
Status	Enabled (default) – The RAID volume is able to receive I/O commands
	Offline – The RAID volume cannot receive I/O
Size	The usable capacity, (MB) of the Virtual RAID drive.
Stripe Size	The maximum chunk of data that is written to one disk of a RAID group. The stripe width = Stripe size * number of disks. The ATCA-S201 currently applies a fixed size of 64 KB.

5.3 Software RAID configuration

Administrators may use the 'MD RAID' menus to configure the Software AID features of ATCA-S201. The implementation leverages the mdadm tool available with the 2.6.23 Linux kernel, which also offers the ability to conduct all volume setup and configuration via a shell commands. Upon creation, a new software raid-device will appear as a new device in web or cli configuration menus. Users may utilize the new raid-device to create logical volumes, and configure iSCSI and NAS file shares. The 'MD RAID' configuration tool appears within the html tool's main navigation panel on the left side as shown in the figure below.

NOTE: Software RAID should be applied before defining volume groups using the logical volume manager (LVM).

5.3.1 Software RAID web-configuration menu usage

On a new system installation, this configuration menu enables the creation of RAID disk(s) that will appear in the physical disk menu. Once created, RAID disks are managed in the same manner as other physical disks, but boast benefits including improved performance and redundancy.

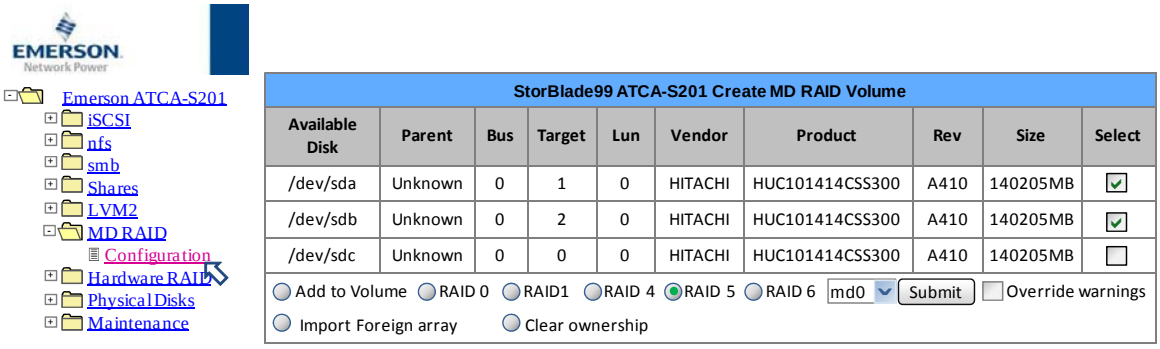


Figure 19 Emerson ATCA-S201 →MD RAID (new installation screen-shot)

Parameter	Description
Available Disk	An enumeration of disks that may be used in new RAID LUN definition.
Parent	Identifies the volume that claims ownership to a disk. 'Unknown' indicates disk has no known volume ownership.
Bus/Target/Lun	Identifies the SCSI parameters used to address the virtual RAID device
Vendor/Product/Rev	Use these items to identify the physical disk resource.
Select	'Radio button' identifies which disks will participate in the new RAID LUN definition.
Add to volume	'Radio button' adds the selected disk(s) to an existing volume as spare disk(s). If a volume is degraded, the volume will immediately commence a re-build operation.
RAID0	Click to create a new RAID0 LUN (stripping)
RAID1	Click to create a new RAID1 LUN (mirroring)
RAID4	Click to create a new RAID4 LUN (Fixed parity)
RAID5	Click to create a new RAID5 LUN (Rotating parity)
RAID6	Click to create a new RAID6 LUN (double parity)

md0	Use this drop down menu to choose a volume name. Four choices: md0, md1,md2 or md3
Submit	Click to commit the selections and create the new RAID device.
Ignore Warnings	'Radio button' will ignore minor mdadm warnings. Example ignore warning when creating RAID1 with disks that have greater than 1% capacity difference. This Filed self-clears on each use.
Import Foreign Array	Will display ONLY in situations when a drive contains meta-data that indicates it was at one time a member of a software RAID volume. Click and select participating drives to attempt an import of the volume.
Clear ownership	Will display ONLY in situations when a drive contains meta-data that indicates it was at one time a member of a software RAID volume. Click and select drives to clear all meta-data stored on these disk(s). This operation will permanently eliminate the import array option.

▼ *Important considerations and volume restrictions*

5. A maximum of 4 software-RAID volumes may be defined on each ATCA-S201.
6. The default stripe size is 64KB, but can be changed by creating the array using the CLI mdadm tool instead.
7. A user may assign multiple spare disks to each volume.

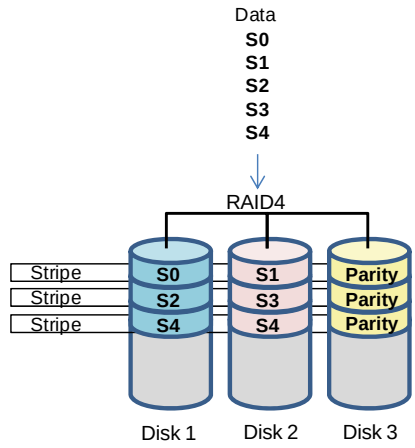
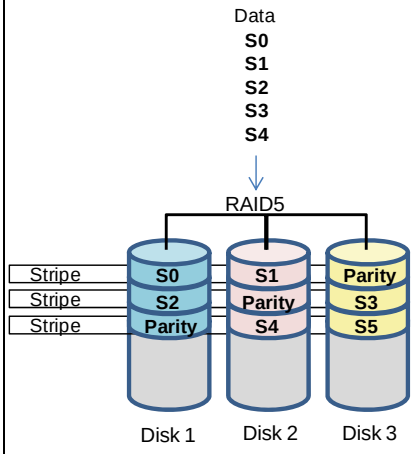
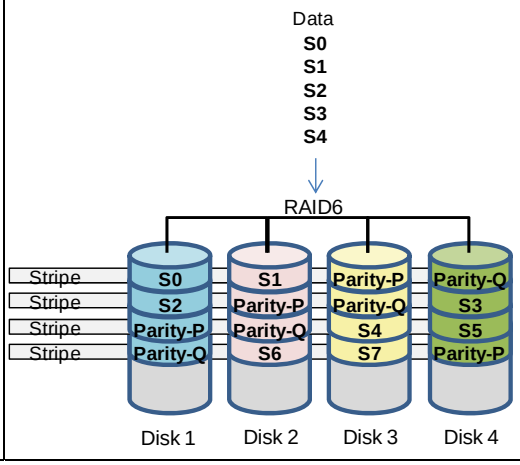
5.3.2 Software RAID, CLI command syntax

Table 27 CLI command syntax, mdadm: manage RAID configuration

Create new volume	**`mdadm --create raiddevice –n <#devices> -l <raidlevel> [-c <stripe_size>] <component-devices>`**
--create	"Create" mode, used initialize a new md array, associate some devices with it, and activate the array.
Raiddevice	Device name assigned to new volume. Example /dev/md0.
<#devices>	Integer, specifies the number of <component-devices>
<raidlevel>	Integer: 4=raid4, 5=raid5, 6=raid6
<stripe_size>	Optional, will default to 64 if omitted, expressed in kilobytes. Within a stripe, this defines the 'chunk' of data read or written to any single member disk.
<component-devices>	Space delimited list of component devices. Example /dev/sda /dev/sdb…
Preserve new volume attributes	**`mdadm --detail --scan > /etc/mdadm.conf`**
	Issue this command immediately after creating a new volume. This command preserves key volume parameters, and ensures the new volume is available across system reboots.
List volume status	`mdadm --detail --scan`
	Issue this command at any time to inspect volume status
Create hot spare	**`mdadm –-add raiddevice <spare-device>`**
--add	Used to add a spare disk to an existing raid-device. Users may issue this commend any number of times to specify multiple spare drives if available.
Raiddevice	Device name assigned to existing volume. Example /dev/md0
<spare-device>	Designate spare device. Example /dev/sda
Remove faulty disk	**`mdadm –-remove raiddevice <faulty-device>`**

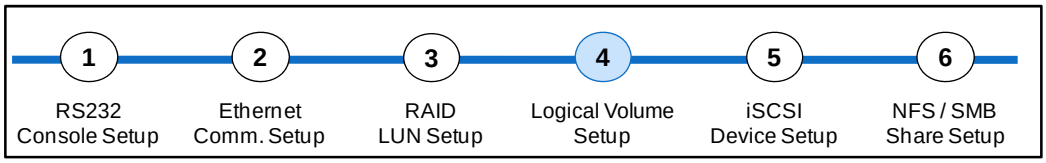
--remove	Used to remove a disk from a volume definition. Users may later re-add the disk using the –add command.
Raiddevice	Device name assigned to existing volume. Example /dev/md0
<faulty-device>	Designate faulty device. Example /dev/sda
Remove volume	`/etc/rc.d/init.d/mdarray stop`
step2	Edit file: /etc/mdadm.conf and remove RAID volume entry

5.3.3 Software RAID levels and capabilities

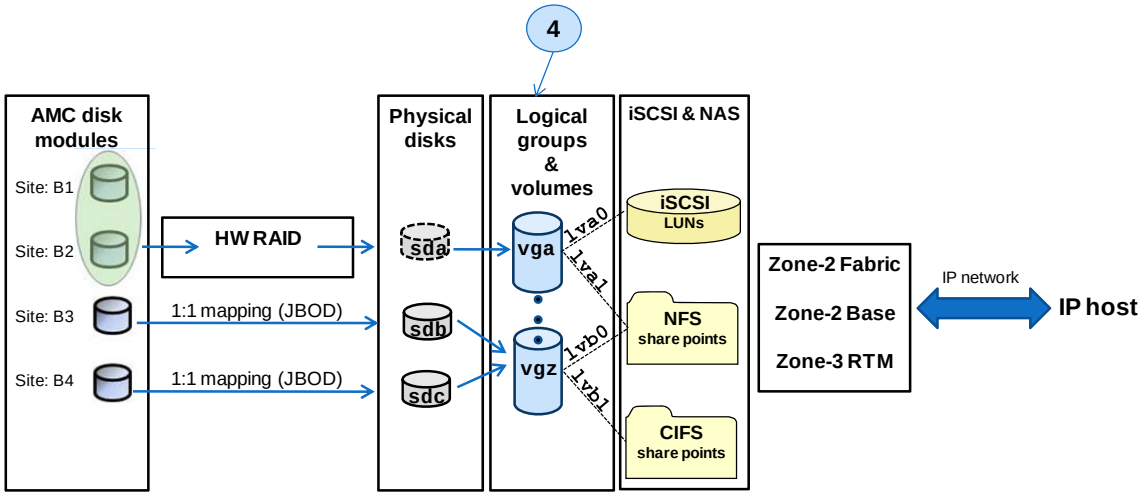
RAID Level	Description	Data Layout Diagram
RAID4	Three or more disks are grouped in fashion where all written data is available even when any single disk drive is removed or fails. RAID4 employs block level striping with a dedicated parity disk.	
RAID5	Three or more disks are grouped in fashion where all written data is available even when any single disk drive is removed or fails. RAID5 employs block level striping with a distributed parity disk. This provides a significant advantage for RAID5 vs RAID4 for write operations, because the bandwidth of all disks is available for parity write operations.	
RAID6	Four or more disks are grouped in fashion where all written data is available even when any two disk drives are removed or fail. RAID6 employs block level striping with two distributed parity disks. While RAID6 provides a significant redundancy advantage, each write spawns two additional parity calculations, which in turn adds commensurate loads on both the internal CPU and memory systems.	

6 Prepare Logical Volumes for iSCSI or file sharing

Configuration Step:



This chapter explains how to prepare a device resource (example /dev/sda) for iSCSI or NAS file sharing. Disks appearing in the "physical disk" menu **must first** be mapped to a Logical Volume group before it can be used for these services. Once a device is committed as a shared resource for iSCSI or NAS for service, it becomes un-available for new RAID or logical volume definitions unless it is first un-shared.



6.1 Benefits of a logical Volume Group (/dev/vga)

A volume group is a group of one or more physical disks. A volume group gives the administrator several powerful tools to manage storage resources.
These features include:

- Define volume groups with multiple disks or partitions
- Dynamically increase a volume group by adding new physical disks

6.1.1 Benefits of a Logical device/disk (/dev/vga/lva0)

A volume group may be divided into multiple pieces. Each piece is known as logical device but may also be called a logical disk or volume. A Logical Device offers powerful features that include:

- Essentially unlimited logical devices defined on each volume group
- Dynamically increase the size of logical device

6.2 Viewing Physical disks

Logical volumes are comprised of one or more physical disk members. Using the HTML configuration tool, the user may view the available set of physical disks.

Emerson ATCA-S201 → Physical Disks

This top html menu provides a summary list of current physical disks.

Note: The disks appearing in this view will dynamically change to reflect alterations made with **MD_RAID** configuration menus.

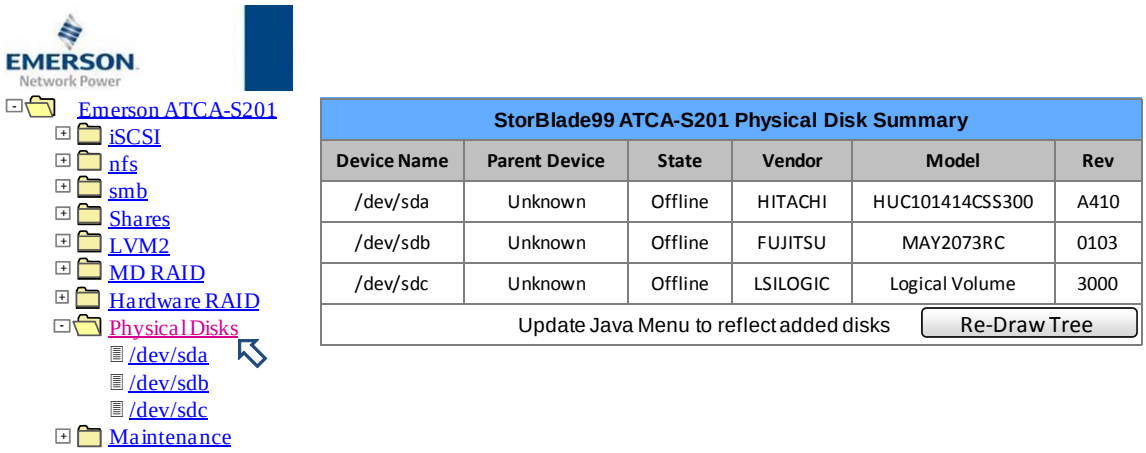


Figure 20 HTML tool, Emerson ATCA-S201 →Physical Disk (summary screen)

6.2.1 Interpreting physical disk status

Physical disks resources can be mapped to logical volume groups, which are split into Logical device 'slices' which are then shared as iSCSI or NAS. The number of Physical disks may not necessarily correlate 1:1 with the hardware disk pool (e.g. number of AMC drive carriers), because physical disks may include volumes created through RAID services that mask the individual hardware disk members. From the ATCA-S201 perspective, physical disks are presented as Linux SCSI devices (/dev/sd[a-z]).

Status	description
Online	Device is actively used as either a iSCSI export or NAS share volume
Offline	Device is available for iSCSI or NAS operations.

6.2.1.1 Disk view refresh, Re-draw Tree button

The physical disk assignments change as disks become utilized in a RAID definitions. Use the “Re-Draw Tree” button to rescan for physical disks, and refresh the menu view.

6.2.1.2 Rescan SAS Topology

If the disk configuration is not displaying properly, users can rescan the SAS topology, using the button located on the Maintenance menu page.

6.2.1.3 Software Reset SAS Controller

If the disk configuration is not displaying properly, users can issue a software-reset signal to the embedded SAS controller using the button located on the Maintenance menu page. If users have hot-swapped many disks, this ensures the SAS controller has completely purged internal tables, and is properly presenting the new or remaining disks to the operating system.

6.2.2 View physical disk properties

Additional property informational is available for each physical disk. These may be viewed by clicking the individual device (e.g. /dev/sda), which opens the menu shown below.

ATCA-S201 ATCA-S201 Physical Disk /dev/sda Status										
Device Name	State	Type	Parent	Host	Bus	Target	LUN	Vendor	Model	Rev
/dev/sda	Online	Raw	Unknown	0	0	19	0	ATA	64G SATA Flash D	401A

Table 21 HTML tool, Emerson ATCA-S201 →Physical Disk (configuration screen)

Parameter	Description
Device Name	Linux SCSI device name, from ATCA-S201 management perspective
State	Online: indicates the device is active and ready for I/O
	Offline:
Type	Raw: indicates the device was not formatted by the ATCA-S201
	file: indicates the device was formatted by the ATCA-S201
Parent	Identifies the volume that claims ownership to a disk. 'Unknown' indicates disk has no known volume ownership.
Host/Bus/Target/LUN	Identifies the SCSI parameters used to address the physical device
Vendor/model/Rev	Identifies the vendor and revision of the disk device. If vendor = LSILogic, this physical device is a RAID volume managed by the ATCA-S201 resources.

6.3 Create a logical Volume Group (/dev/vga)

A volume group must contain at least one physical disk member. The figure below outlines the steps that will be taken to create volume groups and logical device/disk volumes.

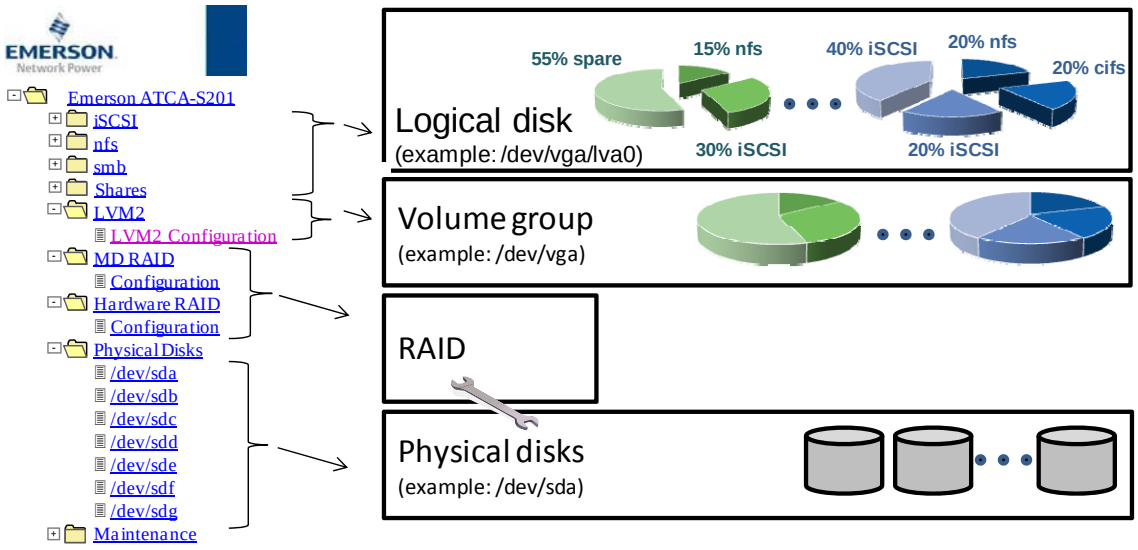
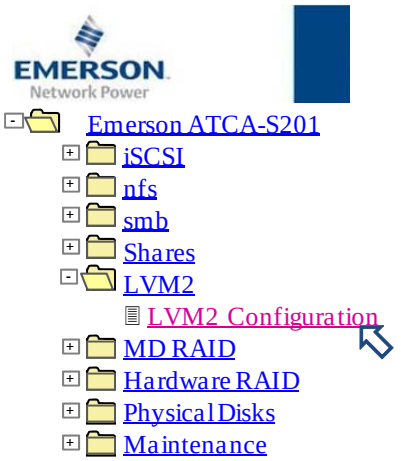


Figure 22 HTML tool, Main navigation side-bar, LVM2->Configuration

Logical volumes are comprised of one or more physical disk members. Using the HTML configuration tool, the user may view the available set of physical disks and assign them to volume groups.

Emerson ATCA-S201 → LVM2 → LVM2 Configuration

The screen shows physical disks which are available for a new volume group definition.



StorBlade99 ATCA-S201 Available Physical Disks									
Disk Name	Volume Group	State	Capacity	File	Type	Vendor	Model	Rev	Select
/dev/sda	-none-	Offline	140205(MBytes)	Raw	Unknown	HITACHI	HUC101414CSS300	A410	☐
/dev/sdb	-none-	Offline	70136(MBytes)	Raw	Unknown	FUJITSU	MAY2073RC	0103	☐
/dev/sdc	-none-	Offline	70008(MBytes)	Raw	Unknown	LSILOGIC	Logical Volume	3000	☑
Select 1 or more disks for Volume Group						vga	Submit		

Figure 23 HTML tool, Emerson ATCA-S201 →LVM2 Configuration

▼ *Follow these instructions to create a new volume group*

Step 2. Click the **'Select'** box to choose which disks will be assigned to the new volume group.

Step 3. Use drop down menu to specify volume group name. (vga,vgb, etc)

Step 4. Click the '**Submit**' button

▼ *CLI command syntax*

Table 28 CLI command syntax, create new volume groups

Convention:	**atca_blade set_lvm2 Y <diskmask> Y Y +**
<diskmask>	Ydisk | Ndisk ... [Ydisk | Ndisk] variable length mask. Must specify one entry for each available system disk. Ydisk includes disk in new volume group, Ndisk exclude disk from new volume group.
Syntax examples	**atca_blade set_lvm2 Y Ydisk Ndisk Y Y +**
	System has two disks. Assign the first disk to a new volume group.

Table 24 HTML tool, Emerson ATCA-S201 →LVM2 logical group (status screen)

Parameter	Description
Volume/member	Linux SCSI device name, from ATCA-S201 management perspective
Access	Displays the volumes access privilege settings; default is read/write
Total Size	The calculated capacity (GB) is the product of 'Total PE' x 'PE Size'.
PE Size	The physical extent (PE) in LVM is the block-size that physical volumes are using. The default physical extent is 4MB.
Total PE	This is the summation of physical extents contributed by its members.
Allocated Space/PE	The number of physical extents committed to logical device definitions.
Free Space/PE	The number of physical extents not yet committed (available) to new or existing logical devices.

6.4 Creating a Logical Device (/dev/vga/lva0)

After successfully creating a volume group, the user must next create a logical device which can be assigned to iSCSI or NAS services. The LMV2 configuration menu will update to show the new volume group as shown below.

StorBlade99 ATCA-S201 Available Physical Disks

Disk Name	Volume Group	State	Capacity	File	Type	Vendor	Model	Rev	Select
/dev/sda	-none-	Offline	140205(MBytes)	Raw	Unknown	HITACHI	HUC101414CSS300	A410	☐
/dev/sdb	-none-	Offline	70136(MBytes)	Raw	Unknown	FUJITSU	MAY2073RC	0103	☐
Select 1 or more disks for Volume Group			vga	Submit					

Volume Group vga Status

Volume	Access	Total Size	PE Size	Total PEs	Allocated Space	Free Space	Resizable
vga	read/write	68(GBytes)	4(MBytes)	17501	0(GBytes)	68(GBytes)	resizable
Member	**PV Name**	**Capacity**	**PE Size**	**Total PE**	**Allocated PE**	**Free PE**	**Status**
1	/dev/sdc	68(GBytes)	4(MBytes)	17501	0	17501	

Logical Devices

Volume	LV Name	Access	Status	Open	Size	Select
Enter size to create or extend	68	GBytes	New Volume	Extend Volume	Delete Volume	

▼ *Follow these instructions to create a new logical device*

Step 1. Enter the size of the new device in the field labeled **Enter size to create or extend** [ ].
(It can exceed the seed value displayed in the box).

Step 2. Click the '**New Volume**' button

▼ *CLI command syntax*

Table 29 CLI command syntax, create new logical device

Convention:	`atca_blade set_lvm2 index <diskmask> Y <size> Y +`
<diskmask>	Ndisk ... [Ndisk] variable length mask. Must specify one entry for each available system disk.
<size>	Size of new logical volume.
Syntax examples	`atca_blade set_lvm2 Y Ndisk Ndisk Y 100 Y +`
	Create a logical disk of size 100GB.

6.4.1 Extend/Expand a Logical Device (/dev/vga/lva0)

The user may dynamically expand the space allocated to a logical device.

▼ *Follow these instructions to extend an existing volume group*

Step 1. Click the '**Select**' box to choose which device that will get additional capacity.

Step 2. Enter the new size increase in the field labeled
Enter size to create or extend [ ].
(It can exceed the seed value displayed in the box).

Step 3. Click the '**Extend Volume'** button

6.4.2 Delete a Logical device (/dev/vga/lva0)

The user may dynamically delete a logical device, and return all the space to the volume group.

Note: All data on this volume will be destroyed, and cannot be recovered.

▼ *Follow these instructions to extend an existing volume group*

Step 1. Click the '**Select'** box to choose which device will be deleted.

Step 2. Click the '**Delete Volume'** button

6.5 Manage shares (prepare logical device for service)

By default, all logical devices are unformatted and not yet visible to either iSCSI or NAS services. The manage share menu is used to prepare a logical device for one or more of these services (iSCSI, NFS or SMB). The manage share will display a menu for each logical device defined, along with options to make service assignments.

StorBlade99 ATCA-S201 Shared Resource /dev/vga/lva0				
Logical Volume	**Share Name**	**Share Type**	**Block / File**	**Action**
/dev/vga/lva0	lva0	☑ **iSCSI** ☐ **nfs** ☐ **smb**	Format	Share

Figure 25 HTML tool, Manage shares menu function

Block File field	Description
Format	This button is available for logical devices not yet designated as either iSCSI or NAS. Formatting a physical disk will permanently erase all existing data.
Share	If the **Share type** field is nfs or smb, this button commits the logical device and enables a "file share mount point". If the **Share type** field iSCSI this button is commits the logical device and enables an "iSCSI mount point".
Block	Indicates the bytes on the logical device are not managed by the ATCA-S201. If exposed by iSCSI, an external host owns the device in its entirety (partitioning, formatting etc.).
File	Indicates the logical device is formatted, and the bytes on the device are managed by the ATCA-S201 and its Linux file system including partitioning and formatting.

6.5.1 Commit a logical drive for iSCSI service

A newly defined logical drive is immediately ready for iSCSI block sharing. In the example above, the logical disk named /dev/vga/lva0 is ready for "iSCSI share".

▼ *Follow these instructions to assign iSCSI service*

Step 1. Enter a 'human friendly' name for your new iSCSI share in the field labeled **Share Name** [ ].

Step 2. Click the '**iSCSI** box.

Step 3. Click the '**Share'** button.
Upon completion the '**Block / File'** field will display **Block**.

Note: The 'share' in this example is not yet visible externally via IP links, and external hosts cannot yet access this resource. Proceed to the iSCSI setup chapter to create iSCSI LUNs.

▼ *CLI command syntax*

Table 30 CLI command syntax, create iSCSI share

Convention:	`atca_blade manage_shares Y <diskmask> N Y <name> Y Y +`
<diskmask>	Y | N ... [Y|N] variable length mask. Must specify one entry for each system disk. Use to 'Y' designate which disk to share. Use 'N' in all other positions.
< name>	Enter human friendly "share name"
Syntax example #1	`atca_blade set_shares Y Y N N Y iSCSI_targetAA Y Y +`
	Designate disk 1 of 2, an iSCSI share called iSCSI_target_AA
Syntax example #2	`atca_blade set_shares Y N Y N Y iSCSI_targetBB Y Y +`
	Designate disk 2 of 2, an iSCSI share called iSCSI_target_BB

6.5.2 Commit a logical drive for NAS service

Before a disk may be utilized for file sharing services (nfs/smb), it must be formatted. Depending on the size of the device or virtual volume, formatting may take several minutes.

▼ *Follow these instructions to assign NAS service*

Step 1. Enter a 'human friendly' name for your new NAS share in the field labeled **Share Name** [ ].

Step 2. Click the '**Format'** button to commit a logical device as NFS/SMB share. Formatting can take several minutes, with duration depending on the size.

Step 3. Click the '**nfs'** box to allow access via OS's that support network file services, such as Linux or Solaris®.

Step 4. Click the '**smb'** box to allow access via OS's that support Server Message Block services, such Microsoft® Windows®.

Note: Both **nfs** and **smb** can be selected together.

Step 5. Click the '**Share'** button
Upon completion the '**Block / File'** field will display **File**.

Note: The 'share' in this example is not yet visible externally via IP links, and external hosts cannot yet access this resource. Administrator should proceed to chapter 8 to create NFS or SMB mount points.

Upon completing these steps, the Mange share menu will update as shown below. Changes may be applied by clicking the appropriate box and clicking '**Update'.**

▼ *CLI command syntax*

Table 31 CLI command syntax, format a logical volume

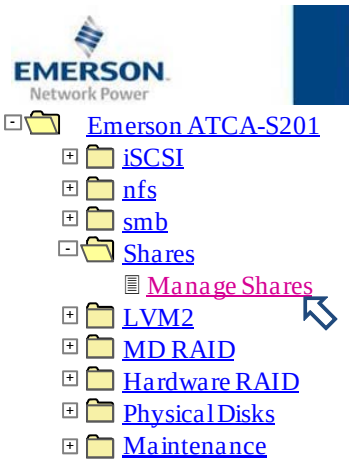
Convention:	`atca_blade set_shares Y <diskmask> Y Y +`
<+skip>	Use to 'Y' designate which disk to format. Use skip in all other positions.
Syntax example #1	`atca_blade set_shares Y skip Y Y Y +`
	Designate disk 'lva' an iSCSI share called iSCSI_target_AA
Syntax example #2	`atca_blade set_shares Y N Y N Y iSCSI_targetBB Y Y +`
	Designate disk 2 of 2, an iSCSI share called iSCSI_target_BB

6.5.3 Un-commit an iSCSI share

The administrator may modify or un-share any currently shared logical device by navigating to the html configuration screen:

Emerson ATCA-S201 → Shares → Manage Shares

The Manage shares menu displays the active status of all logical devices. Scroll to the device of interest, and complete the steps below.



StorBlade99 ATCA-S201 Shared Resource /dev/vga/lva0				
Logical Volume	**Share Name**	**Share Type**	**Block / File**	**Action**
/dev/vga/lva0	**lva0**	☑ **iSCSI** ☐ **nfs** ☐ **smb**	**Block**	**- In Use -**

Share Name	Mount Point <-> Fullname	Share Type	Delete	Action
lva0	/mnt/shr/block/lva0 <-> /mnt/shr/block/lva0	☑ **iSCSI** ☐ **nfs** ☐ **smb**	☐	Update

▼ *Follow these instructions to un-commit a logical drive*

Step 1. Un-Click all the '**iSCSI**' box

Step 2. Click the '**Update**' button.

Step 3. Click the '**Delete**' button.

Step 4. Click the '**Update**' button.

Later, the logical device may be reassigned to a new share, or the space returned to the Volume group be deleting the device using the LVM2 configuration menu.

6.5.4 Un-commit an NFS/SMB share

The administrator may modify or un-share any currently shared logical device by navigating to the html configuration screen:

Emerson ATCA-S201 → Shares → Manage Shares

The Manage shares menu displays the active status of all logical devices. Scroll to the device of interest, and complete the steps below.

StorBlade99 ATCA-S201 Shared Resource /dev/vga/lva0				
Logical Volume	**Share Name**	**Share Type**	**Block / File**	**Action**
/dev/vga/lva0	**lva0**	☑ **iSCSI** ☐ **nfs** ☐ **smb**	**Block**	**- In Use -**

Share Name	Mount Point <-> Fullname	Share Type	Delete	Action
lva0	/mnt/shr/block/lva0 <-> /mnt/shr/block/lva0	☑ **iSCSI** ☐ **nfs** ☐ **smb**	☐	Update

▼ *Follow these instructions to un-commit a logical drive*

Step 1. Un-Click the '**nfs**' and '**smb**' box

Step 2. Click the '**Update**' button.

Step 3. Click the '**Delete**' button.

Step 4. Click the '**Update**' button.

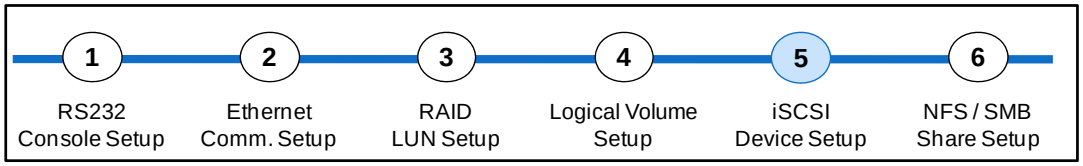
Later, the logical device may be reassigned to a new share, or the space returned to the Volume group be deleting the device using the LVM2 configuration menu.

6.6 Re-name iSCSI shares, make more 'human-friendly'

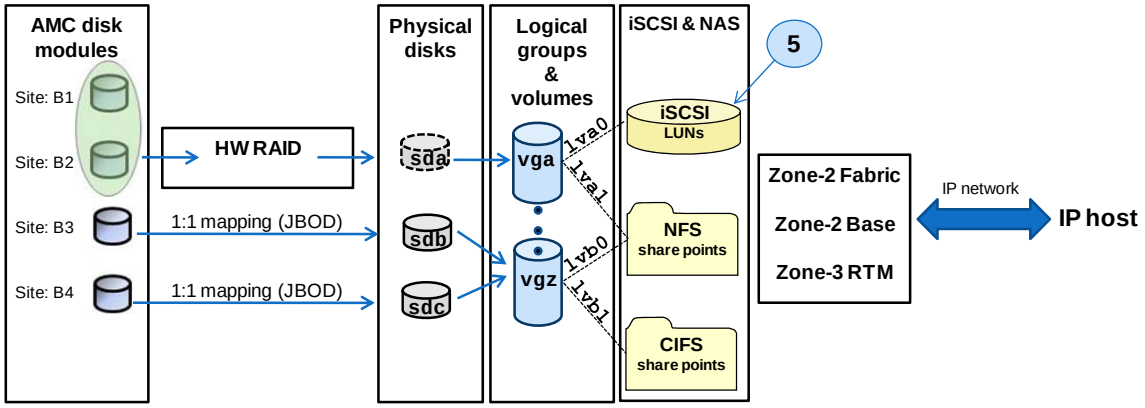
As a default, the ATCA will name shares based on the underlying device path. Though these is nothing wrong with this, the user may use the 'manage shares' menu to assign more appropriate names.

7 iSCSI device setup tools

Configuration Step:



This chapter explains how to create one or more iSCSI LUNs for external host access. The user must complete step 4 before this step can be accomplished.



7.1 iSCSI configuration menu

Using the HTML configuration tool, navigate to this configuration page .

Emerson ATCA-S201 → iSCSI → iSCSI Configuration

This top html menu provides the ability to create an iSCSI target on a device (e.g. /dev/vga/lva0) that was previously committed for iSCSI block I/O share (see chapter).

7.1.1 Add or create an iSCSI target

These are the final steps to make an iSCSI device 'appear' on the IP network.

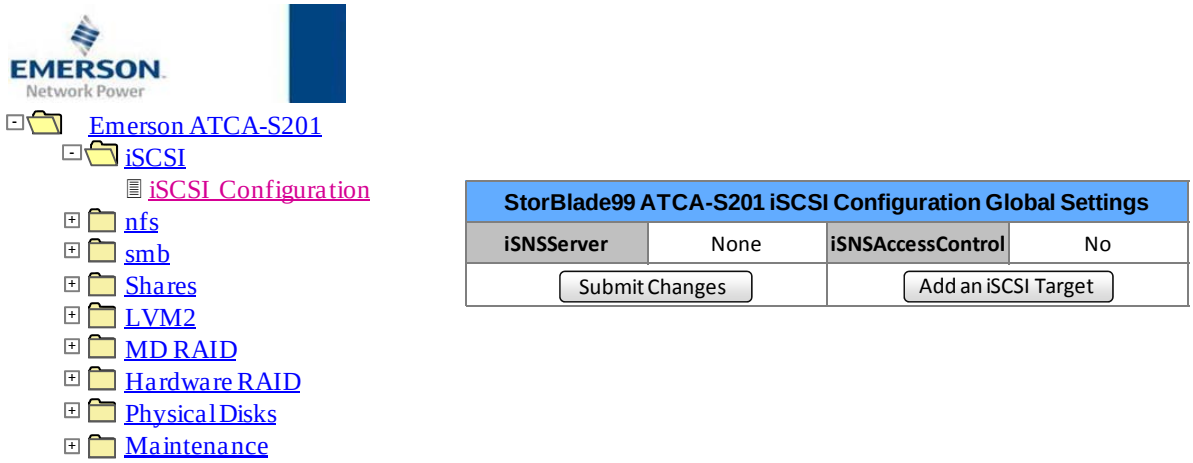


Figure 26 HTML tool, Emerson ATCA-S201 →iSCSI →iSCSI Configuration

▼ *Follow these instructions to create a new iSCSI target*

Step 1. Click the **'add an iSCSI Target'** button.

After confirming the popup, the iSCSI configuration tool page changes, and will display a list of operating attributes for the new iSCSI target. The menu will also include a new section to create an iSCSI LUN (see next section).

7.1.2 Add or create an iSCSI LUN

The final step in defining a usable iSCSI resource requires the creation of one or more iSCSI LUNs. A LUN (Logical Unit Number) is an addressable entity on the iSCSI target. A target may have several LUNs, and each LUN maps one-to-one with a logical share device. When an external host subsequently connects to the iSCSI target, it may write to a LUN, which again is mapped to the logical device. An external host may partition and format each LUN individually and write independent data.

▼ *CLI command syntax*

Table 32 CLI command syntax, create iSCSI share

Convention:	`atca_blade set_iscsi`
	This command invokes an interactive session to modify the iSCSI setting of the blade. The command will spawn a series of Yes/No questions which guide the user the iSCSI configuration options. The command session and responses can be scripted to automate a common configuration setup on multiple blades.

Target iqn.1995-07.com.emerson:ATCA-S201.Target0			Delete This iSCSI Target
Alias	NoAlias	**MaxConnections**	1
InitialR2T	No	**ImmediateData**	Yes
MaxRecvDataSegmentLength	262144	**MaxXmitDataSegmentLength**	262144
MaxBurstLength	262144	**FirstBurstLength**	65536
DefaultTime2Wait	2	**DefaultTime2Retain**	20
MaxOutstandingR2T	8	**DataPDUInOrder**	1
DataSequenceInOrder	1	**ErrorRecoveryLevel**	0
HeaderDigest	None	**DataDigest**	None
Wthreads	8	**IET tid**	1
IncomingUser[0]		**OutgoingUser[0]**	

0 LUNs Served By This Target			
LUN	**Path**	**Type**	**Remove**
Add a new LUN Share to This Target			
LUN	**Path**	**Type**	**Action**
0	lva0	blockio	Add Lun

1 LUNs Served By This Target			
LUN	**Path**	**Type**	**Remove**
0	/export/iSCSI/lva0	blockio	**Remove**
Add a new LUN Share to This Target			
LUN	**Path**	**Type**	**Action**
1		blockio	No paths available

Fol

low these instructions to create an iSCSI LUN

Step 2. Use the **LUN** Drop down menu, to specify the LUN assignment for the resource.

Step 3. Use the **Path** Drop down menu, to specify the logical device that will map to this LUN.

Step 4. Click the **'Add LUN** button. Repeat to add additional LUNs.

1 LUNs Served By This Target			
LUN	**Path**	**Type**	**Remove**
0	/export/iSCSI/lva0	blockio	**Remove**
Add a new LUN Share to This Target			
LUN	**Path**	**Type**	**Action**
1		blockio	No paths available

Figure 27 SCSI configuration screen updates to show the new LUN.

7.1.3 Remove an individual iSCSI LUN

The user can remove an iSCSI LUN from operation by opening the iSCSI configuration page, and clicking the "remove" box for the LUN, followed by the '**submit changes'** button at the top of the screen. The data on the LUN is not erased, and remains intact but inaccessible on the target. When complete, the device resource can subsequently be re-assigned as a LUN in another iSCSI target, and data access is restored.

▼ *Follow these instructions to delete an iSCSI LUN*

Step 1. Click the **'Remove** button corresponding to the LUN you will remove.

Step 2. Click the '**Submit Changes'** button at the top of the menu.

7.1.4 Delete an iSCSI Target (and all LUNS)

The user can remove an iSCSI target (and all LUN assignments) from operation by opening the iSCSI configuration page, and clicking the "Delete This iSCSI Target" button. Clicking this button will generate a pop-up which will ask the user to confirm this operation.

▼ *Follow these instructions to delete an iSCSI Target*

Step 1. Click the **'Delete Tthis iSCSI Target'** button corresponding to the Target you will remove.

Step 2. Click the '**Submit Changes'** button at the top of the menu.

7.1.5 Advanced iSCSI configuration (expert mode)

The iSCSI service running on the storage blade supports numerous configuration options that appear in the iSCSI section of web interface tool. Users may modify any number of parameters listed, and then click the 'submit' button located at the top of the page.

Note: Users may undo all changes and re-apply the default settings by clicking the 'Target Default settings' button.

Target Default Settings

Alternatively, iSCSI configuration options may be set via simple edits to a text based configuration file /etc/ietd.conf using a console window.

The configuration file contains an entry for each target entry created by the web or cli tools. The file contains a stanza style entry for each iSCSI target that begins with the parameter name: "Target". The file syntax is explained in the next section. File changes become active at next reboot or by re-starting the iSCSI service (as root):

/etc/rc.d/init.d/iscsi stop
/etc/rc.d/init.d/iscsi start

▼ *Sample ietd.conf file for iSCSI targets*

Notes: Comment lines must start with a '#' as first character.
A line may extend across multiple lines if last character is backslash '\'
Parameter values are case sensitive: "Yes" and "No"
Parameter names are case insensitive.
The file consists of a global part and zero or more "Target" stanzas.

Everything before the first Target definition belongs to the global configuration.

```
# iSCSI target configuration file ietd.conf
#
Target iqn.1995-07.com.emerson:BladeHost.Target0
        IncomingUser
        OutgoingUser                                    NoAlias
        Alias                                           NoAlias
        #MaxConnections                1       No
        InitialR2T                              No
        ImmediateData                           Yes
        MaxRecvDataSegmentLength    262144
        MaxXmitDataSegmentLength    262144
        #MaxBurstLength              262144
        #FirstBurstLength            65536
        #DefaultTime2Wait            2
        #DefaultTime2Retain          20
        #MaxOutstandingR2T           8
        #DataPDUInOrder              1
        #DataSequenceInOrder         1
```

```
        #ErrorRecoveryLevel          0
        #HeaderDigest                None
        #DataDigest                  None
        #Wthreads                    8
        Lun 0
Path=/export/iSCSI/lva0,Type=blockio,ScsiId=RXEUlYcCN9siiOnP
```

Table 33 iSCSI Advanced configuration and parameter definitions

Target iqn.<yyyy-mm>.<tld.domain.host.Target#>[:<identifier>]
Identifies the iSCSI Qualified Name, which is globally unique as required by the iSCSI standard. **iqn.** followed by a single dot "." **<yyyy-mm.>** is the date (year and month) at which the domain is valid followed by a single dot "." **<tld.domain.>** Reversed domain name followed by a single dot "." **<host.>**Host name is assigned on Maintenance->Network page, followed by a dot "." **<Target#>** is set to numerically enumerate each iSCSI target definition. (e.g. Target0, Target1 etc) The optional <identifier> - permitted by RFC3720, but is not used
IncomingUser <username> <password>
Used to set the <username> and <password> to authenticate iSCSI initiators during discovery sessions, using CHAP. Several entries can be specified for each target discovery. If no IncomingUser is specified, any initiator may open a discovery session. Note: RFC 3720 requires <password> to be 12 characters long. This is enforced by Microsoft's® Initiator.
OutgoingUser <username> <password>
Used to set the <username> and <password> to authenticate the target to initiators during discovery sessions using CHAP. Only one outgoing <username>/<password> combination may be specified. Note: RFC 3720 requires <password> to be 12 characters long. This is enforced by Microsoft's® Initiator.
Alias <string>
May be set to a "friendly" human-readable name or description that is communicated to the initiator at Login. An initiator may elect to display this value when listing connected targets. **NOTE:** As an additional feature, this string is appended to the target name.
MaxConnections <value>
Default 1 Sets the maximum number of connections an initiator may make with a each iSCSI target entity. 1 is the only valid value
InitialR2T <Yes|No>
"No" – default: Indicates the initiator may include BurstLength bytes together immediately following an iSCSI command. This setting may reduce protocol handshakes, and thus improve system performance. "Yes" – Indicates the initiator has to wait for the target to solicit SCSI data before sending it.
ImmediateData <Yes|No>
"Yes" – default: Indicates the initiator may combine iSCSI command and data information and send in the same packet. This setting may reduce protocol handshakes, and thus improve system performance. **"No"** – Indicates the initiator may not combine command and data information in the same packet.
MaxRecvDataSegmentLength <value>
Default: 262144, sets the maximum data segment length that the target can receive. Note: The <value> should be set to multiples of PAGE_SIZE. The maximum supported value is 64 * 4096 = 262144.
MaxXmitDataSegmentLength <value>
Default: 262144, sets the maximum data segment length that the target can send. Note: The actual value is reduced to match the MaxXmitDataSegmentLength and the MaxRecvDataSegmentLength negotiated with each initiator during login. The <value> should be set to multiples of PAGE_SIZE. The maximum supported value is 64 * 4096 = 262144.
#MaxBurstLength <value>
Default: 262144, Sets the maximum amount of data the initiator may send in a single burst.

Note: The <value> should be set to multiples of PAGE_SIZE. The maximum supported value is 64 * 4096 = 262144.
`#FirstBurstLength <value>`
Default: 65536, Sets the maximum amount of unsolicited data the initiator may transmit in the first burst of a transfer either with and/or right after the iSCSI command. Used together with InitialR2T and ImmediateData. Note: The <value> should be set to multiples of PAGE_SIZE. The maximum supported value is 16 * 4096 = 65536.
`#DefaultTime2Wait<value>`
Not currently supported
`#DefaultTime2Retain <value>`
Not currently supported
`#MaxOutstandingR2T <value>`
Default: 1, Controls the maximum number of data transfers the target may request at once, each of up to MaxBurstLength bytes.
`#DataPDUInOrder <Yes|No>`
"Yes" – default:, Indicates the initiator MUST send data PDUs within sequences have to be at continuously increasing addresses. **"No"** – Not supported.
`#DataSequenceInOrder <Yes|No>`
"Yes" – default: Indicates the initiator MUST send Data Sequences with continuous non-decreasing sequence offsets (R2T buffer offset for writes, or the smallest SCSI Data-In buffer offset within a read data sequence). **"No"** – Not supported.
`#ErrorRecoveryLevel 0`
Default 0, Establishes the recovery level supported by the target.
`#HeaderDigest <CRC32C|None>`
"None" – default. CRC not enabled. **"CRC32C"** – Indicates Target will support CRC32C checksum to protect iSCSI PDU's headers, if requested by initiator. Notes: (1) header digests are not used during discovery sessions. (2) CRC32C may negatively affect overall target performance.
`#DataDigest <CRC32C|None>`
"None" – default. CRC not enabled. **"CRC32C"** – Indicates Target will support CRC32C checksum to protect iSCSI PDU's data segments, if requested by initiator. Notes: (1) data digests are not used during discovery sessions. (2) CRC32C may negatively affect overall target performance.
`#Wthreads <value>`
Default: 8 Sets the number of threads used to perform the block I/O to the blades' disk resources. 8 threads was determined optimal for the majority of deployments and workloads.
`Lun <number> Path=<device>,Type<blockio>,ScsiID=<unique-identifier>`
defines a mapping between a Logical Unit Number <number> and a block device <device>. **<number>:** The value between 0 and 2^14-1 **<device>:** Linux device path mapped to the LUN **<blockio>** Indicates the blade will perform direct block i/o with the device, bypassing page-cache for all operations. Optimal for non-aligned sector transfers large block transfers. **<unique-identifier>** a unique ID assigned to the iSCSI volume. It is required to assist mulitipath-aware initiator host accessing the same <device> through several targets. The <unique-identifier> must not exceed 16 characters.

7.1.6 iSCSI Discovery filter configuration (expert mode)

The iSCSI service running on the storage blade includes the ability to limit the targets each host will see during discovery; this can often significantly reduce the iSCSI boot time. The filter mechanism uses the host IP address as criteria to expose or hide iSCSI targets listed in discovery.

Note: This mechanism is not meant to replace the CHAP security features used to authenticate a host and target.

The iSCSI discovery filter is configured via simple edits to a pair of text based configuration files:

```
/etc/initiators.allow
/etc/initiators.deny
```

The file syntax is explained in the next section. File changes become active immediately upon save, no reboot is necessary.

Notes: Comment lines must start with a '#' as first character.
- The file consists of one or more iSCSI iqn Target names.
- If a target iSCSI iqn is not listed in these files, no filtering is applied (this is default case)
- To establish a discovery filter, a target's iSCSI iqn name must appear in both files.

▼ ***/etc/initiators.allow***

Enter the iSCSI iqn followed by one or more ip addresses. Use a comma to separate multiple IP address entries. (Note: Entries must not use tabs)

```
iqn.1995-07.com.emerson:BladeHost.Target0 192.168.1.109
iqn.1995-07.com.emerson:BladeHost.Target1 192.168.1.108, 192.168.1.110
```

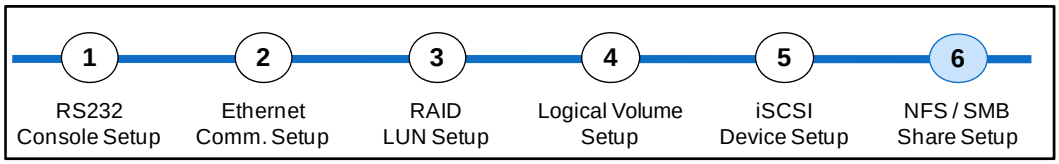
▼ ***/etc/initiators.deny***

For each iSCSI iqn listed above, make a corresponding entry as shown. Each entry should consist of the iSCSI iqn, followed by the word ALL (Note: Entries must not use tabs).

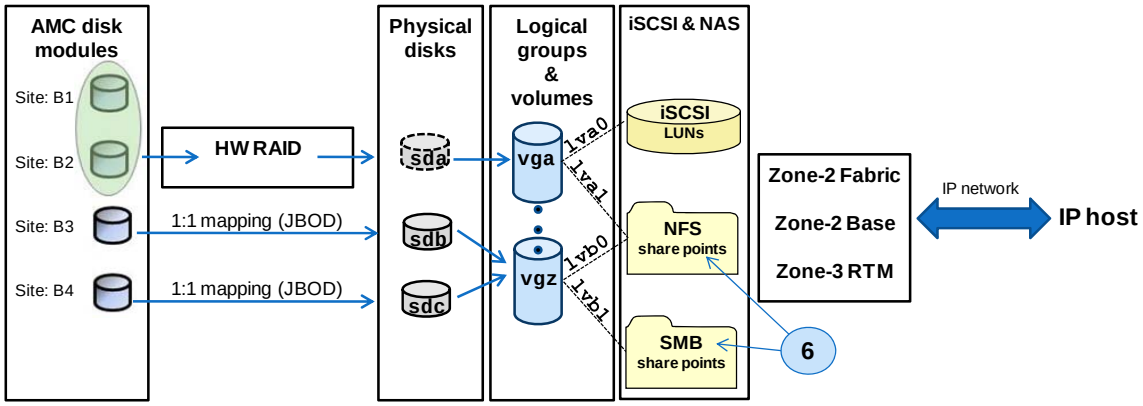
```
iqn.1995-07.com.emerson:BladeHost.Target0 ALL
iqn.1995-07.com.emerson:BladeHost.Target1 ALL
```

8 NFS/SMB Share setup tools

Configuration Step:

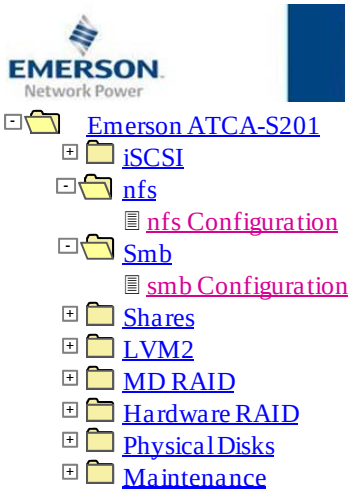


This chapter explains how to establish NFS and SMB mount points for external host access. The configuration menus for the NFS and SMB services are nearly identical, and will be discussed together. The user must complete step 4 before this step can be accomplished.



8.1 NFS and SMB mount point configuration menus

Using the HTML configuration tool, navigate to either of these configuration pages:



These menus provides the ability to create file mount points for logical devices previously committed for file I/O share (see chapter 6).

8.1.1 Export an nfs or smb share

These are the final steps to make an nfs or smb share 'appear' on the IP network.

▼ *Follow these instructions to create a new nfs File-Share Export*

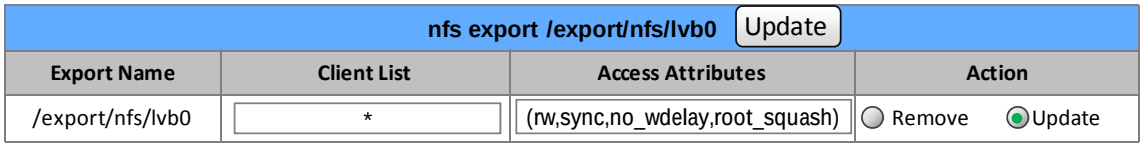
nfs menu	Emerson ATCA-S201 → nfs → nfs Configuration Use the 'nfs' configuration menu to export shares to OS's using network file services, such as Linux or Solaris®.
nfs menu	

Figure 28 HTML tool, Emerson ATCA-S201 →nfs → nfs Configuration

Step 1. Choose the logical device from the drop down menu that will map to this export.

Step 2. Click the **'Add nfs Export'** button.

After confirming the popup, the configuration tool page changes, and will display the newly created export along with several export attributes.



Step 3. Enter one or more client names (separated by commas) in the client list box

Step 4. Adjust the "Access Attributes" if desired. The default attributes include: (rw,sync,no_wdelay,root_squash)
Syntax note: attributes must be in parenthesis, with no white spaces.

Step 5. Left click the update button

▼ *CLI command syntax*

Table 34 CLI command syntax, create nfs share

Convention:	atca_blade set_nfs
	This command invokes an interactive session to modify the nfs setting of the blade. The command will spawn a series of Yes/No questions which guide the user the nfs configuration options. The command session and responses can be scripted to automate a common configuration setup on multiple blades.

▼ *Follow these instructions to create a new smb File-Share Export*

smb menu	Emerson ATCA-S201 → smb → smb Configuration Use the 'smb' configuration menu to export shares to OS's using Server Message Block services, such Microsoft® Windows®.

StorBlade99 ATCA-S201 Network File Share (smb/cifs) Configuration			
Security	share	Guest Access	Yes
Workgroup	WORKGROUP	Netbios Name	PPCSAMBA
Log Level	1	Log Size	100
Allowed Hosts	ALL	Denied Hosts	NONE
Share Device	lvb0	Share Name	Share0 Add smb Export

Figure 29 HTML tool, Emerson ATCA-S201 →smb → smb Configuration

Step 1. Choose the logical device from the drop down menu that will map to this export.

Step 2. Click the **'Add nfs Export'** button.

After confirming the popup, the configuration tool page changes, and will display the newly created export along with several export attributes.

Name=Share0 path=/export/smb/Fileshare	Delete	Update	
Public Access	☑	Guest Access	☑
Read Only	☐	Browseable	☑
Comment	Open format comment field		

Step 3. Adjust the "Access Attributes" if desired.

Step 4. Left click the update button

▼ *CLI command syntax*

Table 35 CLI command syntax, create smb share

Convention:	atca_blade set_smb
	This command invokes an interactive session to modify the smb setting of the blade. The command will spawn a series of Yes/No questions which guide the user the smb configuration options. The command session and responses can be scripted to automate a common configuration setup on multiple blades.

8.1.2 Remove an individual file-share Export

The user can remove any export from operation by opening the nfs or smb configuration menu. All data on these exports is NOT lost. It is merely made unavailable and can be exported again at a later time.

▼ *Follow these instructions to Delete a file-share export*

Step 1. Click the **'Delete this Export'** button corresponding to the export you will remove. Confirm the popup message.

8.1.3 Advanced file share configuration (expert mode)

The file share services running on the storage blade supports numerous configuration features that are not part of the web interface tool, but available via simple edits to a text based configuration file using a console window.

File share service	Configuration file
Samba (cifs)	/etc/samba/smb.conf
nfs	/etc/exports

The configuration file contains an entry for each target entry created by the web or cli tools. The file syntax explanations follow in the next section.

▼ *Sample smb.conf file for samba/CIFs file shares*

Notes:

Comment lines must start with a '#' or ";" as first character.
A line may extend across multiple lines if last character is backslash '\'
Parameter names are case insensitive

The configurations applicable to this product are contained in the [global] section.

```
[global]
security = share
interfaces = 192.168.1.152/255.255.255.0
workgroup = WORKGROUP
netbios name = PPCSAMBA
hosts deny = NONE
hosts allow =ALL
```

1. Parameter and content definitions for this file is available online:

   http://us1.samba.org/samba/docs/man/manpages-3/smb.conf.5.html

▼ *Sample /etc/export file for nfs file shares*

Notes:

Comment lines must start with a '# ' as first character.
A line may extend across multiple lines if last character is backslash '\'

The /etc/exports file facilitates the export of file systems to remote hosts, with various user options. Each exported file system should be on its own individual line, with lists of authorized hosts placed after an exported file system, with each entry delimited by spaces. Options for each of the hosts is placed in parentheses directly after the host identifier, without any spaces separating the host and the first parenthesis.

```
-sh-2.05b# cat exports
```

```
/export/nfs/Fileshare nfs_share1(rw,sync,no_wdelay,root_squash)
```

▼ *Export option syntax:*

<export><host1>(<options>) <hostN>(<options>)

Note: Refer to the **exports** man page for details on other lesser-used options.

Table 36 Common nfs export option definitions

host1-hostN
Host specifies the directory on the storage blade that is the target of the export.
Option <wdelay|no_wdelay>
no_wdelay- (default) option turns off the delayed writes feature; no_wdelay must be accompanied with the sync option. **wdelay**- option causes the NFS server to delay writing to the disk if it suspects another write request is imminent. This can improve performance by reducing the number of times the disk must be accessed by separate write commands, reducing write overhead.
Option <root_squash>
This default setting prevents root users connected remotely from having root privileges and assigns them the user ID for the user nfsnobody. This effectively "squashes" the power of the remote root user to the lowest local user, preventing unauthorized alteration of files on the ATCA storage blade.
Option <ro|rw>
ro - Mounts of the exported file system are read-only. Remote hosts are not able to make changes to the data shared on the file system. **rw**- (default) Mounts of the exported file system are read/write. Remote hosts are able to make changes to data shared on the file system
Option <sync>
The **sync** setting (default) instructs the Linux kernel to minimize the amount of write data kept in volatile system memory. Though it is sometimes slower to complete all writes to disk, doing so can prevent data loss in the event of a power failure.

9 Blade Maintenance and Firmware upgrades

This chapter provides information about preserving all existing blade configuration settings and also installing and updating the firmware loaded on the ATCA-S201 storage services blade. At manufacturing time, the ATCA carrier is pre-loaded with firmware prior to shipping. Periodically, new firmware releases are offered to improve the functionality or performance of the ATCA carrier blade.

9.1 Blade Maintenance

The following section describes how to create a backup of an existing blade configuration and how to restore this configuration on a replacement blade. The procedure will record the iSCSI, NAS, volume, and share privileges of all disk storage connected to the ATCA-S201. Moreover, it will record IP attributes of all fabric, base and RTM Ethernet ports, as well as any VLAN, bonds or RAID definitions.

9.1.1 Backup your blade configuration

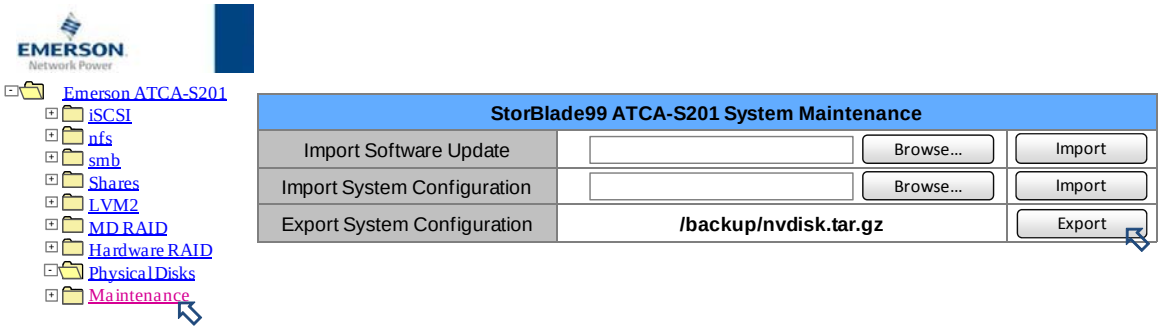
The ATCA-S201 blade software keeps all system configuration data in a single archive file. This file contains all customizations made by the user over the life of the blade. Administrators can manually copy this file to a safe location and later reload the configuration if needed.

The following procedure is a detailed description of the web-based export system configuration procedure.

▼ *Export System configuration file using web-GUI tool*

Step 2. Navigate to the Maintenance menu. Click the **'Export'** button.

Step 3. Acknowledge the popup window to confirm and commence the export. The action will create a backup file on the host which can be later imported.



▼ *Export system configuration file using CLI*

The following procedure is a detailed description of the CLI-based export system configuration procedure.

Step 4. On your remote host, open a secure ftp connection.
```
sftp admin@192.168.100.100
```

Step 5. Set binary mode and copy file
```
bin
get /backup/nvdisk.tar.gz
```

9.1.2 Import (restore) a blade configuration

The following procedure is a detailed description of the web-based import system configuration procedure.

▼ *Import System configuration using web-GUI tool*

Step 6. Navigate to the Maintenance menu. Click the **'Browse'** button, navigate to find the new *.gz firmware file.

Step 7. Click the **'Import'** configuration button.

Step 8. A popup will confirm successful import.

▼ *Import System configuration using CLI*

Step 9. Open a secure ftp connection. (Note: Substitute the proper IP address)
```
sftp admin@192.168.100.100
```

Step 10. Change remote directory
```
cd /dev/shm
```

Step 11. Set binary mode and copy file
```
bin
put nvdisk.tar.gz
exit
```

Step 12. Open a secure remote shell. (Note: Substitute the proper IP address)
```
ssh –l admin 192.168.100.100
```

Step 13. Un-tar the config file
```
tar –C / –xvf /dev/shm/nvdisk.tar.gz
```

9.2 ATCA Firmware

All firmware code is stored in a single EEPROM flash device located on the carrier blade. The ATCA-S201 flash device is partitioned into regions containing the following code functions:

- U-boot
- Linux Kernel (kernel)
- Root file system and storage applications (rfs)
- Non-Volatile blade configuration Data (NVDATA)

Each image contains a CRC signature which is validated by the system prior to loading. The normal methods for updating these code images is to establish a management connection, (see chapter 3) login as administrator, and utilize either the command line interface (CLI) or web-based graphical user interface (GUI) interface outlined later in this chapter . Both of these mechanisms require that the existing firmware is known-good and intact.

Additionally, an alternate emergency recovery method is provided to repair flash contents that are blank, erased or corrupted.

9.2.1 Download New Firmware package

To begin, the user must first download new ATCA firmware component(s). Please contact your Emerson Networks sales person for access.

9.2.1.1 Identifying the correct firmware image

The download area contains firmware for several products. Locate the latest firmware for the ATCA-S201. Emerson distributes the code as gunu-zip (*.gz) file. The distribution will contain the following three files:

File	Description
Rootfs.ext.gz.uboot	compressed file system firmware image file (version denoted by timestamp)
uImage	Compressed linux kernel firmware image
U-boot.bin	Compressed u-boot firmware code image

9.3 Normal Firmware Update procedures

Two methods exist for upgrading the firmware on the ATCA-S201, one that is web based and one that is command line. Both are equally effective, and both require root administration privileges.

9.3.1 Web flash tool, update procedure details

Emerson offers the ability to update the carrier firmware using secure html connections. The user must establish Web access to use this utility. (See chapter 3 New System configuration 3 . The following procedure is a detailed description of the web-based flash update procedure:

▼ *Upgrade firmware procedure*

StorBlade99 ATCA-S201 Maintenance Page		
File Name	**Revision**	**Build Date**
Software Release kit	V.1.0rc7	Date: 2009/07/21 20:05:48
U-boot	1.3.0	Apr 27 2009 – 17:44:03
Linux	2.6.23	#28 Wed Jul 1 09:09:29 EDT 2009
atca_blade	Revision: 1.73	Date: 2009/07/21 20:05:48
Reset IO Counters	Rescan SAS topology	Software reset SAS controller

StorBlade99 ATCA-S201 System Maintenance		
Import Software Update	Browse...	Import
Import System Configuration	Browse...	Import
Export System Configuration	**/backup/nvdisk.tar.gz**	Export

▼ *Follow these instructions to load new firmware*

Step 1. Click the **'Browse'** button, navigate to find the new *.gz firmware file.

Step 2. Click the **'Import'** button. The import can take 1 to 5 minutes; the user must wait, and not navigate away from the open browser window.

Step 3. The following screen will appear. Click the software component(s) to upgrade
and click the **'Update'** button.

StorBlade99 ATCA-S201 System Maintenance		
Apply Software Update	**/dev/shm/ATCA-S201_V1.0rc7/u-boot** ☑ **/dev/shm/ATCA-S201_V1.0rc27uImage_2.6.23** ☑ **/dev/shm/ATCA-S201_V1.0rc27rootfs** ☑	Update
Export System Backup	**/backup/nvdisk.tar.gz**	Export

A Pop-up window notifies the user when the flash update completes. The new software becomes active at next reboot. A blade reboot button is available on the 'ATCA Status' menu (see

StorBlade99 ATCA-S201 Blade 1 (0x96) Status

Vendor	IANA ID	Name	HW Revision	H8 FW Revision	IPMI Rev	Model	Serial
Emerson	65cd	ATCA-S201	0004	01.10	01.50	ATCA-S201	100LYMMSSSS

Refresh | Reboot | Power Off

AMC Site B1 (0x7a) Configuration

	Phy Num	Type	SAS Address	Handle	Parent
Disk	00	SAS	5000cca000784c49	0009	0001

	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B2 (0x7c) Configuration

	Phy Num	Type	SAS Address	Handle	Parent
Disk	01	SAS	500000e016cbd032	000a	0002

	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B3 (0x7e) Configuration

	Phy Num	Type	SAS Address	Handle	Parent
Disk	02	SAS	5000c50005b18665	000b	0003

	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B4 (0x80) Configuration

	Phy Num	Type	SAS Address	Handle	Parent
Disk	03	SAS	500000e016cbd982	000c	0004

	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	AMC-S402	0106825G	068NYMxxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

AMC Site B5 (0x8e) Configuration

	Vendor	Product	Model	Serial	State	Present	MgEna	MgOK	PayEna	PayOK
AMC State	Emerson	RTM	0106828G	401NYMxxx	Enabled	True	True	True	True	True
Site Control	Enable	Disable								

Step 4. Figure 14), or via shell console prompt using:
reboot

9.3.2 flash_update.sh tool usage and options

Emerson offers a shell script (.sh) to update firmware code stored in flash. This command line script is named **sbflash,** and is located on the /bin directory of the ATCA-S201.

SYNOPSIS

sbflash *[-r] [-k] [-u] [-t* tftp_serverIP*]*

DESCRIPTION

sbflash is a shell script which enables the user to selectively update some or all of the firmware components. A blade reboot is required to activate the new firmware components.

OPTIONS
-r: indicates the root file system should be replaced with the image on the tftp server.

-k: indicates the linux kernel should be replaced with the image on the tftp server.

-u: indicates the uboot components should be replaced with the image on the tftp server.

-t tftp_serverIP: used to specify the dotted decimal IP address of the remote tftp server.
(example -t 192.168.1.151). If this option is omitted, the script will search for tftp at the IP address assigned to U-boot variable assignment for **serverip**.

▼ *Example #1: flash new root file system and kernel from specified tftp server*

```
sbflash –r –k –t 192.168.1.151
```

9.3.3 CLI flash tool, update procedure details

The following procedure is a detailed description of the CLI flash update procedure:

▼ *Upgrade firmware procedure*

1. Establish console or ssh access to the ATCA-S201. Must be user root.
2. Install a second host machine on the same IP network as the ATCA-S201. This machines IP address must be visible from the ATCA-S201. Use ping to validate it is accessible. (e.g. ping 192.168.xxx.xxx)
3. Load the second host machine with TFTP server software. A good quality tftp program is offered by PumpKIN, an open source and free implementation that is written to RFC1350.
4. Copy all new firmware file to the secondary host machine named **/tftpboot/**
5. Execute the following command from the ATCA-S201 shell

```
#
# sbflash -t 192.168.1.151 –r
```

```
uboot_flash=/dev/mtd4
rootfs_flash=/dev/mtd2
kernel_flash=/dev/mtd1
Will use TFTP Server 192.168.1.151
Writing root file system image rootfs.ext2.gz.uboot to /dev/mtd2
File rootfs.ext2.gz.uboot not found on local system, try tftp from
192.168.1.151
Successful tftp get of rootfs.ext2.gz.uboot
Updating Flash /dev/mtd2 from file rootfs.ext2.gz.uboot
**********************************************
*                                            *
*      Do not interrupt this process         *
*      or the system will be unbootable      *
```

```
*                                                *
************************************************
Erasing 256 Kibyte @ 31c0000 -- 99 % complete.
Programming /dev/mtd2
Verifying rootfs.ext2.gz.uboot
Successful update of flash /dev/mtd2 from file rootfs.ext2.gz.uboot
/nvdisk/mnt #
```

9.4 Emergency firmware recovery, theory of operation

The ATCA-S201 hardware actually contains two copies of flash code. The primary image used for normal customer carrier operation, while the second image contains a backup copy preserved for emergency firmware recovery tasks. The contents of the backup flash remain fixed at time of manufacturing and there is no end-user mechanism to modify its contents. This ensures the device is not accidentally re-written or erased. A jumper on the ATCA blade is used to instruct the CPU to boot either the primary flash (normal) or the secondary flash (emergency recovery).

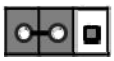
9.4.1 Jumper Settings

The ATCA-S201 carrier board includes jumpers that are used for special recovery and reset procedures. Jumper locations are shown in Figure 30. Jumpers create an electrical connection between two pins which can be sensed by circuitry on ATCA-S201 to enter special service modes or behavior. Pin 1 is identified with a square solder pad on the printed circuit board. Jumper behavior is described below.

Table 37 JP1, jumper for primary/recovery Flash selection

JP1	Jumper Setting	Description
	Short Pin 1-2	Normal setting. When in this position, the jumper indicates that boot is loaded from the primary flash device.
	Short Pin 2-3	Service setting. When in this position, the jumper indicates that boot code is loaded from the secondary flash device.

Table 38 JP2, jumper for clearing master password

JP2	Jumper Setting	Description
	Short Pin 1-2	Normal setting. When in this position, the jumper indicates the master password is preserved in flash.
	Short Pin 2-3	Service setting. When in this position, the jumper indicates the master password shall be cleared.

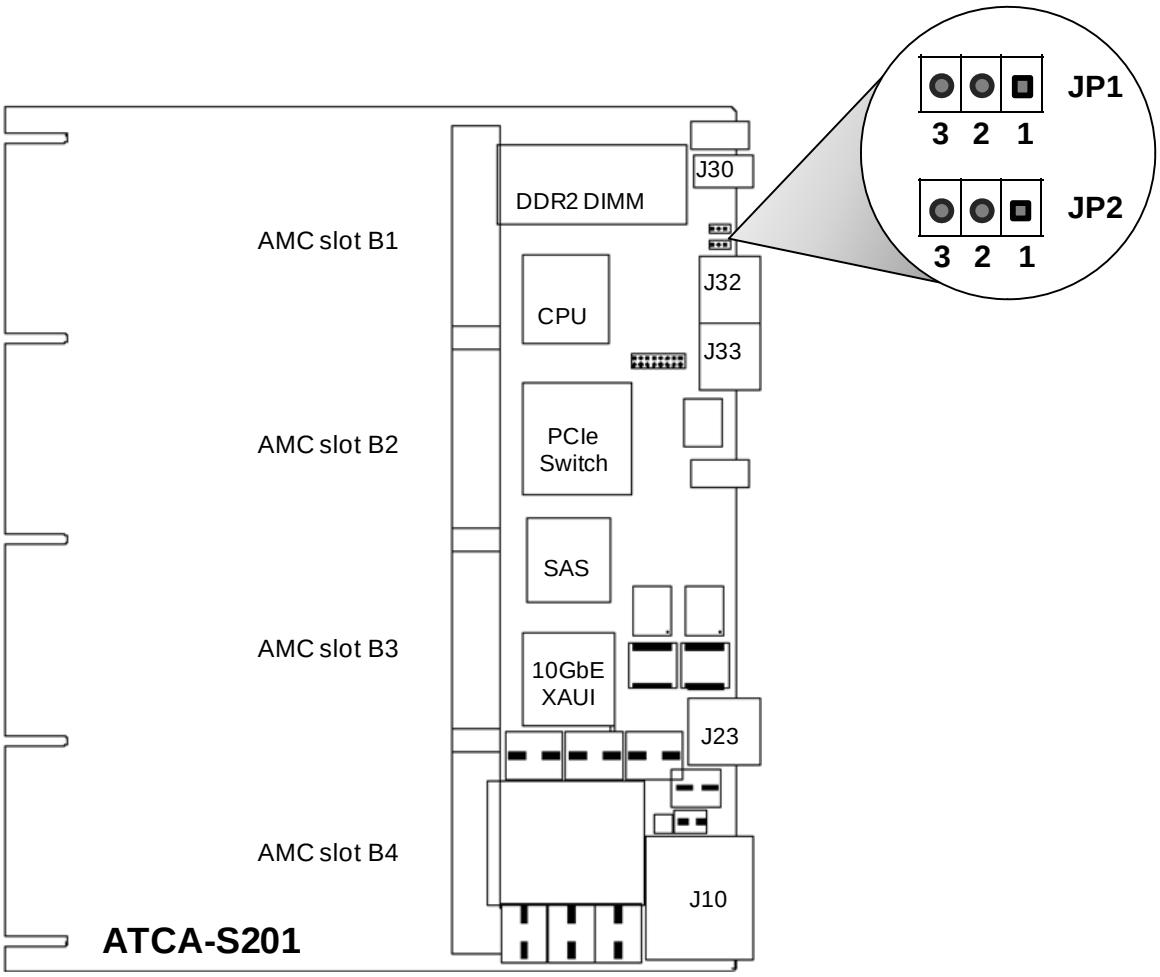


Figure 30 ATCA-S201 Jumper locations

9.4.2 Emergency flash recovery (factory reset)

The method described in this section explains a procedure to repair primary flash contents that are blank, erased or corrupted. We advise against using this emergency recovery procedure if the ATCA-S201 is functional, and management communications can be conducted.

▼ *Upgrade firmware procedure*

1. Remove the ATCA carrier the chassis (see 2.9, Removing the ATCA carrier blade)
2. Locate header JP1, and move the jumper to the service setting. This causes the blade to fetch firmware from the read-only factory flash.
3. Re-install the ATCA blade into the chassis and allow it to reboot.

4. The ATCA blade will break into the U-boot console.
5. Establish a serial connection, login into the blade as root (see section 3.2)
6. Use **printenv** to list the environment variables. Assign a *serverip* address to match the tftp server address in the next step , for example: **setenv serverip 192.168.xxx.xxx**
7. Install a second host machine on the same IP network as the ATCA-S201. Its IP address must match the *serverip* address listed in the previous step.
8. Load the second host machine with TFTP server software. A good quality tftp program is offered by PumpKIN, an open source and free implementation that is written to RFC1350.
9. If necessary create a directory on the secondary host machine named **/tftpboot/**
10. Place the new blade firmware image(s) for the primary flash device in **/tftpboot/**
11. When all pieces are in place, go to U-boot console and type: **run ramboot**
12. Watch U-boot console, and wait for output message: "**Primary flash successfully restored**"
13. Remove the ATCA carrier the chassis
14. Locate header JP1, and move the jumper to the normal setting.
15. Re-install the ATCA blade into the chassis and allow it to reboot normally.

9.4.3 Clear root password

For security purposes, administrators are encouraged to change factory default passwords to protect unauthorized access and configuration of the storage blades resources. The method described in this section explains a procedure to clear the blades root password to factory default. None of the other user account passwords are cleared.

▼ *root password reset procedure (method 1)*

This procedure is useful when the user has no access to the RTM serial console port.

1. Remove the ATCA carrier the chassis (see 2.9, Removing the ATCA carrier blade)
2. Locate header JP2, and move the jumper to the service setting.
3. Re-install the ATCA blade into the chassis and allow it to reboot.
4. Inspect the LED's on the front panel. When the ATCA Health status begins blinking green, the password reset has occurred.
5. Power down the blade and again remove it from the chassis.
6. Locate header JP2, and move the jumper to the normal setting.
7. Re-install the ATCA blade into the chassis and allow it to reboot.

8. Administrators may login as root. There is no password, and the 'root' user will be asked to create one.

▼ *root password reset procedure (method 2)*

This procedure is useful when the user has access to the serial console port and can operate the U-boot environment. This secondary method allows you to clear the root password without removing the blade from the chassis but does require a power cycle and some familiarity with U-boot.

1. Establish a connection to the serial port (RS232)
2. Reboot the blade:

```
# reboot
```

3. Stop the normal boot sequence; enter the U-boot menu.
   (see section 3.6.1)
4. Type the following series of U-boot commands:

```
uboot=> setenv resetroot 1
uboot=> run flashboot
```

The above commands will continue the boot sequence and trigger the blades Linux file system to clear the root password. No other passwords are cleared. Do not use **saveenv** after setting *resetroot*, otherwise the root password will be reset on every re-boot.

10 ATCA-S201 Mechanical and Connector Information

This chapter provides the specifications and connector pin outs for the ATCA-S201 module.

10.1 Specifications for the ATCA-S201

This section provides mechanical, electrical, environmental, and other relevant physical information.

10.1.1 Physical dimensions

The ATCA-S201 is an 8U (280 mm) height board with 325 mm in depth for standard applications. It complies with IEEE 1101.11 mechanical standards, as required by the PICMG 2.0 Revision 3.0 specification. The ATCA-S201 is keyed to conform to the PICMG 2.10, Keying of ATCA Boards and Backplanes specification.

10.1.2 Power Requirements

The ATCA-S201 includes a stacked power supply module with maximum rated output of 210 W of power. This represents a surplus of power vs. the expected power consumption. The power consumption of the RTM is limited to 25 W maximum. The unpopulated base blade (no AMC or RTM) blade will consume 1.04 A at 48 V (50 W).

10.1.3 Environmental Specifications and Compliance

The environmental specifications for the ATCA-S201 assembly are presented in the table below.

Table 39 Environmental specifications for the ATCA-S201

SPECIFICATION	VALUE	
Operating Temperature (airflow 5.0 CFM)	0°C ~ 55 °C	
Operating Temperature (airflow 2.0 CFM)	0°C ~ 23 °C	
Storage Temperature	-40 °C ~ 85 °C	
Operating Temperature Gradient	11 °C /H (max)	
Storage Temperature Gradient	20 °C /H (max)	
Shipping Temperature Gradient	20 °C /H (max) *1	
Operating Humidity	8 % ~ 80 %	
Storage Humidity	5 % ~ 95 %	
Shipping Humidity	5 % ~ 95 % *1	
Wet bulb Maximum Temperature	27 °C	
Condensation	No condensation	
Atmospheric Pressure and Altitude	Operating: 0 ~ 3,000 m Shipping: 0 ~ 12,000 m	
Operating Shock	See PICMG 3.0 specification, Regulatory guidelines.	
Operating Vibration	See PICMG 3.0 specification, Regulatory guidelines.	
RoHS	6 of 6 compliant.	
Operating voltage	-36 to -72 Vdc	
Operating power	3.12@48V = 150W max total, shared as follows:	
Max ATCA blade Current Draw (unpopulated)	1.04 @ 48V (50 watts)	
Max current draw (each AMC slot)	72 watts (max each)	100 watts total shared power pool
Max current draw (ARTM slot)	25 watts max	
Reliability	MTBF: 229481 Hours	

10.1.4 NEBS Compliance

NEBS certifications are performed by integrator at a system level (chassis, ATCA, AMC shelf managers etc) The RTM module will not preclude the system from passing NEBS.

10.1.5 Electromagnetic Compliance

The board is designed and implemented so as to minimize electromagnetic emissions, susceptibility, and the effects of electrostatic discharge. The board carries the following certifications:

Table 40 EMC Emission compliancy

Description	Description
US: FCC 47 CFR Part 15 Class A	FCC Class A emissions requirements (United States)
ICES-003 2004 Class A	Class A Interference-causing Equipment standard (Canada)
VCCI V-3/2007.04 Class A	Class A ITE emissions requirements (Japan)
Europe Commercial: EN5022:2006 Class A, ITE	Class A ITE emissions requirements (EU, Europe)
AS/NZS CISPR 22:2005 Class A, ITE	Class A ITE emissions requirements (Australia)
Europe Commercial: EN 55022:1998/A1:2000/A2:2003	Immunity for ITE equipment
Europe Commercial: EN 55024:1998A1:2001/A2:2003	Immunity for ITE equipment
Europe Commercial: EN 61000-4-2,3,4,5,6 ,11: 2001	EMC Electrostatic discharge immunity
Europe Commercial: EN6100-3-2, 2000 Section 2	With A2 (2005) Limits for harmonic current emissions
Europe Commercial: EN6100-3-3, 2000 Section 3	With A2 (2005) limits for voltage fluctuations and flicker

10.2 Connectors and Pin assignments

This section provides position and pin-out details of all connectors available on the ATCA-S201.

Table 41 Connector Port Identification and Location

1	AMC Slot 0	7	Zone 3, J32 RTM signal connector
2	AMC Slot 1	8	Zone 3, J33 RTM signal connector
3	AMC Slot 2	9	Zone 2, J23 Chassis connector
4	AMC Slot 3	10	Zone 1, J10 Power supply connector
5	SODIMM, DDR2 socket	11	Power supply mezzanine module
6	Zone 3, J30 RTM power connector		

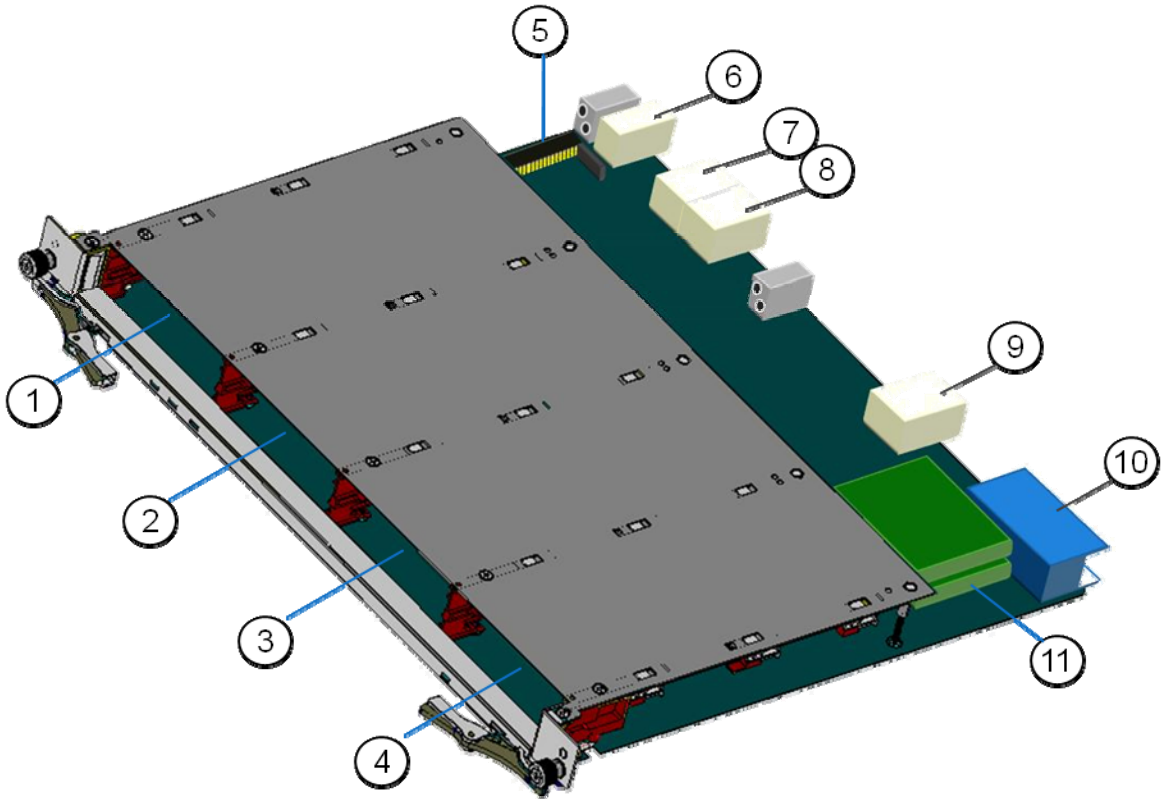


Figure 31 ATCA-S201 ATCA Module Connectors

10.2.1 AMC Module Slots

The ATCA-S201 can accept up to four mid-height single width AMC modules. Each slot is routed with PCI Express (AMC.1) and storage (AMC.3) signaling.

▼ *AMC.1 SAS/SATA*

Channel 2 of the AMC slots is allocated for SAS signaling. All four AMC are connected to the SAS Controller located on the ATCA carrier.
Channel 3 of the AMC slots is allocated for SAS signaling. A manufacturing option is available to provide ONE of the following configurations:

- Port 3 is routed to the on board SAS Controller.
- Port 3 is routed to the Zone 3 RTM connector.

▼ *AMC.3 PCI Express*

All four slots implement a x4 PCIe connection on channels 4 to 7. All slots are directly connected to the PCI Express switch located on the ATCA carrier.

10.2.1.1 AMC Slot B1, Port Assignments

Table 42 AMC Slot 0, Port Assignments

Port#	Region	Port Mapping	Port#	Region	Port mapping
CLK1	CLOCK	--	8	AMC-AMC	--
CLK2	CLOCK	--	9	AMC-AMC	--
CLK3	CLOCK	PCI Express Clock	10	AMC-AMC	--
0	COMMON	--	11	AMC-AMC	--
1	COMMON	--	12	EXTENDED	--
2	COMMON	SAS/SATA Controller Port 0	13	EXTENDED	--
3	COMMON	SAS/SATA Controller on RTM	14	EXTENDED	--
4	FAT PIPE	PCI-Express PEX Switch Lane0, port 14	15	EXTENDED	--
5	FAT PIPE	PCI-Express PEX Switch Lane1	16	EXTENDED	--
6	FAT PIPE	PCI-Express PEX Switch Lane2	17	EXTENDED	--
7	FAT PIPE	PCI-Express PEX Switch Lane3	18	EXTENDED	--
			19	EXTENDED	--

10.2.1.2 AMC slot B2, Port Assignments

Table 43 AMC Slot 1, Port Assignments

Port#	Region	Port Mapping	Port#	Region	Port mapping
CLK1	CLOCK	--	8	AMC-AMC	--
CLK2	CLOCK	--	9	AMC-AMC	--
CLK3	CLOCK	PCI Express Clock	10	AMC-AMC	--
0	COMMON	--	11	AMC-AMC	--
1	COMMON	--	12	EXTENDED	--
2	COMMON	SAS/SATA Controller Port 1	13	EXTENDED	--
3	COMMON	SAS/SATA Controller on RTM	14	EXTENDED	--
4	FAT PIPE	PCI-Express PEX Switch Lane0, port 13	15	EXTENDED	--
5	FAT PIPE	PCI-Express PEX Switch Lane1	16	EXTENDED	--
6	FAT PIPE	PCI-Express PEX Switch Lane2	17	EXTENDED	--
7	FAT PIPE	PCI-Express PEX Switch Lane3	18	EXTENDED	--
			19	EXTENDED	--

10.2.1.3 Port Assignments for AMC Slot B3

Table 44 AMC slot 2, Port Assignments

Port#	Region	Port Mapping	Port#	Region	Port mapping
CLK1	CLOCK	--	8	AMC-AMC	--
CLK2	CLOCK	--	9	AMC-AMC	--
CLK3	CLOCK	PCI Express Clock	10	AMC-AMC	--
0	COMMON	--	11	AMC-AMC	--
1	COMMON	--	12	EXTENDED	--
2	COMMON	SAS/SATA Controller Port 2	13	EXTENDED	--
3	COMMON	SAS/SATA Controller on RTM	14	EXTENDED	--
4	FAT PIPE	PCI-Express PEX Switch Lane0	15	EXTENDED	--
5	FAT PIPE	PCI-Express PEX Switch Lane1	16	EXTENDED	--
6	FAT PIPE	PCI-Express PEX Switch Lane2	17	EXTENDED	--
7	FAT PIPE	PCI-Express PEX Switch Lane3	18	EXTENDED	--
			19	EXTENDED	--

10.2.1.4 AMC Slot B4, Port Assignments

Table 45 AMC slot 3, Port Assignments

Port#	Region	Port Mapping	Port#	Region	Port mapping
CLK1	CLOCK	--	8	AMC-AMC	--
CLK2	CLOCK	--	9	AMC-AMC	--
CLK3	CLOCK	PCI Express Clock	10	AMC-AMC	--
0	COMMON	--	11	AMC-AMC	--
1	COMMON	--	12	EXTENDED	--
2	COMMON	SAS/SATA Controller Port 3	13	EXTENDED	--
3	COMMON	SAS/SATA Controller on RTM	14	EXTENDED	--
4	FAT PIPE	PCI-Express PEX Switch Lane0	15	EXTENDED	--
5	FAT PIPE	PCI-Express PEX Switch Lane1	16	EXTENDED	--
6	FAT PIPE	PCI-Express PEX Switch Lane2	17	EXTENDED	--
7	FAT PIPE	PCI-Express PEX Switch Lane3	18	EXTENDED	--
			19	EXTENDED	--

10.2.2 Zone 1 Connectors

The ATCA-S201 includes a standard zone 1 connector designated as J10 on the ATCA board. This connector is implemented with a 30-pin male connector type available from Positronics industries (http://www.connectpositronic.com), part number VPB30W8M400A1.

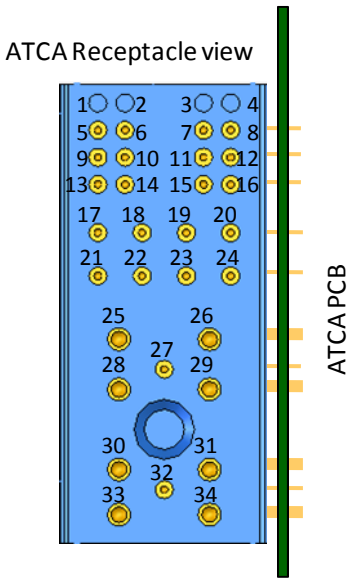


Figure 32 Zone 1 J10 Connector Port Pin Location Diagram

Table 46 Connector J10, Zone-1 Pin Assignments

Pin#	Signal	Pin#	Signal	Pin#	Signal	Pin#	Signal
1	NC	10	PP_HA5	19	NC	28	VRTN_A
2	NC	11	PP_HA6	20	NC	29	VRTN_B
3	NC	12	PP_HA7	21	NC	30	N48V_A
4	NC	13	PP_IPMB_SCL_A	22	NC	31	N48V_B
5	PP_HA0	14	PP_IPMB_SDA_A	23	NC	32	PPENABLE_A
6	PP_HA1	15	PP_IPMB_SCL_B	24	NC	33	N48V_A
7	PP_HA2	16	PP_IPMB_SDA_B	25	Shelf Ground	34	N48V_B
8	PP_HA3	17	NC	26	Logic Ground		
9	PP_HA4	18	NC	27	PPENABLE_B		

10.2.3 Zone 2 Connectors

The ATCA-S201 provides Ethernet fabric and base ports on the Zone-2 connector designated as J23 on the ATCA board. This connector is implemented with a 4-pin per column type available from Tyco electronics (http://www.tycoelectronics.com), part number 6469081-1.

Note: The connector pin-outs are presented from the point of view of ATCA blade, such that:

'TX' refers to ATCA as the signal source, and chassis as the signal receiver.

'RX' refers to ATCA blade as signal receiver, and chassis as the signal source.

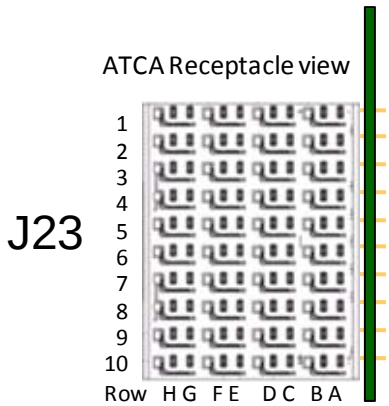


Figure 33 Zone 2 Connector Port Pin Location Diagram

Table 47 Connector J23, Zone-2 Pin Assignments

Row#	Interface	A	B	C	D	E	F	G	H
1	XAUI_0	TX2+	TX2-	RX2+	RX2-	TX3+	TX3-	RX3+	RX3-
2	XAUI_0	TX0+	TX0-	RX0+	RX0-	TX1+	TX1-	RX1+	RX1-
3	XAUI_1	TX2+	TX2-	RX2+	RX2-	TX3+	TX3-	RX3+	RX3-
4	XAUI_1	TX0+	TX0-	RX0+	RX0-	TX1+	TX1-	RX1+	RX1-
5	BASE0	MDIO0+	MDIO0-	MDIO1+	MDIO1-	MDIO2+	MDIO2-	MDIO3+	MDIO3-
6	BASE1	MDIO0+	MDIO0-	MDIO1+	MDIO1-	MDIO2+	MDIO2-	MDIO3+	MDIO3-
7	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-

Table 48 Connector J23, Zone-2 Signal Descriptions

XAUI_0	Fabric Port 0, 10GbE XAUI TX and Rx signals
XAUI_1	Fabric Port 1, 10GbE XAUI TX and Rx signals
BASE_0	Base Port 0, 1GbE, MDIO interface signals. For Star or dual star backplanes
BASE_1	Base Port 1, 1GbE, MDIO interface signals. For Star or dual star backplanes

10.2.4 Zone 3 Connectors

The ATCA-S201 routes several I/O signals to the zone 3 connector complex consisting of connectors J30, J32 and J33. These connectors enable future expansion using advanced rear transition modules (RTM) whose 'J' connectors mirror the 'P' connectors located on the carrier module. All of these connectors utilize a 3-pin per column type available from Tyco electronics (http://www.tycoelectronics.com), part number 6469081-1 .

Note: The connector pin-outs are presented from the point of view of ATCA blade, such that:

'TX' refers to ATCA as the signal source, and chassis as the signal receiver.

'RX' refers to ATCA blade as signal receiver, and chassis as the signal source.

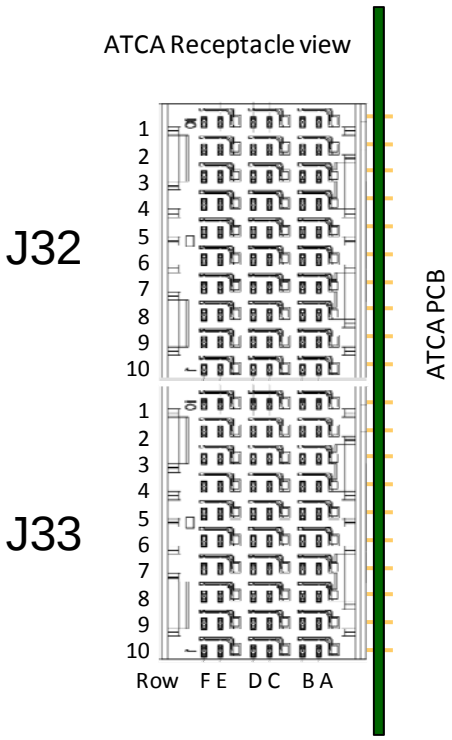


Figure 34 Zone 3, Connector Port Pin Location Diagram

10.2.4.1 Connector P32, Storage and Management Infrastructure Pin Assignments

The ATCA-S201 P32 connector pin assignments and descriptions appear below.

Table 49 Connector P32, Management infrastructure pin assignments

Row#	Interface	A	B	C	D	E	F
1							
2	SAS-out	SAS_TX0+	SAS_TX0-	SAS_RX0+	SAS_RX0-	UART_RTS0#	NC
3	SAS-out	SAS_TX1+	SAS_TX1-	SAS_RX1+	SAS_RX1-	UART_TXD0	UART_RXD0
4	SAS-out	SAS_TX2+	SAS_TX2-	SAS_RX2+	SAS_RX2-	NC	UART_CTS0#
5	SAS-out	SAS_TX3+	SAS_TX3-	SAS_RX3+	SAS_RX3-	NC	NC
6	LAN0	LAN0_MDIO0+	LAN0_MDIO0-	LAN0_CTV	LAN0_CTV	LAN0_MDIO1+	LAN0_MDIO1-
7	LAN0	LAN0_MDIO2+	LAN0_MDIO2-	LAN0_LEDACT#	LAN0_LEDLNK#	LAN0_MDIO3+	LAN0_MDIO3-
8	SAS-in	AMC0_TX3+	AMC0_TX3-	AMC0_RX3+	AMC0_RX3-		
9	SAS-in	AMC1_TX3+	AMC1_TX3-	AMC1_RX3+	AMC1_RX3-	AMC3_TX3+	AMC3_TX3-
10	SAS-in	AMC2_TX3+	AMC2_TX3-	AMC2_RX3+	AMC2_RX3-	AMC3_RX3+	AMC3_RX3-

Table 50 Connector J32, Management infrastructure signal descriptions

SAS-out	These signal pairs connect to the SAS controller (LSI-1068) on ATCA-S201, ports 4, 5, 6 and 7.
SAS-in	These signal pairs route to the Port3 of the AMC slots, sites 0, 1, 2 and 3
LAN0_MDIOxx	GbE Management port. 10/100/1000BaseT signals. These signals route to a transceiver owned by the Freescale PowerPC device.
LAN0_CTV	10/100/1000BaseT transformer Center Tap signal, which could be used to terminate center tap of transformers, if they are placed on RTM. This signal is applicable if Ethernet PHY is located on ATCA blade, while GE transformers are located on RTM.
LEDACT#	LAN 0 (Management) activity indicator signal for LED (active low)
LEDLINK#	LAN 0 (Management) LINK indicator signal for LED (active low)
UART_	RS232 Serial Signals, transmit, receive, clear to send, request to send, data terminal ready, data set ready. These signals route to the Freescale PowerPC device.

10.2.4.2 Connector J33, PCI-Express and Test infrastructure Pin Assignments

The ATCA-S201 J33 connector pin assignments and descriptions appear below.

Table 51 Connector J33, PCIe and Miscellaneous RTM Pin Assignments

Row#	Interface	A	B	C	D	E	F
1	PCIe	PETX0+	PETX0-	PERX0+	PERX0-	FCLKA+	FCLKA-
2	PCIe	PETX1+	PETX1-	PERX1+	PERX1-	NC	NC
3	PCIe	PETX2+	PETX2-	PERX2+	PERX2-	NC	NC
4	PCIe	PETX3+	PETX3-	PERX3+	PERX3-	NC	NC
5	PCIe	PETX4+	PETX4-	PERX4+	PERX4-	NC	NC
6	PCIe	PETX5+	PETX5-	PERX5+	PERX5-	JTAG_TCK	JTAG_TMS
7	PCIe	PETX6+	PETX6-	PERX6+	PERX6-	JTAG_TRST#	JTAG_TDO
8	PCIe	PETX7+	PETX7-	PERX7+	PERX7-	JTAG_TDI	PCIRST#
9	Misc	NC	NC	NC	NC	RTM#	PCICFG#
10	Misc.	I2C_RST	I2C_SCL	I2C_SDA	NC	PS0#	ENABLE#

Table 52 Connector J33, PCIe and Miscellaneous RTM Signal Descriptions

PETx...	PCI-Express transmit differential pair signals
PERx...	PCI-Express receive differential pair signals
FCLKA	Fabric clock, as defined in AMC.0 specification. Intended to be used for PCI-Express 100MHz spread spectrum clock. This signal can be either terminated or passed through the CREFCLK via jumpers on the RTM403. The ATCA blade provides no spread spectrum support.
PCIRST#	PCI-Express reset signal (input). The ATCA board may drive a Logic low to reset PCI-Express switch and PCI-Express interfaces that are behind it.
RTM#	RTM# signal is grounded by the ATCA-S201 to indicate a MMC controller is present (see AMC.0 specification.) The ATCA implementation shall include a 10Kohm pull-up resistor to management power on the ATCA. In this way, an ATCA is able to detect non-intelligent vs. intelligent RTMs.
PCICFG#	PCI-Express bus configuration signal. It shall be grounded on RTMs that use a single x8 PCI-Express bus and pulled up on the ATCA with 10Kohm resistor to management power. On RTMs that expect two x4 PCI-Express busses this pin will float (not be connected). Two x4 PCI Express busses are intended for RTM implementations that desire to avoid PCI-Express switch in order to reduce latency. The ATCA-S201 asserts logic ground to this signal.
PS0#	Active low RTM present signal.PS0# is tied to logic GND on the ATCA blade. PS0# (Connector J33) and PS1# (Connector J30) shall be connected through a diode on the ATCA-S201, exactly as defined in AMC.0 specification. PS1# is last mate on Power connector and PS0# is on the opposite end of the set of connectors. Logic low on PS1# indicates that RTM is present and fully inserted.
ENABLE#	When low indicates to RTM that it is fully inserted and that MMC can start execution. Logic high shall keep MMC in reset state. This signal shall have a pull-up resistor as indicated in AMC.0 specification.
JTAG_xxx	These pins provide a functional JTAG port on the P33 connector. The JTAG chain is for mfg testing only and the chain is not intended for RTM use.
I2C_xxx	This bus allows an RTM to place peripherals on the ATCA serial management bus.

10.2.4.3 Connector J30, Power Supply for RTM

The ATCA-S201 supplies 12 V and the 3.3 V stand-by voltages to an advanced rear transition modules (RTM) via the P30 connector. The P30 connector assignments also include the IPMI-L interface, PS1#. If needed, an advanced RTM will convert the main 12V payload power into 1.2V, 1.5V, 2.5V and 3.3V by using DCDC converters.

The ATCA-S201 is specified to the following maximum power ratings:

Mean power: 25 W
Peak power: 26 W
Standard deviation of power from mean power: 0.25 W

The ATCA-S201 P30 connector is implemented by using Metral® 89096-xxx from FCI (www.fciconnect.com).

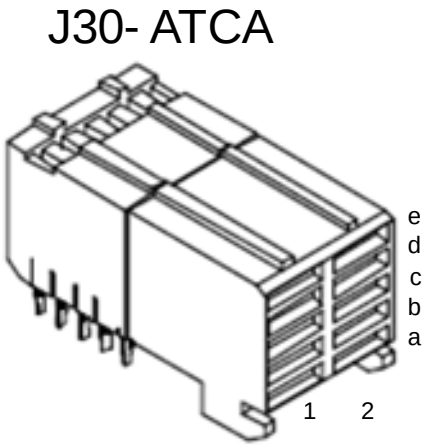


Figure 35 'J30' RTM Power Receptacle

10.2.4.4 Connector J30, RTM Power Pin Assignment

The ATCA-S201 J30 connector pin assignments and descriptions appear below.

Table 53 J30, RTM Power Pin Header Assignment

Row#	Interface	1	2
a	Pwr	Logic_GND	Shelf_GND
b	Pwr	Logic_GND	+3.3V MP
c	IPMI	IPMI_SCL_L	IPMI_SDA_L
d	Pwr	+12V PP	+12V PP
e	Pwr	PS1#	NC

Table 54 Connector J30, RTM Power Pin Signal Descriptions

PS1#	Active low RTM present signal. PS1# shall be pulled up to 3.3 V management power on the ATCA blade. PS0# (Connector P33) and PS1# (Connector P30) shall be connected through a diode on the ATCA-S201, exactly as defined in AMC.0 specification. PS1# is last mate on Power connector and PS0# is on the opposite end of the set of connectors. Logic low on PS1# indicates that RTM is present and fully inserted.
IPMI_SCL_L	IPMI bus clock signal, as defined in AMC.0 specification. The RTM shall have a pull-up resistor for this signal as indicated in AMC.0specification.
IPMI_SDA_L	IPMI bus data signal, as defined in AMC.0 specification. The RTM shall have a pull-up resistor for this signal as indicated in AMC.0 specification.
12VPP	12 V payload power, enabled after successful E-keying, as outlined in the AMC.0 specification. RTM must meet requirements posted for payload power in AMC specification.
3.3V_MP	3.3V Management Power. RTM must meet requirements posted for management power in AMC.0 specification.
Shelf_GND	Frame/Chassis Safety Ground
Logic_GND	(Logic 0vdc). Logic Ground- Common return for Management Power Payload Power, reference potential for single ended logic signaling, and shielding for differential pair signals in the AMC Connector.

10.2.5 Power Supply Mezzanine Module

The ATCA-S201 incorporates a power mezzanine module from Artesyn® Technologies which performs DC-DC conversions to produce the various voltages needed by the ATCA carrier, its AMC slots and the advanced rear transition module is installed. The module supplier is.

Pin#	Signal	Pin#	Signal	Pin#	Signal	Pin#	Signal
1	-48_A	9	C_CL	17	A2	25	3V3_OUT
2	-48_B	10	HU	18	INTRPT	26	3V3_OUT
3	NC	11	HUHU+OUT	19	A1	27	NC
4	NC	12	HU+IN	20	SCL	28	NC
5	RTN_A	13	ON/OFF-	21	A0	29	12V_OUT
6	RTN_B	14	ON/OFF+	22	SDA	30	12V_RTN
7	EN_A	15	B_OK#	23	3V3_RTN	31	
8	EN_B	16	A_OK#	24	3V3_RTN	32	

Note: This module is not user serviceable

10.2.6 SODIMM DDR Module

The ATCA-S201 incorporates a SODIMM socket which holds the DDR2 memory for the onboard PowerPC® processor.

Note: This module is not user serviceable

11 RTM-ATCA-SXXX Overview

The RTM-ATCA-SXXX is an Advanced Rear transition module (RTM) that features a SAS expander which provides a storage I/O path between the front ATCA board and rear I/O access panel. The front ATCA board connection conforms to the 3-row Advanced RTM standard. Optionally, the module may be populated with up to two (2) SAS, SATA or SSD 2.5" disk drives. .

Users may pair the RTM-ATCA-SXXX with ATCA disk carriers (ATCA-S120) to create in-chassis JBOD. The RTM-ATCA-SXXX may also be used to add more disk capacity to other ATCA carrier products

ATCA cards with proper zone-3 connector pin-outs can extend connectivity to connectors on the RTM panel. All rear panel connectors are compatible with commodity off-the-shelf, non-proprietary cables. Standard connectors include a x4 SAS/SATA IB connector and two RJ45 pass-through management ports (RS232 and 1 GbE Ethernet). The RTM-ATCA-SXXX includes a modular management controller (MMC) and conforms to the PICMG 3.1 revision 2 specification.

11.1 Features of the Advanced Rear Transition Module

The RTM-ATCA-SXXX is a 8U (233.35mm) x 80mm single slot Rear Transition Module with very few active silicon components. The prominent attributes include:

- One X4 IB-SAS/SATA port (Infiniband style SFF-8470)
- Accommodates up to two disks (manufacturing assembly option)
- 1Gb RS232 LAN port (pass through connection to Front ATCA blade)
  - LED drive logic
- RS232 Port ((pass through connection to Front ATCA blade)
- MMC, with hot swap and LED control,
- FRUID serial EERPORM (note: The FRU ID is not a separate part but rather embedded in the MMC controller.)
- Temperature sensors
- Voltage sensors
- SPI flash memory

11.2 I/O PICMG Standards Compliance

The RTM-ATCA-SXXX is fully compliant with the following PCI Industrial Computer Manufacturers Group (PICMG) specifications:

- PICMG 3.1

11.3 I/O Interfaces

The RTM-ATCA-SXXX mates to ATCA carrier blades via zone-3 connectors in a fashion conforming to PICMG 3.0 ATCA specification revision 2. Internally the ATCA-S201 provides connections to "bridge" between zone3 and the RTM faceplate as follows:

Table 55 I/O Ports Available on RTM Faceplate

RTM Zone-3 function	RTM Faceplate
RS232 Console port	Port 1 –RJ45
SAS, x4 (3.0GHz)	Port 2 – IB SAS connector (SFF-8470)
1Gb Ethernet Management port	Port 3 - RJ45
IPMI – to MMC device on RTM	NA
Power	NA

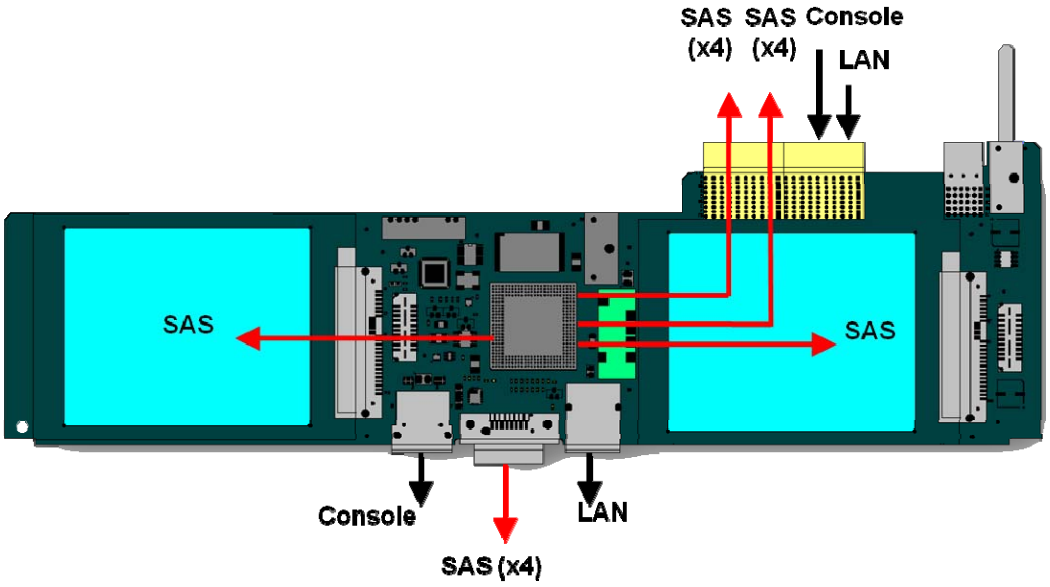


Figure 36, RTM-ATCA-SXXX Functional Interconnect Diagram

11.3.1 External SAS Connector

The RTM-ATCA-SXXX provides a x4 SAS port, implemented with a infiniband Style connector. Depending on RTM factory configuration, this will carry 4 SAS lanes.

11.3.1.1 SAS Cable Length

The RTM-ATCA-SXXX provides can accommodate SAS Cables up to3M in length.

11.3.2 Ethernet Management Port (RJ-45)

An Ethernet management port is provided on the RTM-ATCA-SXXX to facilitate a pass-through communication path to certain ATCA board products. The port uses an RJ-45 connector, with integrated LED for Link (green) and activity (amber). The port auto negotiates to either 10/100/1000BASE-T.

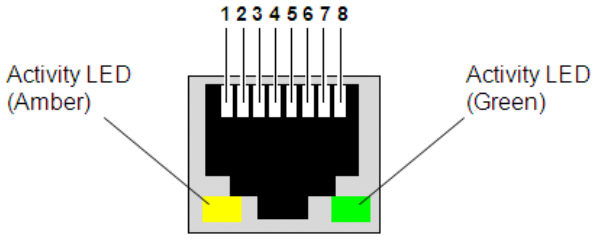


Figure 37, Ethernet Management Port

11.3.3 Serial Console Port (RJ-45)

An RS232 serial console port is provided on the RTM-ATCA-SXXX to facilitate a pass-through communication path to certain ATCA board products. The port uses an RJ45 connector.

11.4 LEDs

The following LEDs are located on the face plate of the RTM-ATCA-SXXX.

Table 56 LEDs On RTM Faceplate

LED			RTM Faceplate
Ethernet Activity	AMBER	On	LAN management activity LED
		Off	No Activity
Ethernet Link	GREEN	On	LAN management LINK LED
		Off	No Link
Hot Swap (**HS**)	BLUE	On	Management power available to the module and the module can safely be extracted
		Off	The module is operational and is unsafe for extraction
		Long Blink	Delay before module is activated
		Short Blink	Delay before module is de-activated
Fault or "Out of Service" (**OOS**)	RED	On	Module Fault set by Shelf manager or 12V payload power not detected.
		Off	No module fault 12V payload power is being supplied to board
Module Ready (**OK**) and "in service"	GREEN	On	12V payload power is being supplied to board
		Off	12V payload power is not detected

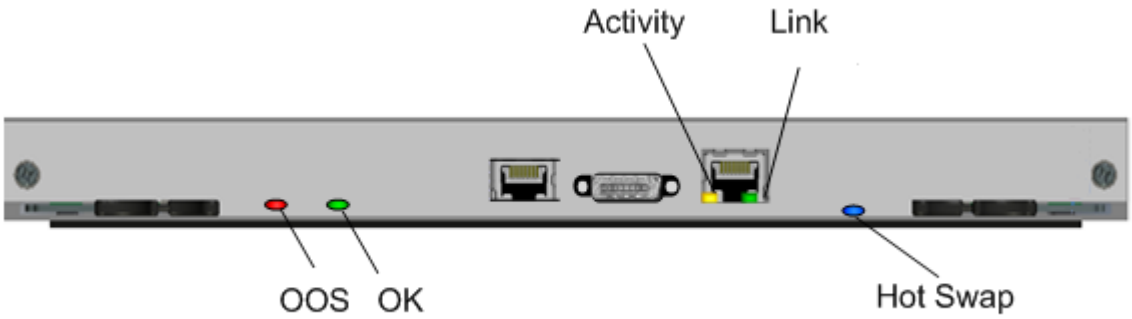


Figure 38 RTM-ATCA-SXXX Front Panel LEDs

11.5 Software Support

The RTM-ATCA-SXXX requires no special software to operate. As shipped from the factory, the expander is un-zoned, and configured for table routing.

11.6 Products Supported by this Manual

The information in this manual applies to the following products:

- RTM-ATCA-SXXX-0
- RTM-ATCA-SXXX-2
- RTM-ATCA-SXXX-2-300

Figure 39. RTM-ATCA-SXXX Top View (Two Disk Drives)

11.7 Identification Labels

At manufacturing time, several labels are affixed to the RTM-ATCA-SXXX as shown below. For proper identification of the RTM, use these barcode labels to accurately

determine the module identity. The barcode labels provide the following information:

Table 57 RTM-ATCA-SXXX Identification Labels

Label	Description
Label 1: Final assembly P/N	For Internal Use Only
Label 2: Sub-Assembly P/N	For Internal Use Only
Label 3: Serial number (S/N)	S/N Format :AAA = Assembly Number (401) L =Location of manufacturer (S) Y = Calendar year of manufacturer (2008 = 8, 2010=A) MM = Calendar month of manufacturer (March = 03) SSSS = Sequence number (reset each month) (1234)
Label 4: Part Numbers Example: 0106828G01A RTM-ATCA-SXXX-0	This label contains 2 numbers: Top = Internal Part Number Bottom = Ordering Part Number

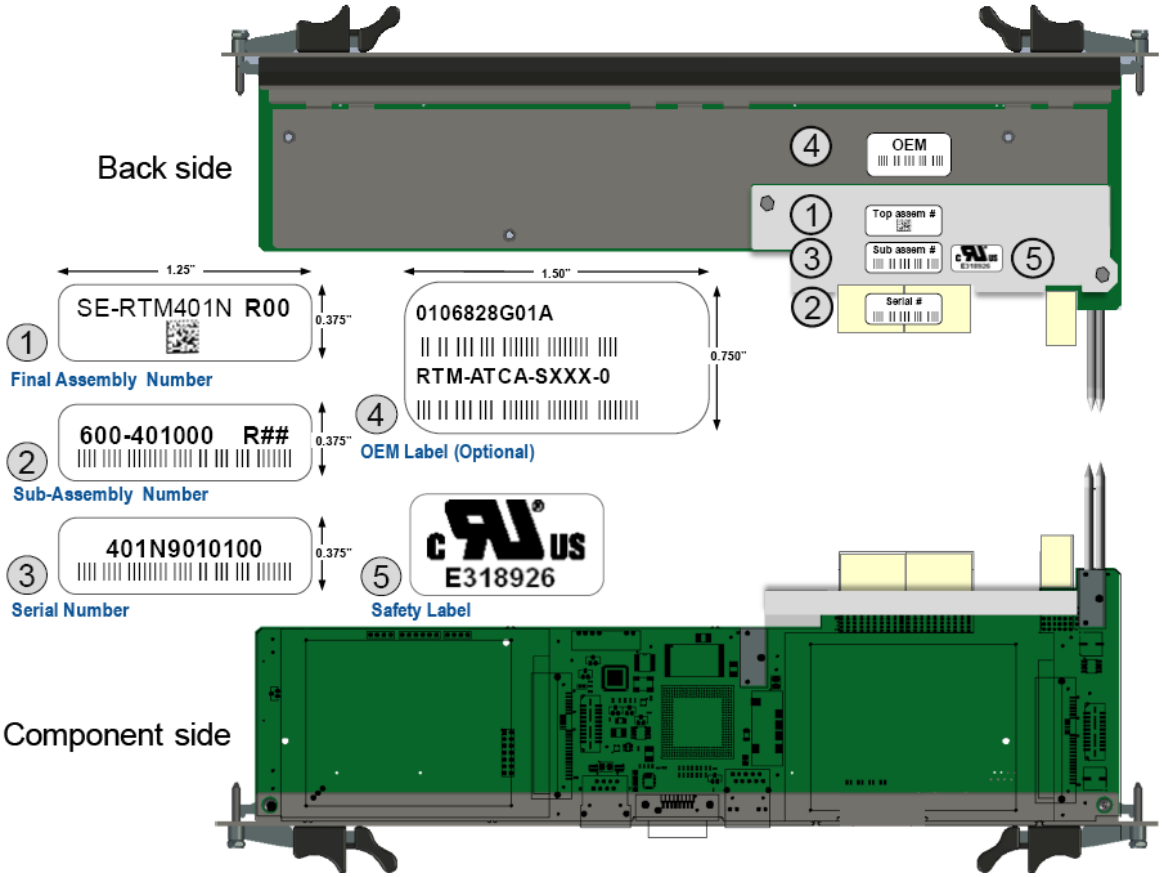


Figure 40 RTM-ATCA-SXXX Diagram Showing Identification Label Locations

12 RTM-ATCA-SXXX Installation

This chapter contains the procedures for installing and removing the RTM-ATCA-SXXX.

12.1 Installation and Removal of the Rear Transition Module

The RTM-ATCA-SXXX can be installed into an ATCA shelf (chassis) with a midplane made for front and rear board installations. The module must be installed in the slot directly behind the host ATCA node board. These back-to-back slots have common pins to enable passing of signals via the Zone-3 connector complex.

12.2 Important Information about Your Chassis

Before installing the rear transition module, verify the module's part number to ensure that the correct rear transition module is being installed into the system. For information on identifying the rear transition module, see Section11.6.

12.2.1 Safety Statement

The RTM-ATCA-SXXX is designed to comply with UL60950-1, and is intended to be used with similarly tested ATCA products that have a user's guide detailing user installation of module accessories.

12.2.2 Observe Maximum Module Current Requirements

There are several manufacturing options for the RTM. The diskless version of the RTM requires no power from the front ATCA node board, but may draw up to 200mA from the 3.3 V management power source. Be sure to validate that the host chassis can supply the RTM slot with these maximum current requirements.

Table 58 Max RTM Module Current Requirements

Module Current	RTM-ATCA-SXXX-0 (No Disk)	RTM-ATCA-SXXX-2 (Two disk version)
+12 V (spin up < 100 µsec)	0.55 A(6.6W)	2.05 A (25 W) (staggered spin-up)
+12 V normal operating	0.55 A (6.6 W)	2.05 A (24.6 W)
+12 V (idle)	0.55 A (6.6 W)	1.55 A (18.6 W)
OFF STATE	LESS THAN 0.4 W	LESS THAN 0.4 W

Module Current	RTM-ATCA-SXXX (No Disk)	RTM-ATCA-SXXX-2 (Two disk version)
+12 V (spin up < 100 μsec)	0.55 A(6.6W)	2.05 A (25 W) (staggered spin-up)
+12 V normal operating	0.55 A (6.6 W)	2.05 A (24.6 W)
+12 V (idle)	0.55 A (6.6 W)	1.55 A (18.6 W)
OFF STATE	LESS THAN 0.4 W	LESS THAN 0.4 W

12.3 Before You Install Or Remove The RTM

Boards may be damaged if improperly installed or handled. Please read and follow the guidelines in this section to protect your equipment.

12.3.1 Observe ESD Precautions

Emerson strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from its protective wrapper or from the system, place the component flat on a grounded, static-free surface (and, in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.

12.3.2 Watch for Bent Pins or Other Damage

Bent pins or loose components can cause damage to the board, the backplane, or other system components. Carefully inspect your board and the backplane for both pin and component integrity before installation. Our suppliers take significant steps to ensure there are no bent pins on the backplane or connector damage to the boards prior to leaving our factory. Bent pins caused by improper installation or by boards with damaged connectors could void the warranty for the backplane or boards.

If a system contains one or more crushed pins, power off the system and contact your local sales representative to schedule delivery of a replacement chassis assembly.

12.4 Use Caution When Installing or Removing RTM

When first installing boards in an empty chassis or onto a carrier card, we recommend that you start at the left of the card cage and work to the right.

When inserting or removing a board in a slot adjacent to other boards, use extra caution to avoid damage to the pins and components located on the primary or secondary sides of the boards.

12.4.1 Preserve EMI Compliance

To preserve compliance with applicable standards and regulations for electromagnetic interference (EMI), during operation all front and rear openings on the chassis or board faceplates must be filled with an appropriate card or covered with a filler panel. If the EMI barrier is open, devices may cause or be susceptible to excessive interference.

12.4.2 Understand Hot Swap

Your RTM is electrically designed for hot swap within a fully powered chassis. To facilitate hot swap, there is a blue LED on the rear faceplate. This LED is under software control.

If your system is using software that provides full hot swap capabilities, the software will illuminate the blue hot swap LED on the rear faceplate when software has stopped and it is safe to remove the advanced rear transition module.

If your system does not have hot swap-aware software running, behavior of the blue LED is indeterminate. In this case, you may need to manually shut down applications or operating systems running on the board prior to board removal, even if the blue LED is lit.

Powering down or removing a board before the operating system or other software running on the board has been properly shut down may cause corruption of data or file systems.

12.5 Verify Slot Usage

Prevent possible damage to module components by verifying the proper slot usage for your configuration.

12.6 Installing the Advanced Rear Transition Module

This section describes a recommended procedure for installing the RTM module in a chassis.

Before you install your module, please read all cautions, warnings, and instructions presented in this section.

Handling modules and peripherals can result in static damage. Use a grounded wrist strap, static-dissipating work surface, and antistatic containers when handling and storing components.

Insert the board by holding the Module Handles—do not exert unnecessary pressure on the faceplate.

Hot swap compliant modules may be installed while the system is powered on. If a module is not hot swap compliant, you should remove power to the slot or system before installing the module.

5. Verify that you have taken the necessary antistatic precautions.
6. Go to the back of the system and choose an appropriate slot for the rear transition module.

   Rear transition modules must be installed in-line behind the accompanying node board. For example, if the accompanying node board is going to be installed in slot 3, its rear transition module must be installed at the back of the system in slot 3.
7. Remove the slot filler panel from the selected node board slot, if necessary.
8. Prepare the module by loosening the locking screws and opening the injector/ejector latch at the top of the module as shown in the figure below.

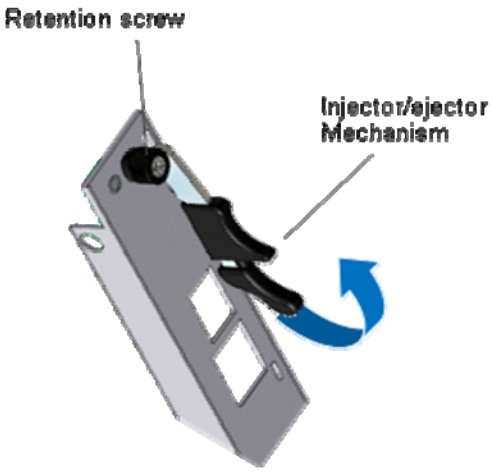


Figure 41 Injector / Ejector Latch and Locking Screw

9. Carefully align the edges of the module with the guides in the appropriate slot.

   It might be helpful to look into the enclosure to verify correct alignment of the rails in the guides. Align the edges of the module with the card cage rail guides in the appropriate slot.
10. Taking care to keep the module aligned in the guides, apply equal and steady pressure and slide the module in until the injector/ejector mechanism engages the retention bars.

11. Position your thumbs at the top and bottom of the RTM; simultaneously push in the module and rotate the injector/ejector mechanisms inward to their closed position to seat and secure RTM. DO NOT FORCE THE BOARD INTO THE SLOT.
12. Tighten the two module retention screws to secure the module into the shelf.
13. Power on the system, if necessary. Refer to your system manual for instructions on correctly powering on the system. Once power is applied to the chassis, the internal MMC controller runs a self-test that runs for approximately 10 seconds. Upon a successful power up self-test, the blue hot swap LED will blink and then turn off, indicating that the module has been placed in operation.

12.7 Removing the Advanced Rear Transition Module

The RTM-ATCA-SXXX is hot-swappable and can be removed from the chassis without powering down its associated node board. This section describes a recommended procedure for removing a board module from a chassis.

Before you remove your module, please read all cautions, warnings, and instructions presented in this section. Hot swap compliant modules may be removed while the system is powered on. If the chassis is not hot swap compliant, you should remove power to the slot or system before removing the module.

To remove a rear transition module, follow these steps:

14. Loosen the locking screws on the rear transition module.
15. Rotate the top ejector handle to the half way (HW) position. Do not remove the module immediately.
16. If your host module running hot swap-aware software, the action of rotating the ejector lever will start the shutdown process on the board. The software will slowly blink the blue hot swap LED indicating the module is in the process of being de-activated.
17. Once the module has been de-activated, the Blue LED will illuminate steady. Once this is done you can extract the module by pulling on the module handle.

    Note: Powering down or removing a board before the operating system or other software running on the board has been properly shut down may cause corruption of data or file systems.
18. If your board or system is not running hot swap-aware software, the blue LED may illuminate without regard to software processes still running on the board. Be sure to manually shut down applications or operating systems running on the board prior to board removal.
19. Carefully pull the module from the chassis.
20. If the card slot is to remain empty, install a filler panel in the slot.

12.8 Verifying the Hardware Installation

This section provides information to verify the installation of the RTM-ATCA-SXXX. Visually inspect the module power LED on the RTM panel. Refer to Figure 38 RTM-ATCA-SXXX Front Panel LEDs.

13 RTM-ATCA-SXXX Mechanical and Connector Information

This chapter provides the specifications and connector pin outs for the RTM-ATCA-SXXX.

13.1 Specifications for the RTM-ATCA-SXXX

This section provides mechanical, electrical, environmental, and other relevant information.

13.1.1 Physical Dimensions

The RTM-ATCA-SXXX is an 8U (233.35 mm) height board with 80 mm in depth for standard applications. It complies with IEEE 1101.11 mechanical standards, as required by the PICMG 2.0 Revision 3.0 specification. The RTM-ATCA-SXXX is keyed to conform to the PICMG 2.10, Keying of ATCA Boards and Backplanes specification.

13.1.2 Power Requirements

There are several manufacturing options for the RTM. Be sure to validate the host chassis, can supply the RTM slot with these maximum current requirements.

Table 59 Max RTM Module Current Requirements

Module Current	ATCA-S201-0 (No Disk)	ATCA-S201-2 (Two disk version)
+12V (spin up < 100 µsec)	0.55A(6.6W)	2.05A (25W) (staggered spin-up)
+12v normal operating	0.55A (6.6W)	2.05A (24.6W)
+12v (idle)	0.55A (6.6W)	1.55A (18.6W)
OFF STATE	LESS THAN 0.4W	LESS THAN 0.4W

13.1.3 Environmental Specifications and Compliance

The environmental specifications for the RTM-ATCA-SXXX assembly are presented in the table below.

Table 60 Environmental Specifications for the ATCA-S201

SPECIFICATION	VALUE
Operating Temperature (airflow 3.1 CFM)	0°C ~ 55 °C
Storage Temperature	-40 °C ~ 85 °C
Operating Temperature Gradient	11 °C /H (max)
Storage Temperature Gradient	20 °C /H (max)
Shipping Temperature Gradient	20 °C /H (max) *1
Operating Humidity	8 % ~ 80 %
Storage Humidity	5 % ~ 95 %
Shipping Humidity	5 % ~ 95 % *1
Wet bulb Maximum Temperature	27 °C
Condensation	No condensation
Atmospheric Pressure and Altitude	Operating: 0 ~ 3,000 m Shipping: 0 ~ 12,000 m
Operating Shock	See PICMG 3.0 specification, Regulatory guidelines.
Operating Vibration	See PICMG 3.0 specification, Regulatory guidelines.
RoHS	6 of 6 compliant.

13.1.4 NEBS Compliance

NEBS certifications are performed by integrator at a system level (chassis, ATCA, AMC shelf managers etc). The RTM module will not preclude the system form passing NEBS.

13.1.5 Electromagnetic Compliance

The board is designed and implemented so as to minimize electromagnetic emissions, susceptibility, and the effects of electrostatic discharge. The board carries the following certifications:

Table 61 EMC Emission Compliancy

Description	Description
US: FCC 47 CFR Part 15 Class A	Yes, Class A emissions requirements (USA)
Canada: ICES 003 Class A	Yes Class A Digital Apparatus emissions (Canada)
Japan: VCCI Class A	Yes Class A ITE emissions requirements (Japan)
Europe Commercial: EN 55022:1994 Class A	Yes, Class A ITE emissions requirements (EU)
Europe Commercial: EN 55024:1998 Class A	Immunity for ITE equipment
Europe Commercial: EN 61000-4-2,3,5,6,8,11: 2001	EMC Electrostatic discharge immunity
Europe Commercial: EN 61000-4-4: 2000 (Limits for harmonic current emissions)	Yes
Europe Commercial: EN 61000-3-2,3	Yes, Limits for harmonic current emissions
Europe Telecom Carrier: EN 300-386 v1.3.3 April 2005	Requirements for Telecom Network Equipment – Non-Telco Centers
Europe CE Mark	Yes
Australia: AS/NZS 3548 C-Tick	Yes, Class A ITE emissions requirements (Australia)
South Korea: MIC	
Taiwan: BSMI	

13.2 Connectors and Pin Assignments

This section provides position and pin-out details of all connectors available on the RTM-ATCA-SXXX.

Table 62 Connector Port Identification and Location

1	Serial console port	4	Zone 3 Connector
2	SAS Connector	5	Power connector
3	10/100/1000 Mb management port	6	RTM alignment pin

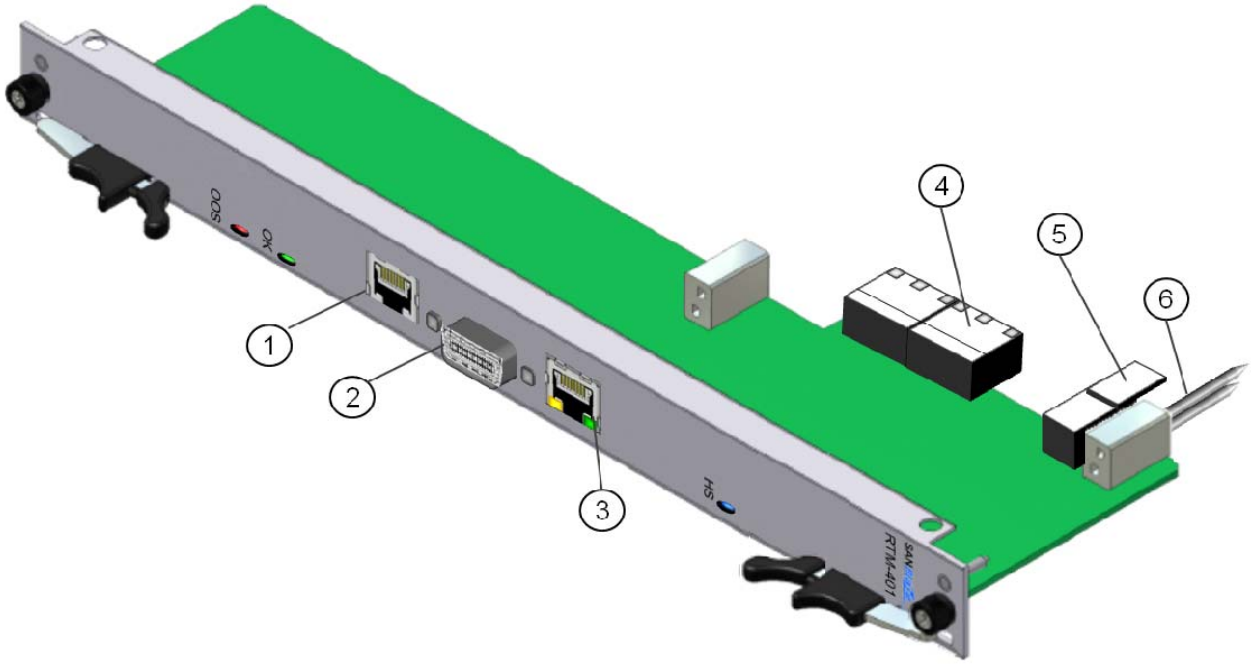


Figure 42 RTM-ATCA-SXXX Connectors

13.2.1 SAS Connector Port

Port 3 provides an infiniband (IB) SAS connector, SFF-8470. The port is wired as pass-through to the front ATCA carrier via the J32/P32 Zone-3 connector. This receptacle features jack screws to mechanically secure the external cable. A cable can be ordered from Emerson.

Figure 43. RTM-ATCA-SXXX Front Panel SAS Connector Pin-Out Diagram

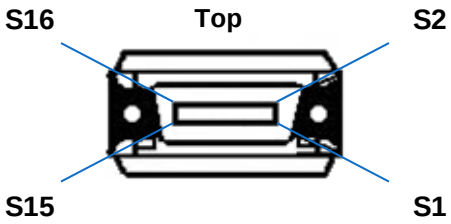


Table 63. RTM-ATCA-SXXX Front Panel SAS Connector Pin Assignments

Signal	Connector Pin	Description
SAS_RX0+	S1	SAS Lane 0, Rx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_RX0-	S2	
SAS_RX1+	S3	SAS Lane 1, Rx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_RX1-	S4	
SAS_RX2+	S5	SAS Lane 2, Rx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_RX2-	S6	
SAS_RX3+	S7	SAS Lane 3, Rx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_RX3-	S8	
SAS_TX3-	S9	SAS Lane 3, Tx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_TX3+	S10	
SAS_TX2-	S11	SAS Lane 2, Tx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_TX2+	S12	
SAS_TX1-	S13	SAS Lane 1, Tx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_TX1+	S14	
SAS_TX0-	S15	SAS Lane 0, Tx Differential Pair, Drives ATCA Zone 3 connector (P32)
SAS_TX0+	S16	

13.2.2 10/100/1000 Mb Management Port

The RTM-ATCA-SXXX provides a 1 GbE management port on the faceplate via RJ45 jack (port 3). The port is wired as pass-through to the front ATCA carrier via the J32/P32 Zone-3 connector

Table 64 10/100/1000 Management Port Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	LAN0_A+	5	LAN0_C-
2	LAN0_A-	6	LAN0_B-
3	LAN0_B+	7	LAN0_D+
4	LAN0_C+	8	LAN0_D-

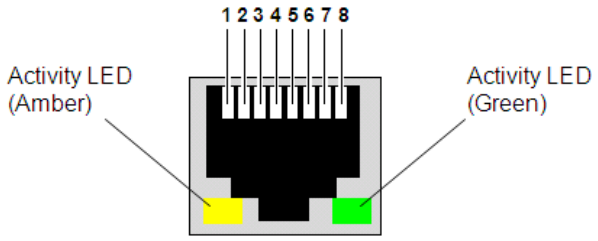


Figure 44 10/100/1000 Mb Management Port Pin Location Diagram

13.2.3 Serial Console Management Port

Port 4 is a low-profile RJ-45 connector jack that provides RS232 signaling. The port is wired as pass-through to the front ATCA carrier via the J32/P32 Zone-3 connector

Table 65 Serial Console Management Port Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	RTS	5	GND
2	DTR	6	RXD
3	TXD	7	DSR
4	GND	8	CTS

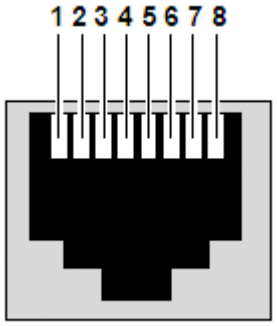


Figure 45 Serial Console Management Port Pin Location Diagram

13.2.4 Zone 3 Connectors

The RTM-ATCA-SXXX routes several I/O signals to the Zone-3 connector complex consisting of connectors J30, J32 and J3. These connectors enable expansion using rear transition modules (RTM) whose 'J' connectors mirror the 'P' connectors located on the carrier module. All of these connectors utilize a 3-pin per column type available from Tyco electronics (http://www.tycoelectronics.com), part number 6469081-1

.

Note: The connector pin-outs are presented from the point of view of ATCA blade, such that:

'TX' refers to ATCA blade as the signal source, and RTM as the signal receiver.

'RX' refers to ATCA blade as signal receiver, and RTM as the signal source.

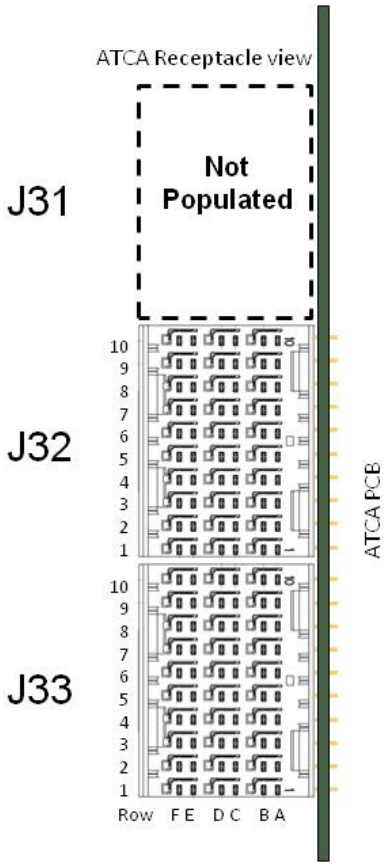


Figure 46 Zone 3, Connector Port Pin Location Diagram

13.2.4.1 Connector P32, Storage and Management Infrastructure Pin Assignments

The RTM-ATCA-SXXX P32 connector pin assignments and descriptions appear below.

Table 66 Connector P32, Management Infrastructure Pin Assignments

Row#	Interface	A	B	C	D	E	F
1							
2	SAS	SAS_TX0+	SAS_TX0-	SAS_RX0+	SAS_RX0-	UART_RTS0#	NC
3	SAS	SAS_TX1+	SAS_TX1-	SAS_RX1+	SAS_RX1-	UART_TXD0	UART_RXD0
4	SAS	SAS_TX2+	SAS_TX2-	SAS_RX2+	SAS_RX2-	NC	UART_CTS0#
5	SAS	SAS_TX3+	SAS_TX3-	SAS_RX3+	SAS_RX3-	NC	NC
6	LAN0	LAN0_MDIO0+	LAN0_MDIO0-	LAN0_CTV	LAN0_CTV	LAN0_MDIO1+	LAN0_MDIO1-
7	LAN0	LAN0_MDIO2+	LAN0_MDIO2-	LAN0_LEDACT#	LAN0_LEDLNK#	LAN0_MDIO3+	LAN0_MDIO3-
8	SAS	SAS_TX4+	SAS_TX4-	SAS_RX4+	SAS_RX4-		
9	SAS	SAS_TX5+	SAS_TX5-	SAS_RX5+	SAS_RX5-	SAS_TX7+	SAS_TX7-
10	SAS	SAS_TX6+	SAS_TX6-	SAS_RX6+	SAS_RX6-	SAS_RX7+	SAS_RX7-

Table 67 Connector J32, Management Infrastructure Signal Descriptions

SAS ports 4-7	A manufacturing option exists for these signals. These pins are either No-connect, or These transceiver pairs will connect port2 of the AMC front slots. (Port 4 routes to site 0)
SAS ports 0-3	These transceiver pairs will connect port3 of the AMC front slots (Port 0 routes to site 0)
LAN0_MDIOxx	GbE Management port. 10/100/1000BaseT signals. These signals route to a transceiver owned by the Freescale PowerPC device.
LAN0_CTV	10/100/1000BaseT transformer Center Tap signal, which could be used to terminate center tap of transformers, if they are placed on RTM. This signal is applicable if Ethernet PHY is located on ATCA blade, while GE transformers are located on RTM.
LEDACT#	LAN 0 (Management) activity indicator signal for LED (active low)
LEDLINK#	LAN 0 (Management) LINK indicator signal for LED (active low)
UART_	RS232 Serial Signals, transmit, receive, clear to send, request to send, data terminal ready, data set ready. These signals route to the Freescale PowerPC device.

13.2.4.2 Connector J33, PCI-Express and Test Infrastructure Pin Assignments

The RTM-ATCA-SXXX, J33 connector pin assignments and descriptions appear below.

Table 68 Connector J33, Miscellaneous RTM Pin Assignments

Row#	Interface	A	B	C	D	E	F
1		NC	NC	NC	NC	NC	NC
2		NC	NC	NC	NC	NC	NC
3		NC	NC	NC	NC	NC	NC
4		NC	NC	NC	NC	NC	NC
5		NC	NC	NC	NC	NC	NC
6		NC	NC	NC	NC	NC	NC
7		NC	NC	NC	NC	NC	NC
8		NC	NC	NC	NC	NC	NC
9		NC	NC	NC	NC	NC	NC
10	Misc.	NC	NC	NC	NC	PS0#	ENABLE#

Table 69 Connector J33, Miscellaneous RTM Signal Descriptions

PS0#	Active low RTM present signal.PS0# is tied to logic GND on the ATCA blade. PS0# (Connector J33) and PS1# (Connector J30) shall be connected through a diode on the RTM, exactly as defined in AMC.0 specification. PS1# is last mate on Power connector and PS0# is on the opposite end of the set of connectors. Logic low on PS1# indicates that RTM is present and fully inserted
ENABLE#	When low indicates to RTM that it is fully inserted and that MMC can start execution. Logic high shall keep MMC in reset state. This signal shall have a pull-up resistor as indicated in AMC.0 specification.

13.2.4.3 Connector J30, Power Supply for Advanced RTM

The RTM-ATCA-SXXX supplies 12V and the 3.3V stand-by voltages to an Advanced rear transition modules (RTM) via the P30 connector. The P30 connector assignments also include the IPMI-L interface, PS1#. If needed, an Advanced RTM will convert the main 12V payload power into 1.2V, 1.5V, 2.5V and 3.3V by using DCDC converters.

The RTM-ATCA-SXXX P30 connector is implemented with the Metral® 89096-xxx from FCI (www.fciconnect.com).

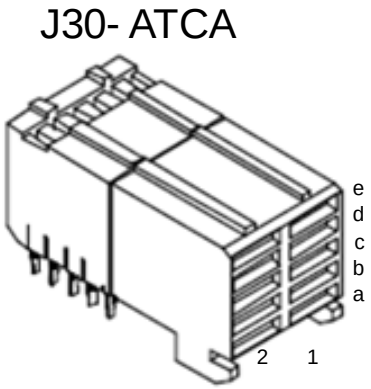


Figure 47 'J30' RTM Power Receptacle

13.2.4.4 Connector J30, RTM Power Pin Assignment

The RTM-ATCA-SXXX J30 connector pin assignments and descriptions appear below.

Table 70 J30, RTM Power Pin Header Assignment

Row#	Interface	1	2
e	Pwr	PS1#	NC
d	Pwr	+12V PP	+12V PP
c	IPMI	IPMI_SCL_L	IPMI_SDA_L
b	Pwr	Logic_GND	+3.3V MP
a	Pwr	Logic_GND	Shelf_GND

Table 71 Connector J30, RTM Power Pin Signal Descriptions

PS1#	Active low RTM present signal. PS1# shall be pulled up to 3.3V Management Power on the ATCA blade. PS0# (Connector P33) and PS1# (Connector P30) shall be connected through a diode on the RTM, exactly as defined in AMC.0 specification. PS1# is last mate on Power connector and PS0# is on the opposite end of the set of connectors. Logic low on PS1# indicates that RTM is present and fully inserted
IPMI_SCL_L	IPMI bus clock signal, as defined in AMC.0 specification. The RTM shall have a pull-up resistor for this signal as indicated in AMC.0specification.
IPMI_SDA_L	IPMI bus data signal, as defined in AMC.0 specification. The RTM shall have a pull-up resistor for this signal as indicated in AMC.0 specification.
12VPP	12V Payload Power, enabled after successful E-keying, as outlined in the AMC.0 specification. RTM must meet requirements posted for payload power in AMC specification
3.3V_MP	3.3V Management Power. RTM must meet requirements posted for management power in AMC.0 specification.
Shelf_GND	Frame/Chassis Safety Ground
Logic_GND	(Logic 0vdc). Logic Ground- Common return for Management Power Payload Power, reference potential for single ended logic signaling, and shielding for differential pair signals in the AMC Connector.

14 IPMI Functions List

The ATCA-S201 module supports the intelligent platform management interface (IPMI) version 1.5. This system is used to collect status information from on on-board sensors as well as sensors installed on AMC or RTM modules. Collected information items include:

- Hot swap communication with the shelf manager
- Inlet air temperatures
- Voltage monitoring
- Electronic Keying as described in the AMC.0 specification
- FRU information
- Drives blue LED indicators for hot swap, OOS (out of service)
- Drives green LED for module “OK”

The RTM-ATCA-SXXX module includes an MMC device for reporting status information to the ATCA blade. This MMC utilizes an Intelligent Platform Management Interface (IPMI) which will communicate with the ATCA. This MMC controls and monitors the following:

- Hot Swap communication with the shelf manager
- Inlet air temperatures
- Voltage monitoring
- Electronic Keying as described in the AMC.0 specification
- FRU information
- Drives “blue” LED indicators for Hot Swap. OOS (out of service),
- Drives “green LED for module “OK”

14.1 IPMI and Management Controller (IPMC)

The design features an IPMI controller consisting of a 16-bit microcontroller, flash and SRAM. The microcontroller uses I^2C interface to communicate the shelf management controller (ShMC), sensors, and MMC devices on AMC modules and the RTM if installed.

- Support hot-swap operation as defined for AMC modules in PICMG AMC.0 specification “Fail-safe flash update” - if interrupted at anytime, the MMC firmware is still able to respond and re-flash.

14.2 Sensor data records

The MMC monitors the status of the module and provides this data so it can be read by the shelf manager. Below are the SDRs that the ATCA-S201 and the RTM-ATCA-SXXX modules create.

Table 72. ATCA-S201 Sensor Data Records

Sensor	UNR	UC	UNC	LNC	LC	LNR	ID String
1.0V	1.16	1.13	1.10	0.90	0.87	0.84	+1.0V
1.1V	1.27	1.24	1.21	0.99	0.99	0.91	+1.1V
1.2V	1.40	1.36	1.32	1.08	1.04	1.00	+1.2V
1.5V	1.75	1.70	1.65	1.35	1.30	1.25	+1.5V
1.8V	2.05	2.00	1.95	1.65	1.60	1.55	+1.8V
2.5V	2.90	2.80	2.70	2.30	2.20	2.10	+2.5V
3.3V	3.60	3.55	3.50	3.10	3.00	2.0	+3.3V
AMC Exit Temp	80	90	100	N/A	N/A	N/A	AMC exit Temp
Zone-3 Exit	80	90	100	N/A	N/A	N/A	Zone3-Exit
Inlet Temp	60	70	80	N/A	N/A	N/A	Inlet Temp

Table 73. RTM-ATCA-SXXX Sensor Data Records

Sensor	UNR	UC	UNC	LNC	LC	LNR	ID String
3.3V	3.60	3.50	3.45	3.15	3.10	3.00	+3.3V
5.0V	5.50	5.35	5.25	4.75	4.65	4.5	+5V
12V	13.60	13.40	13.00	11.00	10.60	10.400	+12V
Board Temp (LM75)	70	60	50	N/A	N/A	N/A	Board Temp
Inlet Temp (LM60)	70	60	50	N/A	N/A	N/A	Inlet Temp

The ATCA-S201 and the RTM-ATCA-SXXX include the standard FRU data records per the IPMI Platform Management FRU Information Storage Definition, Board Info Area. The ATCA-S201 and the RTM-ATCA-SXXX include additional FRU records as defined in the PICMG 2.9 specification.

Table 74 ATCA-S201 Example FRU Data Records

Board Information	ATCA-S201
Version	1
Language Code	EN (English)
MFG date.time	See note *1
Manufacturer	Emerson
Product Name	ATCA-S201
Serial Number	100LYMMssss (See note *2)
Part Number	0106826G01A

*1. Manufacturing time is defined as 'minutes since 1/1/96' in the IPMI FRU spec.

*2. Serial Number format: 102LYMSSSS

AAA = Assembly Number (102)

L =Location of manufacturer

Y = Calendar year of manufacturer (2008 = 8, 2010 = 0)

MM = Calendar month of manufacturer (March = 03)

ssss = Sequence number (reset each month) (1234)

Table 75 RTM-ATCA-SXXX Example FRU Data Records

Board Information	RTM-ATCA-SXXX
Version	1
Language Code	EN (English)
MFG date.time	See note *1
Manufacturer	Emerson
Product Name	RTM-ATCA-SXXX
Serial Number	AAALYMMssss (See note *2)
Part Number	0106828G01A

*1. Manufacturing time is defined as 'minutes since 1/1/96' in the IPMI FRU spec.

*2. Serial Number format: AAALYMMssss

AAA = 401 part code (denotes RTM-ATCA-SXXX)

L =Location of manufacturer (S)

Y = Calendar year of manufacturer (2008 = 8)

MM = Calendar month of manufacturer (March = 03)

SSSS = Sequence number (reset each month) (1234)

14.2.1 RTM e-Keying Port Assignments

Port #	Port Name	Link type	Link type extension	RTM Pin groups
1	unused			
2	unused			
2	PCIe Lane0	AMC.1 PCI Express type 8	0, Gen1	J33 A1,B1, C1, D1
3	PCIe Lane1	AMC.1 PCI Express type 8	0, Gen1	J33 A2,B2, C2, D2
4	PCIe Lane2	AMC.1 PCI Express type 8	0, Gen1	J33 A3,B3, C3, D3
5	PCIe Lane3	AMC.1 PCI Express type 8	0, Gen1	J33 A4,B4, C4, D4
6	PCIe Lane4	AMC.1 PCI Express type 8	0, Gen1	J33 A5,B5, C5, D5
7	PCIe Lane5	AMC.1 PCI Express type 8	0, Gen1	J33 A6,B6, C6, D6
8	PCIe Lane6	AMC.1 PCI Express type 8	0, Gen1	J33 A7,B7, C7, D7
9	PCIe Lane7	AMC.1 PCI Express type 8	0, Gen1	J33 A8,B8, C8, D8
10	SAS_0	AMC.3 Storage signaling		J32-A2, B2, C2, D2
11	SAS_1	AMC.3 Storage signaling		J32-A3, B3, C3, D3

12	SAS_2	AMC.3 Storage signaling		J32-A4, B4, C4, D4
13	SAS_3	AMC.3 Storage signaling		J32-A5, B5, C5, D5
14	AMC1_EO_12			J31 C1,D1, E1, F1
15	AMC1_EO_13			J31 A1,B1, E2, F2
16	AMC1_EO_14			J31 A2,B2, C2, D2
17	AMC1_EO_15			J31 C3,D3, E3, F3
18	AMC1_EO_16			J31 A3,B3, E4, F4
19	AMC1_EO_17			J31 A4, B4, C4, D4
20	AMC1_EO_18			J31 C5, D5, E5, F5
21	AMC1_EO_19			J31 A5, B5, E6, F6
22-31	unused			

14.3 Supported IPMI Commands

The MMC communicates with the carrier controller through the local IPMB-L bus of the carrier and responds to all mandatory commands for AMC Module Management Controllers (as defined in the RTM Specification), as well as some optional ones.

Table 76 Supported IPMI Commands

Command	IPMI/PICMG/AMC Spec	NetFn	CMD	MMC Req
IPM Device "Global" Commands				
Get Device ID	17.1	App	01h	Mandatory
Broadcast "Get Device ID"	17.9	App	01h	Mandatory
Messaging Commands				
Send Message	18.7	App	34h	Optional
Event Commands				
Platform Event	23.3	S/E	02h	Mandatory
Sensor Device Commands				
Get Device SDR Info	29.2	S/E	20h	Mandatory
Get Device SDR	29.3	S/E	21h	Mandatory
Reserve Device SDR Repository	29.4	S/E	22h	Mandatory
Get Sensor Reading Factors	29.5	S/E	23h	Optional
Set Sensor Hysteresis	29.6	S/E	24h	Optional
Get Sensor Hysteresis	29.7	S/E	25h	Optional
Set Sensor Threshold	29.8	S/E	26h	Optional
Get Sensor Threshold	29.9	S/E	27h	Optional
Set Sensor Event Enable	29.10	S/E	28h	Optional
Get Sensor Event Enable	29.11	S/E	29h	Optional
Rearm Sensor Events	29.12	S/E	2Ah	Optional
Get Sensor Event Status	29.13	S/E	2Bh	Optional
Get Sensor Reading	29.14	S/E	2Dh	Mandatory
FRU Device Commands				
Get FRU Inventory Area Info	28.1	Storage	10h	Mandatory
Read FRU Data	28.2	Storage	11h	Mandatory
Write FRU Data	28.3	Storage	12h	Mandatory
ATCA™ Commands				
Get PICMG Properties	3-9	PICMG	00h	Mandatory
FRU Control	3-22	PICMG	04h	Mandatory
Get FRU LED Properties	3-24	PICMG	05h	Mandatory
Get LED Color Capabilities	3-25	PICMG	06h	Mandatory
Set FRU LED State	3-26	PICMG	07h	Mandatory
Get FRU LED State	3-27	PICMG	08h	Mandatory
Get Device Locator Record ID	3-29	PICMG	0Dh	Mandatory
AMC® Commands				
Set AMC Port State	3-27	PICMG	19h	Mandatory
Get AMC Port State	3-28	PICMG	1Ah	Mandatory

15 IPMC Firmware Upgrade Procedure

This chapter provides the instruction for upgrading the IPMC (Intelligent Platform Management controller) firmware. If the ATCA-S201 requires new firmware, an upgrade can be performed remotely using a LAN connection to the self manager.

15.1 The ipmitool utility

Firmware upgrades are accomplished with **ipmitool**, a utility for managing IPMI-enabled devices. The utility is an open source derivative which is modified by the shelf management supplier.

The ATCA-S201 keeps a redundant copy of the firmware in the FLASH. Upgrades are reliable and reversible. A failure in the download (error or interruption) does not disturb the IPMC's ability to continue using the "old" firmware or its ability to restart the download process. The IPMC automatically fails back to the previous firmware if there is a problem when first running new code.

SYNOPSIS

The minimum information to complete a firmware upgrade is documented here.

```
$ ipmitool [-I|-H|-T|-B|-t|-b] hpm upgrade <firmware_file>
$ ipmitool [-I|-H|-T|-B|-t|-b] hpm activate
```

DESCRIPTION

ipmitool lets you manage Intelligent Platform Management Interface (IPMI) functions of either a local or remote system using IPMI V1.5 and IPMI v2.0. Capabilities include printing FRU data, LAN configuration, sensor readings, and remote power control.

OPTIONS

Table 77 ipmitool options relevant to firmware upgrades

Option	Description
-I <*interface*>	Selects IPMI interface to use. Supported interfaces that are compiled in are visible in the usage help output. Use **lan** to designate Ethernet.
-H <*address*>	Remote server address, can be IP address or hostname. This option is required for *lan* interfaces.
-T <*address*>	If updating AMC, use this to specify optional bus address of the bridge device (ex: Carrier IPMB-0 address if updating an AMC)
-B <*bus id*>	If updating an AMC, these this optional bus ID of the Bridge device (ex: 0 if updating through a IPMC
-t <*address*>	IPMB-L address of the final target
-b <*bus id*>	bus ID of the final target [0=IPMB-0(IPMC), 7=IPMB-L(AMC)]

COMMAND SYNTAX EXAMPLES

EXAMPLE 1. The following example shows the command sequence for firmware upgrade of an AMC installed on a carrier:

```
$ ipmitool -I lan -H 192.168.0.2 -T 0x82 -B 0 -t 0x74 -b 7 hpm upgrade
hpm1fw.img
$ ipmitool -I lan -H 192.168.0.2 -T 0x82 -B 0 -t 0x74 -b 7 hpm activate
```

Line 1 puts the new firmware in the flash device, where hpm1fw.img is the image. Line 2 is used to dynamically load and activate the new firmware.

EXAMPLE 2. The following example shows the command performing firmware upgrade on the carrier itself:

```
$ ipmitool -I lan -H 192.168.0.2 -t 0x82 -b 0 hpm upgrade hpm1fw.img
$ ipmitool -I lan -H 192.168.0.2 -t 0x82 -b 0 hpm activate
```

Line 1 puts the new firmware in the flash device, where hpm1fw.img is the image. Line 2 is used to dynamically load and activate the new firmware.

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