Sun Netra™ CP3240 Switch Installation Guide

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Preface

The *Sun Netra CP3240 Switch Installation Guide* describes the installation and configuration of the Sun Netra CP3240 switch. This guide also includes information about software, environment specifications, connectors, and certifications.

Before You Read This Document

Obtain and read the following documents:

- *Sun Netra CP3x40 Switch Safety and Compliance Manual* (820-3505)
- *Sun Netra CP3240 Switch Product Notes* (820-3260)

How This Document Is Organized

Chapter 1 provides unpacking instructions and initial setup information for the switch. It provides information and procedures needed to install and make the Sun Netra CP3240 switch operational.

Chapter 2 introduces the key features of the switch. This chapter includes a product definition, a list of product features, and a functional block diagram with a brief description of each block. This chapter can be used to compare the features of the switch against the needs of a specific application.

Chapter 3 describes the jumper settings on the switch. This chapter details factory default settings and provides information about tailoring the board to the needs of specific applications.

Chapter 4 describes the software packages running on the switch. This section serves as a primer for using the software on the switch.

Appendix A contains the electrical, environmental, and mechanical specifications for the switch.

Appendix B This appendix provides a connector location illustration and connector pin out tables. A detailed description and pin out for each connector is given.

Appendix C provides links to websites with information about many of the devices and technologies used in the switch.

Appendix D presents UL, CE, and FCC agency approval and certification information for the switch.

Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

Note – Characters display differently depending on browser settings. If characters do not display correctly, change the character encoding in your browser to Unicode UTF-8.

Related Documentation

The following table lists the documentation for this product. The online documentation is available at:

`http://docs.sun.com/app/docs/prod/cp3240.switch?l=en#hic`

Application	Title	Part Number	Format	Location
Latest information	*Sun Netra CP3x40 Switch Product Notes*	820-3260-*xx*	PDF	Online
Ponter doc	*Sun Netra CP3240 Switch Getting Started Guide*	820-3254-*xx*	Printed	Shipping Kit
Usage	*Sun Netra CP3240 Switch User's Guide*	820-3252-*xx*	PDF	Online
Reference	*Sun Netra CP3240 Switch Software Reference Manual*	820-3253-*xx*	PDF	Online
AMC Ponter doc	*Sun Netra CP3240 Advanced Mezzanine Card Getting Started Guide*	820-7260-*xx*	Printed	Shipping Kit
AMC Installation	*Sun Netra CP3240 Advanced Mezzanine Card 10G Copper User's Guide*	820-7261-*xx*	PDF	Online
AMC Installation	*Sun Netra CP3240 Advanced Mezzanine Card 10G Optic User's Guide*	820-7262-*xx*	PDF	Online
AMC Reference	*Sun Netra CP3240 Advanced Mezzanine Card LED User's Guide*	820-7263-*xx*	PDF	Online
Safety	*Sun Netra CP3x40 Switch Safety and Compliance Manual*	820-3505-*xx*	PDF	Online

The following table lists the documentation that is related to this product. The online documentation is available at:

`http://docs.sun.com/app/docs/prod/n900.srvr#hic`

Application	Title	Part Number	Format	Location
Latest information	*Netra CT 900 Server Product Notes*	819-1180-*xx*	PDF	Online
Pointer Doc	*Netra CT 900 Server Getting Started Guide*	819-1173-*xx*	Printed	Shipping kit
Overview	*Netra CT 900 Server Overview*	819-1174-*xx*	PDF	Online
Installation	*Netra CT 900 Server Installation Guide*	819-1175-*xx*	PDF	Online
Service	*Netra CT 900 Server Service Manual*	819-1176-*xx*	PDF	Online
Administration	*Netra CT 900 Server Administration and Reference Manual*	819-1177-*xx*	PDF	Online
Programming	*Netra CT 900 Software Developer's Guide*	819-1178-*xx*	PDF	Online
Safety	*Netra CT 900 Server Safety and Compliance Guide*	819-1179-*xx*	PDF	Online
Setup	*Netra CT 900 Server Hardware Setup Guide*	819-1647-*xx*	PDF	Online
Safety	*Important Safety Information for Sun Hardware Systems*	816-7190-*xx*	Printed	Shipping kit

Third-Party Web Sites

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Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

http://www.sun.com/hwdocs/feedback

Please include the title and part number of your document with your feedback:

Sun Netra CP3240 Switch Installation Guide, part number 820-3251-13.

Getting Started

This chapter provides information and procedures needed to install and make the Sun Netra CP3240 switch operational. This chapter should be read before using the board.

In addition to this chapter, refer to the following safety documentation:

- *Netra CP3X20 Switch Safety and Compliance Manual* (820-3505)
- *Important Safety Information for Sun Hardware Systems* (816-7190)

Caution – When the system is plugged in, energy hazards are present on the midplane. Do not reach into the enclosure.

Caution – Static electricity can damage electronic components. Wear a wrist strap grounded through one of the system's ESD ground jacks when removing and replacing hot-swappable components.

This chapter contains the following topics:

1.1 System Requirements

The following sections briefly describe the minimum system requirements and the configurable features. Links are provided to other chapters and appendices containing more detailed information.

1.1.1 Connectivity

The switch can work in any AdvancedTCA shelf. It is mainly designed to be used as hub blade, however, it can also operate a node or a full-mesh blade.

1.1.1.1 Hub Connectivity

In AdvancedTCA. the hub board defines the system, so it is important that it be put in the correct slot. In all shelves there are two slots specifically designated for hub boards, logical slots 1 and 2. If the slots are not labeled, these slots are easily identifiable because they have a larger number of Zone 2 connectors than the other slots (the only slots with all five Zone 2 connectors).

Base is always routed in a dual star. This means every node slot has a Base channel routed to each of the hub slots. Independent of how the Fabric is used, a hub board is always needed for Base. If full mesh node boards are used in a full mesh shelf, a hub board is not needed for Fabric.

1.1.2 Electrical and Environmental

The switch has the following power requirements:

TABLE 1-1 Power Requirements

State	Power in Watts (W)
Idle, no AMCs	45W
All ports linked with RTM, no AMCs	72W
All ports linked with RTM, heavy traffic, no AMCs	78W
Designed max power with 15W RTM, and 100W shared for all AMC sites	200W

The 48VDC has a tolerance of 0VDC to 75VDC without damage. The switch will operate when 48VDC is 36VDC to 72VDC, inclusive.

Caution – Any input voltage outside the range of 0VDC to 75VDC can damage the switch.

The switch requires air flow. A minimum of 100 LFM should be kept on the board at all times. If an RTM is being used, active RTM cooling is not required.

Caution – None of the integrated chips junction temperature should exceed 125˚C. The switch requires air flow to meet this requirement. Testing should be done in your shelf to find the quantity of air flow needed. 100 LFM is the recommended minimum quantity of air flow.

The switch might contain materials that require regulation upon disposal. Please dispose of this product in accordance with local rules and regulations. For disposal or recycling information, please contact your local authorities or the Electronic Industries Alliance at `http://www.eiae.org/`.

1.2 Unpacking

Check the shipping carton for damage. If the shipping carton or contents are damaged, notify the carrier and Sun. Retain the shipping carton and packing material for inspection by the carrier. Obtain authorization before returning any product to Sun. Refer to the *Netra CP3240 Switch Getting Started Guide* (820-3254) for return instructions.

Caution – This board must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the board. Wear a wrist strap grounded through one of the system's ESD ground jacks when installing or servicing system components.

1.3 Handling Switches

Caution – The system is sensitive to static electricity. To prevent damage to the assembly, always connect an antistatic wrist strap between you and the system.

Caution – Do not flex the switches; the surface-mounted components can break if the switch is bent.

To minimize the amount of switch flexing, observe the following precautions:

- When removing a switch from an electrostatic discharge bag, keep it vertical until you place the switch on the electrostatic discharge mat.
- Do not place a switch on a hard surface. Use a cushioned antistatic mat. The switch connectors and components have very thin pins that bend easily.
- Be careful of small parts located on the component side of a switch.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport a switch in an antistatic bag.

Caution – The heat sinks on a switch can be damaged by incorrect handling. Do not touch the heat sinks while installing or removing a switch. Hold a switch only by the edges. If a heat sink is loose or broken, obtain a replacement switch.

Caution – The heat sinks on a switch can be damaged by improper packaging. When storing or shipping a switch, ensure that the heat sinks have sufficient protection.

1.4 Connectors

The switch includes several connectors to interface to application-specific devices. Refer to the Chapter B for complete connector descriptions and pin outs.

1.5 Jumper Options

The switch provides several jumper configuration options for features. Location figures and descriptions are provided in Chapter 3.

1.6 Switch and RTM Faceplates

The following shows the Sun Netra CP3240 switch and the copper RTM (XCP3240H-RTM-CU-Z) and the fiber optic RTM (XCP3240H-RTM-OP-Z).

FIGURE 1-1   Switch and RTM Faceplates
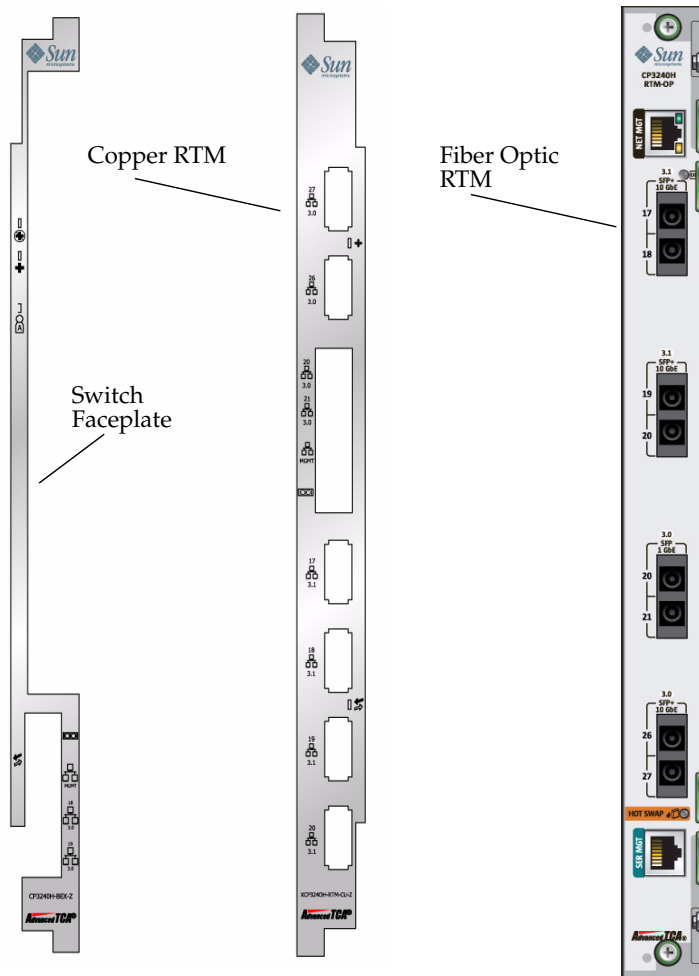
1.6.1　Base 10/100/1000 Uplink Ports (RJ-45)

There are two front panel Base 10/100/1000Base-T Ethernet uplink ports on the faceplate. They are ports number 18 and 19 on the Base network.

1.6.2　10/100 Management Port (RJ-45)

There is a 10/100 management Ethernet port on the faceplate. This port can be used to manage the Base and Fabric. This port and the 10/100 management port on the RTM can be used at the same time.

1.6.3　Serial Management Port (RJ-45)

There is a RS-232 serial management port on the faceplate. This port can be used to manage the Base and Fabric. See Section 4.4, "Serial Select" on page 4-8 for information about how to switch between managing the Base and the Fabric.

1.7　RTM Airflows

1.7.1　RTM Airflow Requirements

The following chart provides the RTM airflow requirements. No alarms are triggered at any of the listed temperatures for the given airflow.

TABLE 1-2　Airflow Requirements

Watts	m^3/min				CFM			
Power Level	25°C	28°C	40°C	55°C	25°C	28°C	40°C	55°C
25	0.07	0.07	0.14	0.14	2.5	2.5	5	5

1.7.2 RTM Pressure Drop Versus Airflows (Impedence Curves)

The following graphs plot the impedance curves for the RTMs, per PICMG 3.0 requirements.

FIGURE 1-2   Netra CP3240H-RTM-CU Airflow (Pa)
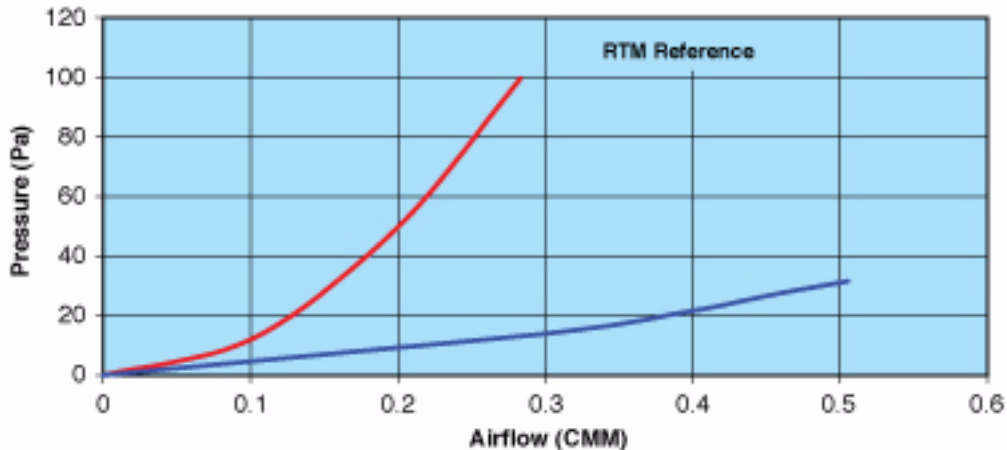
FIGURE 1-3   Netra CP3240H-RTM-CU Airflow (InchesH^{2}0)
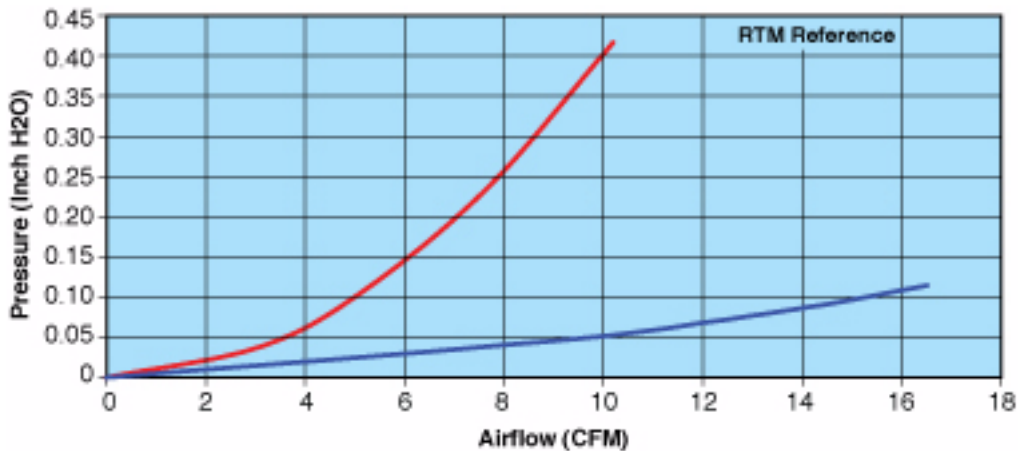
FIGURE 1-4   Netra CP3240H-RTM-OP Airflow (Pa)
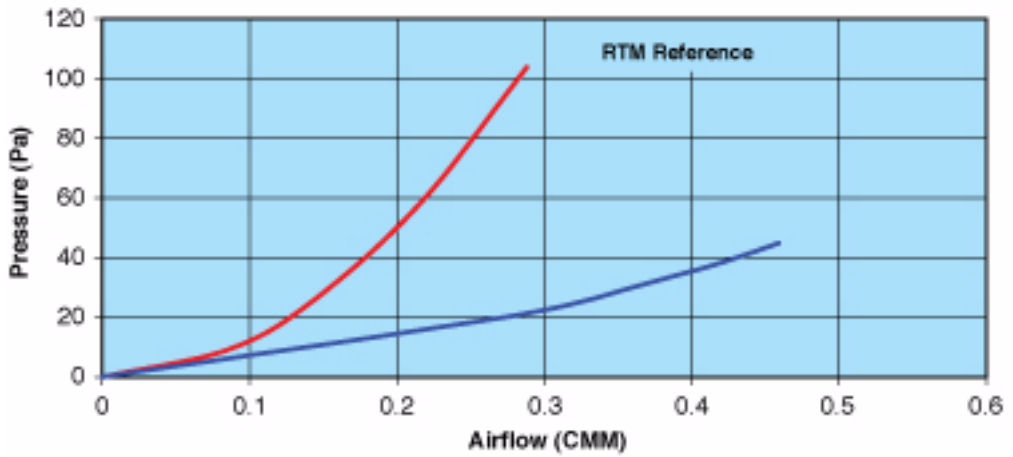
FIGURE 1-5   Netra CP3240H-RTM-OP Airflow (InchesH20)
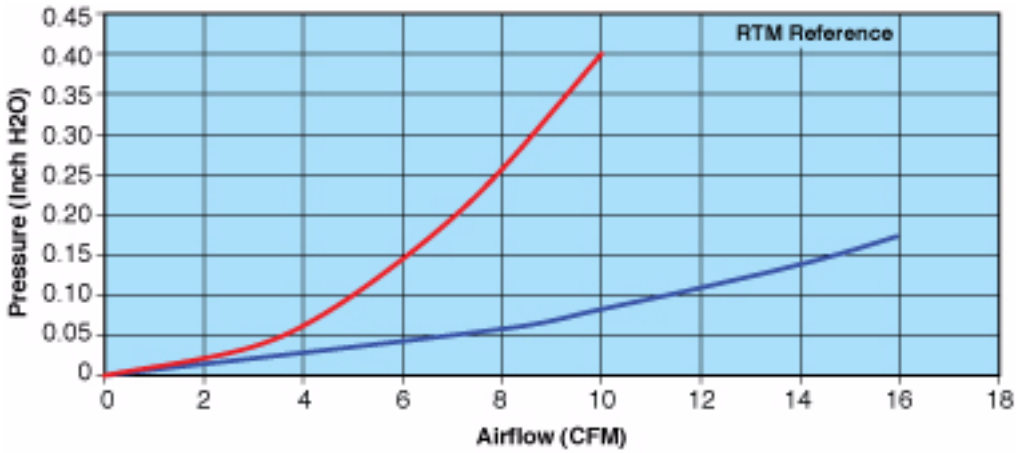
1.8 Removing and Installing Switches

This section describes how to remove and install switches.

If you are hot-swapping the rear transition module for a switch, you must remove the switch from the front of the system before removing the rear transition module from the rear of the system. Do not remove the rear transition module without first removing the accompanying switch from the front.

1.8.1 Removing a Switch Set

Following are the instructions for removing a switch and, if necessary, the accompanying rear transition module.

1.8.1.1 Removing a Switch From the Front of the Server

1. Move the front cable management bracket to the lower position (FIGURE 1-6**).**

FIGURE 1-6 Front Cable Management Bracket in Lower Position
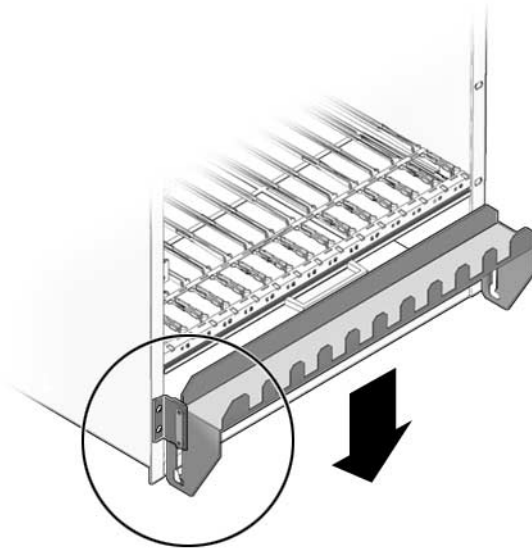
2. Disengage the injector/ejector mechanisms at the top and bottom of the board to notify software that the board is about to be removed. Wait for the Hot-Swap LED to light.

FIGURE 1-7 shows the proper way to remove or insert a hot-swappable board into a system.

FIGURE 1-7   Injector/Ejector on the Switch (Open Position)

injector/ejector mechanism
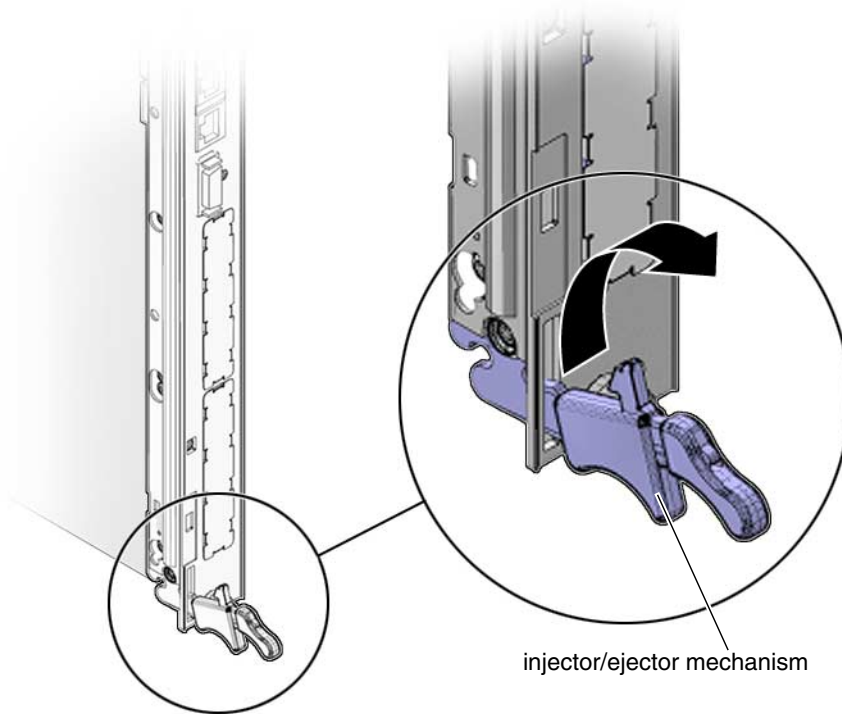
3. **Disconnect all cables connected to the switch.**

4. **Loosen the two board retention screws that fasten the board to the enclosure.**

5. **Open the ejectors fully, rotating the handles outward until the board disengages from the midplane.**

6. **Slide the board evenly out of the enclosure.**

7. **Determine if you are going to replace the rear transition module.**

   ■ If you are going to replace the rear transition module, go to "Removing a Rear Transition Module for a Switch" on page 1-13.

   ■ If you are not going to replace the rear transition module, you must install a replacement switch or a filler panel to maintain the enclosures shielding and cooling performance. Refer to Section 1.8.2.2, "Installing a Switch" on page 1-14.

Note – As long as the switch is removed from the slot, and the system is running with only the single remaining switch, you do not have redundancy for that component. Both switches must be installed and running to have redundancy for that component.

1.8.1.2　Removing a Rear Transition Module for a Switch

1. **Remove the switch from the front of the server, if you have not already done so.**

   Refer to "Removing a Switch From the Front of the Server" on page 1-11 for those instructions. Do not remove the rear transition module until you have first removed the switch.

   Note – Opening the handle on the RTM shuts down both the RTM and the switch.

2. **Disconnect any cables connected to the rear transition module for the switch.**

3. **Loosen any retention screws that fasten the module to the enclosure.**

4. **Open the ejectors fully, rotating the handles outward until the board disengages from the midplane.**

5. **Slide the module evenly out of the enclosure.**

6. **Install a replacement rear transition module or a filler panel to maintain the enclosure's shielding and cooling performance.**

   Refer to Section 1.8.2.1, "Installing the Rear Transition Module for a Switch" on page 1-14.

   Caution – Failure to cover all rear panel slots with rear transition modules or filler panels can negatively impact the cooling of the system.

1.8.2 Installing a Switch Set

If you have a rear-access server, you must install the rear transition module before installing the front switch.

- If you want to install the rear transition module, go to Section 1.8.2.1, "Installing the Rear Transition Module for a Switch" on page 1-14.
- If you want to install a switch, go to Section 1.8.2.2, "Installing a Switch" on page 1-14.

1.8.2.1 Installing the Rear Transition Module for a Switch

1. **Choose an appropriate slot for the rear transition module.**

   Rear transition modules must be installed inline behind the accompanying front board. For example, if the accompanying front board is installed in slot 7, its rear transition module must be installed at the back of the system in slot 7.

2. **Remove the filler panel, if necessary.**

3. **Prepare the rear transition module by opening its injector/ejector handles.**

4. **Carefully align the edges of the board with the guides in the slot.**

   Look into the enclosure to verify correct alignment of the rails in the guides.

   Caution – Do not force the module into the slot. If it does not fit properly, check to ensure that you have the correct matching RTM for the switch.

5. **Keeping the board aligned in the guides, slide the board in until the injector/ejector mechanisms engage the retention bar.**

6. **Simultaneously push in the board and rotate the injector/ejector handles to their closed positions (rotate inward) to seat the midplane connectors.**

7. **Tighten the board retention screws to anchor the board in the shelf.**

8. **Connect the cables to the rear transition module.**

1.8.2.2 Installing a Switch

1. **Locate the switch slots.**

   The switches can be inserted only in slot 7 or slot 8 in the Netra CT 900 server.

2. **Move the front cable management bracket to the lower position (**FIGURE 1-6**).**

3. **Remove the filler panel, if necessary.**

4. **Prepare the switch by opening its injector/ejector handles (**FIGURE 1-7**).**

5. **Carefully align the edges of the board with the guides in the slot.**

   Look into the enclosure to verify correct alignment of the rails in the guides.

6. **Keeping the board aligned in the guides, slide the board in until the injector/ejector mechanisms engage the retention bar.**

7. **Simultaneously push in the board and rotate the injector/ejector handles to their closed positions (rotate inward) to seat the midplane connectors.**

   If system power is on, the Hot-Swap LED should light up. The Hot-Swap LED should blink for several seconds, and then go off. If the Hot-Swap LED does not go off after several seconds, push harder on the injector/ejector handles to verify that they are pushed in all the way.

8. **Tighten the board retention screws to anchor the board in the shelf.**

9. **Connect the cables to the switch.**

1.9 Switch LEDs

The following sections give the status information for all of the LEDs on the switch.

- "ATCA Board Status LEDs" on page 1-15
- "Hot-Swap LED" on page 1-16

1.9.1 ATCA Board Status LEDs

TABLE 1-3 describes the three LEDs defined by ATCA to monitor board status.

TABLE 1-3 ATCA Board Status LEDs

LED	Color	Normal Operation	Description
OOS	Red	Off	Out of service. This LED lights on a critical switch error, such that the board should be removed.
OK	Green	On	This LED is lit when the switch is booted and switching
A	Amber	Off	Minor Error/User Defined. This LED can be defined by the user via software applicatons.

Note that both the OOS and MINOR LEDs are lit when the board is powered but not booted. This includes all Hot-Swap states M1 through M3. Refer to "Hot-Swap LED" on page 1-16.

1.9.2 Hot-Swap LED

This blue LED communicates the Hot-Swap status of the switch. TABLE 1-4 shows the different states of the Hot-Swap LED.

TABLE 1-4 Hot-Swap LED States

Order	Visible State	State	Description
1	Solid	M1 FRU Inactive	The Intelligent Platform Management Interface (IPMI) microcontroller is booted, but the payload is not. The bottom latch is not fully closed.
2	Blinking (from solid)	M2 Activation Request	The IPMI microcontroller has requested permission to boot the payload from the shelf management controller.
3	Off	M3-M4 Active	The IPMI microcontroller has received permission to boot the payload, and has done so. This should be the state under normal operation.
4	Blinking (from off)	M5-M6 Deactivation Request	The IPMI microcontroller has requested permission to shut down the payload. Opening the bottom latch activates this state.
Back to 1			

Note – A board should be hot-swapped only when the LED is solid blue.

Overview

This chapter introduces the key features of the switch and RTMs. This chapter includes a product definition, a list of product features, and functional block diagrams with brief descriptions. This chapter can be used to compare the features of the switch against the needs of a specific application.

This chapter contains the following topics:

2.1 Features

Part of Sun's ATCA platform, the Sun Netra CP3240 switch complies with PICMG 3.0 R2.0 ECN002 and PCIMG 3.1 Option 1 and Option 9. The Sun Netra CP3240 switch implements two separate switched networks on a single PCB. By separating the Base and Fabric networks, the Sun Netra CP3240 switch provides a separate control plane and data plane. It provides 1Gigabyte Ethernet switching on the 3.0 Base Fabric, and the 3.1 Expansion Fabric provides 1Gigabyte/10Gigabyte Ethernet switching. Both of these networks are fully managed with the robust FASTPATH management suite. Both networks support Layer 2 switching as well as Layer 3 routing.

The Sun Netra CP3240 switch can host three AdvancedMC mid-size modules. A variety of different AMC types can be used, including AMC.1, AMC.2, and AMC.3. Netra CP3240 switch supports connectivity to three AMCs and to RTMs with multiple 10Gigabyte-Ethernet links.

The XCP3240H-RTM-CU-Z (copper) and XCP3240H-RTM-OP-Z (fiber optic) are Sun's RTMs that are paired with the Sun Netra CP3240 switch.

The following sections briefly outline the features of the Sun Netra CP3240 switch.

2.1.1 General

- PICMG 3.0 AdvancedTCA form factor
- PICMG 3.0 R2.0 ECN002 compliant
- PICMG 3.0 compliant 10/100/1000Base-T Ethernet Base Fabric hub board
- PICMG 3.1 Option 1 (1000Base-BX) and Option 9 (10GBase-BX4) compliant Ethernet Expansion Fabric hub board
- Two separate subsystems providing two separate networks on a single PCB
- 14-slot shelf supported
- Manage both switches with a single serial port and Ethernet management port
- Low power < 100 watts under heavy load (without AMCs)
- Operates with or without an RTM
- Changeable RTM to support different technologies (for example, RJ-45 versus SFP, XFP versus CX4)
- AdvancedTCA and AdvancedMC IPMI support with Pigeon Point Systems BMR-H8S-AMCc Board Manager
- Dual-image IPMI firmware

2.1.2   Base Interface

- Broadcom BCM56503-based design
- Full gigabit non-blocking, wire-speed switching/routing
- Layer 2 switching
- Layer 3 routing
- 27 ports:
    - 14 10/100/1000Base-T Ethernet ports for node slots
    - 1 10/100/1000Base-T Ethernet port for redundant switch
    - 2 10/100/1000Base-T Ethernet ports for front panel access
    - 2 10/100/1000Base-T Ethernet ports for rear panel access (with RTM)
    - 3 1000Base-BX Ethernet ports for AMC sites (AMC.2 Type E1 compliant)
    - 1 10/100/1000Base-T Ethernet port primary shelf manager
    - 1 10/100Base-TX Ethernet port for redundant shelf manager (cross-connect)
    - 1 10GBase-BX4 Ethernet port to the redundant hub board via the Update Channel
    - 2 10GBase-CX4 Ethernet ports for rear-panel access (with RTM)
- 400MHz Freescale MPC8247 control CPU
- 256MB PC100 SDRAM
- 64MB on-board flash
- Hardware redundant flash for guaranteed flash recovery
- 10/100BaseTX out-of-band management Ethernet port
- Front- and rear-access RJ-45 serial management port
- Full IPv6 support
- L2 and L3 Multicast support

2.1.3 Fabric Gigabit Interface

- Broadcom BCM56800-based design
- Full gigabit non-blocking, wire-speed switching/routing
- Layer 2 switching
- Layer 3 routing
- 20 total ports:
    - 14 10GBase-BX4 Ethernet ports for node slots
    - 1 10GBase-BX4 Ethernet port for redundant switch
    - 1 10GBase-BX4 for AMC site (AMC.2 Type 5)
    - 4 10GBase-CX4 for rear-panel access (with RTM)
- Auto-negotiation between 1GbE (1000Base-BX 3.1 Option 1) and 10GbE (10GbEBase-BX4 3.1 Option 9)
- 400MHz Freescale MPC8247 control CPU
- 256MB PC100 SDRAM
- 64MB on board flash
- Hardware redundant flash for guaranteed flash recovery
- 10/100BaseTX out-of-band RJ-45 management Ethernet port
- Front- and rear-access RJ-45 serial management port
- Full IPv6 support
- L2 and L3 multicast support

2.1.4   AMC Sites

- Site 1 1000Base-BX to 3.0 network (AMC port 0) is ethernet port 22
- Site 2 1000Base-BX to 3.0 network (AMC port 0) is ethernet port 23
- Site 2 10GBase-BX to 3.1 network (AMC port 8-11) is ethernet port 16
- Site 3 1000Base-BX to 3.0 network (AMC port 0) is ethernet port 24

Site 1: AMC.0 Mid-size, AMC.2 Type E1

- 1000Base-BX to 3.0 network (AMC port 0)
- AMC ports 4-7 connected to AMC site 2
- SAS/SATA ports routed between AMCs (AMC port 2-3)

Site 2: AMC.0 Mid-size, AMC.2 Type 5 and E1

- 10GBase-BX4 to 3.1 network (AMC port 8-11)
- 1000Base-BX to 3.0 network (AMC port 0)
- AMC ports 4-7 connected to AMC site 1
- SAS/SATA ports routed between AMCs (AMC port 2-3)

Site 3: AMC.0 Mid-size, AMC.2 Type E1

- 1 1000Base-BX to 3.0 network (AMC port 0)
- SAS/SATA ports routed between AMCs (AMC port 2-3)
- Update channel support for redundant master clock generators (AMC port 15)
- PCI-E Fabric clock support

2.2 Switch Components

The following sections list and describe key components of the Sun Netra CP3240 switch.

2.2.1 Broadcom StrataXGS 3 BCM56503 Ethernet Switch

The Sun Netra CP3240 switch uses Broadcom StrataXGS 3 BCM56503 for Base Ethernet switching/routing. This chip is an Ethernet switch with 24 1Gigabyte ports and 3 10Gigabyte ports. It provides non-blocking, wire-speed switching and routing on all ports under 100% load. The BCM56503 features many advanced features presented to the user via the FASTPATH software. See the Section 4.10, "FASTPATH" on page 4-18 for more information.

2.2.2 Broadcom StrataXGS 3 BCM56800 Ethernet Switch

The Sun Netra CP3240 switch uses Broadcom StrataXGS 3 BCM56800 for Fabric Ethernet switching/routing. This chip is an Ethernet switch with 20 10Gigabyte ports. It provides non-blocking, wire-speed switching and routing on all ports under 100% load. The BCM56800 features many advanced features presented to the user via the FASTPATH software. See Section 4.10, "FASTPATH" on page 4-18 for more information.

2.2.3 Broadcom BCM5464R and BCM5461S 10/100/1000Base-T Ethernet PHY

Quad and single ports respectively, the Broadcom PHYs provide the physical interfacing for 10/100/1000Base-T. They are low-power devices and provide features such as jumbo frames support, auto-MDIX, and cable testing.

2.2.4 Freescale PowerQUICC II MPC8247 Communications Processor

The Freescale MPC8247 is a microprocessor designed for maximum flexibility. It features a dual core architecture with a PPC G2 LE core and a RISC core controlling the peripherals. Running at 400MHz with only 1 watt of power, the MPC8247 provides high performance with incredibly low power consumption. Paired with the 256MB PC100 SDRAM and 64MB flash, the CPU subsystem of the Sun Netra CP3240 switch is more than enough to handle the switching application and future upgrades.

2.2.5 Pigeon Point BMR-H8S-AMCc AdvancedTCA IPMI Subsystem

The Sun Netra CP3240 switch uses the near-industry standard Pigeon Point Systems BMR-H8S-AMCc for dedicated IPMI management. It controls all interaction between the Sun Netra CP3240 switch and the shelf management controller. It fully supports the PICMG 3.0 R2.0 ECN002 and the AMC.0 R2.0 specifications. The BMC-H8S-AMCc provides all required management for the AMC modules, in addition to the voltage monitoring, temperature monitoring, e-Keying, and other services it provides for the Sun Netra CP3240 switch. Pigeon Point Systems is the leading provider of IPMI firmware for AdvancedTCA, and the firmware has been thoroughly tested to be fully compliant with the specification.

2.3 Protocols, RFCs, and MIBs Support

The Sun Netra CP3240 switch features Level7 FastPath 2340 switching software, version 4.4.4 and newer. This software provides layer 2 switching, quality of service, IPv4 routing, IPv6 routing, and IP multicast.

2.3.1 FASTPATH Switching

- IEEE 802.1ab—Link Level Discovery
- IEEE 802.1D—Spanning Tree
- IEEE 802.1p—Ethernet Priority with User Provisioning and Mapping
- IEEE 802.1Q—Virtual LANs with Port-based VLANs
- IEEE 802.1S—Multiple Spanning Tree
- IEEE 802.1v—Protocol-based VLANs
- IEEE 802.1W—Rapid Spanning Tree
- IEEE 802.1X—Port-based Authentication
- IEEE 802.3—10 Base-T
- IEEE 802.3ab—1000 Base-T
- IEEE 802.3ac—VLAN Tagging
- IEEE 802.3ad—Link Aggregation
- IEEE 802.3ae—10 Gigabyte
- IEEE 802.3u—100 Base-T
- GARP—Generic Attribute Registration Protocol: Clause 12, 802.1D-2004
- GMRP—Dynamic L2 Multicast Registration: Clause 10, 802.1D-2004
- GVRP—Dynamic VLAN Registration: Clause 11.2, 802.1Q-2003
- IEEE 802.3x—Flow Control
- draft-ietf-magma-snoop-10.txt—Considerations for IGMP and MLD Snooping Switches

2.3.1.1 Additional Layer 2 Functionality

- Broadcast/Multicast/Unknown Unicast storm recovery
- Double VLAN/vMAN tagging
- DHCP filtering
- Jumbo Ethernet frames
- Many-to-one port mirroring (Tx, Rx, both)
- Static MAC filtering
- MAC-based VLANs
- IP subnet-based VLANs
- Port description
- Protected ports
- Network and host DoS attack suppression

2.3.1.2 System Facilities

- Event and Error Logging Facility
- Run-time and configuration download capability
- PING utility
- XMODEM
- RFC 768—UDP
- RFC 783—TFTP
- RFC 791—IP
- RFC 792—ICMP
- RFC 793—TCP
- RFC 951—BootP
- RFC 1321—Message Digest Algorithm
- RFC 1534—Interoperation between BootP and DHCP
- RFC 2030—Simple Network Time Protocol (SNTP) V4 for IPv4, IPv6, and OSI
- RFC 2131—DHCP client/server
- RFC 2132—DHCP options and BootP vendor extensions
- RFC 2865—RADIUS client
- RFC 2866—RADIUS accounting
- RFC 2868—RADIUS attributes for Tunnel protocol support
- RFC 2869—RADIUS extensions
- rfc2869bis—RADIUS support for Extensible Authentication Protocol (EAP)

- RFC 3164—BSD Syslog protocol
- RFC 3396—Encoding long options in the Dynamic Host Configuration Protocol (DHCPv4)
- RFC 3580—802.1X RADIUS usage guidelines

2.3.1.3   Switching MIBs

- RFC 1213 — MIB-II
- RFC 1493 — Bridge MIB
- RFC 1643 — Ethernet-like MIB
- RFC 2233 — The Interfaces Group MIB using SMI v2
- RFC 2618 — RADIUS authentication client MIB
- RFC 2620 — RADIUS accounting MIB
- RFC 2674 — VLAN MIB
- RFC 2737—Entity MIB version 2
- RFC 2819—RMON groups 1, 2, 3 and 9
- RFC 3291—Textual conventions for Internet Network Addresses
- RFC 3635—Definitions of managed objects for the Ethernet-like interface types
- IEEE 802.1X MIB (IEEE802.1-PAE-MIB)
- IEEE 802.3AD MIB (IEEE802.3-AD-MIB)
- FASTPATH Enterprise MIBs supporting switching features

2.3.1.4   Routing MIBs

- RFC 1724—RIP v2 MIB extension
- RFC 1850—OSPF MIB
- RFC 2096—IP forwarding table MIB
- RFC 2787—VRRP MIB
- RFC 2863—The Interfaces Group MIB
- FASTPATH Enterprise MIBs supporting routing features

2.3.2 FASTPATH Routing

- RFC 826—Ethernet ARP
- RFC 894—Transmission of IP Datagrams over Ethernet networks
- RFC 896—Congestion control in IP/TCP networks
- RFC 919—IP Broadcast
- RFC 922—IP Broadcast in the presence of subnets
- RFC 950—IP subnetting
- RFC 1027—Using ARP to implement Transparent Subnet Gateways (proxy ARP)
- RFC 1058—RIP v1
- RFC 1256—ICMP router discovery messages
- RFC 1321—Message Digest Algorithm
- RFC 1765—OSPF database overflow
- RFC 1812—Requirements for IP version 4 routers
- RFC 2082—RIP-2 MD5 authentication
- RFC 2131—DHCP relay
- RFC 2328—OSPFv2 (FASTPATH supports Broadcast interfaces.)
- RFC 2453—RIP v2
- RFC 3046—DHCP/BootP relay
- RFC 3101—OSPF "Not So Stubby Area" (NSSA) option
- RFC 3768—Virtual Router Redundancy Protocol
- Route redistribution across RIP and OSPF
- VLAN routing
- Weighted static routes

2.3.3 FASTPATH Quality of Service

2.3.3.1 DiffServ

- RFC 2474—Definition of the Differentiated Services field (DS field) in the IPv4 and IPv6 headers
- RFC 2475—Architecture for differentiated services
- RFC 2597—Assured Forwarding PHB Group
- RFC 3246—Expedited forwarding PHB (Per-Hop Behavior)
- RFC 3260—New terminology and clarifications for DiffServ

Optional policy attributes:

- Assign matching traffic flow to a specific queue
- Redirect or mirror (flow-based mirroring) matching traffic flow to a specific port

2.3.3.2 Access Control Lists (ACLs)

Permit/Deny actions for inbound or outbound IP traffic classification based on:

- Type of Service (TOS) or Differentiated Services (DS) DSCP field
- Source IP address
- Destination IP address
- TCP/UDP source port
- TCP/UDP destination port
- IP protocol number

Permit/Deny actions for inbound or outbound Layer 2 traffic classification based on:

- Source MAC address
- Destination MAC address
- Ethertype
- 802.1p user priority (outer and/or inner VLAN tag)
- VLAN identifier value or range (outer and/or inner VLAN tag)

Optional rule attributes:

- Assign matching traffic flow to a specific queue
- Redirect or mirror (flow-based mirroring) matching traffic flow to a specific port
- Generate trap log entries (ACL logging) containing rule hit counts

2.3.3.3 Class of Service (CoS)

Direct user configuration of the following:

- IP DSCP to traffic-class mapping
- Interface trust mode: 802.1p, IP DSCP, or untrusted
- Interface traffic-shaping rate
- Minimum and maximum bandwidth per queue
- Strict priority versus weighted (WRR/WFQ) scheduling per queue
- Tail drop versus weighted random early detection (WRED) queue depth management

2.3.3.4 Quality of Service MIBs

- RFC 3289—MIB for the Differentiated Services Architecture (read-only)
- Private MIBs for full configuration of DiffServ, ACL, and CoS functionality

2.3.4 FASTPATH Multicast

- RFC 1112—Host Extensions for IP multicasting
- RFC 2236—IGMPv2
- RFC 2362—PIM-SM
- RFC 2365—Administratively scoped boundaries
- RFC 3376—IGMPv3
- IP multicast traceroute
- Draft-ietf-pim-v2-dm-03—PIM-DM
- Draft-ietf-idmr-dvmrp-v3-10—DVMRP
- Static RP configuration
- Draft-holbrook-idmr-igmpv3-ssm-08.txt—IGMPv3/MLDv2 for SSM
- Draft ietf-magma-igmp-proxy-06.txt—IGMP/MLD-based multicast forwarding (IGMP/MLD Pproxying)
- Draft ietf-smm-arch-06.txt—Source specific multicast for IP
- Draft ietf-magma-igmpv3-and-routing-05.txt—IGMPv3 and Multicast Routing Protocol interaction

2.3.4.1 Multicast MIBs

- RFC 2932—IPv4 multicast routing MIB
- RFC 2933—IGMP MIB
- RFC 2934—PIM MIB for IPv4
- Draft-ietf-magma-mgmd-mib-03.txt—Multicast Group Membership Discovery MIB
- Draft-ietf-idmr-dvmrp-mib-11.txt—DVMRP MIB
- IANA-RTP-PROTO-MIB
- FASTPATH Enterprise MIBs supporting multicast features

2.3.5 FASTPATH IPv6 Routing

- RFC 1981—Path MTU for IPv6
- RFC 2373—IPv6 addressing
- RFC 2460—IPv6 protocol specification
- RFC 2461—Neighbor discovery
- RFC 2462—Stateless autoconfiguration
- RFC 2463—ICMPv6
- RFC 2464—IPv6 over Ethernet
- RFC 2711—IPv6 router alert
- RFC 2740—OSPFv3 (FASTPATH supports Broadcast and Point-to-Point interfaces.)
- RFC 2893—Transition mechanisms for IPv6 hosts and routers (6over4 configured)
- RFC 3315—DHCPv6 (stateless + relay)
- RFC 3484—Default address selection for IPv6
- RFC 3493—Basic Socket Interface for IPv6
- RFC 3513—Addressing architecture for IPv6
- RFC 3542—Advanced Sockets API for IPv6
- RFC 3587—IPv6 Global Unicast Address format
- RFC 3736—Stateless DHCPv6
- Dual IPv4/IPv6 TCP/IP stack

2.3.5.1   IPv6 Routing MIBs

- RFC 2465—IPv6 MIB
- RFC 2466—ICMPv6 MIB
- FASTPATH Enterprise MIBs supporting IPv6 features

2.3.6   FASTPATH Management

- RFC 854—Telnet
- RFC 855—Telnet option specifications
- RFC 1155—SMI v1
- RFC 1157—SNMP
- RFC 1212—Concise MIB definitions
- RFC 1867—HTML/2.0 forms with file upload extensions
- RFC 1901—Community based SNMP v2
- RFC 1908—Coexistence between SNMP v1 and SNMP v2
- RFC 2068—HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03
- RFC 2271—SNMP framework MIB
- RFC 2295—Transparent content negotiation
- RFC 2296—Remote variant selection; RSVA/1.0 state management cookies draft-ietf-http-state-mgmt-05
- RFC 2570—Introduction to SNMPv3
- RFC 2576—Coexistence between SNMP v1, v2 and v3
- RFC 2578—SMI v2
- RFC 2579—Textual conventions for SMI v2
- RFC 2580—Conformance statements for SMI v2
- RFC 3410—Introduction and applicability statements for Internet-Standard Management Framework
- RFC 3411—Architecture for describing SNMP management frameworks
- RFC 3412—Message processing and dispatching for SNMP
- RFC 3413—SNMP applications
- RFC 3414—User-based security model for SNMP v3
- RFC 3415—View-based access control model for SNMP
- RFC 3416—Version 2 of the protocol operations for SNMP

- RFC 3417—Transport mappings for SNMP
- RFC 3418—MIB for SNMP
- Configurable management VLAN

2.3.6.1 SSL 3.0 and TLS 1.0

- RFC 2246—TLS protocol, version 1.0
- RFC 2346—AES Ciphersuites for transport layer security
- RFC 2818—HTTP over TLS

2.3.6.2 SSH 1.5 and 2.0

- Draft-ietf-secsh-transport-16—SSH Transport Layer Protocol
- Draft-ietf-secsh-userauth-17—SSH Authentication Protocol
- Draft-ietf-secsh-connect-17—SSH Connection Protocol
- Draft-ietf-secsh-architecture-14—SSH protocol architecture
- Draft-ietf-secsh-publickeyfile-03—SECSH Public Key File format
- Draft-ietf-secsh-dh-group-exchange-04—Diffie-Hellman Group Exchange for the SSH Transport Layer Protocol
- HTML 4.0 Specification—December, 1997
- Java and Java Script 1.3

2.3.6.3 Additional Management Features

- Industry Standard CLI with the following features:
  - Scripting capability
  - Command completion
  - Context sensitive help
- User password encryption
- Multi-session Telnet server
- TACACS+
- Dual firmware image support

2.4 Functional Diagrams and Port Maps

2.4.1 Switch

FIGURE 2-1   Switch Functional Block Diagram
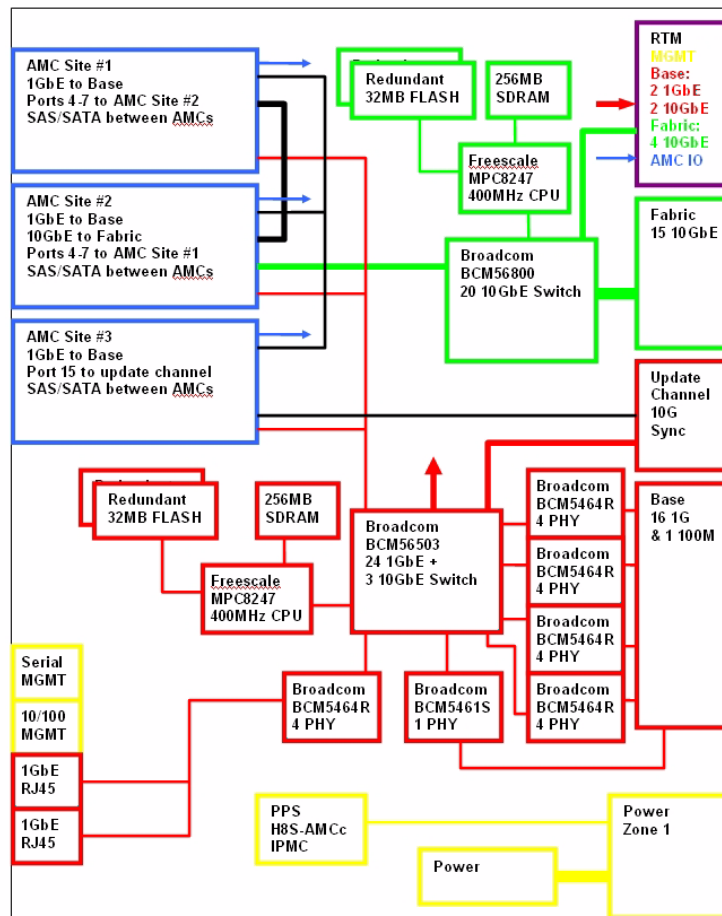
TABLE 2-1   Switch External Ports

Front Panel	Port Type	Fiber Optic AMC	Module	Logical Port	Comments
RJ-45 #1	Serial RS-232	RS-232	RJ-45		
RJ-45 #2	Management	10/100 Base T	RJ-45		
RJ-45 #3	Base 1GBE	10/100/1000Base T	RJ-45	Base - 18	Standard I/F is copper
RJ-45 #4	Base 1GBE	10/100/1000Base T	RJ-45	Base - 19	Standard I/F is copper

2.4.2   Rear Transition Modules (RTM)s

The Sun Netra CP3240 switch supports RTMs through ATCA Zone 3 connectors (see TABLE 2-2). The Sun Netra CP3240 switch was designed to support multiple RTM designs.

4 Fabric 10Gigabyte, 2 Base 10Gigabyte, 2 Base 1Gigabyte, AMC I/O, and management ports are run to the RTM. Several voltage rails are supplied, and all of the signals needed to design an ECN002 compliant RTM are present.

TABLE 2-2   Zone 3 RTM Ports

Base Ports	1G Infrastructure	10G Infrastructure
Base Port 20	1G SGMII	None
Base Port 21	1G SGMII	None
Base Port 26	None	10G XAUI
Base Port 27	None	10G XAUI
Fabirc Port 17	1G SGMII	10G XAUI
Fabirc Port 18	1G SGMII	10G XAUI
Fabirc Port 19	1G SGMII	10G XAUI
Fabirc Port 20	1G SGMII	10G XAUI

The Sun Netra CP3240 switch is paired with either a copper or fiber optic RTM. The following sections describe each RTM.

2.4.2.1 Copper RTM

The XCP3240H-RTM-CU-Z is the Sun Netra CP3240 switch's copper RTM pairing. This RTM supports all the ports the Sun Netra CP3240 switch provides using 10GBase-CX4 for the 10Gigabyte and 10/100/1000Base-T for the 1Gigabyte ports.

FIGURE 2-2   Copper RTM Functional Block Diagram
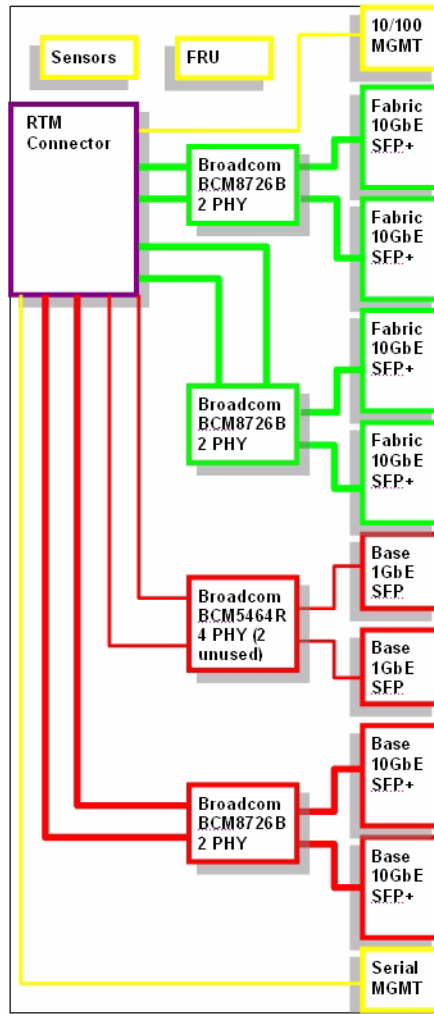
TABLE 2-3   Copper RTM External Ports

Port Type	RTM	Module	Logical Port	Comments
Base 10GBE	XAUI	CX4	Base - 27	
Base 10GBE	XAUI	CX4	Base - 26	
Base 1GBE	10/100/1000Base T	RJ-45	Base - 20	Standard I/F is copper
Base 1GBE	10/100/1000Base T	RJ-45	Base - 21	Standard I/F is copper
Management	10/100 Base T	RJ-45		
Serial RS-232	RS-232	RJ-45		
Fabric 10GBE	XAUI	CX4	Fabric - 17	
Fabric 10GBE	XAUI	CX4	Fabric - 18	
Fabric 10GBE	XAUI	CX4	Fabric - 19	
Fabric 10GBE	XAUI	CX4	Fabric - 20	

TABLE 2-4   Copper RTM Port Restrictions

Port	1G Infrastructure	1G Port	10G Infrastructure	10G Port
Base Port 20	SERDES	1000Base-T RJ45	None	None
Base Port 21	SERDES	1000Base-T RJ45	None	None
Base Port 26	None	None	XAUI	10GBase-CX4
Base Port 27	None	None	XAUI	10GBase-CX4
Fabirc Port 17	None	None	XAUI	10GBase-CX4
Fabirc Port 18	None	None	XAUI	10GBase-CX4
Fabirc Port 19	None	None	XAUI	10GBase-CX4
Fabirc Port 19	None	None	XAUI	10GBase-CX4
Fabirc Port 20	None	None	XAUI	10GBase-CX4

2.4.2.2 Fiber Optic RTM

The XCP3240H-RTM-OP-Z is the Sun Netra CP3240 switch's fiber optic RTM pairing. This RTM supports all the ports the Netra CP3240 switch provides using 10GBase-X for the 10Gigabyte and 1000Base-X for the 1Gigabyte ports.

FIGURE 2-3   Fiber Optic RTM Functional Block Diagram
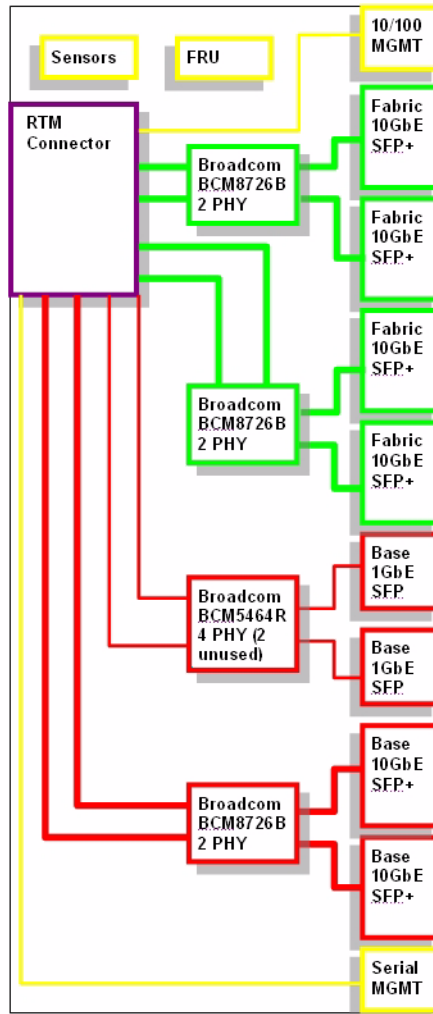
TABLE 2-5   Fiber Optic External RTM Ports

Port Type	Fiber Optic RTM	Module	Logical Port	Comments
Management	10/100 Base T	RJ-45		Not a module, 10/100Base T
Base 10GBE	10GBase-X	SFP+	Base - 27	Cannot Support 1G Operation
Base 10GBE	10GBase-X	SFP+	Base - 26	Cannot Support 1G Operation
Base 1GBE	1000Base-X	SFP	Base - 20	Can Support 1G SFP Copper
Base 1GBE	1000Base-X	SFP	Base - 21	Can Support 1G SFP Copper
Serial RS-232	10GBase-X	SFP+	Fabric - 17	Can Support 1G SFP Copper
Fabric 10GBE	10GBase-X	SFP+	Fabric - 18	Can Support 1G SFP Copper
Fabric 10GBE	10GBase-X	SFP+	Fabric - 19	Can Support 1G SFP Copper
Fabric 10GBE	10GBase-X	SFP+	Fabric - 20	Can Support 1G SFP Copper
Serial RS-232	Serial RS232	RJ-45		Not a module, RS232 Serial

Note – For enabling 1G operation of Fabric ports 17-20, see .

TABLE 2-6   Fiber Optic RTM Port Restrictions

Port	1G Infrastructure	1G Port	10G Infrastructure	10G Port
Base Port 20	SERDES	SFP LX SX	None	None
Base Port 21	SERDES	SFP LX SX	None	None
Base Port 26	None	None	XAUI	SFP+ LX SX LRM
Base Port 27	None	None	XAUI	SFP+ LX SX LRM
Fabric Port 17	SERDES	SFP LX SX	XAUI	SFP+ LX SX LRM
Fabric Port 18	SERDES	SFP LX SX	XAUI	SFP+ LX SX LRM
Fabric Port 19	SERDES	SFP LX SX	XAUI	SFP+ LX SX LRM
Fabric Port 20	SERDES	SFP LX SX	XAUI	SFP+ LX SX LRM

2.4.3 Base Fabric Switch Subsystem

FIGURE 2-4 Base Fabric Switch Subsystem
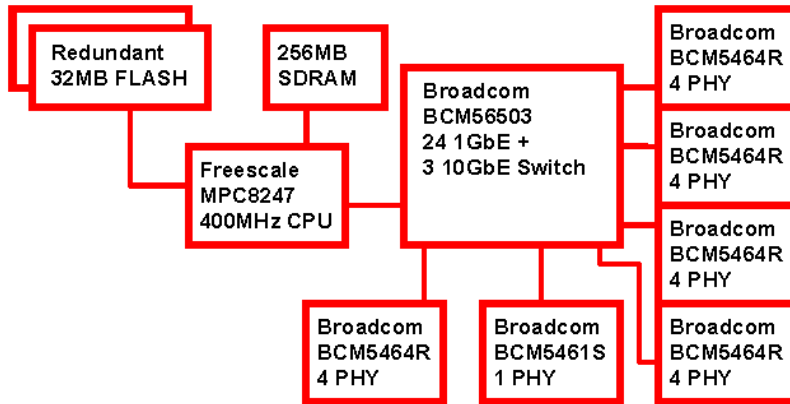
PICMG 3.0 AdvancedTCA defines 10/100/1000Base-T Ethernet over the Base Fabric, called "Base" in this guide. The Base is designed to be the control plane for the shelf. Scaling from 10Mbps to 1000Mbps, the Base interface can accommodate a wide variety of node boards. The Base interface on the Sun Netra CP3240 switch is based around three main components: the Broadcom BCM56503, the Broadcom BCM5464x, and the Freescale MPC8247.

2.4.4 Expansion Fabric Switch Subsystem

FIGURE 2-5 Expansion Fabric Switch Subsystem
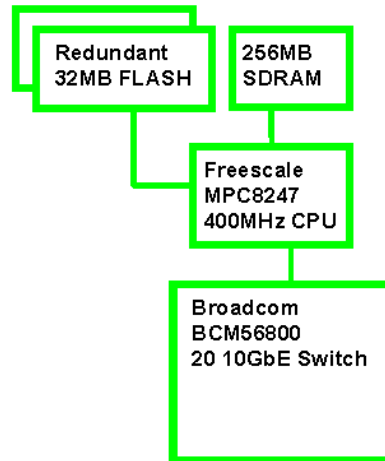
PICMG 3.0 AdvancedTCA provides an agnostic mesh on the backplane called the Expansion Fabric. This interface is the data plane in the shelf. The Expansion Fabric is called "Fabric" in this guide. This fabric can be several different technologies defined by AdvancedTCA sub-specifications. The Sun Netra CP3240 switch is designed to comply with *PICMG 3.1 Ethernet/Fibre Channel for AdvancedTCA Systems*, options 1 and option 9. That means the Sun Netra CP3240 switch provides a single 1/10Gigabyte port to each node board.

The Fabric uses 10GBase-BX4 Ethernet to provide connectivity between boards though the backplane. The Fabric can scale down to 1Gigabyte and work with 1000Base-BX boards. The Fabric subsystem is based around two main components: the Broadcom BCM56800 and the Freescale MPC8247.

2.4.5 AdvancedMC Sites

PICMG AdvancedMC AMC.0 defines hot-swappable daughter cards to be used in PICMG architectures. The Sun Netra CP3240 switch supports three AMC sites so that the functionality of the Sun Netra CP3240 switch can be expanded. AMC.2 (Ethernet) AMCs are supported with direct connections to the Base and Fabric subsystems. Other types of AMCs, such as AMC.1 (PCI-Express) or AMC.3 (SAS/SATA), can be used as well. Nearly any type of AMC can be supported, because the Sun Netra CP3240 switch connects the AMCs sites directly together on certain ports.

2.4.5.1 AMC Port Maps

FIGURE 2-6 AMC Port Map Diagram
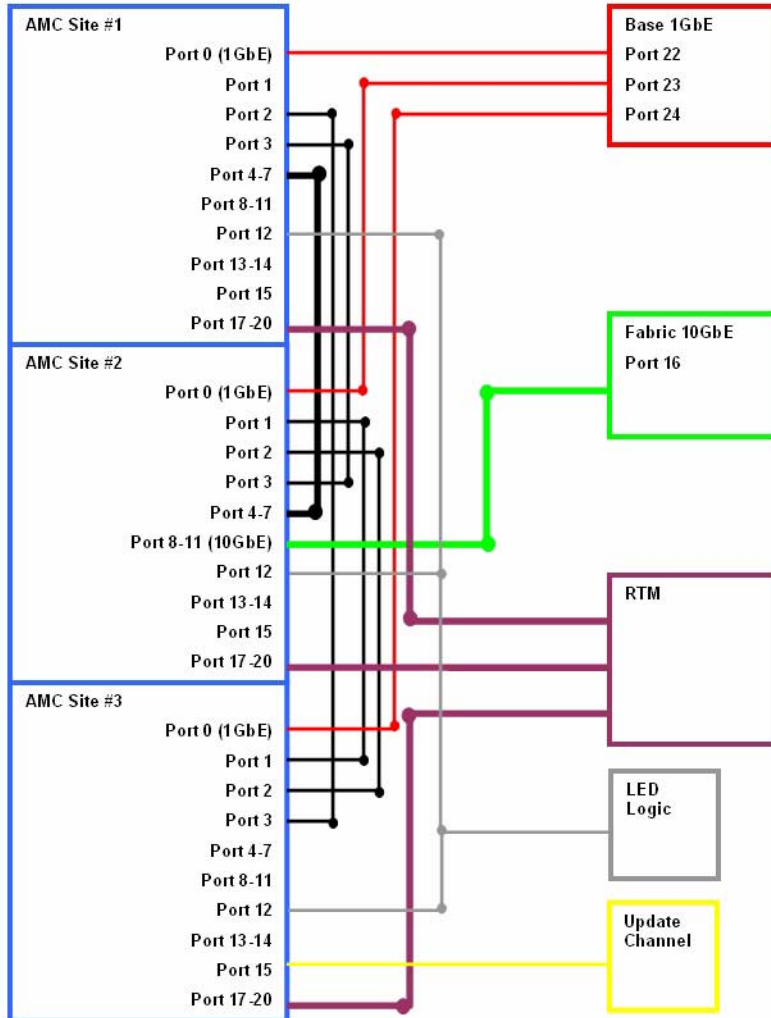
TABLE 2-7   AMC Ethernet Port Availability

Slot	Location	1G Infrastructure	10G Infrastructure
AMC 1	Top	1G Base SGMII	None
AMC 2	Middle	1G Base SGMII	XAUI from BCM56800 Fabric Port 16
AMC 3	Bottom	1G Base SGMII	None

TABLE 2-8   AMC Site 1: AMC.0 Mid-size, AMC.2 Type E1, AMC.2 Type 5 (Optional), LED Module Support

Port	Type	Connected
0	GB	Base (3.0) switch
1	Any	Not connected
2	Any	Port 3 of AMC #3, usually used for SAS/SATA
3	Any	Port 3 of AMC #2, usually used for SAS/SATA
4	Any	Ports 4-7 of AMC #2, usually used for PCIE
5		
6		
7		
8		Not connected
9		
10		
11		
12		Custom LED board support
13		Not connected
14		Not connected
15		Not connected
17	Any	RTM for future use
18	Any	RTM for future use
19	Any	RTM for future use
20	Any	RTM for future use
TCLK1	CLK IN	FPGA and Zarlink

TABLE 2-8   AMC Site 1: AMC.0 Mid-size, AMC.2 Type E1, AMC.2 Type 5 (Optional), LED Module Support *(Continued)*

TCLK2	CLK OUT	FPGA and Zarlink
TCLK3	CLK IN	FPGA and Zarlink
TCLK4	CLK OUT	FPGA and Zarlink
FCLK	100MHz	100MHz

TABLE 2-9   AMC Site #2 AMC.0 Mid-Size, AMC.2 Type E1, AMC.2 Type 5, Double module support, LED Module Support

Port	Type	Connected
0	GbE	Base (3.0) switch
1	Any	Port 1 of AMC #3, usually used for GbE
2	Any	Port 2 of AMC #3, usually used for SAS/SATA
3	Any	Port 3 of AMC #1, usually used for SAS/SATA
4	Any	Ports 4-7 of AMC #1, usually used for PCIE
5		
6		
7		
8	10GbE	Fabric (3.1) switch.
9		
10		
11		
12		custom LED board support
13		Not connected
14		Not connected
15		Not connected
17	Any	RTM for future use
18	Any	RTM for future use
19	Any	RTM for future use
20	Any	RTM for future use
TCLK1	CLK IN	FPGA & Zarlink
TCLK2	CLK OUT	FPGA & Zarlink
TCLK3	CLK IN	FPGA & Zarlink
TCLK4	CLK OUT	FPGA & Zarlink
FCLK	PCIE CLK	100MHz

TABLE 2-10 AMC Site 3: AMC.0 Mid-size, AMC.2 Type E1, Master Clock Generator Support, LED Support

Port	Type	Connected
0	GB	Base (3.0) switch
1	Any	Port 1 of AMC #2, usually used for GB
2	Any	Port 2 of AMC #2, usually used for SAS/SATA
3	Any	Port 2 of AMC #1, usually used for SAS/SATA
4		Not connected
5		Not connected
6		Not connected
7		Not connected
8		Not connected
9		Not connected
10		Not connected
11		Not connected
12		custom LED board support
13		Not connected
14		Not connected
15	Any	Update channel, usually used for clock sync
17	Any	RTM for future use
18	Any	RTM for future use
19	Any	RTM for future use
20	Any	RTM for future use
TCLK1	CLK IN	FPGA and Zarlink
TCLK2	CLK OUT	FPGA and Zarlink
TCLK3	CLK IN	FPGA and Zarlink
TCLK4	CLK OUT	FPGA and Zarlink
FCLK	100MHz	100MHz

2.4.5.2 AMC Module Support by Site

TABLE 2-11 AMC Modules by Site

AMC Module	Site 1 (top most when the board is vertical)	Site 2 (middle)	Site 3 (bottom most site when the board is vertical)
AMC10G-XFP	No*	Yes	No
AMC10G-CX4	No*	Yes	No
AMCLED001	Yes	Yes	Yes
PCI-Express AMC	Yes	Yes	No
1G Common Options Ethernet AMC	Yes	Yes	Yes
10G Fat Pipe Ethernet AMC	No*	Yes	No

2.4.5.3 AMC Port Restrictions for RTMs

The following tables list AMC port restrictions for RTMs

TABLE 2-12 AMC Port Restrictions for Copper RTMs

1G Infrastructure	1G Base Ports	10G Infrastructure	10G Fabric Ports
BCM5464R Copper PHY Port 22	10/100/1000 BaseT/RJ-45	XAUI Pass through	10G Fabric XAUI CX4
BCM5464R Copper PHY Port 23	10/100/1000 BaseT/RJ-45	None	None
BCM5464R Copper PHY Port 24	10/100/1000 BaseT/RJ-45	None	None
Front panel Base Port 18	J13 3rd	BCM5464R Copper PHY	
Front panel Base Port 19	J13 Bottom	BCM5464R Copper PHY	

TABLE 2-13 AMC Port Restrictions for Fiber Optic RTMs

1G Infrastructure	1G Base Ports	10G Infrastructure	10G Fabric Ports
SERDES	SFP - LX SX		SFP+ LRM
SERDES	SFP - LX SX		None
SERDES	SFP - LX SX		None
10/100/1000 BaseT/RJ-45			
10/100/1000 BaseT/RJ-45			

Configuring Jumper Settings

This chapter describes jumper settings for configuring the switch. Other configuration options are software controlled. Software configuration options are described in Chapter 4.

This chapter contains the following topics:

3.1 Jumper Settings

The following jumper settings are available for configuring the switch. Each of jumper settings is described in the subsections.

TABLE 3-1 Switch Configuration Jumper Settings

Jumper	Default	Purpose
P4	L2	Cross Connect Control
P6(1-2)	OFF	Fabric Zero Reset Configuration Word
P6(3-4)	OFF	Base Zero Reset Configuration Word
P8(1-2)	OFF	Base Write Protect Disable
P8(3-4)	OFF	Fabric Write Protect Disable
P9	OFF	IPMC Firmware Write
P10(1-2)	OFF	IPMC Disable
P10(3-4)	OFF	IPMC FWE
P11(1-2)	OFF	Forced Board Enable
P11(3-4)	OFF	IPMC Board Reset Disable
P12	OFF	EMI Ground to Logic Ground
P13	OFF	Serial Direction

3.1.1 P4 Cross-Connect Control

This jumper is used to control ShMC cross connect. ShMC cross connect is the ability to connect to two ShMCs at 10/100 each rather than use a single 10/100/1000 for a single ShMC. The first ShMC port is number 1 on the Base. The second ShMC port is number 17 on the Base.

TABLE 3-2 P4 Cross-Connect Jumper Settings

P4	Default	Function
OFF		Software control of cross connect.
1-2	Default	Force cross connect enabled, base channel 1 is two 10/100BaseTX ports.
3-4		No cross connect; base channel 1 is 10/100/1000Base-T.

3.1.2   P6(1-2) Fabric Zero Reset Configuration Word

This jumper is used to configure the Fabric Gigabyte CPU to use the default Reset Configuration Word, or use the one in the flash.

TABLE 3-3   P6 (1-2) Fabric Zero Reset Jumper Settings

P6(1-2)	Default	Function
ON		Use default Reset Configuration Word (all zeros)
OFF	Default	Use Reset Configuration Word in flash

3.1.3   P6(3-4) Base Zero Reset Configuration Word

This jumper is used to configure the Base CPU to use the default Reset Configuration Word, or use the one in the flash.

TABLE 3-4   P6 (3-4) Base Zero Reset Jumper Settings

P6(3-4)	Default	Function
ON		Use default Reset Configuration Word (all zeros)
OFF	Default	Use Reset Configuration Word in flash

3.1.4   P8(1-2) Base Write Protect

This jumper configures write protection on the Base reset configuration word.

TABLE 3-5   P8 (1-2) Base Write-Protect Jumper Settings

P8(1-2)	Default	Function
ON		Disable the write protection of the Base reset configuration word
OFF	Default	Write protect the Base reset configuration word

3.1.5   P8(3-4) Fabric Write Protect

This jumper configures write protection on the Fabric reset configuration word.

TABLE 3-6   P8 (3-4) Fabric Write Protect Jumper Settings

P8(3-4)	Default	Function
ON		Disable the write protection of the Fabric reset configuration word
OFF	Default	Write protect the Fabric reset configuration word

3.1.6   P9 IPMC Firmware Program

These jumpers configure IPMC firmware write actions via the debug serial port.

TABLE 3-7   P9 IPMC Firmware Program Jumper Settings

P4	Default	Function
OFF	Default	Normal operation
1-2		Install to program IPMC firmware via the debug serial port
3-4		Install to program IPMC firmware via the debug serial port

3.1.7   P10(1-2) IPMC Reset

This jumper configures the IPMI subsystem reset function.

TABLE 3-8   P10 (1-2) IPMC Reset Jumper Settings

P10 (1-2)	Default	Function
ON		Disable IPMI subsystem (hold it in reset)
OFF	Default	Enable IPMI subsystem

3.1.8 P10(3-4) IPMC FWE

These are reserved and should be left configured for the default setting.

TABLE 3-9 P10 (3-4) IPMC FWE Reserved Jumper Settings

P10 (3-4)	Default	Function
ON		
OFF	Default	Normal operation

3.1.9 P11(1-2) Forced-Board Enable

This jumper controls whether the switch is forced on when it is powered up, or if the IPMI subsystem controls the power up of the switch. Forcing power to the board is not enough for the board to boot. The board could still be held in reset. Configre P11 (3-4) jumper setting as well to bring the board out of reset.

TABLE 3-10 P11 (1-2) Forced-Board Enable Jumper Settings

P11 (1-2)	Default	Function
ON		Force power on. Use this to run without a ShMC.
OFF	Default	IPMI controls power to the board.

3.1.10 P11(3-4) IPMC Board Reset

This jumper configres the IPMI to send a reset signal that will reset the entire board

TABLE 3-11 P11 (3-4) IPMC Board Reset Jumper Settings

P11 (3-4)	Default	Function
ON		IPMI subsystem cannot reset the switch. Use this to run without a ShMC.
OFF	Default	IPMI subsystem can reset the switch and hold it in reset.

3.1.11 P12(1-2) and P12 (3-4) EMI Ground to Logic Ground

The switch and the entire AdvancedTCA shelf separate the ground of the chassis itself from digital ground for EMI protection. This jumper configures the two grounds.

TABLE 3-12 P12 (1-2) and P12 (3-4) Grounding Jumper Settings

P12 (1-2) (3-4)	Default	Function
OFF	Default	Separate EMI ground and logic ground.
1-2		Connect EMI ground to logic ground.
3-4		Connect EMI ground to logic ground.

3.1.12 P13 Serial Direction

The front panel serial port and the RTM serial port are mutually exclusive; only one can be used at a time. The serial port can be forced to the front or the RTM, or it can be controlled by the software.

TABLE 3-13 P13 Serial Direction Jumper Settings

P13	Default	Function
OFF	Default	Software control of serial direction.
1-2		Front serial port active; RTM serial port disabled.
3-4		Front serial port disabled; RTM serial port active.

3.2 Jumper Locations

FIGURE 3-1 shows the locations of the jumper settings.

FIGURE 3-1 Switch Jumper Locations
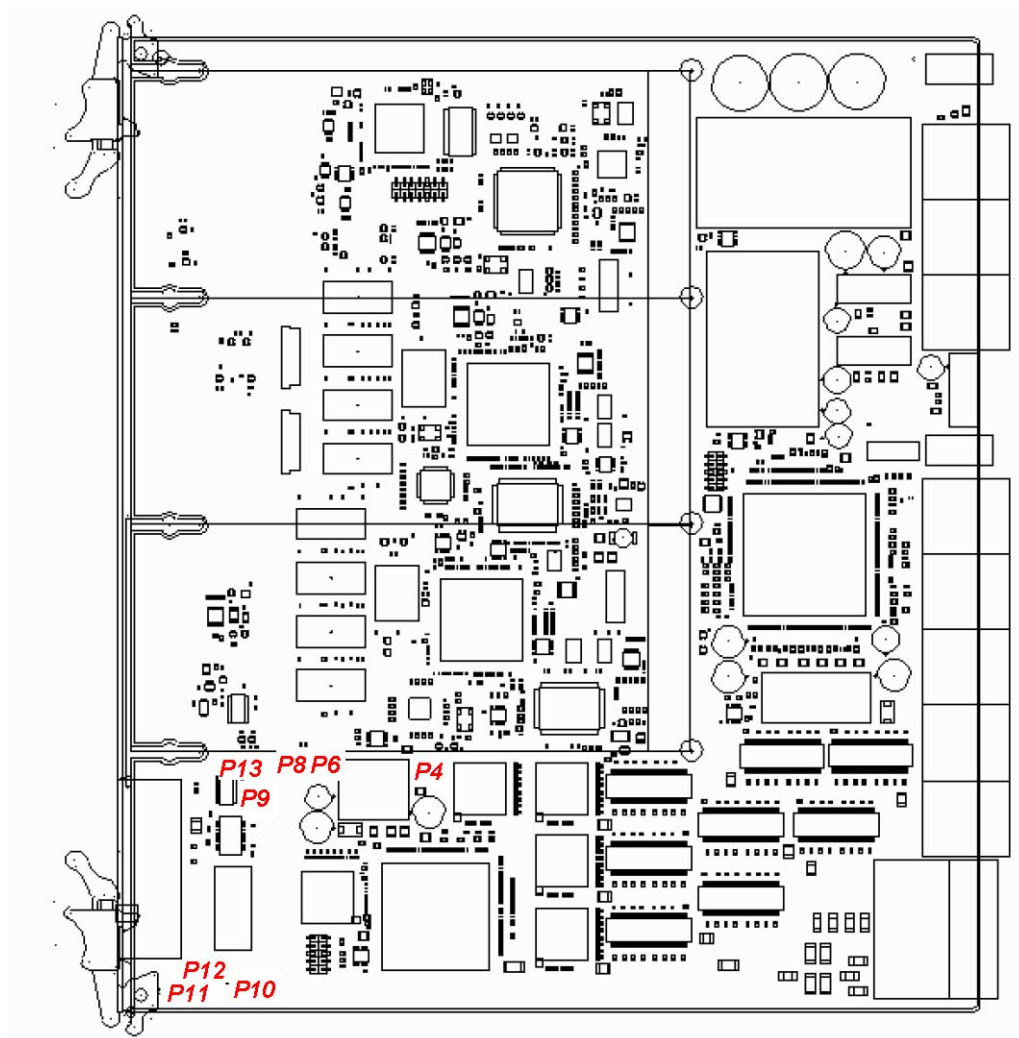
Configuring Switch Software

This chapter describes how to configure the switch software.

The switch incorporates four main software components:

- IPMI firmware, which runs on a separate microcontroller.
- uBoot loads the boot for the system. It can be compared to a BIOS on a node board.
- Operating system (OS), which uses Monta Vista 3.1 Pro, based on the 2.4.20 Linux kernel.
- LVL7 Systems' FASTPATH software, which provides all of the management and control features of the switch.

The IPMI firmware, uBoot, and OS are covered in this chapter. FASTPATH is described, however, for detailed information and command syntax, refer to the *Netra CP3240 Switch Command Reference Manual* (820-3253).

This chapter contains the following topics:

4.1 IPMI Firmware Sensors

This section describes the IPMI firmware sensors.

4.1.1 State Sensors

TABLE 4-1 IPMI State Sensors

Sensor	Name	Type	Description	Discrete States Returned
0	`TABLE 4-2` `HOT_SWAP`	State	hotswap discrete state	M state, per ATCA spec
1	RTM hotswap	State	hotswap discrete state	M state, per ATCA spec
2	AMC 0 hotswap	State	hotswap discrete state	M state, per ATCA and AMC spec
3	AMC 1 hotswap	State	hotswap discrete state	M state, per ATCA and AMC spec
4	AMC 2 hotswap	State	hotswap discrete state	M state, per ATCA and AMC spec
5	IPMB physical	State	IPMB Link sensor	Defined in ATCA spec.
6	BMC Watchdog	State	Watchdog timer	Discrete, Watchdog 2 (per the IPMI spec)
11	RTM Presence	State	Rear Module Present Signal	State 01h = Device absent, 02h = Device present
12	Base Early*	State	Base firmware signal	Asserted indicates Uboot prompt
13	Base Full*	State	Base firmware signal	Asserted indicates Linux has booted
14	Base Good*	State	Base firmware signal	Asserted indicates FASTPATH has loaded
15	Fabric Early*	State	Fabric firmware signal	Asserted indicates Uboot prompt
16	Fabric Full*	State	Fabric firmware signal	Asserted indicates Linux has booted
17	Fabric Good*	State	Fabric firmware signal	Asserted indicates FASTPATH has loaded

*These sensors represent the software state of the switch.

The following tables lists the logic that drives these sensors.

TABLE 4-3   IPMI Sensor Logic

State	Timeout	Failover Condition	Early	Full	Good
Initial power-on state	5 sec	Uboot corrupted or erased	0	0	1
uBoot initial state	5 sec	Uboot finds no image	0	0	0
uBoot console	n/a	Failover timer stops	1	0	0
Linux booted	90 sec	Soft-off now occurs	0	1	0
Linux boot menu	n/a	Failover timer stops (user interruption)	1	1	0
FASTPATH booted	90 sec	Timer stops if this state is reached in time	0	1	1
Critical code update	n/a	An update is in progress; the failover time stops	1	1	1

4.1.2 Threshold Sensors

TABLE 4-4 IPMI Thresold Sensors

Sensor #	Name	Type	Description	Units	Lower Thresholds			Upper Thresholds		
					Minor	Major	Critical	Minor	Major	Critical
7	+12.0V	Thresh	+12V main power	Volts	11.016	10.21	9.02	13.45	13.72	13.77
8	+3.3V	Thresh	+3.3V line	Volts	3.126	3.02	2.914	3.563	3.654	3.805
9	+2.5V	Thresh	+2.5V line	Volts	2.308	2.202	2.106	2.701	2.808	2.904
10	+1.25V	Thresh	+1.25V line	Volts	1.156	1.009	0.7546	1.5582	1.754	1.9502
18	Base CPU Temp	Thresh	Base CPU Temp	ºC	n/a	n/a	n/a	60	70	80
19	RTM temp	Thresh	RTM Temperature	ºC	n/a	n/a	n/a	55	65	75
20	Fabric CPU Temp	Thresh	Fabric CPU Temp	ºC	n/a	n/a	n/a	60	70	80
21	+1.5V	Thresh	+1.5V line	Volts	1.4014	1.303	1.1074	1.6072	1.7052	1.9012
22	+1.8V	Thresh	+1.8V line	Volts	1.656	1.509	1.303	1.9502	2.107	2.303
23	+1.0V	Thresh	+1.0V line	Volts	0.902	0.706	0.51	1.1074	1.303	1.509
24	+1.2V	Thresh	+1.2V line	Volts	1.107	1.009	0.804	1.303	1.4014	1.607
25	Site 1 Pwr Cur	Thresh	AMC Slot current sense	Amps	n/a	n/a	n/a	5.5	6.023	6.517
26	Site 1 Pwr	Thresh	AMC Slot +12V	Volts	n/a	n/a	n/a	13.048	13.44	13.608
27	Site 1 MP	Thresh	AMC Slot Management Pwr	Volts	n/a	n/a	n/a	3.456	3.514	3.6
28	Site 2 Pwr Cur	Thresh	AMC Slot current sense	Amps	n/a	n/a	n/a	5.5	6.023	6.517
29	Site 2 Pwr	Thresh	AMC Slot +12V	Volts	n/a	n/a	n/a	13.048	13.44	13.608

TABLE 4-4 IPMI Thresold Sensors *(Continued)*

Sensor	Name	Type	Description	Units	Lower Thresholds			Upper Thresholds		
30	Site 2 MP	Thresh	AMC Slot Management Pwr	Volts	n/a	n/a	n/a	3.456	3.514	3.6
31	Site 3 Pwr Cur	Thresh	AMC Slot current sense	Amps	n/a	n/a	n/a	5.5	6.023	6.517
32	Site 3 Pwr	Thresh	AMC Slot +12V	Volts	n/a	n/a	n/a	13.048	13.44	13.608
33	Site 3 MP	Thresh	AMC Slot Management Pwr	Volts	n/a	n/a	n/a	3.456	3.514	3.6

4.2   uBoot

uBoot is the boot loader. Much like a BIOS, it brings the system to a usable state for the operating system (OS) to boot. It also performs a POST of the CPU subsystem. It can be used as a recovery console if the firmware image becomes corrupt or a firmware update fails. Several important environment variables are stored in uBoot, only some of which should ever be changed, namely `noekey` and `baudrate`.

4.2.1   uBoot Console

To get to a uBoot console, you must prevent the switch from booting into the OS. Shown here is an example of the start of a boot sequence.

```
CPU:    400 MHz
DRAM:   256 MB
FLASH: 64 MB, Base, Primary Flash

### JFFS2 loading 'image1' to 0x400000
Scanning JFFS2 FS: . done.
### JFFS2 load complete: 10026940 bytes loaded to 0x400000
Booting ...
   Loading Ramdisk to 0fdf6000, end 0ff8d551 ... OK
```

Press any key before ### JFFS2 loading 'image1' to 0x400000 appears.

There is only a one-second delay to press a key.

When the uBoot prompt is displayed, you can then enter any of the following commands.

TABLE 4-5   uBoot Console Commands

Command	Result
`print` or `printenv`	Shows the current environment variables.
`set` `<variable>` or `setenv`	Followed by an environment variable, this command changes the environment variable.
`save` or `saveenv`	Writes the variables to flash. You must save the changes if you want them to persist through a reset.

4.2.2 E-Keying Control in uBoot

See the Section 4.3.1, "e-Keying" on page 4-7 for a description of e-Keying, and how it is supported.

To disable e-Keying, use the `noekey` environment variable.

List the ports to be disabled separated by only commas.

```
set noekey 1,2,3,4
```

Or use the word `all` to disable e-Keying completely.

```
set noekey all
```

To re-enable e-Keying clear the variable.

```
set noekey
```

After changing the environment variables you must always *save* if you would like the change to persist though a reset.

4.2.3　Serial-Baud Rate Control in uBoot

You can change the serial baud rate from within FASTPATH, the boot menu, or in uBoot. Changing it in uBoot is the only method that allows it to persist through a reset. Only standard baud rates are accepted.

Note – Change the baud rate on the Fabric first, then on the Base. If the baud rate on the Fabric and Base do not match, the Fabric will not be accessible. If the Fabric is not accessible, change the baud rate on the Base until the Fabric is accessible.

To change the baud rate in uBoot, enter the command as in the following example.

```
set baudrate <115200>
```

After changing the rate, you must *save* if you would like the change to persist though a reset.

4.3　Linux

The switch uses Linux as an operating system. The Monta Vista 3.1 Pro 2.4.20 kernel is used. There are no settings to change, and the OS is completely transparent to the user.

4.3.1　e-Keying

e-Keying is implemented as a Linux driver. The CPUs for both Base and Fabric have a direct connection to the IPMI controller, which is used to communicate e-Keying messages. The CPU is interrupted when an e-Keying event occurs. The driver handles these interrupts and disables ports based on the information it receives. This disables the port at the PHY level. e-Keying can be ignored by creating a uBoot environment variable as described in the Section 4.2.2, "E-Keying Control in uBoot" on page 4-6.

4.3.2 e-Keying Bypass

e-Keying can be ignored by creating a uBoot environment variable as described in Section 4.2.2, "E-Keying Control in uBoot" on page 4-6. When e-Keying is bypassed, ports are no longer enabled or disabled based on the e-Keying state. The e-Keying information is still shared with the shelf manager as usual, but now ports are enabled regardless if the shelf manager enables them or not.

4.3.3 ATCA LEDs

The ATCA LEDs can be turned on from several sources, one of which is a Linux driver. Both the Base and Fabric drive these LEDs. The red OOS LED is driven until FASTPATH has loaded, at which point the green Healthy LED is driven. The OOS LED signals are "OR" so that if one or more are active, the LED is on. The Healthy LED signals are "AND." The Base and Fabric must be booted into FASTPATH as well as several hardware conditions must be met for this LED to be on.

4.4 Serial Select

A single-serial port is provided to control both CPUs. The ` key, usually in the upper left key on the keyboard and the same key as ~, can be used to switch between controlling the Base (3.0) and the Fabric (3.1). The ` key works in uBoot, Linux, the BCM debug shell, and FASTPATH.

When you switch between Base and Fabric [Base] or [Fabric] is printed to the console so that you know which one you are currently controlling.

```
(switch Base) #
(and then ENTER is pressed here)
(switch Base) #[Fabric]
(and then ENTER is pressed here)
(switch Fabric) #[ Base ]
(switch Base) #
User:
```

4.5 Serial Location

The switch supports running its serial port to both the front panel and the RTM. It does not support both the front panel and RTM at the same time. You must configure the port to go to the location needed. By default, the port is routed to the front panel.

4.5.1 Changing Serial Location from UBoot

In this example, the serial port direction is to the RTM.

CODE EXAMPLE 4-1   Serial Port Change from uBoot

```
CPU:    400 MHz
DRAM:   256 MB
FLASH: 64 MB, Base, Primary Flash

Use the [`] key above the TAB key to switch between BASE and FABRIC.
[Break UBoot by pressing a key when the switch boots]
=> set console rtm
[set console to front for the front panel]
=> save
Saving Environment to Flash...
Un-Protected 1 sectors
Erasing Flash...
. done
Erased 1 sectors
Writing to Flash... done
Protected 1 sectors
=> boot
```

4.5.2 Changing Serial Location from FASTPATH

In this example, the serial port direction is changed to the RTM. Note that the change is instantaneous and lasts though a reboot.

CODE EXAMPLE 4-2   Serial Port Change from FASTPATH

```
configure
lineconfig
serial location rtm
[set location to front for the front panel]
```

4.6 Boot Sequence

The following is an example of a boot sequence.

CODE EXAMPLE 4-3   Boot Sequence Example

```
CPU:   400 MHz
DRAM:  256 MB
FLASH: 64 MB, Base, Primary Flash

### JFFS2 loading 'image1' to 0x400000
Scanning JFFS2 FS: . done.
### JFFS2 load complete: 10026500 bytes loaded to 0x400000
Booting ...
    Loading Ramdisk to 0fdf6000, end 0ff8d4c2 ... OK

Mounting /dev/mtdblock2 at /mnt/fastpath...done.
Mounting tmpfs at /mnt/application...done.

****************************************************************
***
* Use the [`] key above the TAB to switch between BASE and FABRIC. *
****************************************************************
***

switch, Base, Primary Flash, image1

Select startup mode.  If no selection is made within 5 seconds,
the Application will start automatically...

    --- Main Menu ---

1 - Start Switch Application
2 - Display Utility Menu
Select (1, 2):
Extracting Application from image1.....done
Loading Application...done.
SOC unit 0 attached to PCI device BCM56503_B2


FASTPATH starting...started!

(Unit 1)>

User:
```

The switch takes approximately 50 seconds to boot to a console and be fully functional.

4.6.1 Boot Utility Menu

There is a utility menu that can be used before FASTPATH boots. During boot there is a two-option menu displayed for five seconds. This menu allows access to the utility menu if you press number 2 and Enter.

CODE EXAMPLE 4-4   Boot Utility Menu Access

```
switch, Base, Primary Flash, image2

    --- Utility Menu ---

 1 - Start Switch Application
 2 - Load Code Update Package using TFTP/FTP
 3 - Load Code Update Package using XMODEM/YMODEM/ZMODEM
 4 - Copy Primary Flash to Backup Flash
 5 - Select Serial Speed
 6 - Retrieve Error Log using TFTP
 7 - Retrieve Error Log using XMODEM/YMODEM/ZMODEM
 8 - Erase Current Configuration
 9 - Erase Permanent Storage
10 - Select Boot Method
11 - Activate Backup Image
12 - Start Diagnostic Application
13 - Reboot

Select option (1-13):
```

Most of the options are self explanatory based on their names. The following sections describe some of the options more fully.

4.6.1.1 Load Code Update Package using TFTP/FTP

FASTPATH can be updated from within FASTPATH itself, but it can also be updated from this menu.

- The update image must be on a TFTP server or FTP server.
- The server must be on the same network as the out-of-band management port.
- You need to have the IP of the server, the desired IP of the board being updated, the gateway (if needed), and the file name.

Note – DHCP can be used to obtain an IP for the switch during this update. Enter dhcp as the IP address. This entry begins the update and provides status information as it is updating.

4.6.1.2 Erase Current Configuration

This is the same as clear config from within FASTPATH. This option can be used if the switch is in an unknown state, and restoring the default settings is desired.

4.6.1.3 Erase Permanent Storage

This command completely erases FASTPATH, any log files, and any configurations. It does not erase uBoot or Linux. **Use of this command is never recommended**. Updates can safely be installed without running this option, and configurations and log files are preserved.

4.6.1.4 Select Boot Method

The switch supports three boot methods:

- from the local image on the flash
- from an image over the network
- from an image over the serial port

The default option is booting from the flash. See Section 4.9, "Network Boot" on page 4-14 for more information.

4.6.1.5   Start Diagnostic Application

This option boots the Broadcom diag shell, currently SDK version 5.4.1. This environment is provided *as is*, with no support. Several commands provided in this shell are not supported and will not work. This shell is provided mainly for debug, testing, and diagnostics purposes. This shell has many low-level tests, and low-level register access. It can be used to check the integrity of particular boards. Help is provided in the shell with `??` and commands followed by a single question mark. Some commands of interest are `TestList` and `TestRun`.

4.7   Primary and Backup Flash

The switch features hardware flash redundancy. If the switch fails to boot from the primary flash for any reason, the onboard IPMC will reset the board and attempt to boot out of the backup flash. No user interaction is required.

The switch backup flash comes preprogrammed with default settings. You can change what is loaded on the backup flash by using the `Copy Primary Flash to Backup Flash` command from the utility menu.

4.8   Dual Firmware Images

The switch supports dual firmware images of the Base and Fabric software. While this feature does not provide high availability (the hardware redundant flash provides that), it does provide a way to store two copies of the firmware on the switch. This allows you to switch between firmware, as needed.

4.8.1   Booting the Non-Active Image

Which image is active can be changed several ways.

From the boot menu, the `Activate Backup Image` option can be used.

From within FASTPATH the `boot system` command in combination with the `update bootcode` commands can be used.

4.8.2 Updating the Non-Active Image

All of the update methods supported by the active image (image1 by default) are also supported for the non-active image (image2).

4.8.3 Fabric 1G/10G Auto-negotiation

The Fabric networks support both 1Gigabyte and 10Gigabyte operation. No configuration is required to put the switch into either a 1Gigabyte or 10Gigabyte mode. The switch will dynamically connect at the appropriate speed.

4.9 Network Boot

The switch supports network booting. This feature can be used to test updates to FASTPATH without installing them. Updates containing changes to uBoot, Linux, or the IPMC must be installed to the flash before they can be used.

1. **Setup a TFTP server on the update network.**

   Tftpd is the standard TFTP server for Linux and Solaris.

   For Windows, Solarwinds (http://www.solarwinds.net) offers a free TFTP server.

2. **Place the update image on the TFTP server.**

   It will have a .tgz file extension.

3. **Connect to the serial management port of the network to be updated, and connect the MGMT port to the update network.**

4. **Reboot the switch using the reboot button, hotswap handle, or** `reload` **command.**

5. **As the switch boots, press number** 2 **to enter the Utility Menu.**

6. **Press number** 8 **to change the boot method.**

7. **Press number** 3 **to select network as the boot method.**

8. **Enter the information for your TFTP server.**

   For host IP, you can enter `dhcp` if you would like to use DHCP to obtain a valid IP address.

9. Press number 1 **to boot the system.**

CODE EXAMPLE 4-5   Example Console Output

```
CPU:   400 MHz
DRAM:  256 MB
FLASH: 64 MB, Base, Primary Flash

### JFFS2 loading 'image1' to 0x400000
Scanning JFFS2 FS: . done.
### JFFS2 load complete: 10026500 bytes loaded to 0x400000
Booting ...
   Loading Ramdisk to 0fdf6000, end 0ff8d4c2 ... OK

Mounting /dev/mtdblock2 at /mnt/fastpath...done.
Mounting tmpfs at /mnt/application...done.

****************************************************************
***
* Use the [`] key above the TAB to switch between BASE and FABRIC. *
****************************************************************
***

switch, Base, Primary Flash, image1

Select startup mode.  If no selection is made within 5 seconds,
the Application will start automatically...

    --- Main Menu ---

1 - Start Switch Application
2 - Display Utility Menu
Select (1, 2): 2

****************************************************************
***
* Use the [`] key above the TAB to switch between BASE and FABRIC. *
****************************************************************
***

switch, Base, Primary Flash, image1

    --- Utility Menu ---

 1 - Start Switch Application
 2 - Load Code Update Package using TFTP/FTP
 3 - Load Code Update Package using XMODEM/YMODEM/ZMODEM
 4 - Copy Primary Flash to Backup Flash
 5 - Select Serial Speed
```

```
 6 - Retrieve Error Log using TFTP
 7 - Retrieve Error Log using XMODEM/YMODEM/ZMODEM
 8 - Erase Current Configuration
 9 - Erase Permanent Storage
10 - Select Boot Method
11 - Activate Backup Image
12 - Start Diagnostic Application
13 - Reboot

Select option (1-13): 10

Current Boot Method: FLASH

1 - Flash Boot
2 - Network Boot
3 - Serial Boot
4 - Exit without change
Select option (1-4): 2
Enter Server IP []:10.10.3.199
Enter Host IP (# or dhcp) []:dhcp
Enter Transfer Method (tftp or ftp) [ftp]:
Enter Filename []:/switch.1.0.1.0.stk
Accept changes? Press(Y/N): y

********************************************************************
***
* Use the [`] key above the TAB to switch between BASE and FABRIC. *
********************************************************************
***

switch, Base, Primary Flash, image1

      --- Utility Menu ---

 1 - Start Switch Application
 2 - Load Code Update Package using TFTP/FTP
 3 - Load Code Update Package using XMODEM/YMODEM/ZMODEM
 4 - Copy Primary Flash to Backup Flash
 5 - Select Serial Speed
 6 - Retrieve Error Log using TFTP
 7 - Retrieve Error Log using XMODEM/YMODEM/ZMODEM
 8 - Erase Current Configuration
 9 - Erase Permanent Storage
10 - Select Boot Method
11 - Activate Backup Image
12 - Start Diagnostic Application
13 - Reboot
```

CODE EXAMPLE 4-5   Example Console Output *(Continued)*

```
Select option (1-13): 1
Creating tmpfs filesystem on tmpfs for download...done.
Bringing up eth0 interface...done.
HOST IPADDR=10.10.2.246
Transferring '/switch.1.0.1.0.stk' from '10.10.3.199' via
ftp...done.
Bringing down eth0 interface...done.
Extracting Application...done.
Destroying tmpfs filesystem on tmpfs...done.
Loading Application...done.
SOC unit 0 attached to PCI device BCM56503_B2

FASTPATH starting...started!

(Unit 1)>

User:
```

10. **Use option 8 of the Utility Menu to change the boot method back to flash, when desired.**

4.10 FASTPATH

The switch features LVL7 Systems' FASTPATH 2340 software, version 4.4. FASTPATH is a software package providing the robust management needed to control a modern switch-router. This section serves as a quick primer on using FASTPATH on the switch. FASTPATH is not covered in detail in this guide, but is covered in the *Netra CP3240 Switch Command Reference Manual* (820-3253).

4.10.1 Management Options

The switch can be controlled by a CLI, a web interface, and through SNMP. All management interfaces, other than serial, can be enabled or disabled, provided over both the out-of-band management port and/or any in-band ports, and be limited to certain in-band ports.

4.10.1.1 CLI

The switch provides an industry standard CLI. The CLI is provided over the serial port, telnet and SSH. This section only describes some basic commands. For detailed command syntax, refer to the *Netra CP3240 Switch Command Reference Manual* (820-3253).

The CLI is mode based. It works similarly to a console in Linux or Windows. Commands are grouped under modes, and those commands only work when the user is in the current mode. There are very few global commands.

To return to one mode higher than the current mode, use *exit.*

For example to shutdown port 17, switch to enable mode, configure mode, interface 17 mode, then issue the *shutdown* command. Use *exit* to return to configure mode, and *exit* again to return to enable mode.

Many commands have a no form. The no form is used to disable the command. With the previous example, to re-enable port 17, once you are in the interface 17 mode, you would issue the no shutdown command.

4.10.2   Basic CLI Commands

TABLE 4-6   Basic CLI Commands

Command	Function	Mode
enable	Switch to privilege mode. You must be in enabled mode for most options.	default
show port all	Show status of the ports.	privilege
show interface ethernet 0/x	Show detailed statistics on port 0/x.	privilege
clear counters	Clear all statistics.	privilege
clear config	Restore the default configuration.	privilege
show running-config	Show the current configuration of the switch. This command shows everything that is not set to the default value. The output is a script that can be copied to a file for later use, or for another switch.	privilege
copy system:running-config nvram:startup-config	Save the current configuration though a reboot.	privilege
serviceport protocol dhcp	Use DHCP on the out-of band port. Only one of the serviceport and network can use DHCP. To enable DHCP on one, you must disable it on the other. The same command works for network.	privilege
serviceport protocol none	Use user assigned IP NOTE: the same command works for network.	privilege
serviceport ip <ip> <netmask> <gateway>	Force an IP for serviceport.	privilege
network parms <ip> <netmask> <gateway>	Force an IP for network.	privilege
show network	View the in-band management settings.	privilege
show serviceport	View the out-of-band management settings.	privilege
serial baudrate	Change the serial baudrate.	privilege
vlan database	Switch to vlan database mode. Create and delete VLANs here.	privilege
vlan x	Create a VLAN with number x.	vlan
exit	Return to one mode higher.	
configure	Switch to configure mode. You must be in configure mode to change most settings.	privilege

TABLE 4-6	Basic CLI Commands *(Continued)*	
interface 0/x	Switch to interface mode. You must be in interface mode to change most port specific settings.	configure
vlan participation include x	Add interface to VLAN x.	interface
vlan pvid x	Change interface's pvid to VLAN x.	interface

4.10.3 Logins and Prompts

FASTPATH supports multiple users with different security levels. **By default, there is one admin user with no password.** In the CLI, privilege mode is password-protected separately from the default mode, but also has a default of no password.

4.10.3.1 CLI Defaults

A CLI is provided on the serial console, telnet console, and SSH console. The **serial console** is **always enabled**. The **telnet console** is **enabled** by default. **SSH** is **disabled** by default.

```
Username:admin
Password:
>enable
Password:
#
```

The prompts always show the current mode. Here are a few examples.

```
default mode
# privilege mode
# configure mode
(interface 0/2)
# interface 0/2 mode
```

4.10.3.2 Web Interface Defaults

The username and password are the same as the CLI. The **web interface** is **enabled** by default. Java is enabled by default. **HTTPS** is **disabled** by default.

4.10.3.3 SNMP Defaults

SNMP is **enabled** by default. The default read-only community string is `public`. The default read-write community string is `private`.

4.10.4   Secure Remote Access

4.10.4.1   SSH and SSL/TLS Keys

The switch supports SSH for a secure CLI console as well as SSL/TLS for secure HTTP. By default, SSH and SSL are disabled. The switch cannot generate its own keys. Keys must be generated on an external PC, and uploaded to the switch via TFTP. Once the keys are on the switch, SSH and HTTPS must be enabled to be used.

4.10.4.2   Enabling SSH and SSL

First, the certifications and keys must be uploaded to the switch using a command such as the following:

```
copy tftp://<ip>/<file> <location>
```

Upload the following files to the switch:.

File	Location
rsa1.key	nvram:sshkey-rsa1
rsa2.key	nvram:sshkey-rsa2
dsa.key	nvram:sshkey-dsa
dh512.pem	nvram:sslpem-dhweak
dh1024.pem	nvram:sslpem-dhstrong
server.pem	nvram:sslpem-server
rootcert.pem	nvram:sslpem-root

Enable secure access (SSH/Telnet) and disable non-secure access (SSL/HTTP).

```
ip ssh
configure
```

```
lineconfig
no transport input telnet
exit
```

```
ip http secure-server
no ip http server
```

4.10.5 Default Settings

The switch comes configured with a default configuration. This configuration boots
the board to Layer 2 switching. This configuration is very basic and should be
updated for your environment. The default settings are as follows:

- every port is in VLAN 1
- every port is configured in switching mode
- management interfaces are enabled
- spanning-tree is enabled on every port
- everything else is disabled

The settings of the switch can be checked with the show running-config
command. This command shows how the current configuration is different than the
default configuration. This command can be very useful because the output is in
script format. This output can be backed up or copied to another switch.

4.10.6 Port Ordering

The ports are ordered the same way as the ATCA channels. The ATCA specification
allows for backplanes to be routed differently. This means that logical slots and
physical slots often do not match.

The switch supports an abstraction layer that allows the port order to be changed.
This allows vendors to match logical slots and physical slots independent of routing.
Contact Sun if you would like a non-standard port order. Sun's port ordering is
shown in the following table for shelves with middle hub slots, that is, slots 7 and 8.

TABLE 4-7   Port Order List

Shelf Physical Slot	Base Port	Fabric Port
1	13	12
2	11	10

TABLE 4-7 Port Order List *(Continued)*

3	9	8
4	7	6
5	5	4
6	3	2
7	Netra CP3240	Netra CP3240
8	2	1
9	4	3
10	6	5
11	8	7
12	10	9
13	12	11
14	14	13
15	15	14
16	16	15
ShMC 1	1	none
ShMC 2 (if cross connect)	17	none

Note – If ports are ordered the same as the ATCA channels, Base and Fabric are always one number off. So, if a board is in slot 6, it is connected to Base channel 3 and Fabric channel 2.

4.11 Firmware Updates

All of the firmware listed in this section is field upgradeable. There is a single update image that supports the Base firmware, Fabric firmware, and IPMC firmware. This update image must be installed twice though, once on the Base and once on the Fabric. The IPMC update happens during a Base update. Each firmware can be updated independently without affecting other firmware, for example, FASTPATH can be updated without touching uBoot and Linux.

4.11.1 Firmware List

- IPMC firmware
- Base Firmware
    - uBoot
    - Linux
    - FASTPATH
- Fabric Firmware
    - uBoot
    - Linux
    - FASTPATH

4.11.2 Firmware Upgrades

For up-to-date instructions on upgrading the firmware packages, refer to the following documentation:

- *Netra CP32X0 Product Notes* (820-3260)
- README files within the download package

4.12 Fiber Optic RTM Configuration

For the fiber optic RTM (XCP3240H-RTM-OP-Z) to work correctly, switch firmware 1.2.1.0 or newer is required. The following sections describe support and requirements for configuring the RTM.

4.12.1 Module Support

The Fiber Optic RTM was designed to work with any standard compliant SFP or SFP+ module.

4.12.2 Backplane Ports Versus RTM Optical Ports

The Sun Netra CP3240 switch's backplane ports are capable of auto-negotiating between 1G and 10G speeds without any user input. However, the RTM optical ports must be explicitly configured without auto-negotiation for 1G operation. This requirement is due to the underlying technology used in 10G interfaces.

4.12.3 10G Configuration for RTM Optical Port

For 10G operation, an SFP+ module must be used and the port must be set to `no auto-negotiate`. For all 10G RTM ports, `no auto-negotiate` is the default setting.

CODE EXAMPLE 4-6   Enabling 10G Operation on RTM Optical Ports

```
configure
interface <0/xx>
no auto-negotiate
exit
exit
```

where *<0/xx>* is the port number of the RTM on Fabric. Valid entries are 0/17, 0/18, 0/19, and 0/20.

For each port on the RTM, enter the command.

4.12.4 1G Configuration for RTM Optical Port

For 1G operation, an SFP module must be used and the port (17-20) must be set to `auto-negotiate`. When you enable auto-negotiation, 1G operation is automatically enabled and 10G operation is automatically disabled.

For all 10G RTM optical ports `no auto-negotiate` is the default setting. Therefore, 1G operation must be explicitly enabled. Note that Base 10G port, 0/25 and 0/27 do not support 1G operation. The Fabric 10G RTM optical ports support both 1G and 10G operation.

CODE EXAMPLE 4-7   Enabling 1G Operation on RTM Optical Ports

```
configure
interface <port numbers/range in 0/20 format>
auto-negotiate
exit
exit
```

where *<0/xx>* is the port number of the RTM on Fabric. Valid entries are 0/17, 0/18, 0/19, and 0/20.

For each port on the RTM, enter the command.

Environment Specifications

This appendix describes the electrical, environmental, and mechanical specifications. It includes connector descriptions and pin outs, as well as illustrations of the board dimensions and connector locations.

A.1 Electrical and Environmental

The following sections provide tables and illustrations showing the electrical and environmental specifications.

A.1.1 Absolute Maximum Ratings

The following values are stress ratings only. Do not operate at these maximums. See "Section A.1.2, "Normal Operating Ranges" on page A-2 for normal operating conditions.

TABLE A-1 Absolute Maximum Electrical and Temperature Ratings

Supply Voltage 48V	0 VDC to -75VDC.
Storage Temperature:	-40° to +85° Celsius
Non-Condensing Relative Humidity:	<95% at 40° Celsius

A.1.2 Normal Operating Ranges

TABLE A-2 Normal Operating Electrical and Temperature Ratings

Description	Range
Nominal operating voltage	-36 VDC to -72VDC
Operating temperatures: • 60m below sea level up to 1800m above sea level* • from 1800m up to 4000m above sea level**	 -5° to +55° Celsius -5° to +40°C
Operating humidity	<85% at 40° Celsius
Idle power consumption (without links)	45W
Maximum power consumption with 15W RTM and no AMCs	100W
Maximum power consumption with 15W RTM and 100W shared for all AMC sites)	200W

*The MTBF will be significantly reduced if operated above 45° C for more than 96 consecutive hours.

**The MTBF will be significantly reduced if operated above 30° C for more than 96 consecutive hours.

A.2 Reliability

Reliability prediction was done using Issue 6, Method I, Case 3 of the Bellcore Industrial Reliability program. The prediction assumed 25% operating temperature with 100% duty cycle, in a ground benign, controlled environment.

- MTBF: 122,173 hours
- 2-year limited warranty

A.3 Mechanical

This section includes the mechanical specifications for dimensions and weight.

A.3.1 Board Dimensions and Weight

The switch meets the PICMG 3.0 AdvancedTCA Specification R2.0 ECN002 and AMC.0 R2.0 for all mechanical parameters.

Mechanical dimensions are shown in the illustration and are outlined in the following table.

TABLE A-3   Board Dimensions and Weight

Item	Dimensions or Weight
PCB	280mmx 322.5mm x2.4mm
Board	8U x 6HP (one slot)
Weight	2.12 kg (without AMCs)

280mm

322.5mm
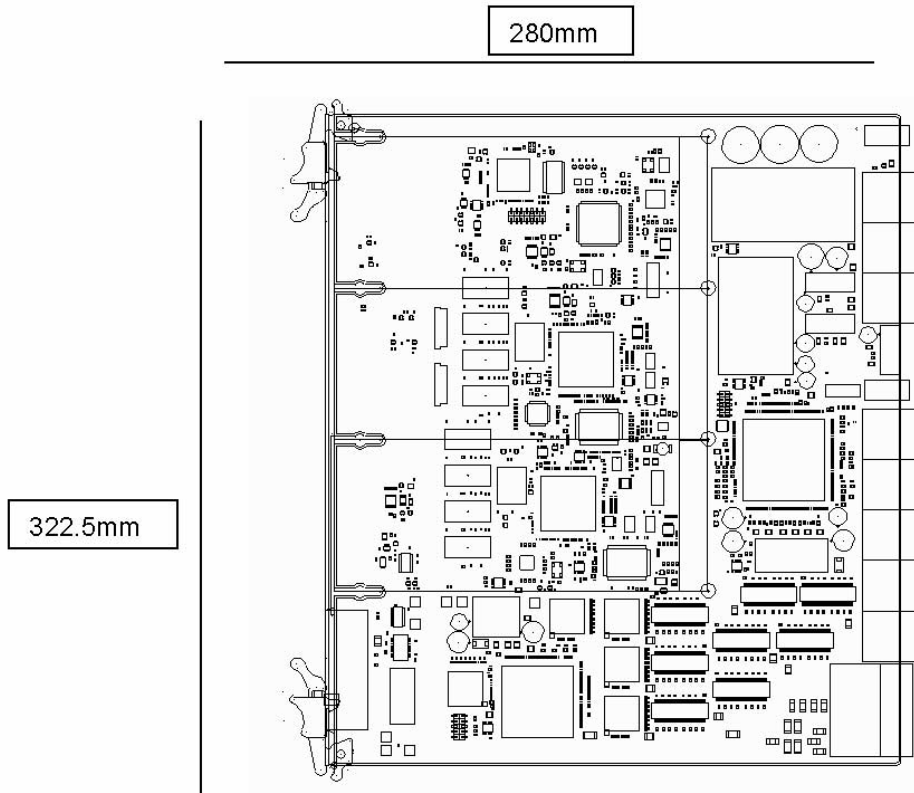
Connectors

This appendix describes the switch's connectors you can use to interface to application-specific devices.

B.1 Connector Assignments

TABLE B-1 Connector Assignments

Connector	Function
J13 Top	Serial MGMT Port RJ-45 (Base and Fabric)
J13 2nd	10/100 Ethernet MGMT Port RJ-45 (Base and Fabric)
J13 3rd	10/100/1000 Ethernet Port RJ-45 (Base)
J13 Bottom	10/100/1000 Ethernet Port RJ-45 (Base)
J8	ATCA Zone 3 RTM Connector Top
J7	ATCA Zone 3 RTM Connector Middle
J6	ATCA Zone 3 RTM Connector Bottom
J9	ATCA Zone 1 Connector
J5	ATCA Zone 2 P20 ZD Connector
J4	ATCA Zone 2 P21 ZD Connector
J3	ATCA Zone 2 P22 ZD Connector
J2	ATCA Zone 2 P23 ZD Connector
J1	ATCA Zone 2 P24 ZD Connector

B.2 Connector Locations (Topside)

FIGURE B-1 Connector Locations (Topside)

)
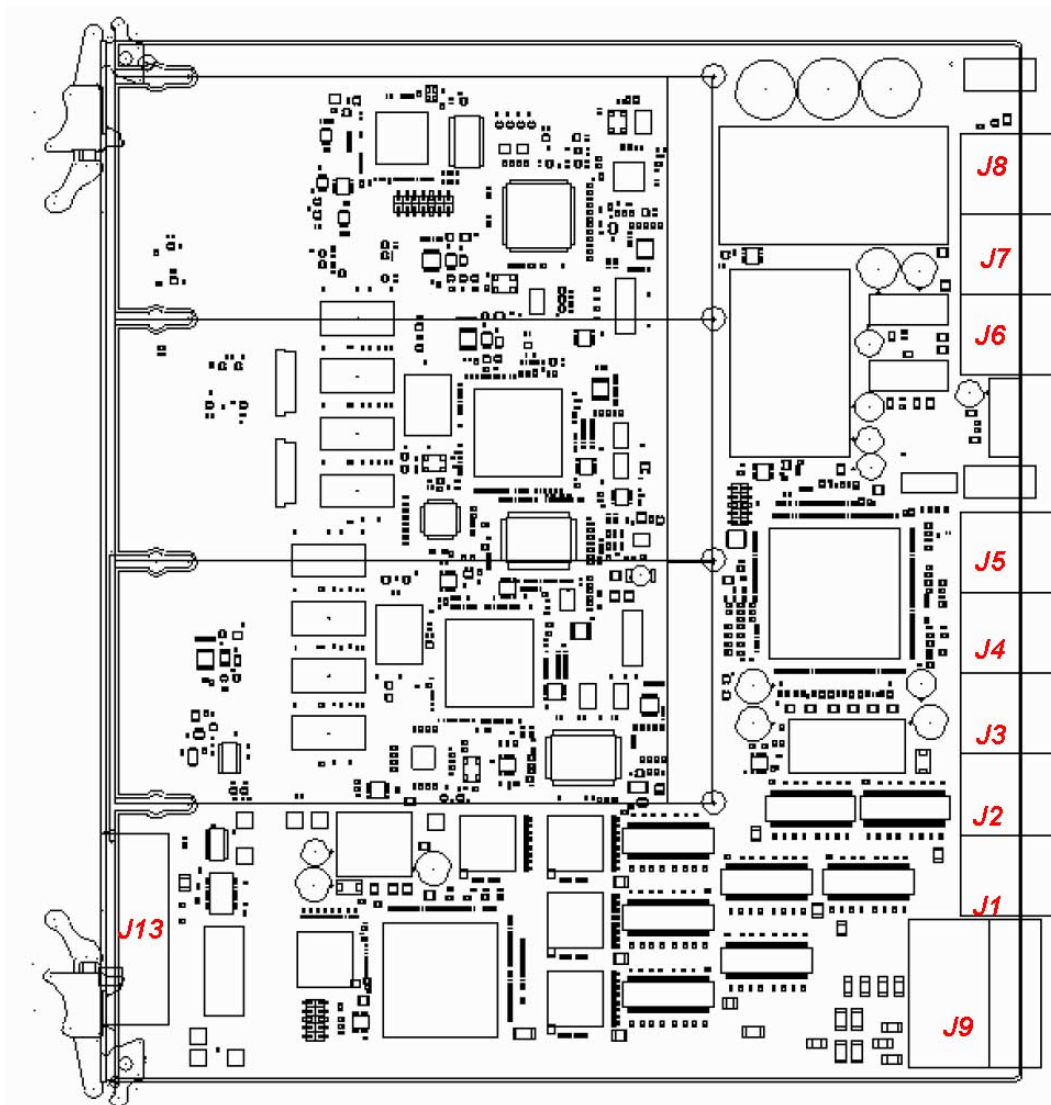
TABLE B-2   ATCA Zone 1 Connector (J9) Pins

Pin #	Pin Name	Pin #	Pin Name
1	NC	18	NC
2	NC	19	NC
3	NC	20	NC
4	NC	21	NC
5	HA(0)	22	NC
6	HA(1)	23	NC
7	HA(2)	24	NC
8	HA(3)	25	SHELF_GND
9	HA(4)	26	GND
10	HA(5)	27	NC
11	HA(6)	28	VRTN_A
12	HA(7)	29	VRTN_B
13	SCL_A	30	EARLY_A
14	SCD_A	31	EARLY_B
15	SCL_B	32	NC
16	SCD_B	33	-48V_A
17	NC	34	-48V_B

FIGURE B-2   ATCA Zone 1 Connector (J9)
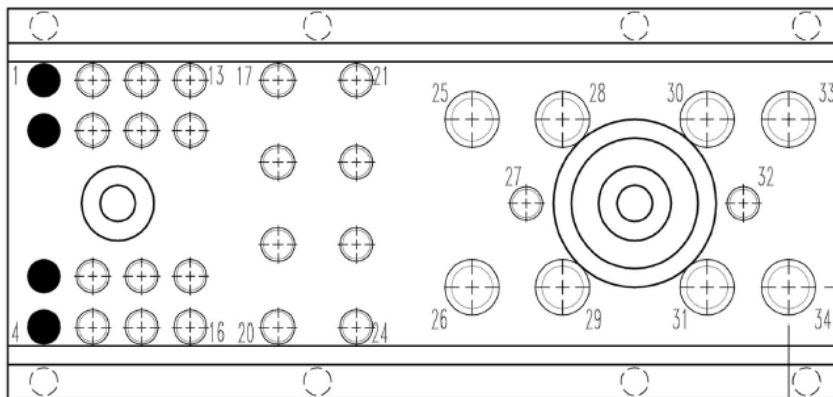
B.3   ATCA Zone 2 P20 ZD Connector (J5)

TABLE B-3   ATCA Zone 2 P20 ZD Connector (J5)

		a	b	c	d	e	f	g	h
1	Clks	CLK1A+	CLK1A-	CLK1B+	CLK1B-	CLK2A+	CLK2A-	CLK2B+	CLK2B-
2		AMC3 P12_TX+	AMC3 P12_TX-	AMC3 P12_RX+	AMC3 P12_RX-	CLK3A+	CLK3A-	CLK3B+	CLK3B-
3	Upd ate Ch and Clks	Base Tx2 10GbE+	Base Tx2 10GbE-	Base Rx2 10GbE+	Base Rx2 10GbE-	Base Tx3 10GbE+	Base Tx3 10GbE-	Base Rx3 10GbE+	Base Rx3 10GbE-
4		Base Tx0 10GbE+	Base Tx0 10GbE-	Base Rx0 10GbE+	Base Rx0 10GbE-	Base Tx1 10GbE+	Base Tx1 10GbE-	Base Rx1 10GbE+	Base Rx1 10GbE-
5	Fabri c Ch 15	Tx2 10GbE [15]+	Tx2 10GbE [15]-	Rx2 10GbE [15]+	Rx2 10GbE [15]-	Tx3 10GbE [15]+	Tx3 10GbE [15]-	Rx3 10GbE [15]+	Rx3 10GbE [15]-
6		Tx0 10GbE [15]+	Tx0 10GbE [15]-	Rx0 10GbE [15]+	Rx0 10GbE [15]-	Tx1 10GbE [15]+	Tx1 10GbE [15]-	Rx1 10GbE [15]+	Rx1 10GbE [15]-
7	Fabri c Ch 14	Tx2 10GbE [14]+	Tx2 10GbE [14]-	Rx2 10GbE [14]+	Rx2 10GbE [14]-	Tx3 10GbE [14]+	Tx3 10GbE [14]-	Rx3 10GbE [14]+	Rx3 10GbE [14]-
8		Tx0 10GbE [14]+	Tx0 10GbE [14]-	Rx0 10GbE [14]+	Rx0 10GbE [14]-	Tx1 10GbE [14]+	Tx1 10GbE [14]-	Rx1 10GbE [14]+	Rx1 10GbE [14]-
9	Fabri c Ch 13	Tx2 10GbE [13]+	Tx2 10GbE [13]-	Rx2 10GbE [13]+	Rx2 10GbE [13]-	Tx3 10GbE [13]+	Tx3 10GbE [13]-	Rx3 10GbE [13]+	Rx3 10GbE [13]-
10		Tx0 10GbE [13]+	Tx0 10GbE [13]-	Rx0 10GbE [13]+	Rx0 10GbE [13]-	Tx1 10GbE [13]+	Tx1 10GbE [13]-	Rx1 10GbE [13]+	Rx1 10GbE [13]-

B.4   ATCA Zone 2 P21 ZD Connector (J4)

TABLE B-4   ATCA Zone 2 P21 ZD Connector (J4)

		a	b	c	d	e	f	g	h
1	Fabri c Ch 12	Tx2 10GB [12]+	Tx2 10GB [12]-	Rx2 10GB [12]+	Rx2 10GB [12]-	Tx3 10GB [12]+	Tx3 10GB [12]-	Rx3 10GB [12]+	Rx3 10GB [12]-
2		Tx0 10GB [12]+	Tx0 10GB [12]-	Rx0 10GB [12]+	Rx0 10GB [12]-	Tx1 10GB [12]+	Tx1 10GB [12]-	Rx1 10GB [12]+	Rx1 10GB [12]-
3	Fabri c Ch 11	Tx2 10GB [11]+	Tx2 10GB [11]-	Rx2 10GB [11]+	Rx2 10GB [11]-	Tx3 10GB [11]+	Tx3 10GB [11]-	Rx3 10GB [11]+	Rx3 10GB [11]-
4		Tx0 10GB [11]+	Tx0 10GB [11]-	Rx0 10GB [11]+	Rx0 10GB [11]-	Tx1 10GB [11]+	Tx1 10GB [11]-	Rx1 10GB [11]+	Rx1 10GB [11]-

TABLE B-4 ATCA Zone 2 P21 ZD Connector (J4)

5	**Fabric Ch 10**	Tx2 10GB [10]+	Tx2 10GB [10]-	Rx2 10GB [10]+	Rx2 10GB [10]-	Tx3 10GB [10]+	Tx3 10GB [10]-	Rx3 10GB [10]+	Rx3 10GB [10]-
6		Tx0 10GB [10]+	Tx0 10GB [10]-	Rx0 10GB [10]+	Rx0 10GB [10]-	Tx1 10GB [10]+	Tx1 10GB [10]-	Rx1 10GB [10]+	Rx1 10GB [10]-
7	**Fabric Ch 9**	Tx2 10GB [9]+	Tx2 10GB [9]-	Rx2 10GB [9]+	Rx2 10GB [9]-	Tx3 10GB [9]+	Tx3 10GB [9]-	Rx3 10GB [9]+	Rx3 10GB [9]-
8		Tx0 10GB [9]+	Tx0 10GB [9]-	Rx0 10GB [9]+	Rx0 10GB [9]-	Tx1 10GB [9]+	Tx1 10GB [9]-	Rx1 10GB [9]+	Rx1 10GB [9]-
9	**Fabric Ch 8**	Tx2 10GB [8]+	Tx2 10GB [8]-	Rx2 10GB [8]+	Rx2 10GB [8]-	Tx3 10GB [8]+	Tx3 10GB [8]-	Rx3 10GB [8]+	Rx3 10GB [8]-
1 0		Tx0 10GB [8]+	Tx0 10GB [8]-	Rx0 10GB [8]+	Rx0 10GB [8]-	Tx1 10GB [8]+	Tx1 10GB [8]-	Rx1 10GB [8]+	Rx1 10GB [8]-

B.5 ATCA Zone 2 P22 ZD Connector (J3)

TABLE B-5 ATCA Zone 2 P22 ZD Connector (J3)

		a	b	c	d	e	f	g	h
1	Fabric Ch 7	Tx2 10GB [7]+	Tx2 10GB [7]-	Rx2 10GB [7]+	Rx2 10GB [7]-	Tx3 10GB [7]+	Tx3 10GB [7]-	Rx3 10GB [7]+	Rx3 10GB [7]-
2		Tx0 10GB [7]+	Tx0 10GB [7]-	Rx0 10GB [7]+	Rx0 10GB [7]-	Tx1 10GB [7]+	Tx1 10GB [7]-	Rx1 10GB [7]+	Rx1 10GB [7]-
3	Fabric Ch 6	Tx2 10GB [6]+	Tx2 10GB [6]-	Rx2 10GB [6]+	Rx2 10GB [6]-	Tx3 10GB [6]+	Tx3 10GB [6]-	Rx3 10GB [6]+	Rx3 10GB [6]-
4		Tx0 10GB [6]+	Tx0 10GB [6]-	Rx0 10GB [6]+	Rx0 10GB [6]-	Tx1 10GB [6]+	Tx1 10GB [6]-	Rx1 10GB [6]+	Rx1 10GB [6]-
5	Fabric Ch 5	Tx2 10GB [5]+	Tx2 10GB [5]-	Rx2 10GB [5]+	Rx2 10GB [5]-	Tx3 10GB [5]+	Tx3 10GB [5]-	Rx3 10GB [5]+	Rx3 10GB [5]-
6		Tx0 10GB [5]+	Tx0 10GB [5]-	Rx0 10GB [5]+	Rx0 10GB [5]-	Tx1 10GB [5]+	Tx1 10GB [5]-	Rx1 10GB [5]+	Rx1 10GB [5]-
7	Fabric Ch 4	Tx2 10GB [4]+	Tx2 10GB [4]-	Rx2 10GB [4]+	Rx2 10GB [4]-	Tx3 10GB [4]+	Tx3 10GB [4]-	Rx3 10GB [4]+	Rx3 10GB [4]-
8		Tx0 10GB [4]+	Tx0 10GB [4]-	Rx0 10GB [4]+	Rx0 10GB [4]-	Tx1 10GB [4]+	Tx1 10GB [4]-	Rx1 10GB [4]+	Rx1 10GB [4]-
9	Fabric Ch 3	Tx2 10GB [3]+	Tx2 10GB [3]-	Rx2 10GB [3]+	Rx2 10GB [3]-	Tx3 10GB [3]+	Tx3 10GB [3]-	Rx3 10GB [3]+	Rx3 10GB [3]-
10		Tx0 10GB [3]+	Tx0 10GB [3]-	Rx0 10GB [3]+	Rx0 10GB [3]-	Tx1 10GB [3]+	Tx1 10GB [3]-	Rx1 10GB [3]+	Rx1 10GB [3]-

B.6 ATCA Zone 2 P23 ZD Connector (J2)

TABLE B-6 ATCA Zone 2 P23 ZD Connector (J2)

		a	b	c	d	e	f	g	h
1	Fabric Ch 2	Tx2 10GB [2]+	Tx2 10GB [2]-	Rx2 10GB [2]+	Rx2 10GB [2]-	Tx3 10GB [2]+	Tx3 10GB [2]-	Rx3 10GB [2]+	Rx3 10GB [2]-
2		Tx0 10GB [2]+	Tx0 10GB [2]-	Rx0 10GB [2]+	Rx0 10GB [2]-	Tx1 10GB [2]+	Tx1 10GB [2]-	Rx1 10GB [2]+	Rx1 10GB [2]-
3	Fabric Ch 1	Tx2 10GB [1]+	Tx2 10GB [1]-	Rx2 10GB [1]+	Rx2 10GB [1]-	Tx3 10GB [1]+	Tx3 10GB [1]-	Rx3 10GB [1]+	Rx3 10GB [1]-
4		Tx0 10GB [1]+	Tx0 10GB [1]-	Rx0 10GB [1]+	Rx0 10GB [1]-	Tx1 10GB [1]+	Tx1 10GB [1]-	Rx1 10GB [1]+	Rx1 10GB [1]-

TABLE B-6 ATCA Zone 2 P23 ZD Connector (J2)

	ShMC Port(s)	SHMC BI_A+	SHMC BI_A-	SHMC BI_B+	SHMC BI_B-	SHMC BI_C+ or SHMC2 BI_A+	SHMC BI_C- or SHMC2 BI_A-	SHMC BI_D+ or SHMC2 BI_B+	SHMC BI_D- or SHMC2 BI_B-
5									
6	Base Ch 2	BI_ DA2+	BI_ DA2-	BI_ DB2+	BI_ DB2-	BI_ DC2+	BI_ DC2-	BI_ DD2+	BI_ DD2-
7	Base Ch 3	BI_ DA3+	BI_ DA3-	BI_ DB3+	BI_ DB3-	BI_ DC3+	BI_ DC3-	BI_ DD3+	BI_ DD3-
8	Base Ch 4	BI_ DA4+	BI_ DA4-	BI_ DB4+	BI_ DB4-	BI_ DC4+	BI_ DC4-	BI_ DD4+	BI_ DD4-
9	Base Ch 5	BI_ DA5+	BI_ DA5-	BI_ DB5+	BI_ DB5-	BI_ DC5+	BI_ DC5-	BI_ DD5+	BI_ DD5-
1 0	Base Ch 6	BI_ DA2+	BI_ DA2-	BI_ DB2+	BI_ DB2-	BI_ DC2+	BI_ DC2-	BI_ DD2+	BI_ DD2-

B.7 ATCA Zone 2 P24 ZD Connector (J1)

TABLE B-7   ATCA Zone 2 P24 ZD Connector (J1)

		a	b	c	d	e	f	g	h
1	Base Ch 7	BI_ DA7+	BI_ DA7-	BI_ DB7+	BI_ DB7-	BI_ DC7+	BI_ DC7-	BI_ DD7+	BI_ DD7-
2	Base Ch 8	BI_ DA8+	BI_ DA8-	BI_ DB8+	BI_ DB8-	BI_ DC8+	BI_ DC8-	BI_ DD8+	BI_ DD8-
3	Base Ch 9	BI_ DA9+	BI_ DA9-	BI_ DB9+	BI_ DB9-	BI_ DC9+	BI_ DC9-	BI_ DD9+	BI_ DD9-
4	Base Ch 10	BI_ DA10+	BI_ DA10-	BI_ DB10+	BI_ DB10-	BI_ DC10+	BI_ DC10-	BI_ DD10+	BI_ DD10-
5	Base Ch 11	BI_ DA11+	BI_ DA11-	BI_ DB11+	BI_ DB11-	BI_ DC11+	BI_ DC11-	BI_ DD11+	BI_ DD11-
6	Base Ch 12	BI_ DA12+	BI_ DA12-	BI_ DB12+	BI_ DB12-	BI_ DC12+	BI_ DC12-	BI_ DD12+	BI_ DD12-
7	Base Ch 13	BI_ DA13+	BI_ DA13-	BI_ DB13+	BI_ DB13-	BI_ DC13+	BI_ DC13-	BI_ DD13+	BI_ DD13-
8	Base Ch 14	BI_ DA14+	BI_ DA14-	BI_ DB14+	BI_ DB14-	BI_ DC14+	BI_ DC14-	BI_ DD14+	BI_ DD14-
9	Base Ch 15	BI_ DA15+	BI_ DA15-	BI_ DB15+	BI_ DB15-	BI_ DC15+	BI_ DC15-	BI_ DD15+	BI_ DD15-
10	Base Ch 16	BI_ DA2+	BI_ DA2-	BI_ DB2+	BI_ DB2-	BI_ DC2+	BI_ DC2-	BI_ DD2+	BI_ DD2-

B.8 Serial RJ-45 Connector (J13 Top)

This connector is the Cisco/Intel pinout.

TABLE B-8   Serial RJ-45 Connector (J13-Top)

Pin	Signal
1	RTS~
2	DTR
3	TXD
4	GND
5	GND

Pin	Signal
6	RXD
7	DSR
8	CTS~

B.9   Serial Cable

The switch uses RJ-45 connectors for its serial ports. To connect to a PC's DB9 connector, a special cable or adapter is needed. These cables and adapters are available through various sources or can be made easily. The cable must cross over the TXD and RXD signals, as both the PC and switch are DTE. The minimum cable pinout is listed in the following table.

TABLE B-9   Minimum Serial Cable Pinouts

	RJ-45	DB9
RXD to TXD	6	3
TXD to RXD	3	2
GND to GND	5	5

B.10 10/100/1000Base-T RJ-45 Connector (J13 3rd, J13 Bottom)

TABLE B-10 10/100/1000Base-T RJ-45 Connector (J13-3rd and Bottom)

	Signal
1	MDI_0+
2	MDI_0-
3	MDI_1+
4	MDI_2+
5	MDI_2-
6	MDI_1-
7	MDI_3+
8	MDI_3-

B.11 10/100Base-TX RJ-45 Connector (J13 2nd)

TABLE B-11 10/100Base-TX RJ-45 Connector (J13-2nd)

	Signal
1	Tx+
2	Tx-
3	Rx+
4	unused
5	unused
6	Rx-
7	unused
8	unused

B.12 ATCA Zone 3 RTM Connector Top (J8)

TABLE B-12 ATCA Zone 3 RTM Connector (J8-Top))

	a	b	c	d	e	f	g	h
1	Fabric MDC	Fabric MDIO	Base MDCGE	Base MDIO GE	Base MDC XE	Base MDIO XE	Base PHY RST~	Fabric PHY RST~
2	OOS LED	LED2 LED	LED3 GREEN LED	LED3 RED LED	BLUE LED	RTM PRSNT~	IPMI SDA	IPMI SCL
3	SOFT OFF	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
4	MGMT TX+	MGMT TX-	MGMT RX+	MGMT RX-	SERIAL TX	SERIAL RTS~	SERIAL RX	SERIAL CTS~
5	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
6	+3.3V STBY	+3.3V STBY	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
7	+3.3V	+3.3V	+3.3V	+3.3V	+3.3V	+3.3V	+3.3V	+3.3V
8	+2.5V	+2.5V	+2.5V	+2.5V	+2.5V	+2.5V	+2.5V	+2.5V
9	+1.2V	+1.2V	+1.2V	+1.2V	+1.2V	+1.2V	+1.2V	+1.2V
10	+1.2V	+1.2V	+1.2V	+1.2V	+12V	+12V	+12V	+12V

B.13 ATCA Zone 3 RTM Connector (J7-Middle)

TABLE B-13 ATCA Zone 3 RTM Connector (J7-Middle)

	a	b	c	d	e	f	g	h
1	AMC1 P20 TX+	AMC1 P20 TX-	AMC1 P20 RX+	AMC1 P20 RX-	AMC1 P19 TX+	AMC1 P19 TX-	AMC1 P19 RX+	AMC1 P19 RX-
2	AMC1 P18 TX+	AMC1 P18 TX-	AMC1 P18 RX+	AMC1 P18 RX-	AMC1 P17 TX+	AMC1 P17 TX-	AMC1 P17 RX+	AMC1 P17 RX-
3	AMC2 P20 TX+	AMC2 P20 TX-	AMC2 P20 RX+	AMC2 P20 RX-	AMC2 P19 TX+	AMC2 P19 TX-	AMC2 P19 RX+	AMC2 P19 RX-
4	AMC2 P18 TX+	AMC2 P18 TX-	AMC2 P18 RX+	AMC2 P18 RX-	AMC2 P17 TX+	AMC2 P17 TX-	AMC2 P17 RX+	AMC2 P17 RX-
5	AMC3 P20 TX+	AMC3 P20 TX-	AMC3 P20 RX+	AMC3 P20 RX-	AMC3 P19 TX+	AMC3 P19 TX-	AMC3 P19 RX+	AMC3 P19 RX-
6	AMC3 P18 TX+	AMC3 P18 TX-	AMC3 P18 RX+	AMC3 P18 RX-	AMC3 P17 TX+	AMC3 P17 TX-	AMC3 P17 RX+	AMC3 P17 RX-
7	Tx2 10GB [17]+	Tx2 10GB [17]-	Rx2 10GB [17]+	Rx2 10GB [17]-	Tx3 10GB [17]+	Tx3 10GB [17]-	Rx3 10GB [17]+	Rx3 10GB [17]-
8	Tx0 10GB [17]+	Tx0 10GB [17]-	Rx0 10GB [17]+	Rx0 10GB [17]-	Tx1 10GB [17]+	Tx1 10GB [17]-	Rx1 10GB [17]+	Rx1 10GB [17]-
9	Tx2 10GB [18]+	Tx2 10GB [18]-	Rx2 10GB [18]+	Rx2 10GB [18]-	Tx3 10GB [18]+	Tx3 10GB [18]-	Rx3 10GB [18]+	Rx3 10GB [18]-
10	Tx0 10GB [18]+	Tx0 10GB [18]-	Rx0 10GB [18]+	Rx0 10GB [18]-	Tx1 10GB [18]+	Tx1 10GB [18]-	Rx1 10GB [18]+	Rx1 10GB [18]-

B.14 ATCA Zone 3 RTM Connector (J6-Bottom)

TABLE B-14 ATCA Zone 3 RTM Connector (J6-Bottom)

	a	b	c	d	e	f	g	h
1	Tx2 10GB [19]+	Tx2 10GB [19]-	Rx2 10GB [19]+	Rx2 10GB [19]-	Tx3 10GB [19]+	Tx3 10GB [19]-	Rx3 10GB [19]+	Rx3 10GB [19]-
2	Tx0 10GB [19]+	Tx0 10GB [19]-	Rx0 10GB [19]+	Rx0 10GB [19]-	Tx1 10GB [19]+	Tx1 10GB [19]-	Rx1 10GB [19]+	Rx1 10GB [19]-
3	Tx2 10GB [20]+	Tx2 10GB [20]-	Rx2 10GB [20]+	Rx2 10GB [20]-	Tx3 10GB [20]+	Tx3 10GB [20]-	Rx3 10GB [20]+	Rx3 10GB [20]-
4	Tx0 10GB [20]+	Tx0 10GB [20]-	Rx0 10GB [20]+	Rx0 10GB [20]-	Tx1 10GB [20]+	Tx1 10GB [20]-	Rx1 10GB [20]+	Rx1 10GB [20]-
5	BI_ DA20+	BI_ DA20-	BI_ DB20+	BI_ DB20-	BI_ DC20+	BI_ DC20-	BI_ DD20+	BI_ DD20-
6	BI_ DA21+	BI_ DA21-	BI_ DB21+	BI_ DB21-	BI_ DC21+	BI_ DC21-	BI_ DD21+	BI_ DD21-
7	Base 27 Tx2 10GB+	Base 27 Tx2 10GB-	Base 27 Rx0 10GB+	Base 27 Rx0 10GB-	Base 27 Tx3 10GB+	Base 27 Tx3 10GB-	Base 27 Rx1 10GB+	Base 27 Rx1 10GB-
8	Base 27 Tx0 10GB+	Base 27 Tx0 10GB-	Base 27 Rx2 10GB+	Base 27 Rx2 10GB-	Base 27 Tx1 10GB+	Base 27 Tx1 10GB-	Base 27 Rx3 10GB+	Base 27 Rx3 10GB-
9	Base 26 Tx2 10GB+	Base 26 Tx2 10GB-	Base 26 Rx0 10GB+	Base 26 Rx0 10GB-	Base 26 Tx3 10GB+	Base 26 Tx3 10GB-	Base 26 Rx1 10GB+	Base 26 Rx1 10GB-
10	Base 26 Tx0 10GB+	Base 26 Tx0 10GB-	Base 26 Rx2 10GB+	Base 26 Rx2 10GB-	Base 26 Tx1 10GB+	Base 26 Tx1 10GB-	Base 26 Rx3 10GB+	Base 26 Rx3 10GB-

Datasheet Reference

This appendix provides links to datasheets, standards, and specifications for the technology designed into the switch.

IEEE 802.3-2002 CDMA/CD (Ethernet) and Other IEEE 802.3/802.1 Documents

This document defines Ethernet and several of the protocols used in Ethernet. Any 802 document can be obtained for free six months after it has been published, or, for a fee, a document can be obtained right after it is published.

http://standards.ieee.org/getieee802/

PICMG 3.0 AdvancedTCA

AdvancedTCA specifications can be purchased from the PCI Industrial Computer Manufacturers Group (PICMG) for a nominal fee. A short form AdvancedTCA specification is also available on PICMG's Website.

http://www.picmg.org.

PICMG 3.1 AdvancedTCA Ethernet and Fibre Channel

AdvancedTCA specifications can be purchased from the PCI Industrial Computer Manufacturers Group (PICMG) for a nominal fee.

http://www.picmg.org

Broadcom Datasheets

A non-disclosure agreement (NDA) with Broadcom is required to view their datasheets. Contact Broadcom for more information.

http://www.broadcom.com/

MPC8272 PowerQUICC II Family Reference Manual

This and other Freescale documents about the MPC8247 are available at:

http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=MPC8247

IETF RFCs

The IETF makes all RFCs freely available on their website:

http://www.ietf.org/

Agency Certifications

This appendix lists standards agencies and the certifications related to the switch.

D.1 CE Certification

The Sun Netra CP3240 switch and RTM meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility [EN55024:1998, EN55022:1998] and Low-Voltage Directive 73/23/EEC for Product Safety [EN60950:2000]. A certificate of incorporation is available upon request. The final system configuration must be reconsidered as a whole per these directives.

D.2 NEBS/ETSI

The Sun Netra CP3240 switch and RTM has been designed to meet or exceed:

- Telcordia specification FR-2063 Issue 2 Dec 2002 "Network Building Requirements"
  - Telcordia GR-63, Issue 3, March 2006, Network Equipment-Building System (NEBS) Requirements—Physical Protection
  - Telcordia GR-1089, Issue 4, June 2006, Electromagnetic Compatibility And Electrical Safety Generic Criteria For Network Telecommunication Equipment
- ETSI EN 300 019-2-1 V2.1.2 (2000-09), -2-2 V2.1.1 (1999-09), -2-3 V2.2.2 (2003-04), Environmental conditions and environmental tests for telecommunication equipment; Part 2
- ETSI EN 300 119-5, V1.2.2 (2004-12), Part 4: Engineering requirements for subracks in miscellaneous racks and cabinets

- ETSI EN 300 132-2, September 1996, Equipment Engineering Power Supply Interface At The Input To Telecommunications Equipment; Part 2: Operated by direct current (dc)

- ETSI EN 300 753, October 1997, Acoustic Noise Emitted By Telecommunications Equipment

Certification is dependent on your configuration.

D.3   Safety

- UL/cUL 60950-1 Safety for Information Technology Equipment (UL File #E130569)

- EN/IEC 60950-1:2001, 1ST ED CB/CCA –scheme, Safety for Information Technology Equipment (TUV CB certificate and report)

The following group and/or national deviations were considered:

- CENELEC Common Modifications, Annex ZA

- AU (Australia and New Zealand)

- CH (Switzerland)

- DE (Germany)

- DK (Denmark)

- ES (Spain)

- FI (Finland)

- GB (United Kingdom)

- IE (Ireland)

- KR (Korea)

- NO (Norway)

- SE(Sweden)

- China (deviations to IEC 60950 3rd Ed. considered):

  - Telcordia GR-63-CORE Network Equipment-Building System (NEBS) Requirements Issue 3 Mar 2006—Physical Protection (Designed to meet section 4)

  - Telcordia GR-1089-CORE Safety for Network Telecommunication Equipment Issue 4 Jun 2006 (meets Section 7)

D.4 Emissions Test Regulations

- FCC Part 15, Subpart B Class A Commercial Equipment
- Industry Canada ICES-003 Class A Commercial Equipment
- CISPR 22/EN 55022:1998 Class A Radiated, Power line Conducted
- Telcordia GR-1089-CORE EMC For Network Telecommunication Equipment Issue 4 Jun 2006 (Designed to meet Sections 2 and 3)

D.4.1 EN 50081-1 Emissions

- Telcordia GR-1089-CORE EMC For Network Telecommunication Equipment Issue 4 Jun 2006 (designed to meet 3.2)
- EN55022:1998 Limits and Methods of Measurement of Radio Interference +A1:2000+A2:2003 Characteristics of Information Technology Equipment
- IEC CISPR22:2003 Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
- IEC CISPR 16-1:1999 Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus
- IEC CISPR 16-2:1999 Specification for radio disturbance and immunity measuring apparatus and methods - Part 2: Methods of measurement of disturbances and immunity
- AS/NZS CISPR 22:2004 Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

D.4.2 EN 55024 Immunity

- Telcordia GR-1089-CORE EMC For Network Telecommunication Equipment Issue 4 Jun 2006 (Sections 2.1 (ESD), designed to meet 2.2 (EFT), 3.3)
- EN 55024:1998 Information Technology Equipment – Immunity +A1:2001+A2:2003 characteristics limits and methods of measurements
- EN 300-386:2002 Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; EMC requirements
- IEC 61000-4-2:2001 EMC - Part 4: Testing and measurement techniques - Section 4.2 Electrostatic discharge immunity test - Basic EMC Publication. (+/- 8KV contact and +/-15KV air discharge)

- IEC 61000-4-3:2003 EMC - Part 4. Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test
- IEC 61000-4-4:2004 EMC - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test - Basic EMC Publication
- IEC 61000-4-5:2001 EMC - Part 4: Testing and measurement techniques - Section 5: Surge immunity test
- IEC 61000-4-6:1996 EMC - Part 4: Testing and measurement techniques - Section 6: +A1:2001 Immunity to conducted disturbances induced by radio frequency fields

D.5 Regulatory Information

⚠ **Caution –** If you make any modification to the switch not expressly approved by Sun, you could void your warranty and/or regulatory authority to operate the component.

D.5.1 D.4.1FCC (USA)

This product has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

This switch complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

D.5.2   Industry Canada (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

Cet appareillage numérique de la classe A répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes:

1. Ce dispositif peut ne pas causer l'interférence nocive.

2. Ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

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