



# Sun Enterprise™ 450 Server Board Upgrade Guide

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Your Sun product is marked to indicate its compliance class:

- Federal Communications Commission (FCC) — USA
- Industry Canada Equipment Standard for Digital Equipment (ICES-003) — Canada
- Voluntary Control Council for Interference (VCCI) — Japan
- Bureau of Standards Metrology and Inspection (BSMI) — Taiwan

Please read the appropriate section that corresponds to the marking on your Sun product before attempting to install the product.

## FCC Class A Notice

This device 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.

**Note:** This equipment 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 equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it 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 his own expense.

**Shielded Cables:** Connections between the workstation and peripherals must be made using shielded cables to comply with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted-pair (UTP) cables.

**Modifications:** Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

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1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

**Shielded Cables:** Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted pair (UTP) cables.

**Modifications:** Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

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Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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# Preface

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The *Sun Enterprise 450 Server Board Upgrade Guide*, used with the *Ultra Enterprise 450 Server Owner's Guide*, gives you the information you need to perform a main logic board upgrade to your Sun Enterprise™ 450 server.

Features and options, installation, troubleshooting, parts replacement, network administration information, and other topics about the Sun Enterprise 450 server are all covered in the *Ultra Enterprise 450 Server Owner's Guide*, which accompanied your purchase of the server. Refer to the original documentation to install the parts you will be transferring from your old server into your new Sun Enterprise 450 server. You should also use the documentation to install any options that you purchased with this upgrade.

In addition, you can view many of the component installation and replacement procedures in the multimedia CD-ROM application ShowMe How™, which also accompanied your purchase of the original server.

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## Using UNIX Commands

This document may not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris™ operating environment
- Other software documentation that you received with your system

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# Typographic Conventions

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

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# Shell Prompts

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

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## Related Documentation

Application	Title
Performing diagnostic tests	<i>SunVTS User's Guide</i>
	<i>SunVTS Quick Reference Card</i>
	<i>SunVTS Test Reference Manual</i>
	<i>Solstice SyMON User's Guide</i>
System and network administration	<i>Solaris System Administrator AnswerBook</i>
	<i>SPARC: Installing Solaris Software</i>
Using operating system software	<i>Solaris User's Guide</i>
Miscellaneous	<i>Solaris on Sun Hardware AnswerBook</i>
	<i>Solaris Handbook for Sun Peripherals</i>
	<i>SPARC Hardware Platform Guide</i>

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# Sun Enterprise 450 Server Board Upgrade Guide

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This document and the *Ultra Enterprise 450 Server Owner's Guide* contain the information you need to upgrade the main logic board in your Sun Enterprise 450 server, and to install faster CPU modules.

For important safety and electromagnetic compatibility information, read the section "Electromagnetic Compatibility" on page 14 in this document.

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## Overview

The following sections of this document provide background information and cover the main steps involved in the upgrade procedure:

- "Confirming the Upgrade Contents" on page 2
- "Unpacking the Shipping Cartons" on page 2
- "Transferring Your System's hostid and Ethernet Address" on page 3
- "Halting Your System" on page 4
- "Removing the Old Main Logic Board" on page 5
- "Installing the New Main Logic Board" on page 5
- "Installing UltraSPARC II CPU Modules" on page 7
- "Installing the Remaining Main Logic Board Components" on page 10
- "Reassembling Your System" on page 10
- "Electromagnetic Compatibility" on page 14
- "Powering Up Your Upgraded System" on page 16
- "Return Material Procedure" on page 16

For the procedures that follow, use the sections in the *Ultra Enterprise 450 Server Owner's Guide* where noted. Be sure to read all the information that precedes the steps and follow any procedures noted there in the *Ultra Enterprise 450 Server Owner's Guide*.

You should also have on hand the documentation supplied with any third-party devices that you installed on your server's main logic board. You will need to refer to that documentation to perform some of the procedures during this upgrade.

Be sure to read each section that follows in its entirety, as well as any necessary information in the *Ultra Enterprise 450 Server Owner's Guide* to upgrade the main logic board.

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## Confirming the Upgrade Contents

Your Sun Enterprise 450 server main logic board upgrade kit includes the following:

- Sun Enterprise 450 server main logic board
- CPU air guide
- Class A Electromagnetic Compatibility (EMC) label
- Wrist strap
- Antistatic mat
- *Sun Upgrade Program Policy* document
- *Sun Upgrades RMA* letter

In addition to the main logic board upgrade, you may have ordered one or more of the following hardware components:

- Memory modules (32-megabyte or larger capacity SIMMs)
- CPU module
- Additional DC-to-DC converter(s), if necessary
- New disk drives

If any item, except CPU modules, is not included in the list above, you are expected to transfer the item(s) from your old system main logic board to your new one.

When you upgrade to a Sun Enterprise 450 server, you must return your old main logic board to Sun Microsystems. See "Return Material Procedure" on page 16 for additional details.

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## Unpacking the Shipping Cartons

Follow these steps to unpack your main logic board:

**1. Inspect the shipping cartons before opening them.**

If there is evidence of damage to a carton, contact your sales representative and arrange for an agent of the carrier to be present when you remove the equipment.

2. **Unpack your new Sun Enterprise 450 server main logic board and the CPU air guide.**

3. **Save the cartons and the packing material.**

You will need them to return your old main logic board.

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## Transferring Your System's hostid and Ethernet Address

Because the new NVRAM module on the replacement board contains a new hostid and a new Ethernet address, unless you transfer the NVRAM module from your old main logic board to your replacement board, your server's Ethernet address and hostid number will change. This information is used by the system administrator to identify your server in the network configuration files, and the information is also often used for licensing application software.

Locate the NVRAM module on the main logic board. If necessary, see the section "How to Remove the NVRAM Module" in the *Ultra Enterprise 450 Server Owner's Guide*.

**The system's new Ethernet address** is on the label on the new NVRAM module. The label contains part of the system's Ethernet address, a six-digit hexadecimal number.

For example, the NVRAM label numbers might read 79F843. These numbers comprise the last three pairs of numbers in the system's Ethernet address. The system's Ethernet address is the label number with a prefix of the numbers 080020. Thus the system's new Ethernet address in this example would be 08:00:20:79:F8:43.

**The system's new hostid** is on the label on the new NVRAM module. The label contains part of the system's hostid, a six-digit hexadecimal number.

For example, the NVRAM label numbers might read 79F843. The system's hostid is the hexadecimal number with a prefix of the number 80. Thus the system's new hostid in this example would be 8079F843.

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**Note** – The system's Ethernet address and hostid are also displayed on the system banner when you power up.

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If you transfer the NVRAM chip from your old main logic board to the new main logic board, you do not have to make any changes to your server configuration files or to your application software.

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**Note** – Before performing the main logic board upgrade, you must save any customized NVRAM information separately, such as an `nvrामrc` script or any other non-default settings, so that you may restore the information later.

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If you do not transfer your NVRAM module, the system administrator will need to know the new Ethernet address and hostid stored in the new NVRAM module.

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## Halting Your System

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**Caution** – You must halt the system in an orderly manner. When the operating system or any other standalone program is up and running, do not press Stop-A to halt the system. Abruptly aborting program execution may cause damage to data files.

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Halt your system using the following procedure:

**1. Save all your work.**

Consult your software documentation for instructions on ending a work session and saving your files. If you do not save your work, you could lose it when you switch off the power.

**2. Perform a complete system dump before starting the upgrade process.**

See your operating system documentation if you need instructions on how to do this.

**3. Return to the operating system environment.**

If you are in a windowing environment, exit from it and wait for the system prompt to appear. See the documentation supplied with your windowing system.



**Caution** – If you are transferring your NVRAM module, and have customized your NVRAM module with an `nvrामrc` script, together with any non-default settings in the NVRAM, you will need to save the information separately now, so that you may restore the information after you have performed the upgrade.

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**4. Halt the operating system.**

See the documentation supplied with your operating system for instructions on how to halt it.

- For Solaris 2.5.1 Hardware: 11/97 or later compatible systems, type:

```
% su
Password: superuser password
# /usr/sbin/shutdown -y -g60 -i0
```

The operating system warns other users of your system of the impending shutdown, and then halts itself after a one-minute delay. If you wish to provide a longer delay, see the man page for `shutdown(1)`.

The system responds with system halt messages, followed by either the `>` prompt or the `ok` prompt. When either prompt appears, you can safely turn off the power in the proper sequence.

5. Turn off the power in sequence to:
  - a. External drive units (if any)
  - b. Sun Enterprise 450 server unit
  - c. Monitor (if applicable)

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## Removing the Old Main Logic Board

- Remove the old main logic board using the steps in the section “How to Remove the Main Logic Board” in the *Ultra Enterprise 450 Server Owner’s Guide*.

Remove and clearly label the old NVRAM module if you plan to transfer it to the new main logic board.

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## Installing the New Main Logic Board

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**Note** – The 501-5673 main logic board comes with a CPU air guide. This CPU air guide is essential for proper CPU cooling, and you must install it in the reassembled system. When you unpack the new main logic board, set the CPU air guide aside in a safe place for later installation.

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If you are using the new NVRAM, perform the steps in the section “How to Install the Main Logic Board” in the *Ultra Enterprise 450 Server Owner’s Guide*, and then go to the section “Confirming the Upgrade Contents” on page 2.

If you are transferring the old NVRAM module, perform the first three steps in the section “How to Install the Main Logic Board” in the *Ultra Enterprise 450 Server Owner’s Guide*. Then perform the following steps:

**1. Disconnect the main logic board from its power connector.**

Loosen the captive screws that secure the board to the system rear panel, and pull the handles at the rear of the board until the board is fully disengaged from its power connector.



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**Caution** – Failure to do so could corrupt the information stored in the NVRAM module and adversely affect operation of the system.

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**2. Transfer the NVRAM module from the old main logic board to the new main logic board. Remove the new NVRAM module from the new main logic board using the steps in the section “How to Remove the NVRAM module” in the *Ultra Enterprise 450 Server Owner’s Guide*.**

Be sure to keep the old and the new NVRAM modules clearly identified. You will need to install the new module into the old system board when you return it to Sun Microsystems.

**3. Install the old NVRAM module on the new main logic board using the steps in the section “How to Install the NVRAM module” in the *Ultra Enterprise 450 Server Owner’s Guide*. Then perform the remaining steps below.**

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**Note** – If you have customized your NVRAM module with an `nvrामrc` script, together with any non-default settings in the NVRAM, you will need to restore the information separately, after you have performed the upgrade.

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**4. Reconnect the main logic board to its power connector.**

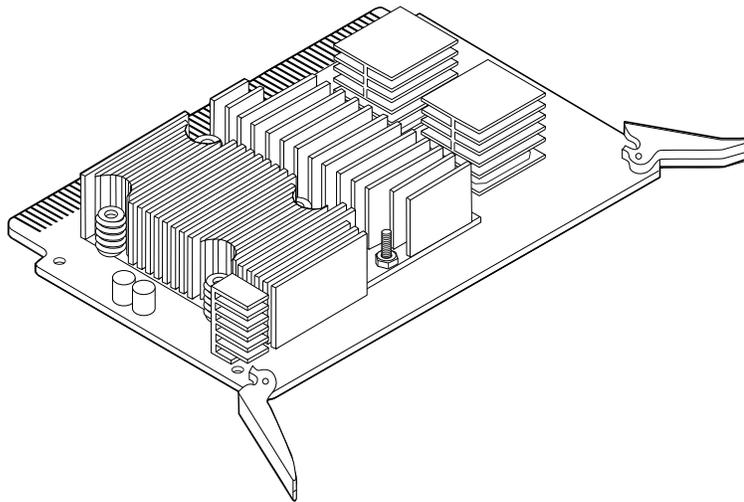
Push on the handles at the rear of the board until the board is fully engaged in its power connector. Tighten the captive screws that secure the board to the system rear panel.

**5. Follow the remaining steps in the section “How to Install the Main Logic Board” in the *Ultra Enterprise 450 Server Owner’s Guide*.**

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## Installing UltraSPARC II CPU Modules

The Sun Enterprise 450 server supports up to four 250-MHz, 300-MHz, 400-MHz, or 480-MHz UltraSPARC II™ CPU modules. The following figure shows the new unshrouded 480-MHz UltraSPARC II CPU module that has 8 Mbytes of integrated cache memory.



Before installing CPU modules, read the section “About CPU Modules” in the *Ultra Enterprise 450 Server Owner’s Guide*.



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**Caution** – Before you install any CPU module, read the section “Setting the Main Logic Board Jumpers” on page 9 in this guide, and verify that the jumper settings are correct for the speed of the CPU module(s) you are installing. Serious system damage can result if the main logic board clock mode jumpers are set incorrectly.

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If you need to know your system’s power consumption, read the section “Calculating System Power Requirements” on page 8 in this guide, and then consult the section “How to Determine System Power Requirements” in the *Ultra Enterprise 450 Server Owner’s Guide*.

The 480-MHz CPU modules require an air guide for proper cooling. This air guide is shipped with the 501-5673 main logic board.

To install CPU modules into the Sun Enterprise 450 server, follow the instructions in the section “How to Install a CPU Module” in the *Ultra Enterprise 450 Server Owner’s Guide*. In addition, read the installation notes that shipped with the CPU modules.

Before installing the CPU module, verify that each new module is one of the following UltraSPARC II modules for Sun Enterprise 450 servers. The following table identifies CPU module speeds.

---

CPU Module Speed (MHz)	Part Number
250-MHz UltraSPARC II	501-4857 or 501-4278
300-MHz UltraSPARC II	501-4849 or 501-4196
400-MHz UltraSPARC II	501-5239 or 501-5446
480-MHz UltraSPARC II	501-5729

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Before you install the fourth CPU module into the top CPU slot (CPU-A1), remove the blank baffle, if installed, from the connector (J0101). Grasp the blank baffle by the front handle and pull it out from the CPU slot.

## Configuring the CPU Modules

Before configuring the CPU module(s), determine if your system will support the power requirements of the new configuration. Review “Calculating System Power Requirements” on page 8 of this guide, and see the section “How to Determine System Power Requirements” in the *Ultra Enterprise 450 Server Owner’s Guide*. In addition, read the installation notes that shipped with the CPU modules.



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**Caution** – All CPU modules installed in a system must operate at identical clock speeds.

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Configure the UltraSPARC II CPU modules in your server according to the rules in the section “About CPU Modules” in the *Ultra Enterprise 450 Server Owner’s Guide* and in “Setting the Main Logic Board Jumpers” on page 9 of this guide.

## Calculating System Power Requirements

The following information is an addition to the section “System Power Requirements Worksheet” in the *Ultra Enterprise 450 Server Owner’s Guide*. Use the following table for your power requirement calculations if you are installing any of the following components:

- 480-MHz CPU module with 8-Mbyte Ecache
- 400-MHz CPU module with 4-Mbyte Ecache
- SunCD™ 32 CD-ROM
- DVD ROM

- 18-Gbyte hard disk drive
- 36-Gbyte hard disk drive
- DDS4 tape drive

Line No.	Option	Qty	+3.3 VDC Amps	Total Amps @ 3.3 V	+5 VDC Amps	Total Amps @ 5 V	+12 VDC Amps	Total Amps @ 12 V
<b>CPU Options</b>								
	480 MHz CPU with 8 MB Ecache and DC-to-DC converter		7.5		6.7			
	400 MHz CPU with 4 MB Ecache and DC-to-DC converter		5.0		5.6			
<b>Internal Storage Device Options</b>								
	SunCD 32 CD-ROM				0.55		0.61	
	DVD ROM				0.42		0.51	
	18 GB hard disk drive				0.8		0.5	
	36 GB hard disk drive				0.8		0.5	
	DDS4 tape drive				0.9		0.5	

## Setting the Main Logic Board Jumpers

The following information supersedes the information presented in the section “About the Clock Mode Select Jumper” in the *Ultra Enterprise 450 Server Owner’s Guide*. Contrary to the table in that section, the new Sun Enterprise 450 server main logic board (501-5673) uses the clock mode select jumpers J2701 and J2702.

Set the clock mode jumper shunts at addresses J2701 and J2702 to correspond to the speed of your UltraSPARC II CPU module. Verify that the jumper setting is correct before starting the system.

Clock Speed	J2701	J2702
250-MHz	1 + 2	2 + 3
300-MHz	1 + 2	2 + 3
400-MHz	2 + 3	2 + 3
480-MHz	2 + 3	1 + 2

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## Installing the Remaining Main Logic Board Components

Refer to the following sections in the *Ultra Enterprise 450 Server Owner's Guide* to restore the remaining main logic board components you removed from the old main logic board.

1. **Install any PCI cards by following the steps in the section “How to Install a PCI Card.”**
2. **Install any DC-to-DC converter using the steps in the section “How to Install a DC-to-DC Converter.”**
3. **Install any memory module by following the steps in the section “How to Install a Memory Module.”**

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**Note** – If you purchased new memory modules, be sure to consult the configuration rules in the section “About Memory” in the *Ultra Enterprise 450 Server Owner's Guide*.

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## Reassembling Your System

To reassemble the system, complete the following steps. Refer to the sections in the *Ultra Enterprise 450 Server Owner's Guide* unless otherwise noted.

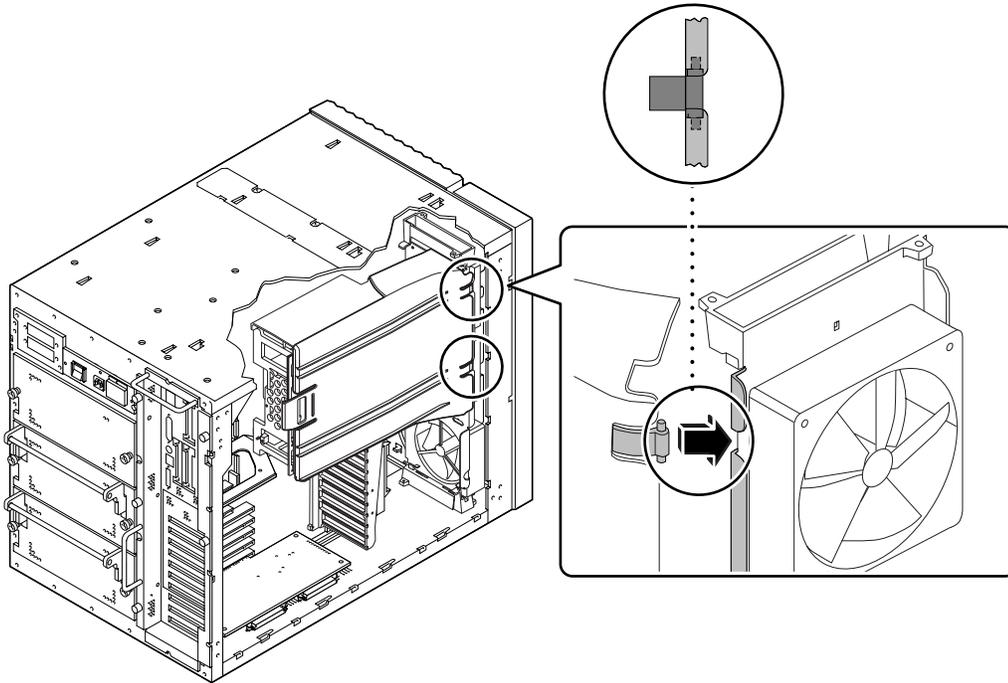
1. **Install the CPU fan tray using the steps in the section “How to Install the CPU Fan Tray Assembly.”**
2. **Reconnect any other devices that you disassembled from the main logic board to perform the upgrade.**

Consult the documentation that accompanied these devices for details about installing and configuring them.

**3. Install the CPU air guide.**

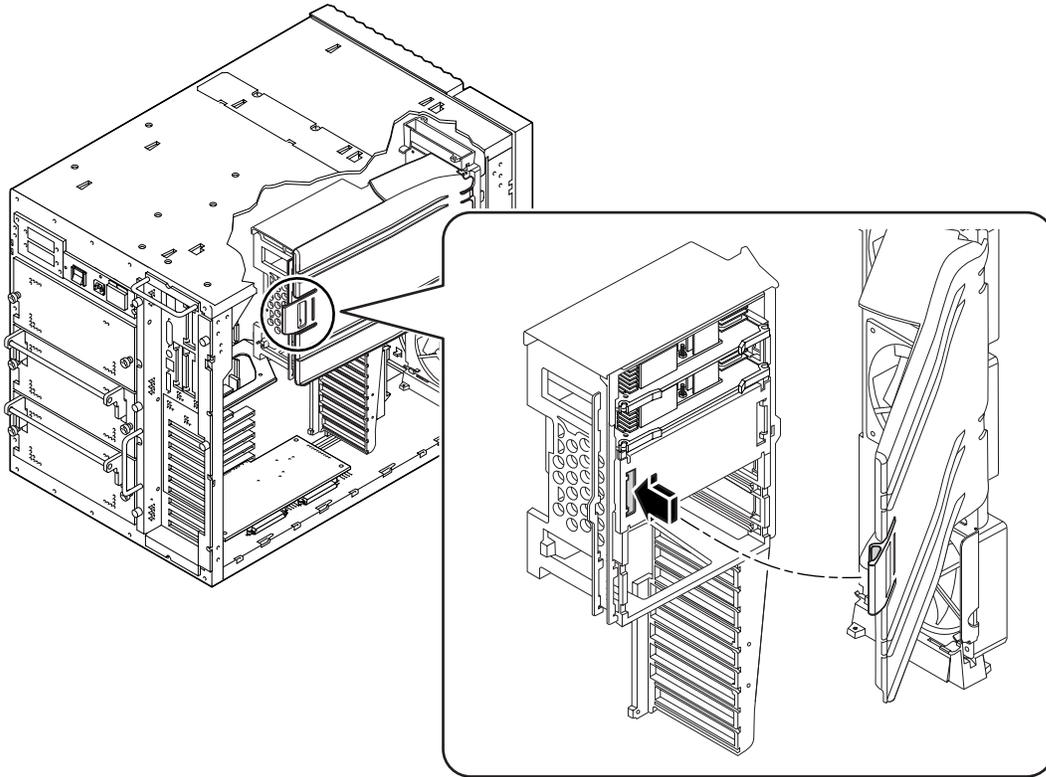
**a. Hook the air guide tabs under the slots in the CPU fan tray assembly.**

The air guide must be held at an angle to provide enough clearance to hook the tabs under the slots in the CPU fan tray assembly.



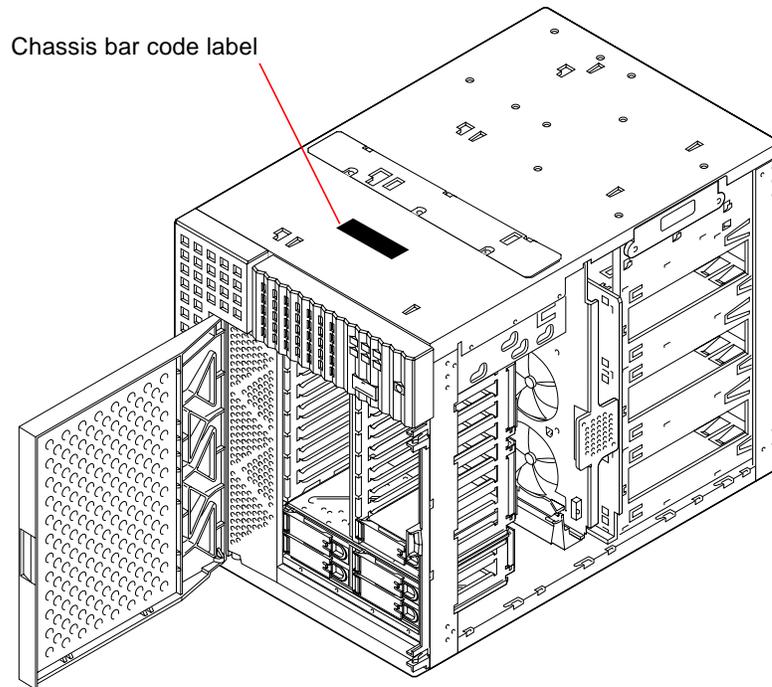
**b. Slide the air guide toward the rear of the chassis to secure the air guide tabs to the CPU fan tray assembly.**

- c. Swivel the air guide against the Y-bracket on the main logic board and snap the latch closed.



**4. Remove the right side panel using the steps in the section “How to Remove the Right Side Panel.”**

Examine the chassis bar code label on the top of the system (see figure below). On the bottom line is a number. Write down the number. If your number is the same or lower than 5402833-04, you must apply a Class A EMC label to your Sun Enterprise 450 server.



**5. Install the right side panel using the steps in the section “How to Install the Right Side Panel.”**

**6. Install the left side panel using the steps in the section “How to Install the Left Side Panel.”**

**7. Reconnect any external cables to the rear panel of the main logic board; see the section “Locating Rear Panel Features.”**

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## Electromagnetic Compatibility

If the number you recorded in Step 4 in the section “Installing the Remaining Main Logic Board Components” on page 10 is the same or lower than 5402833-04, you must read the section “Class A EMC Label” below, and apply the new Class A EMC label.

If the chassis number you recorded in Step 4 in the section “Installing the Remaining Main Logic Board Components” is higher than 5402833-04, read the following paragraphs, and then skip forward to the section “Powering Up Your Upgraded System” on page 16.

The Sun Enterprise 450 server meets the Class B requirements for electromagnetic interference (EMI) conforming to international standards. Some of these standards are noted in the “Declaration of Conformity” in the “Regulatory Compliance Statements” in the *Ultra Enterprise 450 Server Owner’s Guide*. The Class B requirements are intended for home use and are more stringent than Class A requirements. The Class B limits are designed to provide reasonable protection in the home against radio frequency interference.



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**Caution** – Connecting headphones to the headphone jack of the Sun Enterprise 450 server CD-ROM drive can result in radio frequency emissions that exceed Class B limits. Please read the sections that apply to Class A equipment in the “Regulatory Compliance Statements” at the beginning of the *Ultra Enterprise 450 Server Owner’s Guide*. There are several measures you can take to correct interference problems. For additional correction details, see the FCC Class B Notice in the “Regulatory Compliance Statements.”

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### Class A EMC Label

Any Sun Enterprise 450 server configured with a chassis numbered 5402833-04 or lower, with an upgraded main logic board and with new 480-MHz, 8-Mbyte UltraSPARC II CPU modules, meets the Class A system requirements for EMI, but not the Class B requirements. Please read the sections that apply to Class A products in the “Regulatory Compliance Statements” in the *Ultra Enterprise 450 Server Owner’s Guide*.

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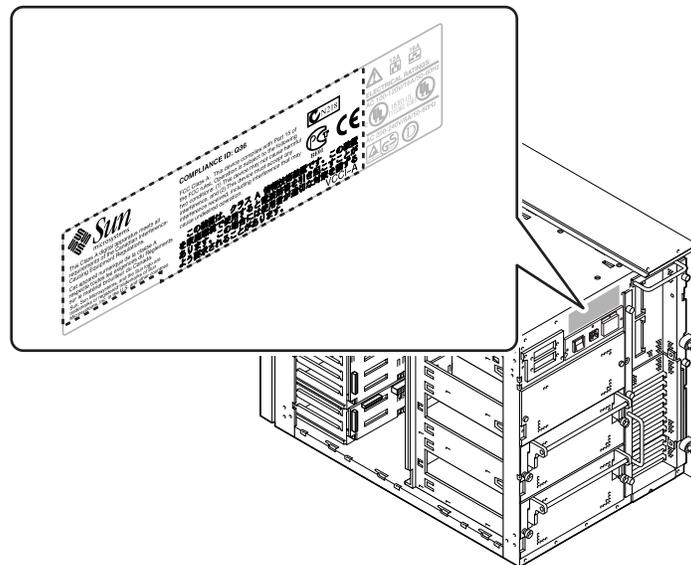
**Note** – To be compliant with international EMC regulations, the upgrade label provided *must* be correctly applied to the upgraded system.

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Read and follow the directions in the next section.

## Applying a Class A Label

- 1. Locate the Class B label on the rear panel of the Sun Enterprise 450 server.**  
The label is located at the top of the back panel in the middle, just above the AC line filter.
- 2. Peel off the new Class A label from its backing material.**
- 3. With the sticky side down, align the left edge of the new label with the left edge of the existing large label.**
- 4. Position the new label so that it covers all of the old label *except* the right side panel containing Electrical Ratings and Product Safety marks; and on older labels, the country of origin in the bottom left corner. Press the label firmly into place.**



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## Powering Up Your Upgraded System

The procedure for powering up your system depends on a number of factors, including the operating system you are using, your network environment, and your server's hostid and Ethernet address. The network environment may require some advance preparation before you turn on your server and connect it to the network. Refer to the *Ultra Enterprise 450 Server Owner's Guide* for instructions about configuring your server before powering up.

The amount of preparation required will also depend on whether you transferred your old NVRAM module to the new main logic board. The system administrator uses network information to identify your server in the network configuration files, and to configure application software licenses. If you did not transfer your old NVRAM module, you or your administrator will need to update certain network configuration files before the upgraded system can join the network. Be sure to inform your system administrator of the new hostid and the new Ethernet address, and to register any software licenses that use your system's new hostid number.

Do not power up your system until you have notified your system administrator of your configuration changes, and have received permission to proceed. If you must act as your own system administrator, see the documentation that accompanies your operating system software.

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## Return Material Procedure

With your upgrade you ordered a Return Material Authorization (RMA) documentation set that includes a letter and instructions for returning your old equipment to Sun Microsystems.

Once you have completed the upgrade process, you must return your old main logic board to Sun Microsystems. Before returning your old main logic board, be sure to remove and keep any memory modules that you have purchased, but did not transfer to the new main logic board.

To return your old equipment to Sun Microsystems:

- 1. Disconnect any cables that may still be attached to the system unit.**
- 2. Pack the components in appropriate packing materials.**

Use the main logic board's Sun Enterprise 450 server upgrade packing materials, if possible. Be sure that the components are secure and well padded inside their respective shipping cartons.

**3. Follow the instructions in the *Sun Upgrades RMA Letter* to return the equipment to Sun Microsystems.**

You have completed the upgrade process. If you encounter any difficulties with your new server, call the Sun Response Center or your authorized service provider.

