Sun Blade 1000 UltraSPARC™ III CPU Module Installation Instructions

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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.

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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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使用者 會被要求採取某些適當的對策。

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Sun Blade 1000 UltraSPARC III CPU Module Installation Instructions

This document describes how to remove or install an UltraSPARC III CPU module for the Sun Blade™ 1000 workstation. The following topics are discussed:

- "UltraSPARC III CPU Module Installation Kit Contents" on page 1
- "Firmware and Software Requirements for the UltraSPARC III 600, 750, or 900 MHz CPU Modules" on page 2
- "Sun Blade 1000 UltraSPARC III CPU Module Installation Instructions" on page 6

UltraSPARC III CPU Module Installation Kit Contents

Your UltraSPARC III CPU module installation kit contains:

- The *Sun Blade 1000 UltraSPARC III CPU Module Installation Instructions* (this manual)
- A disposable antistatic wrist strap
- An antistatic mat
- One UltraSPARC III CPU module (600, 750, or non-Cu 900 MHz).

Firmware and Software Requirements for the UltraSPARC III 600, 750, or 900 MHz CPU Modules

UltraSPARC III 600 MHz CPU Modules

If you are replacing or installing a 600 MHz UltraSPARC III CPU module, you will need to install software patches 109888-10 or later, 110460-09 or later, 108528-10 or later, and OBP firmware upgrade patch 111292-04 or later. The software patches and the OBP firmware upgrade patch can be obtained from the Sun web site at:

`http://www.sun.com/sunsolve/`

Note – Always check the Sun web site for the latest compatible operating environment, firmware, and software updates.

Before installing the 600 MHz UltraSPARC III module, verify that:

- Solaris 8 10/00 or later is installed on your system. Solaris 8 10/00 is the first version of software that supports the UltraSPARC III, 600 MHz CPU module.

  To verify the current version of Solaris software, type the following command in a terminal window:

  ```
  more /etc/release
  ```

- Software patches 109888-10 or later, 110460-09 or later, and 108528-10 or later, are installed on your system.
- OpenBoot PROM firmware v4.2.2 or later is installed on your system. This is OBP firmware upgrade 111292-04. OpenBoot PROM firmware v4.2.2 is the first version of firmware that supports software patches 109888-10, 110460-09, and 108528-10.

  You can determine the PROM firmware version installed on your workstation by typing the following command in a terminal window:

  ```
  /usr/platform/sun4u/sbin/prtdiag -v
  ```

If necessary, upgrade your system's software and firmware to the versions described above.

UltraSPARC III 750 MHz CPU Modules

If you are replacing or installing a 750 MHz UltraSPARC III CPU module, you will need to install software patches 109888-10 or later, 110460-09 or later, 108528-10 or later, and OBP firmware upgrade patch 111292-04 or later. The software patches and the OBP firmware upgrade patch can be obtained from the Sun web site at:

`http://www.sun.com/sunsolve/`

Note – Always check the Sun web site for the latest compatible operating environment, firmware, and software updates.

Before installing the 750 MHz UltraSPARC III module, verify that:

- Solaris 8 10/00 or later is installed on your system. Solaris 8 10/00 is the first version of software that supports the UltraSPARC III, 750 MHz CPU module.

  To verify the current version of Solaris software, type the following command in a terminal window:

  ```
  more /etc/release
  ```

- Software patches 109888-10 or later, 110460-09 or later, and 108528-10 or later, are installed on your system.
- OpenBoot PROM firmware v4.2.2 or later is installed on your system. This is OBP firmware upgrade 111292-04. OpenBoot PROM firmware v4.2.2 is the first version of firmware that supports software patches 109888-10, 110460-09, and 108528-10.

  You can determine the PROM firmware version installed on your workstation by typing the following command in a terminal window:

  ```
  /usr/platform/sun4u/sbin/prtdiag -v
  ```

If necessary, upgrade your system's software and firmware to the versions described above.

UltraSPARC III 900 MHz non-CU CPU Modules

Note – To install an UltraSPARC III Cu CPU module, see the *"Sun Blade 1000 UltraSPARC III Cu Module Installation Instructions"*, 816-2722-10.

If you are replacing or installing an existing 600 or 750 MHz UltraSPARC III CPU module with a 900 MHz, non-Cu, UltraSPARC III CPU module, you will need to install software patches 109888-10 or later, 110460-09 or later, 108528-10 or later and OBP firmware upgrade patch 111292-04 or later. Both software patches and the OBP firmware upgrade patch can be obtained from the Sun web site at:

`http://www.sun.com/sunsolve/`

Note – Always check the Sun web site for the latest compatible operating environment, firmware, and software updates.

Before installing the 900 MHz UltraSPARC III module, verify that:

- Solaris 8 10/00 or later is installed on your system. Solaris 8 10/00 is the first version of software that supports the UltraSPARC III, 900 MHz non-Cu CPU module.

  To verify the current version of Solaris software type the following command in a terminal window:

  ```
  more /etc/release
  ```

- Software patches 109888-10 or later, 110460-09 or later, and 108528-10 or later, are installed on your system.
- OpenBoot PROM firmware v4.2.2 or later installed is on your system. This is OBP firmware upgrade patch 111292-04. OpenBoot PROM firmware v4.2.2 is the first version of firmware that supports software patches 109888-10, 110460-09, and 108528-10.

  You can determine the PROM firmware version installed on your workstation by typing the following command in a terminal window:

  ```
  /usr/platform/sun4u/sbin/prtdiag -v
  ```

If necessary, upgrade your system's software and firmware to the versions described above before beginning the installation procedure for the 900 MHz, non-Cu, UltraSPARC III CPU module.

Note – Never mix UltraSPARC III 600, 750, or 900 MHz CPU modules with UltraSPARC III Cu CPU modules. If the modules are mixed, the workstation will not boot.

Note – The 900 MHz version of the UltraSPARC III module is only available as an option for the Sun Blade 1000 workstation.

Note – UltraSPARC III Cu CPU modules are marked “USIII Cu” (see FIGURE 1).

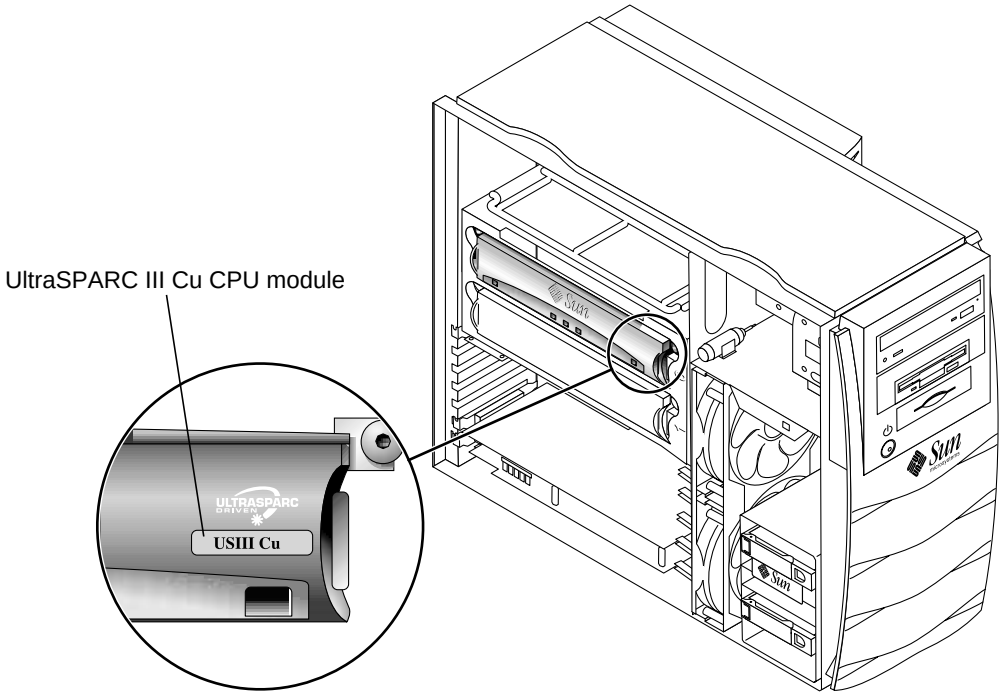


FIGURE 1 UltraSPARC III Cu CPU Module Label

Sun Blade 1000 UltraSPARC III CPU Module Installation Instructions

To install UltraSPARC III module(s) in a Sun Blade 1000 workstation, perform the following installation procedure.

Note – To install an UltraSPARC III Cu CPU module, see the *"Sun Blade 1000 UltraSPARC III Cu Module Installation Instructions"*, 816-2722-10.

Preparing for Installation

This section describes how to:

- Power off the workstation
- Remove the access panel
- Attach an antistatic wrist strap

Note – If you are returning a used CPU module to Sun Microsystems, return the used CPU module in the shipping box and packing materials that came with your new or replacement CPU module.

Powering Off the Workstation

Caution – Prior to turning off power to the workstation, save, back up, and close any open files. Notify any affected users that you are powering off your workstation.

---

1. **To power off the workstation**:

   a. **If the Solaris OS *is* running in a windowing environment**:

      i. **Press and release the front panel power switch** (see FIGURE 2) **to automatically shut down all programs and the operating system, and to power off the workstation.**

      ii. **From the menu displayed on the system monitor, select "Shutdown".**

b. If the Solaris OS *is not* running in a windowing environment:

i. Press the front panel power switch (see FIGURE 2) **to power off the workstation.**

This action automatically shuts down the operating system, all software programs, and it powers off the workstation.

c. If the system is at the ok **prompt (OpenBoot interface), press and hold the front panel power switch for four seconds** (see FIGURE 2) **to power off the workstation.**

This action forces an immediate power off of the workstation. Any unsaved data is lost.

Caution – Pressing the power switch does not remove all power from the workstation. A trickle current remains in the power supply. To remove all power from the workstation, disconnect the power cord.

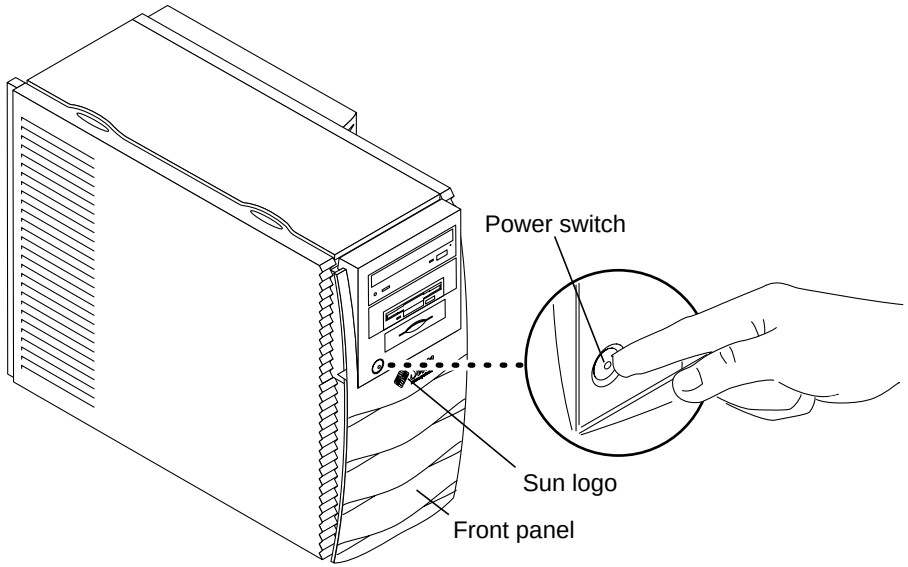


FIGURE 2 Workstation Power Switch

2. Verify the following:

a. The backlit Sun logo on the front panel is off.

b. The workstation fans are not spinning.

3. Turn off power to the monitor and other external peripherals.

4. **Disconnect the cables for any peripheral equipment.**

5. **Remove the lock block, if one is installed** (see FIGURE 3)**.**

   If necessary, use a Phillips screwdriver to remove the screw and lock block.

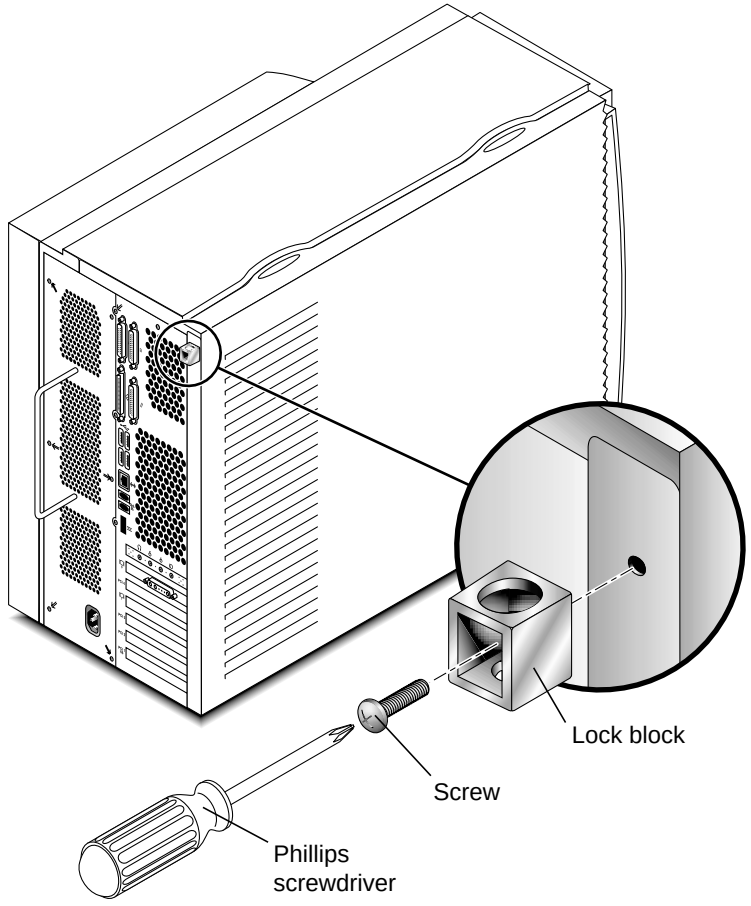


FIGURE 3 Removing the Lock Block

Removing the Access Panel

To remove the access panel (see FIGURE 4):

Note – If the power cord is connected, removal of the access panel will activate the workstation power interlock circuit. This safety mechanism prevents all DC voltages (except +5 VDC standby power) from reaching any internal components.

---

1. **Press down on the two depressions at the top of the access panel (see** FIGURE 4**).**
2. **Tilt the top of the access panel about an inch away from the chassis.**
3. **Lift the access panel up.**
4. **Lift the access panel off.**

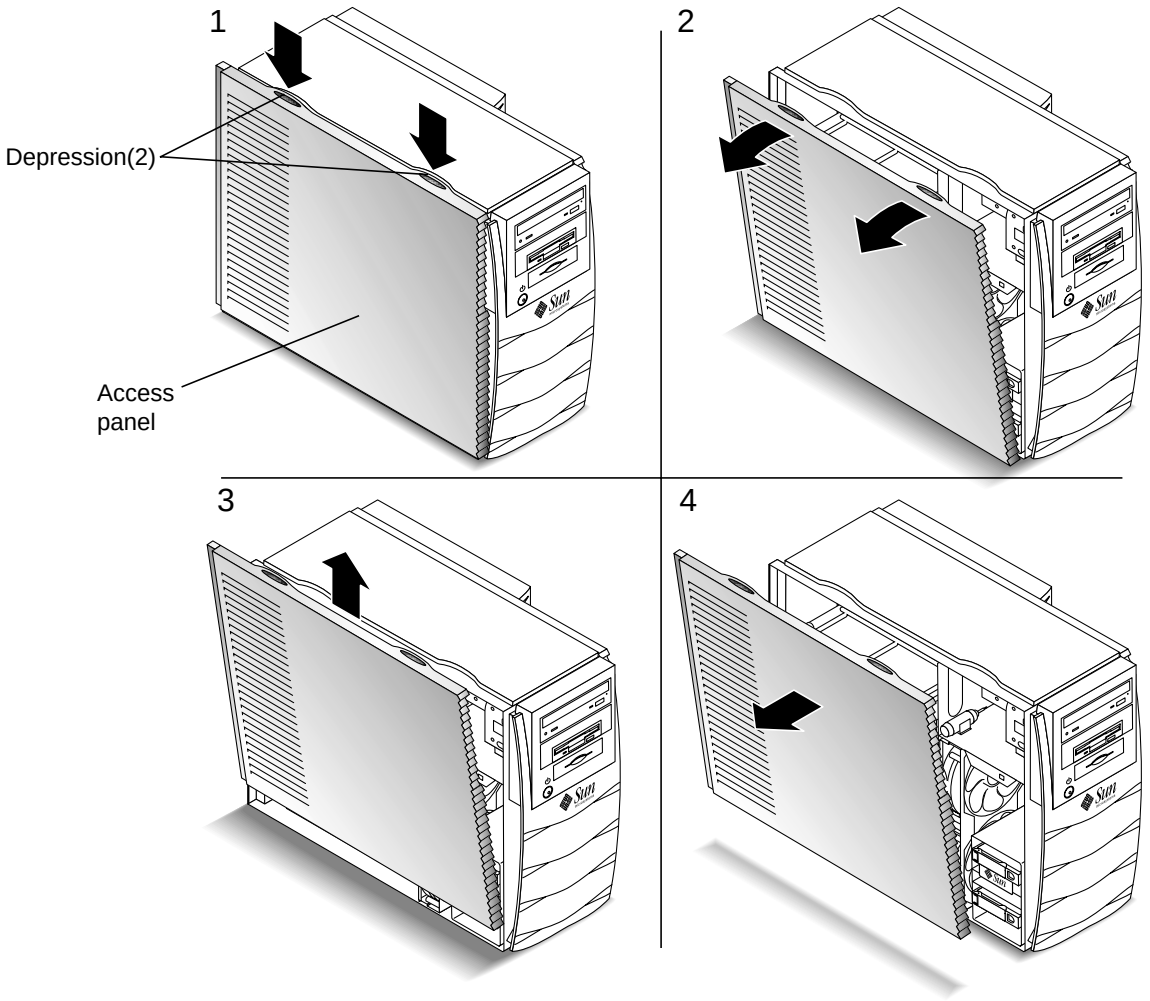


FIGURE 4 Removing the Access Panel

Attaching the Disposable Antistatic Wrist Strap

Caution – Wear an antistatic wrist strap and use an antistatic mat when handling Sun Blade 1000 components. Before servicing or removing workstation components, attach the strap to your wrist and then to a metal area on the chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials within the workstation.

1. **Place the workstation on its side on a work surface, open side facing up** (see FIGURE 5)**.**
2. **Unwrap the first two folds of the disposable antistatic wrist strap and wrap the adhesive side firmly against your wrist.**
3. **Peel the liner from the copper foil at the opposite end of the wrist strap.**
4. **Attach the copper end of the wrist strap to the chassis** (see FIGURE 5)**.**
5. **Disconnect the power cord.**

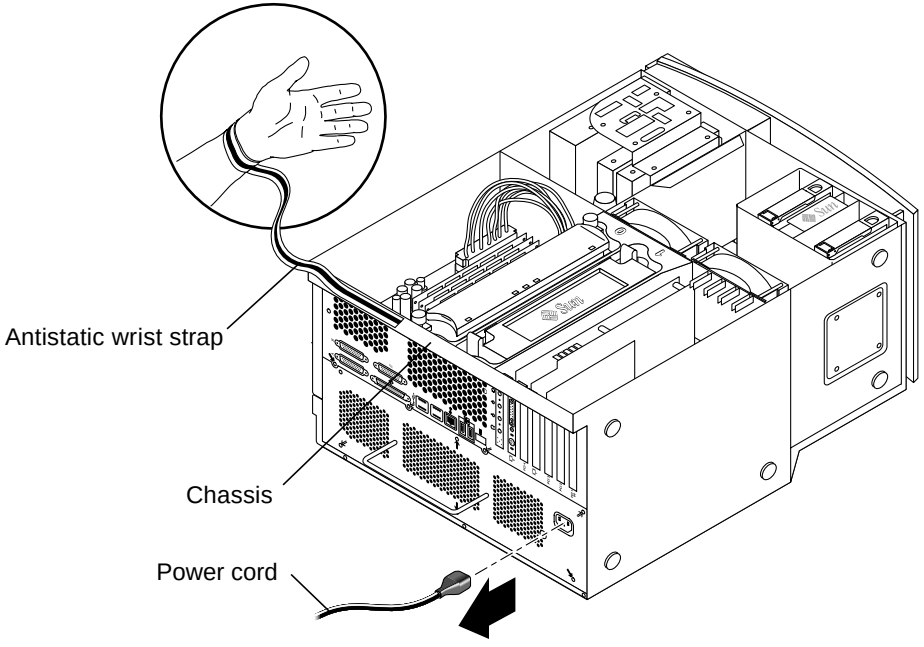


FIGURE 5 Attaching the Antistatic Wrist Strap to the Chassis

About UltraSPARC III CPU Modules

The UltraSPARC III CPU module is a high-performance, highly integrated superscalar processor implementing SPARC-V9 64-bit reduced instruction set computer (RISC) architecture.

Note – There are now two types of UltraSPARC III CPU modules: the UltraSPARC III 600, 750, or 900 MHz CPU module and the UltraSPARC III Cu CPU module.

Note – UltraSPARC III Cu CPU modules are marked “USIII Cu” (see FIGURE 1).

Note – Never mix UltraSPARC III 600, 750, or 900 MHz CPU modules with UltraSPARC III Cu CPU modules. If the modules are mixed, the workstation will not boot.

The workstation’s motherboard provides slots for two UltraSPARC III CPU modules. Each processor module includes one CPU chip with an integrated memory cache for data and instructions, as well as up to 8 Mbytes of external static random access memory (SRAM) cache memory.

The CPU modules communicate with the workstation’s main memory and I/O subsystem via the workstation’s high-speed data bus. The workstation CPU modules are automatically synchronized with the system bus that runs at clock speeds up to 150 MHz.

Configuration Rules

The following configuration rules apply to UltraSPARC III CPU modules used in the Sun Blade 1000 workstation:

- You can install one or two UltraSPARC III CPU modules into the workstation motherboard.
- Always insert the first CPU module into CPU processor slot 0 connectors J0501 and J0601.
- If a second CPU module is to be installed, install the second CPU module into CPU (processor) slot 1 (connectors J0701 and J0801).
- If you wish to install more than one UltraSPARC III 600, 750, or 900 MHz CPU module, you can. The speed of the modules *does not* need to be identical.

Note – Never mix an UltraSPARC III 600, 750, or 900 MHz CPU module with an UltraSPARC III Cu CPU module. If the modules are mixed, the workstation will not boot.

Note – UltraSPARC III Cu CPU modules are marked “USIII Cu” (see FIGURE 1).

CPU Module Positions in the Workstation

Caution – The slot positions of the two UltraSPARC III CPU modules are shown in FIGURE 6. The position shown in figure 6 as “CPU processor slot 0” is the required position for all workstations that contain only one CPU.

The CPU modules are enclosed in a cooling shroud and secured to the shroud with captive screws that must be torqued to specific values.

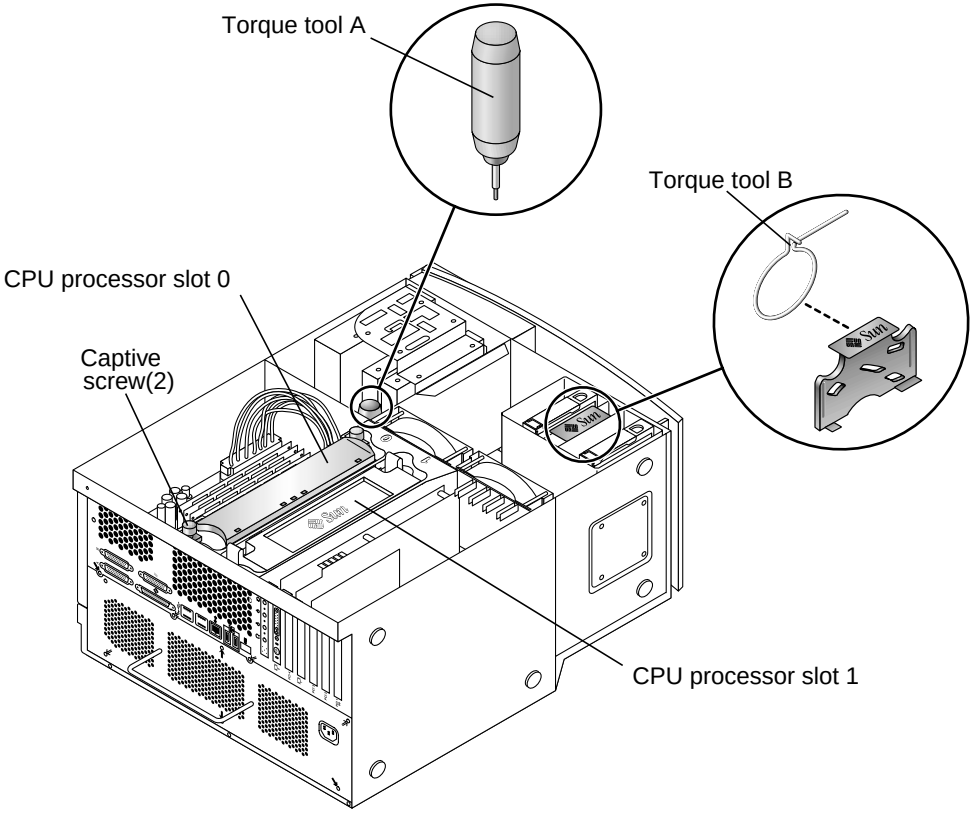


FIGURE 6 Location of CPU Processor Slot 0, CPU Processor Slot 1, Captive Screws, and Torque Tools

Removing a CPU Module

1. **If necessary, place the workstation on its side on a work surface, open side facing up** (see FIGURE 6)**.**

2. **Remove torque tool A or torque tool B from its holder.**

Note – Sun manufacturing installs torque tool A or torque tool B in Sun Blade 1000 workstations. The torque tools are located in different locations in the workstation (see FIGURE 6).

---

3. **If necessary, remove the filler panel** (see FIGURE 7)**.**

   Squeeze the two tabs on the filler panel to release it from the cover for the CPU shroud.

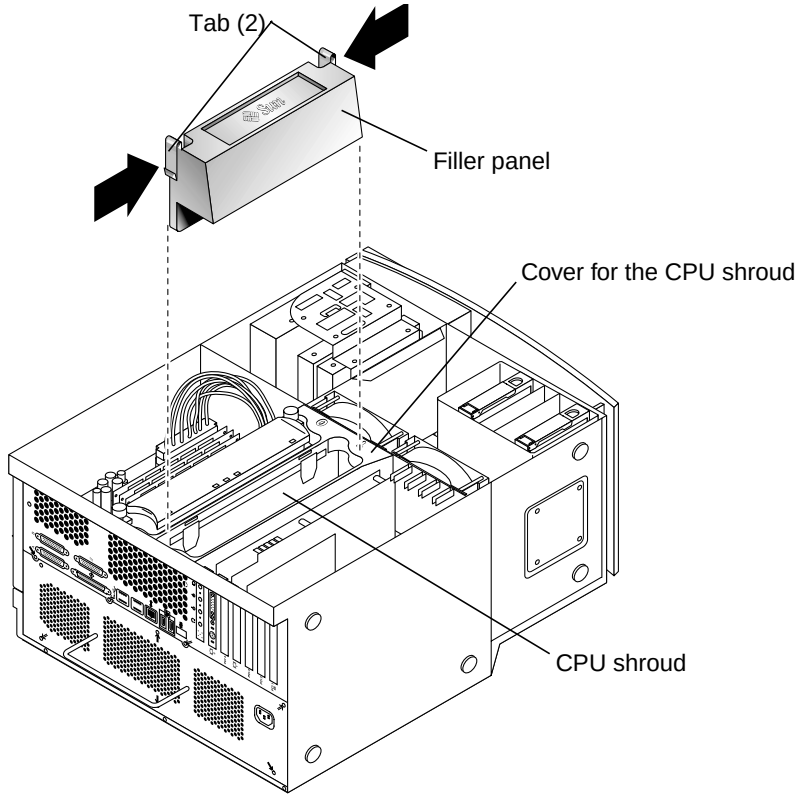


FIGURE 7 Removing the Filler Panel

4. Complete one of the following steps:

Your selection depends on whether you are replacing an existing UltraSPARC III module or installing an additional UltraSPARC III module into an unused CPU processor slot.

- If you are replacing an existing module and have torque tool A, perform Step 5.
- If you are replacing an existing module and have torque tool B, perform Step 6.
- If you are installing an additional CPU module, perform Step 7.

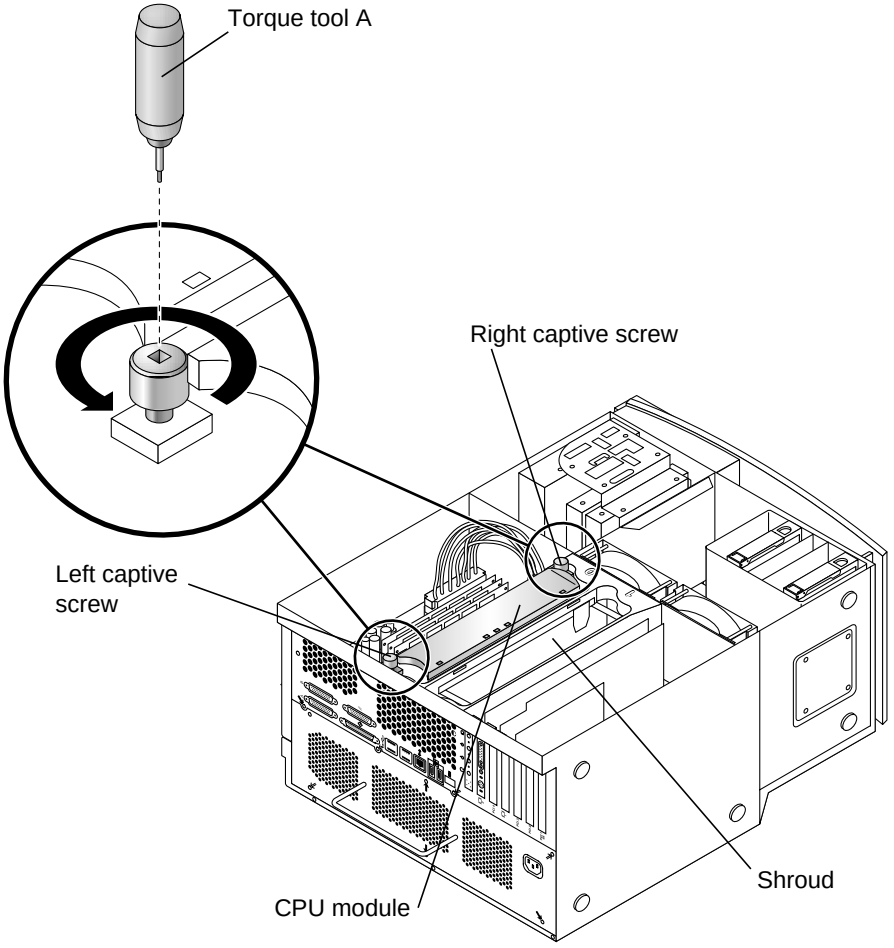


FIGURE 8 Using Torque Tool A to remove the CPU Module

5. To remove an existing CPU module using torque tool A:

a. Alternately rotate the left and right captive screws one turn counterclockwise until the screws are free of the threaded inserts (see FIGURE 8)**.**

Caution – Do not touch the board for the CPU module or its components. Touch only the captive screws and plastic top cover of the module to avoid damaging module components by electrostatic discharge (see FIGURE 10).

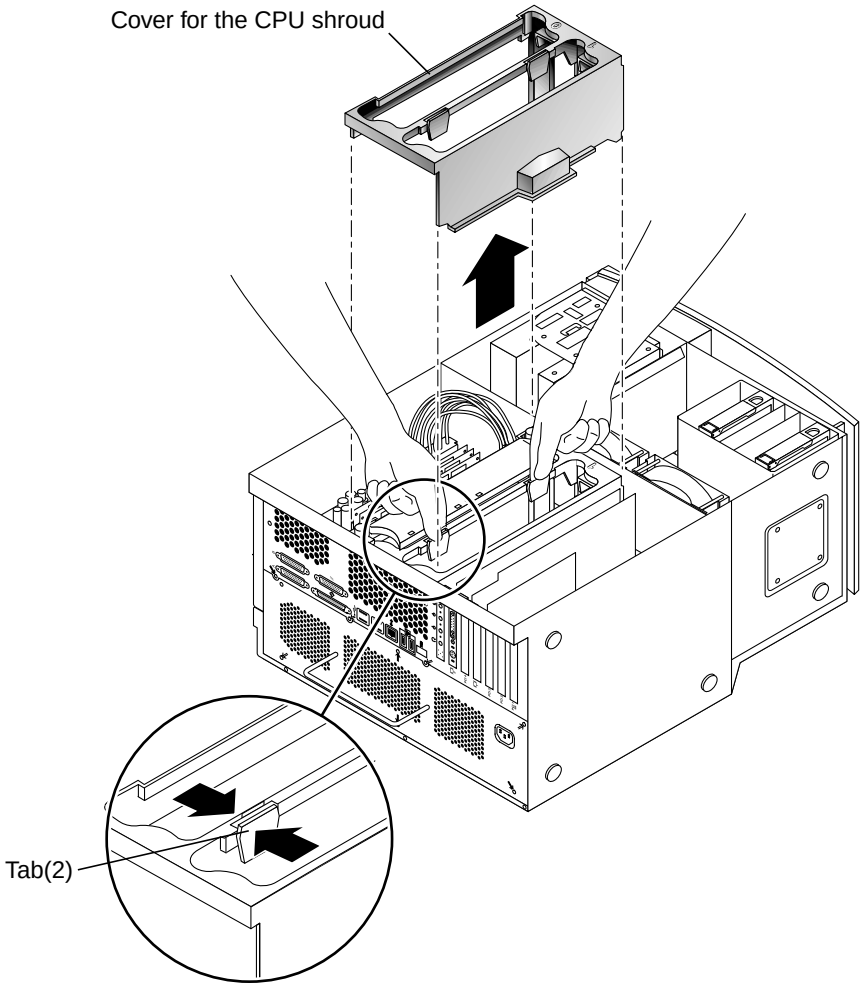
b. Use both hands to lift the CPU module out of the shroud.

c. Place the CPU module on an antistatic mat with the heat sink on the top facing up. Proceed to "Installing a New CPU Module" on page 20.

6. **To remove an existing CPU module using torque tool B**:

   a. **Remove the cover for the shroud (see** FIGURE 9**).**

      Squeeze the two tabs to release the cover from the shroud.



   b. **Alternately rotate the left and right captive screws one turn counterclockwise until the screws are free of the threaded inserts** (see FIGURE 9)**.**

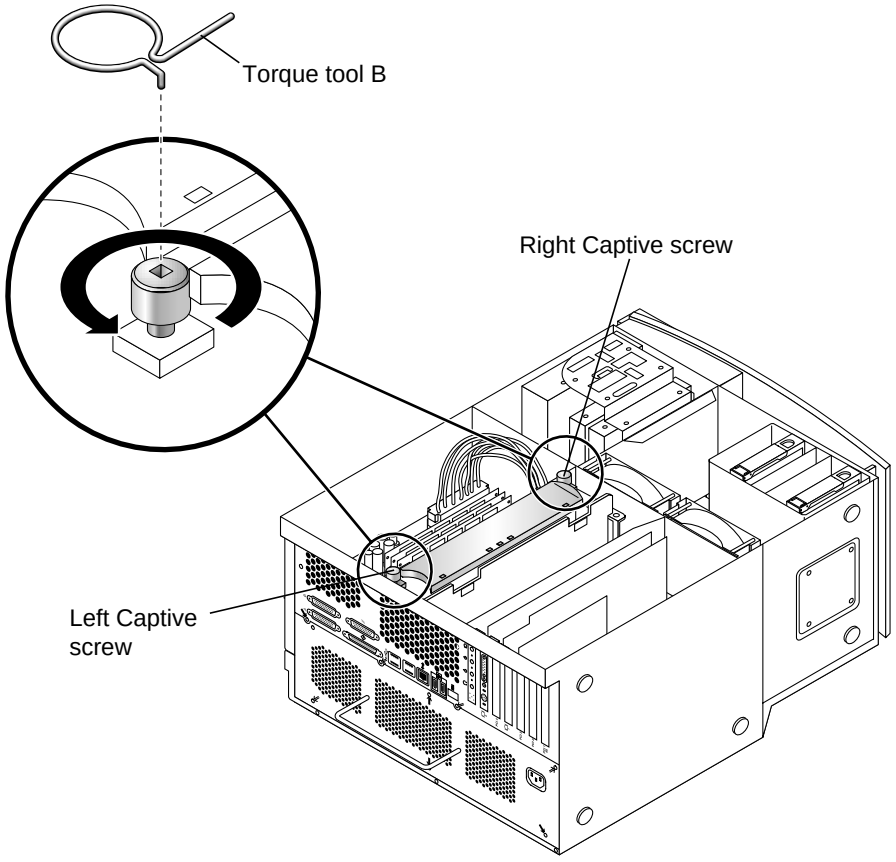


FIGURE 9 Using Torque Tool B to remove the CPU Module

Caution – As you remove the module from the shroud, handle it only by its captive screws. Do not touch the connectors on the bottom edge of the module or the electrical components on the module. The connectors and the components for the module are easily bent or damaged by improper handling and by electrostatic discharge (see FIGURE 10).

c. Use both hands to lift the CPU module out of the shroud.

d. Place the CPU module on an antistatic mat with the heat sink on the top facing up.

7. Proceed to “Installing a New CPU Module” on page 20.

Installing a New CPU Module

Caution – Perform the procedures described in Table 1 when unpacking a new CPU module from its packing carton.

TABLE 1 CPU Module Handling Procedures

Step	Description
1	Use proper ESD grounding techniques when handling components. Wear an antistatic wrist strap and use an antistatic mat. Store ESD-sensitive components in antistatic bags before placing them on any surface.
2	When you remove the CPU module from its packing carton, use both hands to support the module along its sides.
3	As you remove the module from its antistatic bag, handle it only by its captive screws. Do not touch the connectors on the bottom edge of the module. The connectors for the module are easily bent or damaged by improper handling.
4	Do not remove the plastic cover from the CPU module connectors until you are ready to install the module into the workstation.
5	Do not grip the module by the heat sink.

1. **Remove the plastic cover from the CPU module connector** (see FIGURE 10)**.**

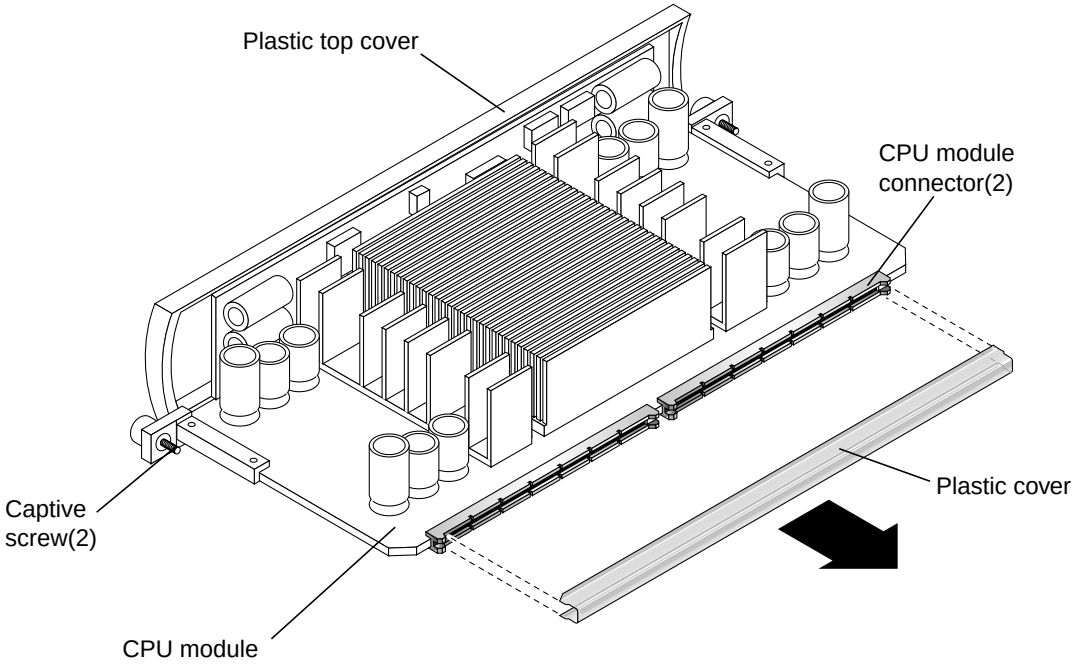


FIGURE 10 Removing the Plastic Cover from the CPU Module Connectors

2. **Lower the CPU module into the shroud until the CPU module's captive screws are aligned with the threaded inserts** (see FIGURE 11)**.**

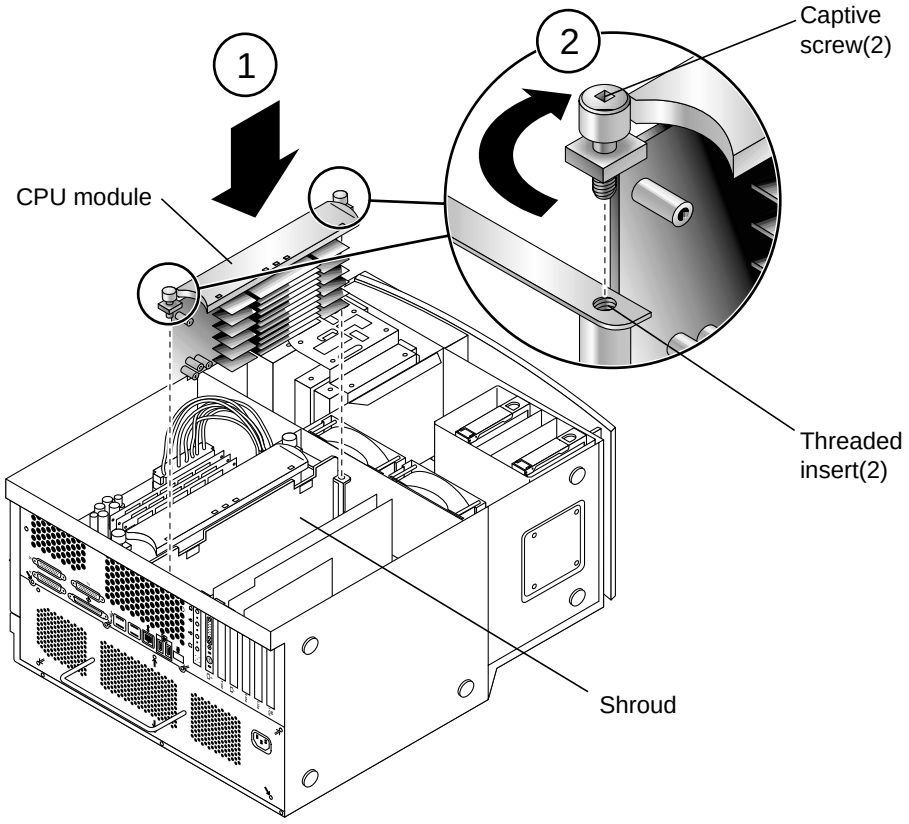


FIGURE 11 Lowering the CPU Module into the Threaded Inserts

3. **Tighten both captive screws by hand until the screws contact the threaded inserts of the CPU shroud.**

   Once the CPU module is seated, surface contact between the captive screws and the threaded inserts of the shroud typically occurs in less than one turn of both left and right captive screws.

4. **Do one of the following**:

   a. **If you have torque tool A, perform steps 10-16** (see FIGURE 6)

   b. **If you have torque tool B, perform steps 5-9 and 14-16** (see FIGURE 6)**.**

5. **Use torque tool B to rotate the left captive screw one turn clockwise** (see FIGURE 12)**.**

Caution – Do not use a torque tool from another Sun product. The Sun Blade 1000 torque tools are specifically designed for this workstation.

6. **Now, use torque tool B to rotate the right captive screw one turn clockwise** (see FIGURE 12)**.**

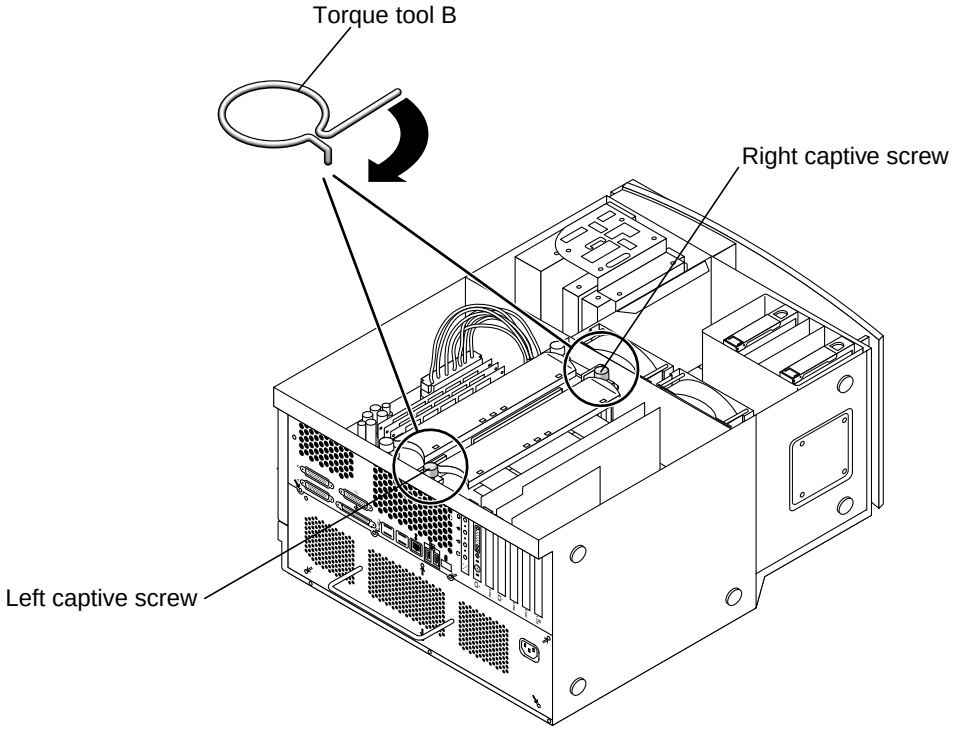


FIGURE 12 Alternately Rotating Left and Right Captive Screws One Turn Clockwise

Caution – Under-torquing the CPU module captive screws may cause a loss of contact between the CPU module and the motherboard connector. This may cause failure of the workstation to boot. Over-torquing the CPU module captive screws may cause severe damage to the module and a potential workstation failure.

7. **Repeat Step 5 and Step 6 until the gap for torque tool B is 0.0 inches (0.0 mm.)** (see FIGURE 13)

   Use the torque tool to alternately tighten the left and right captive screws to the correct torque. Always rotate the left captive screw one turn clockwise and then rotate the right captive screw one turn clockwise. This assures that a uniform and even torque is applied to the CPU module.

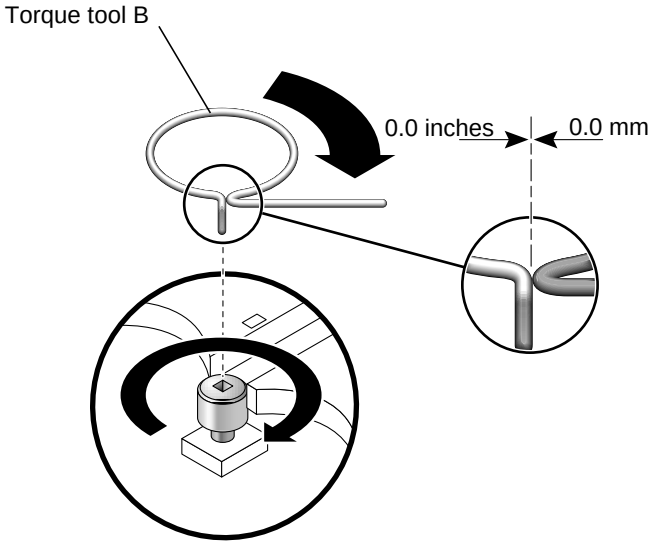


FIGURE 13 Adjusting Torque Tool B Until the Gap is 0.0 Inches (0.0 mm.)

8. **Return torque tool B to its green plastic holder, then return the holder to its storage location in the hard drive bracket.**

9. **If necessary, install the cover for the shroud (see** FIGURE 14**).**

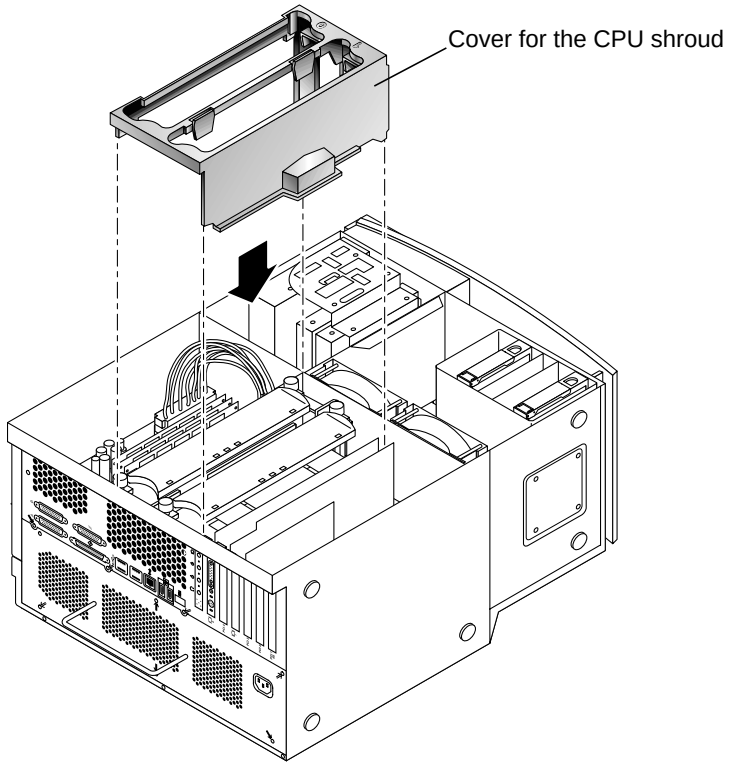


FIGURE 14 Installing the Cover for the Shroud

10. **Use torque tool A to rotate the left captive screw one turn clockwise** (see FIGURE 15)**.**

11. **Use torque tool A to rotate the right captive screw one turn clockwise** (see FIGURE 15)**.**

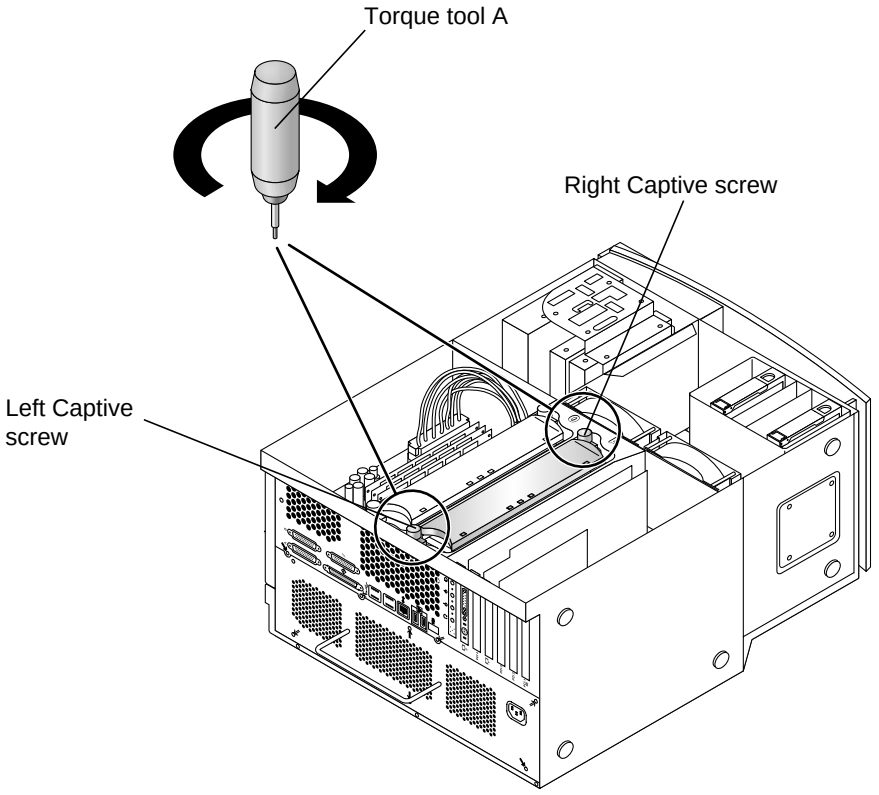


FIGURE 15 Alternately Rotating Left and Right Captive Screws One Turn Clockwise

12. **Repeat steps 10 and 11 until torque tool A clicks** (see FIGURE 16).

    Seating occurs when both captive screws are evenly torqued to 5 inch-lbs. (58 grams-meter). Torque tool A will click when this adjustment specification is achieved.

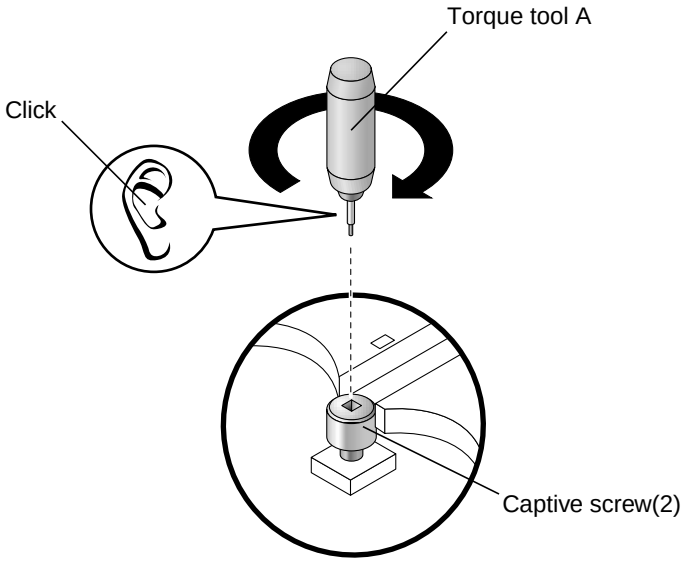


FIGURE 16 Torque Tool A Clicks When the Captive Screws are Correctly Torqued

13. **Return torque tool A to its storage location in the workstation.**
14. **If necessary, reinstall the filler panel for the shroud.**

Caution – To ensure proper workstation cooling, any unused CPU slot must contain a filler panel for the shroud (see FIGURE 7).

15. **Detach the antistatic wrist strap, replace the access panel, plug in the power cord, and power on the workstation.**
16. **Proceed to "Finishing the Installation" on page 28.**

Finishing the Installation

1. **If necessary, remove the antistatic wrist strap from the chassis.**
2. **If necessary, replace the access panel.**
3. **If necessary, install a lock block on the back panel of the workstation.**
4. **Reconnect any cables from external devices to the workstation.**
5. **Reconnect the workstation power cord.**
6. **Power on the workstation:**
   a. **Turn on power to the monitor and to all external devices.**
   b. **Press the power switch on the front panel and release it.**
   c. **After several seconds, verify that the power-indicator LED on the power switch is energized and listen to verify that the workstation fans are operating (spinning).**
7. **The workstation should automatically recognize installation of the new CPU module(s).**

Note – Perform a reconfiguration boot (`boot -r`). If the workstation correctly boots, the CPU module has been correctly installed.

If problems are encountered, verify proper POST operation. See Section 3.4 “Maximum and Minimum Levels of POST” in the *Sun Blade 1000 Service Manual*, 805-4495-10.

For More Information

The *Sun Blade 1000 Service Manual* is available from these sources:

- The manual is shipped with new workstations in HTML and PDF formats on the *Sun Blade 1000 Hardware Documentation* CD (704-6233-10). The HTML version of the manual on this CD also includes this CPU replacement procedure as an animated ShowMe How™ multimedia procedure.
- HTML and PDF versions of this manual are available for viewing and printing on the following web site:

  `http://docs.sun.com`