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hyperSPARC™ Module Installation Guide

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TECHNOLOGY, INC.

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Chapter 1.
Before Installing the hyperSPARC Module

Overview

Carefully follow the instructions in this document to install one or two hyperSPARC modules on your SPARCserver 600MP system board, or on your SPARCstation 10 or SPARCstation 20 main logic board.

The system board or main logic board can have up to two hyperSPARC modules. A module **must** be installed in the following:

- slot 0 on the 600MP system board
- slot 0 (lower slot) on the SPARCstation 10 or SPARCstation 20 main logic board

A module in the second slot ("1" or "B" on the system board, "1" or "upper" slot in the main logic board) is optional. The second slot is used only for dual-module configuration systems.

Note: Be sure to save the original boot PROM(s) and module(s) in the new packaging after installation so that they can be used later if needed.

1.1 Before You Begin the Installation

Important: The hyperSPARC module is designed to run in a Sun SPARCstation 10, SPARCstation 20, or SPARCserver 600MP environment, which includes a minimum of 140W power supply. Operation of hyperSPARC in machines that deviate from this electrical or thermal environment is not guaranteed.

Important: Ensure that fans and air intake grates are cleared of all accumulated dust or debris before installing the new module (older machines may need to be vacuumed thoroughly). This is to ensure proper airflow through the system.

Do not remove the hyperSPARC module from its protective bag until you are instructed to do so. Save the shipping carton and packing materials in case you need to transport the module.

Read all of the cautions and warnings in this manual before you begin and refer to the "Tools Required" section to make sure you have the tools listed.

Important: Before making any system modifications be sure that all file systems are backed up on tape, and that all users are notified that the system will be going down.

1.2 Hardware Installation Overview

Shutting Down the System

Caution: To avoid damaging internal circuits, do not disconnect or plug in any cable while power is applied to the system.

Important: Record NVRAM configuration parameters (especially those that are non-standard) before installing the new boot PROMs, as the new boot PROM(s) will reset values to the default setting.

To obtain a list of NVRAM parameters, type **`eeprom`** at the shell prompt.

Resetting NVRAM parameters to their defaults includes turning on diagnostic mode and setting the default diagnostic boot device to network. If you do not want your system to boot from the network, change the diagnostic switch to **false**.

Use the following command to turn off the diagnostic switch:

```
setenv diag-switch? false
```

Before you turn off the system power, you must halt the operating system or loss of data can occur. To shut down the system and give users a shutdown warning:

1. Back up the system files and data to tape, if necessary.
2. Notify users that the system is going down.
3. Halt the system using the appropriate commands.
4. Wait for the system-halted message and the boot monitor prompt.
5. Turn off the system power in this order:
   a. External drives (if connected)
   b. System unit
   c. Monitor

If you require more specific information about turning off the system power, refer to the hardware service manual for your system.

Caution: Turn off the power at the main AC breaker before you insert or remove boards and disk drives. Do not disconnect the AC power cord from its receptacle.

Tools Required for Module Installation

To remove or install the MBus or hyperSPARC module, you will need:

For a SPARCserver 600MP System Board

- Phillips screwdriver (size #2)
- Flat blade screwdriver
- Allen wrench (2.5 mm)
- ESD kit P/N 250-1088

For a SPARCstation 10 or SPARCstation 20 Main Logic Board:

- Phillips screwdriver (size #1)
- Phillips screwdriver (size #2)
- Needle-nose pliers
- Antistatic mat
- Disposable wrist strap

Electrostatic Discharge Precautions

Caution: Circuit board components are vulnerable to damage by electrostatic discharge (ESD). An electrostatic charge can build up on the human body and then discharge when you touch a board. Such discharge can be produced by walking across a carpet and touching a board, or by other similar causes. *Before handling any board,* make sure you dissipate your body's charge. Touch a conductive surface of the chassis or other element connected to common earth ground to discharge the static electricity present in your body. To minimize risk of ESD damage:

- Handle board by edges only
- Store board in antistatic bag provided

1.3 Using the Disposable Wrist Strap

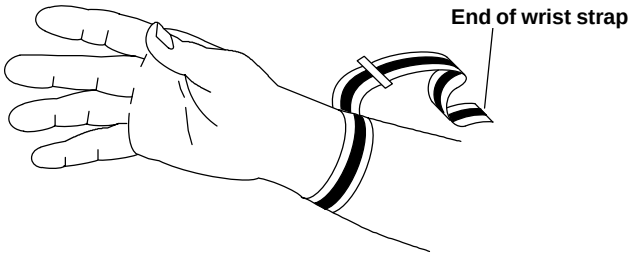
The wrist strap is a device that provides grounding for static electricity between your body and the system unit chassis. Electric current and voltage do not pass through the wrist strap. When needed, attach the wrist strap to your wrist and to the metal case or the power supply. Parts that require the use of a wrist strap are packed with one.

Caution: Boards and modules can be damaged by harmful electrical charges if you do not wear a wrist strap.

To attach wrist strap:

1. Wrap the grounding strap with the conductive adhesive tape twice around your wrist.

Make sure the adhesive tape is against your skin.



2. Attach the end with the adhesive copper strip to the metal casing of the power supply in the system unit.

Note: For SPARCserver 600MP systems, use ESD kit P/N 250-1088 (or equivalent). Instructions are supplied with the kit.

Chapter 2.
Preparing to Install the hyperSPARC Module

2.1 Overview

Carefully follow the instructions in this document to install one or two hyperSPARC modules on your SPARCserver 600MP system board, or on your SPARCstation 10 or SPARCstation 20 main logic board.

The system board or main logic board can have up to two hyperSPARC modules. A module *must* be installed in the following:

- slot 0 on the 600MP system board
- slot 0 (lower slot) on the SPARCstation 10 or SPARCstation 20 main logic board

A module in the second slot ("1" or "B" on the system board, "1" or "upper" slot in the main logic board) is optional. The second slot is used only for quad-processor (dual-module) configuration systems.

Note: If you plan to install hyperSPARC modules of speeds 72 MHz or slower in a machine running SunOS 4.1.4 please refer to Section A.5 in Appendix A or contact ROSS Technical support at 1-800-ROSS-YES before you proceed.

Note: Be sure to save the original boot PROM(s) and module(s) in the new packaging after installation so that they can be used later if needed.

Typographic Conventions

This chapter uses the following fonts to describe system messages and user input:

- `this_font` means a command or a file name.
- ***`this_font`*** indicates *variables* for which you must substitute values.
- **`this_font`** indicates user input.

2.2 Before You Begin the Installation

Note: You should have at least 4 MBytes available in `/usr/stand` before installing the kernel patch. (This directory contains an extra copy of the kernel.)

Important: The hyperSPARC module is designed to run in a Sun SPARCstation 10, SPARCstation 20, or SPARCserver 600MP environment, which includes a minimum of 140W power supply. Operation of hyperSPARC in machines that deviate from this electrical or thermal environment is not guaranteed.

Important: Ensure that fans and air intake grates are cleared of all accumulated dust or debris before installing the new module (older machines may need to be vacuumed thoroughly). This is to ensure proper airflow through the system. This is especially important for SPARCserver 690MP machines, which can easily accumulate a large amount of dust.

The user should receive all of the following:

- The Solaris 1.1 (4.1.3) and Solaris 1.1.1 (4.1.3_U1) patch on CD-ROM.
- One new boot PROM for a SPARCstation 10 or SPARCstation 20, or four new boot PROMs for a SPARCserver 600.
- One or two hyperSPARC modules.
- Antistatic bag(s) containing the hyperSPARC module(s)
- Disposable wrist grounding strap
- Electrostatic discharge (ESD) kit

Do not remove the hyperSPARC module from its protective bag until you are instructed to do so. Save the shipping carton and packing materials in case you need to transport the module.

Read all of the cautions and warnings in this manual before you begin and refer to the "Tools Required" section to make sure you have the tools listed. Then verify the operating system version that is installed, unpack the shipment, apply the hyperSPARC patch, power off the system, and install the new module.

Important: Before making any system modifications be sure that all file systems are backed up on tape, and that all users are notified that the system will be going down.

Important: Before attempting to apply the Solaris 1.1 patch ensure that your system is running SunOS 4.1.3 or SunOS 4.1.3_U1 (also known as Solaris 1.1 or Solaris 1.1.1 respectively). You can do this by typing

`uname -r`
or
`showrev`
at the command line, which will print out the version of SunOS that you are running. *If you are running Solaris 2.3, 2.4, 2.5 or SunOS 4.1.4 (Solaris 1.1.2) you do not need to install the hyperSPARC kernel patch in your machine*. Please skip to the next appropriate chapter that details installing hyperSPARC in your system board.

2.3 Software Installation

Note: Do not install the hyperSPARC kernel patch if your machine is running Solaris 2.3, 2.4, 2.5, or Solaris 1.1.2 (SunOS 4.1.4). The Software patch is intended only for machines running Solaris 1.1 (SunOS 4.1.3) and Solaris 1.1.1 (SunOS 4.1.3_U1). If your machine is running Solaris 2.3, 2.4, 2.5 or SunOS 4.1.4 please skip to the next appropriate chapter that details installing hyperSPARC in your system board.

Exception: If you plan to install hyperSPARC modules of speeds 72 MHz or slower in a machine running SunOS 4.1.4 please refer to Section A.5 in Appendix A or contact ROSS Technical support at 1-800-ROSS-YES before you proceed.

Installing the Kernel Patch (for machines running Solaris 1.1 (SunOS 4.1.3) and Solaris 1.1.1 (SunOS 4.1.3_U1) only)

Note: You must have at least 4 MBytes available in `/usr/stand` before installing the kernel patch. (This directory contains an extra copy of the kernel for configuring diskless clients.)

Contents of the Patch

The hyperSPARC Patch for **SunOS 4.1.3** (Solaris 1.1) contains the following files:

```
sys/sun4m/GENERIC/module_ross625.o
sys/sun4m/GENERIC/module_ross625_asm.o
sys/sun4m/GENERIC/addsub.o
sys/sun4m/GENERIC/div.o
sys/sun4m/GENERIC/mul.o
sys/sun4m/GENERIC/copy.o
lang/rtld/sparc/ld.so
sys/sun4m/module_conf.c
sys/sun4m/GENERIC/vmunix
sys/sun4m/GENERIC_SMALL/vmunix_small
README
install_hypersparc
Copyright
```

The hyperSPARC Patch for **SunOS 4.1.3_U1** (Solaris 1.1.1) contains the following files:

```
sys/sun4m/GENERIC/module_ross625.o
sys/sun4m/GENERIC/module_ross625_asm.o
sys/sun4m/GENERIC/addsub.o
sys/sun4m/GENERIC/div.o
sys/sun4m/GENERIC/mul.o
sys/sun4m/GENERIC/copy.o
sys/sun4m/GENERIC/locore.o
sys/sun4m/GENERIC/module_conf.o
sys/sun4m/GENERIC/vmunix
sys/sun4m/GENERIC_SMALL/vmunix_small
README
install_hypersparc
Copyright
```

During the installation process the following files are referred to as kernel object modules:

`module_ross625.o`, `module_ross625_asm.o`, `addsub.o`, `div.o`, `mul.o`, `copy.o`.

The following file is referred to as the kernel source file:

`module_conf.c`

Installing from Local CD-ROM:

1. Load the CD-ROM on the system you are upgrading. If mounting the CD-ROM on a remote system, skip to the following section for remote-mounting instructions.
2. Log in as root on the console of the system to be upgraded.
3. Run `/usr/etc/extract_patch`. As the CD-ROM patch loads onto the system you are prompted with instructions as you go along.

Warning: *Do not mount the CD-ROM*. Doing so will cause `extract_patch` to fail.

---

4. `Enter the name of the patch you wish to extract`

   `hypersparc`

5. `Are you using CDROM for this operation?`

   `yes`

6. `Enter CDROM Device Name`

   Enter the device name. For example, if your local CD-ROM drive is `/dev/sr0` enter **`sr0`**

   As the script runs, the following messages and prompts are displayed, as shown in the following steps.

   ```
   Ross Technology Revision 1.1
   December, 1993
   ```

   ```
   This patch contains the modified object modules, source files, and a
   generic vmunix for a SunOS 4.1.3 sun4m system. This patch is meant to be
   installed on top of the Solaris 1.1 sun4m release, and is required to
   support the Ross Technology HyperSparc CPU Modules.
   ```

   ```
   The installation script will install all the parts of the patch
   automatically. The kernel included in this patch is a generic kernel and
   can be used in installations which have not customized the kernel. For
   those installations which have customized kernels, it will be necessary to
   rebuild a kernel after installing this patch.
   ```

7. ```
   Multiple software releases found on disc:
   sunos_4_1_3            sunos_4_1_3_U1
   Enter the name of the release you want.
   ```

   If you are running SunOS 4.1.3 or SunOS 4.1.3_U1 *Version A*, type **`sunos_4_1_3.`** Otherwise, if you are running SunOS 4.1.3_U1 *Version B*, type **`sunos_4_1_3_U1.`**

Important: Please read the following!

Before installing the the hyperSPARC patch, you must correctly determine which release of the operating system your machine is running. To do so type

`showrev`

at the commad line. A message similar to the following will be displayed on your screen. It will vary slightly according to your machine's configuration.

```
***************  showrev version 1.15  *****************

* Hostname: "your machine name"
* Hostid: "551407fa"
* Kernel Arch: "sun4c"
* Application Arch: "sun4"
* Kernel Revision:
  4.1.3_U1 Tue Mar 21 17:23:42 CST 1995
* Release: 4.1.3_U1
*********************************************************
```

If your release is listed as **4.1.3** enter **`sunos_4_1_3`** as the correct patch for your system. If your release is listed as **4.1.3_U1** (as shown above), you are running *Revision A* of the 4.1.3_U1 operating system and need to enter **`sunos_4_1_3`**, *NOT* **`SunOS_4_1_3_U1`**. If your release is listed as **4.1.3_U1 Version B**, enter **`sunos_4_1_3_U1`**. Enter **`SunOS_4_1_3_U1`** *only* if your release is listed as `SunOS 4.1.3_U1 Version B`.

```

8. `Do you wish to continue? [yes|no] (yes)`

   Answering yes will copy `module_conf.c` to `/usr/sys/sun4m`, and also copy `module_ross625.o, module_ross625_asm.o,addsub.o, div.o, mul.o, copy.o` to `/usr/sys/sun4m/OBJ.`

   Type **yes** to confirm (**no** will abort the installation).

   ```
   Installing kernel source files

   Installing kernel object modules
   ```

9. `Add lines to files file? [yes|no] (yes)`

   This will add the following lines to `/usr/sys/sun4m/conf/files`:

   ```
   sun4m/module_ross625.c              standard
   sun4m/module_ross625_asm.s          standard
   ```

   These lines are necessary to build a kernel that supports hyperSPARC.

   Type **yes** to confirm. If you answer **no**, you will not be able to build a customized kernel that supports hyperSPARC.

   ```
   Installing new ld.so
   ```

Important: The ld.so from Sun Patch number 100257 (revision 6 and prior) does not implement the iflush instruction. This instruction is necessary to correctly support hyperSPARC's internal instruction cache. If you are running SunOS 4.1.3, make sure to install the ld.so included in the ROSS CD-ROM.

Note: Answer **no** to step 9. if you have already installed a hyperSPARC patch.

---

10. `Install client kernel in /usr/stand? [yes|no] (yes)`

    This will install `vmunix` and `vmunix_small` in `/usr/stand`. These extra kernels are needed to provide diskless clients with a kernel that supports hyperSPARC.

    Type **yes** to confirm. If you answer **no** any diskless clients created in the future will not have a kernel that supports hyperSPARC.

11. `Install generic kernel? [yes|no] (yes)`

    This installs `vmunix` into the root directory.

    Type **yes** to confirm. If you do not install the generic kernel, you will have to create a customized kernel to run hyperSPARC.

    ```
    Saving old kernel as vmunix–
    The hypersparc SunOS 4.1.3 sun4m patch installation is complete. You may
    now reboot with the new generic kernel or configure and build a custom
    kernel and reboot later.
    ```

12. `Reboot with the new generic kernel? [yes|no] (yes)`

    Type **no**. Answering **yes** will reboot the system. At this point the software installation is complete. You can reboot the system with your original CPUs to confirm that the patch is correctly installed. If you decide to reboot the system, ensure that all other users on the system are alerted before you do so.

Note: If you do not run the install script you must install `ld.so`, the kernel objects, and `vmunix` by hand. If you choose not to run the install program and plan to build a custom kernel be sure to add the following lines to `/sys/sun4m/conf/files`:

```
sun4m/module_ross625.c     standard
sun4m/module_ross625_asm.s standard
```

If you need assistance, please call ROSS Technical Support at 1-800-ROSS-YES before proceeding with this step!

Installing from Remote CD-ROM:
Part 1: On the system with the CD-ROM drive (*upgrade server*)

1. Log in as root on the console of the *upgrade server*.
2. Mount the CD-ROM on the *upgrade server*:

   # **mount –rt hsfs /dev/sr0 /cdrom**

   Note: Arrange to export that file system via NFS. `/cdrom` must be the same as the mountpoint of `/dev/sr0`.
3. Add `/cdrom` to the export list:

   # **echo /cdrom >> /etc/exports**
4. Export the file system:

   # **exportfs –v /cdrom**

Part 2: On the system being upgraded with the hyperSPARC module (*client*)

5. After the CD-ROM is mounted on the *upgrade server* (part 1):

   # **mount: *upgrade_server_name*:/cdrom /cdrom**
6. A temporary directory needs to be created for the patch:

   # **cd /usr/tmp**

   # **mkdir hypersparc**

   # **cd hypersparc**

7. Extract the patch contents in the newly created directory. If you are running SunOS 4.1.3 or SunOS 4.1.3_U1 Version A:

   ```
   # tar –xf /cdrom/patches/sunos_4_1_3/patch_hypersparc.

   sys/sun4m/GENERIC/module_ross625.o
   sys/sun4m/GENERIC/module_ross625_asm.o
   sys/sun4m/GENERIC/addsub.o
   sys/sun4m/GENERIC/div.o
   sys/sun4m/GENERIC/mul.o
   sys/sun4m/GENERIC/copy.o
   lang/rtld/sparc/ld.so
   sys/sun4m/module_conf.c
   sys/sun4m/GENERIC/vmunix
   sys/sun4m/GENERIC_SMALL/vmunix_small
   README
   install_hypersparc
   Copyright
   ```

   Otherwise, if you are running SunOS 4.1.3_U1 Version B:

   ```
   # tar –xf /cdrom/patches/sunos_4_1_3_U1/patch_hypersparc
   x sys/sun4m/GENERIC/module_ross625.o
   x sys/sun4m/GENERIC/module_ross625_asm.o
   x sys/sun4m/GENERIC/addsub.o
   x sys/sun4m/GENERIC/div.o
   x sys/sun4m/GENERIC/mul.o
   x sys/sun4m/GENERIC/copy.o
   x sys/sun4m/GENERIC/locore.o
   x sys/sun4m/GENERIC/module_conf.o
   x sys/sun4m/GENERIC/vmunix
   x sys/sun4m/GENERIC_SMALL/vmunix_small
   x README
   x install_hypersparc
   x Copyright
   ```

8. To verify that the patch is extracted correctly from the CD-ROM, list the contents of the directory:

   ```
   # ls
   ```

   You should see the following items:

   ```
   README                  usr
   install_hypersparc      vmunix
   ```

9. To read the README file:

   ```
   # cat README
   ```

   This displays:

   ```
   Ross Technology Revision 1.1
   December, 1993

   This patch contains the modified object modules, source files, and a
   generic vmunix for a SunOS 4.1.3 sun4m system. This patch is meant to be
   installed on top of the Solaris 1.1 sun4m release, and is required to
   support the Ross Technology HyperSparc CPU Modules.
   ```

```
The installation script will install all the parts of the patch
automatically. The kernel included in this patch is a generic kernel and
can be used in installations which have not customized the kernel. For
those installations which have customized kernels, it will be necessary to
rebuild a kernel after installing this patch.
```

10. To install the hyperSPARC patch:

    `# ./install_hypersparc`

11. `Do you wish to continue? [yes|no] (yes)`

    Type **yes** to confirm (**no** will abort the installation).

    `Installing kernel source files`

    `Installing kernel object modules`

12. `Add lines to files file? [yes|no] (yes)`

    Type **yes** to confirm. If you answer **no**, you will not be able to build a customized kernel that supports hyperSPARC.

    `Installing new ld.so`

13. `Install client kernel in /usr/stand? [yes|no] (yes)`

    Type **yes** to confirm. If you answer **no** the newly created diskless clients will not have a kernel that supports hyperSPARC.

14. `Install generic kernel? [yes|no] (yes)`

    Type **yes** to confirm. If you do not install the generic kernel, you will have to create a customized kernel to run hyperSPARC.

    ```
    Saving old kernel as vmunix–
    The hypersparc SunOS 4.1.3 sun4m patch installation is complete. You may
    now reboot with the new generic kernel or configure and build a custom
    kernel and reboot later.
    ```

15. `Reboot with the new generic kernel? [yes|no] (yes)`

    Type **no**. Answering **yes** will reboot the system. At this point the software installation is complete. You can reboot the system with your original CPUs to confirm that the patch is correctly installed. If you decide to reboot the system, ensure that all other users on the system are made aware before you do so.

Note: If you do not run the install script you must install `ld.so`, the kernel objects, and vmunix by hand. If you choose not to run the install program and plan to build a custom kernel be sure to add the following lines to `/sys/sun4m/conf/files`:

```
sun4m/module_ross625.c        standard
sun4m/module_ross625_asm.s    standard
```

2.4 Hardware Installation Overview

Shutting Down the System

Caution: To avoid damaging internal circuits, do not disconnect or plug in any cable while power is applied to the system.

Warning: Record NVRAM configuration parameters (especially those that are non-standard) before installing the new boot PROM(s), as the new boot PROM(s) will reset values to the default setting. To print NVRAM configuration parameters type:

`eeprom | lp` (for systems running Solaris 2.x) or

`eeprom | lpr` (for systems running SunOS)

Resetting NVRAM parameters to their defaults includes turning on diagnostic mode and setting the default diagnostic boot device to network.

Use the following command to turn off the diagnostic switch:

```
setenv diag-switch? false
```

Note: Replacing the boot PROM will *not* change the system's host id.

Before you turn off the system power, you must halt the operating system or loss of data can occur. To shut down the system and give users a shutdown warning:

1. Back up the system files and data to tape, if necessary.
2. Notify users that the system is going down.
3. Halt the system using the appropriate commands.
4. Wait for the system-halted message and the boot monitor prompt.
5. Turn off the system power in this order:
   d. External drives (if connected)
   e. System unit
   f. Monitor

If you require more specific information about turning off the system power, refer to the hardware service manual for your system.

Caution: Turn off the power at the main AC power switch before you insert or remove boards and disk drives. Do not disconnect the AC power cord from its receptacle.

Tools Required for Module Installation

To remove or install the MBus or hyperSPARC module, you will need:

For a SPARCserver 600MP System Board

- Phillips screwdriver (size #2)
- Flat blade screwdriver
- Allen wrench (2.5 mm)
- ESD kit P/N 250-1088

For a SPARCstation 10 or SPARCstation 20 Main Logic Board:

- Phillips screwdriver (size #1)
- Phillips screwdriver (size #2)
- Needle-nose pliers
- Antistatic mat
- Disposable wrist strap

Electrostatic Discharge Precautions

Caution: Circuit board components are vulnerable to damage by electrostatic discharge (ESD). An electrostatic charge can build up on the human body and then discharge when you touch a board. Such discharge can be produced by walking across a carpet and touching a board, or by other similar causes. *Before handling any board,* make sure you dissipate your body's charge. Touch a conductive surface of the chassis or other element connected to common earth ground to discharge the static electricity present in your body. To minimize risk of ESD damage:

- Handle board by edges only
- Store board in antistatic bag provided

2.5 Using the Disposable Wrist Strap

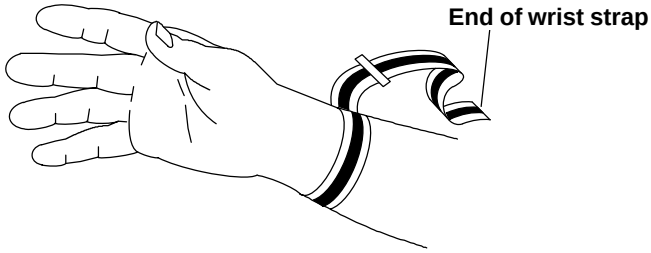
The wrist strap is a device that provides grounding for static electricity between your body and the system unit chassis. Electric current and voltage do not pass through the wrist strap. When needed, attach the wrist strap to your wrist and to the metal case or the power supply. Parts that require the use of a wrist strap are packed with one.

Caution: Boards and modules can be damaged by harmful electrical charges of you do not wear a wrist strap.

To attach wrist strap:

1. Wrap the grounding strap with the conductive adhesive tape twice around your wrist.

Make sure the adhesive tape is against your skin.



2. Attach the end with the adhesive copper strip to the metal casing of the power supply in the system unit.

Note: For SPARCserver 600MP systems, use ESD kit P/N 250-1088 (or equivalent). Instructions are supplied with the kit.

Chapter 3.
Installing the hyperSPARC Module in the SPARCstation 10

This chapter provides the information you need to remove the system unit cover, set the clock speed jumpers, and remove and install a hyperSPARC module on the SPARCstation 10.

Note: Variations of the module may be referred to as the MBus module or SPARC module. These terms may be used interchangeably in this chapter.

Caution: Dual-module configurations have a module in both the upper and lower MBus slots. Both modules must be hyperSPARC only or SuperSPARC only. hyperSPARC and SuperSparc modules will not function correctly if installed together in the same machine.

Important: The hyperSPARC module is designed to run in a Sun SPARCstation 10, SPARCstation 20, or SPARCserver 600MP environment, which includes a minimum of 140W power supply. Operation of hyperSPARC in machines that deviate from this electrical environment is not guaranteed.

Caution: Refer to the “Shutting Down the System” section on page 1-2 to make sure the system is shut off. The green light-emitting diode (LED) at the front of the system unit should not be lit.

Caution: The system chassis power unit must be turned off and the power cord must remain plugged in to ensure a proper ground. Do not disconnect the power cord from the system unit power outlet or the wall socket. This connection provides the ground path necessary to safely remove and install the printed circuit boards and components.

3.1 Removing the System Unit Cover

Caution: Make sure that power to your system unit is turned off. The power cord must remain plugged into the system unit and to the power source to ensure a proper ground.

To remove the cover from the system unit:

1. Use a #2 Phillips screwdriver to fully loosen the captive screw holding the cover to the back panel.

The screw will remain attached to the back panel after it is fully loosened from the cover.

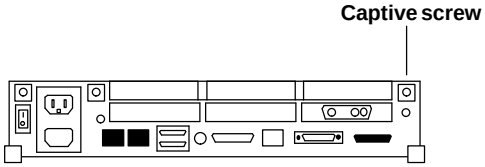


Figure 3-1. Location of Captive Screw on the Rear Panel

2. Use the Phillips screwdriver to press the retainer clip while you loosen the cover from the back panel with your other hand.

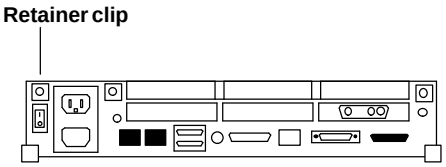


Figure 3-2. Location of the Retainer Clip

3. Grasp the sides of the cover from the rear and lift the cover as shown in Figure 3-3. Push the cover forward until its hinge tabs are free of the system unit.

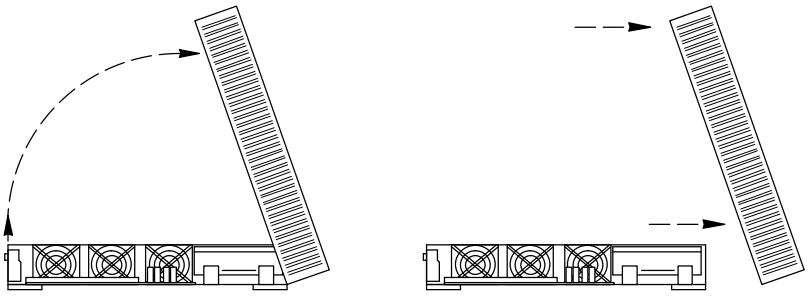


Figure 3-3. Removing the System Unit Cover, Side View

Warning: Before powering on your system again, be sure to install the cover. Refer to section 3.6 “Replacing the System Unit Cover.” It is not safe to operate the SPARCstation 10 without the top cover in place.

3.2 Removing a Module

Warning: The heatsinks on MBus modules may be hot. Use caution when removing or installing MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

Caution: Printed circuit boards are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy the boards.

Wear a grounding wrist strap when handling the boards. Attach the wrist strap to the metal casing of the power supply at the rear of the unit top. Handle boards only by the edges. Do not touch the components themselves or any metal parts.

Do not disconnect the power cord from the system unit power outlet or from the wall socket. This connection provides the ground path necessary to safely remove and install the printed circuit boards and components. In addition, keep the internal power supply cable connected to the main logic board.

Caution: Make sure that the system unit power is turned OFF by checking that the green LED at the front of the chassis is not lit and the fan in the power supply is not running.

To remove an MBus module from the system unit:

1. Check that the green LED at the front of the chassis is not lit.
2. Check that the system power cord remains connected to the system and the wall outlet.
3. Remove the system unit cover.

Caution: Place the antistatic mat (shiny side up) on a work surface near the system. Attach the wrist grounding strap as described on page 1-3.

4. Push back both card retainers for the module.

Refer to Figure 3-4. If the system has two modules (slot 1 on top of slot 0), remove the top module first.

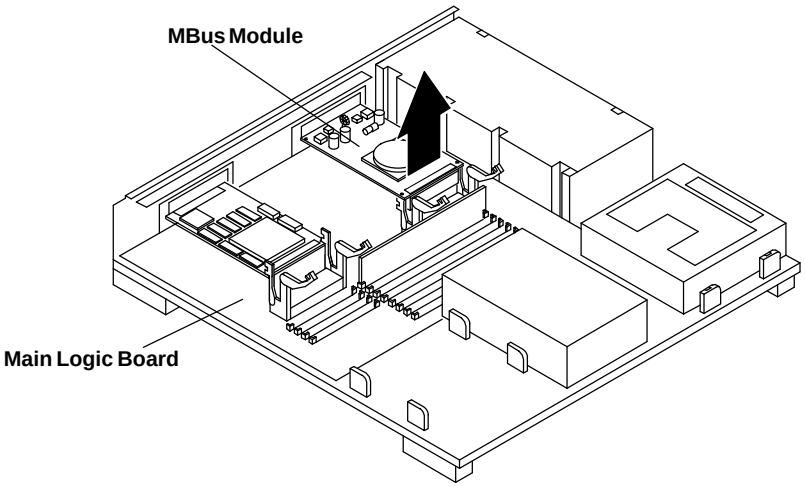


Figure 3-4. Removing the MBus Module

5. Carefully remove the module (lift vertically) until the MBus connector is out of the slot.
6. Place the module on the antistatic mat supplied with the hyperSPARC module kit.
7. Follow steps 4–6 to remove the module from the second slot if two modules were installed.

Note: Be sure to save the original boot PROM and module(s) in the new packaging after installation so that they can be used later if needed.

3.3 Setting the MBus Clock Speed Jumpers

You must set the system clock speed jumpers to 40 MHz MBus on the main logic board to assure correct operation of the hyperSPARC MBus module. The following sections describe the jumper settings for the two different types of main logic boards.

Board with Three Jumpers

One type of board has three jumpers: J1401, J1403, and J1404. All three jumpers must be set as indicated in Figure 3-5 to assure correct operation of the hyperSPARC module.

Board with One Jumper

The other type of board has one jumper: J1401. This jumper must be set as indicated in Figure 3-6 to assure correct operation of the hyperSPARC module.

Note: If the clock speed jumpers are not set correctly, the system may fail to boot.

Use needle-nose pliers to set the clock speed jumpers after referring to Figure 3-6 to determine the correct jumper settings.

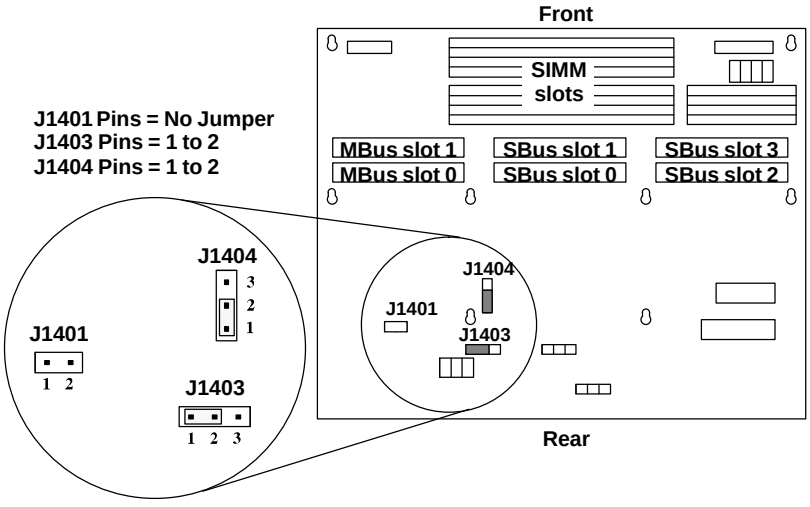


Figure 3-5. Board with Three Jumpers (MBus = 40 MHz)

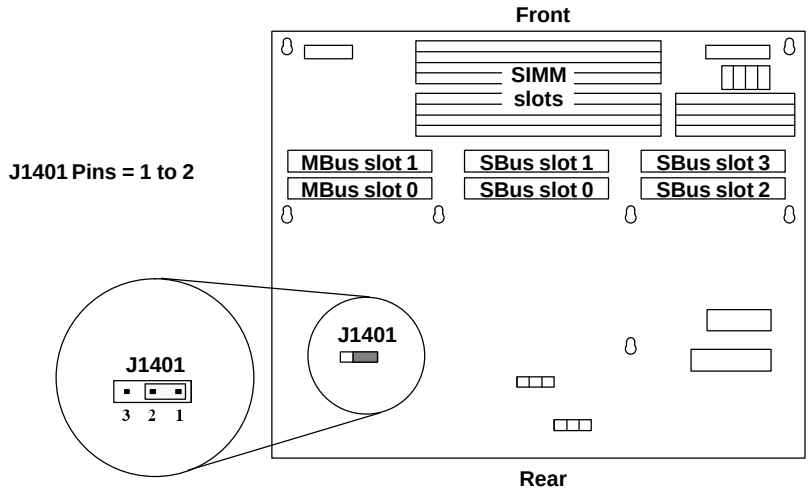


Figure 3-6. Board with One Jumper (MBus = 40 MHz)

3.4 Removing and Replacing the Boot PROM

Warning: Record NVRAM configuration parameters (especially those that are non-standard) before installing the new boot PROM(s), as the new boot PROM(s) will reset values to the default setting. To print NVRAM configuration parameters type:

`eeprom | lp` (for systems running Solaris 2.x) or

`eeprom | lpr` (for systems running SunOS)

Resetting NVRAM parameters to their defaults includes turning on diagnostic mode and setting the default diagnostic boot device to network.

Use the following command to turn off the diagnostic switch:

```
setenv diag-switch? false
```

Note: Replacing the boot PROM will *not* change the system's host id.

Caution: Use ESD kit P/N 250-1088 (or equivalent) when installing integrated circuits, printed circuit boards, and drives in a SPARCstation 10. ESD kit P/N 250-1088 contains the approved ESD mat that has 0.25" of cushioning to protect underside components, prevent board flexing, and provide ESD protection.

Follow the instructions printed on the ESD mat and use the wrist grounding strap.

---

1. Refer to Figure 3-7. If you have an SBus card covering the boot PROM, remove it and set it aside on the antistatic mat.

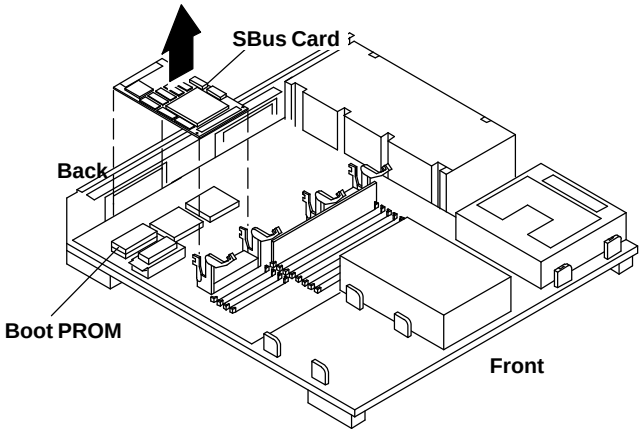


Figure 3-7. Removing the SBus card

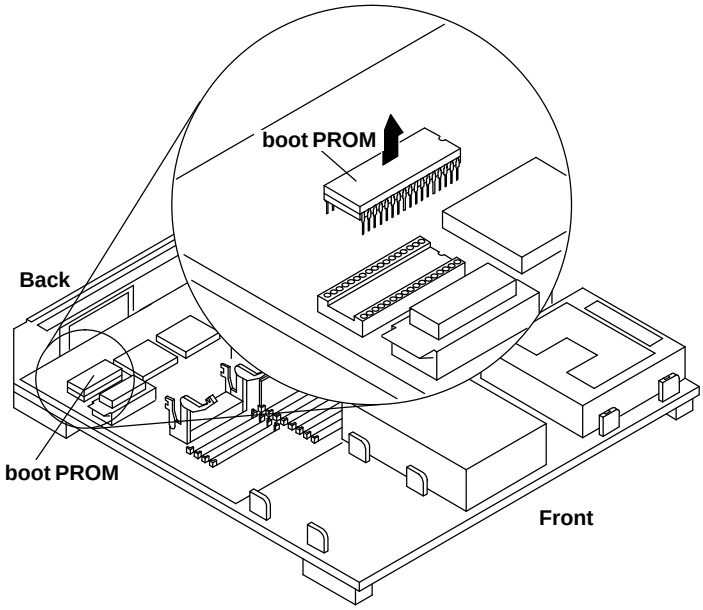


Figure 3-8. Removing the boot PROM

Warning: The heatsinks on the MBus modules may be hot. Use caution when removing or installing boot PROMs and MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

---

2. Locate the boot PROM. Refer to Figure 3-8 for the correct position of the boot PROM.
3. Carefully remove the old boot PROM and replace it with the new boot PROM supplied with the new hyperSPARC module. Ensure that the new boot PROM is firmly seated.
4. Replace the SBus card removed during step 1

Note: Be sure to save the original boot PROM and module(s) in the new packaging after installation so that they can be used later if needed.

3.5 Installing or Replacing a Module

Installing the hyperSPARC Module in MBus Slot 0 (Lower Slot)

Warning: The heatsinks on MBus modules may be hot. Use caution when removing or installing MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

To install a hyperSPARC module in the lower slot:

1. Make sure the wrist strap is securely attached to your wrist and the metal casing of the power supply.

The wrist strap comes with your hyperSPARC module.

2. Make sure the card retainers for the module are pushed back. Refer to Figure 3-9.
3. Open the protective packaging and take out the hyperSPARC module.
4. Insert the back edge of the module between the metal (lower) and plastic (upper) tabs on the back panel.

The connector on the module should be facing MBus slot 0, the lower slot. Refer to Figure 3-9.

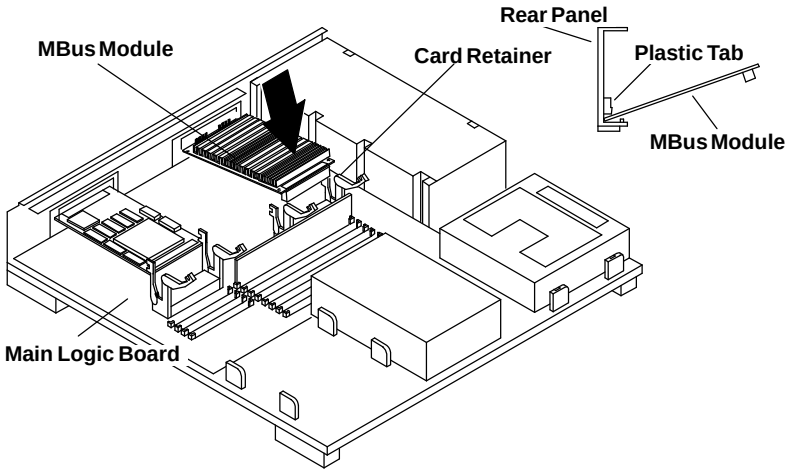


Figure 3-9. Installing the MBus Module

5. Push the module connector down into the socket as shown in Figure 3-9.

Hold the corners of the MBus module and press down firmly until the module is seated.

Caution: Excessive force may bend or damage pins.

Note: MBus slot 0, the lower slot, **must** have a module installed or the system will not work.

The top, upper slot—MBus slot 1—is optional and is used only for systems with a dual-module configuration.

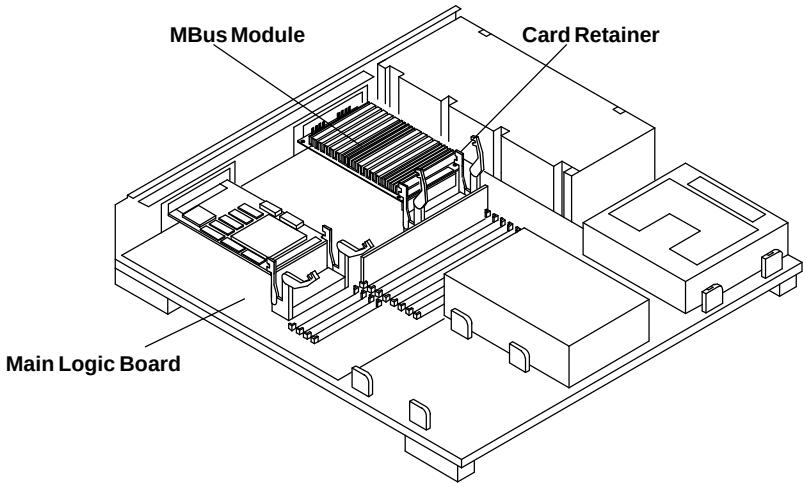


Figure 3-10. Locking Down Card Retainers for the MBus Module

6. Lock the arms of the card retainers on the module by pushing them over the edge of the module as shown in Figure 3-10.

If the system has two modules (slot 1 on top of slot 0), install the module in slot 0 first.

Note: Make sure the module is fully inserted into the slot. If the module is not fully inserted into the MBus slot connector, the card retainers may not lock over the edge of the module.

---

7. If a module was removed from slot 0, place the exchanged module in the antistatic bag you set aside when unpacking the hyperSPARC module.
8. Detach the wrist strap and remove and store the antistatic mat.

Installing the hyperSPARC Module in MBus Slot 1 (Upper Slot)

Warning: The heatsinks on MBus modules may be hot. Use caution when removing or installing MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

To install a hyperSPARC module in the upper slot:

1. Make sure the wrist strap is securely attached to your wrist and the metal casing of the power supply.

The wrist strap comes with your hyperSPARC module.

2. Make sure the card retainers for the module are pushed back. Refer to Figure 3-11.
3. Open the protective packaging and take out the hyperSPARC module.
4. Insert the back edge of the module between the metal (lower) and plastic (upper) tabs on the back panel.

The connector on the module should be facing MBus slot 1, the upper slot. Refer to Figure 3-11.

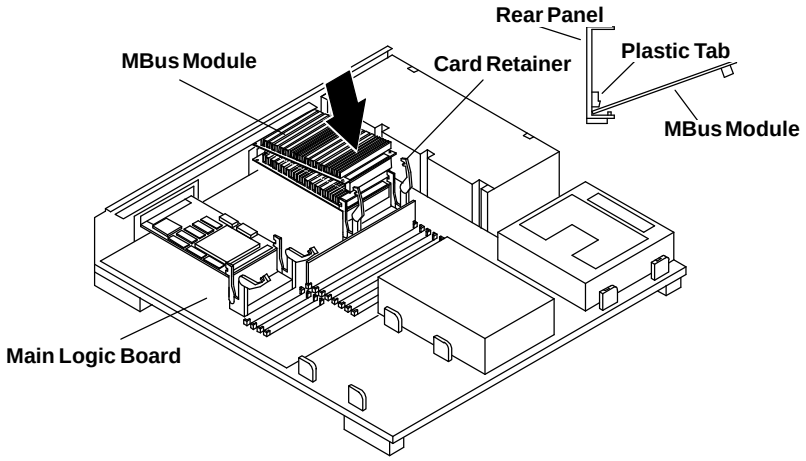


Figure 3-11. Installing the MBus Module

5. Push the module connector down into the socket as shown in Figure 3-11.

Hold the corners of the MBus module and press down firmly until the module is seated.

Caution: Excessive force may bend or damage pins.

Note: MBus slot 0, the lower slot, **must** have a module installed or the system will not function.

The top, upper slot—MBus slot 1—is optional and is used only for systems with a dual-module configuration.

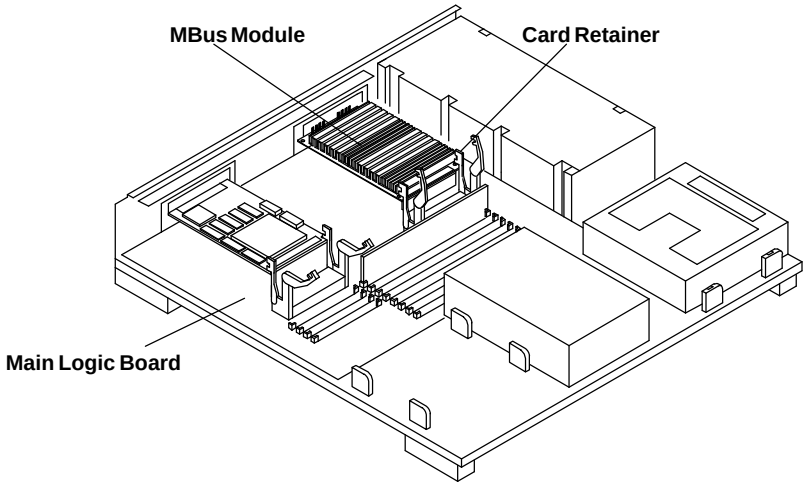


Figure 3-12. Locking Down Card Retainers for the MBus Module

6. Lock the arms of the card retainers on the module by pushing them over the edge of the module as shown in Figure 3-12.

If the system has two modules (slot 1 on top of slot 0), install the module in slot 0 first.

Note: Make sure the module is fully inserted into the slot. If the module is not fully inserted into the MBus slot connector, the card retainers may not lock over the edge of the module.

---

7. If a module was removed from slot 0, place the exchanged module in the antistatic bag you set aside when unpacking the hyperSPARC module.
8. Detach the wrist strap and remove and store the antistatic mat.

3.6 Replacing the System Unit Cover

Note: The card retainers on the module should be pushed over the edge of the module.

To install the system unit cover:

1. Hold the cover approximately at an angle as shown in Figure 3-13, and gently glide the hinge tabs on the cover into the tab slots on the front of the system unit. Continue to hold onto the cover.

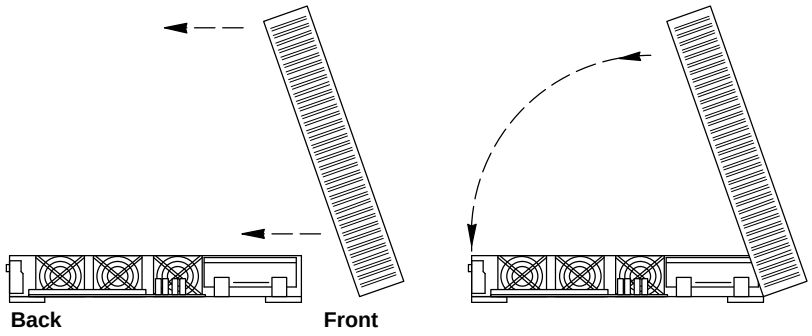


Figure 3-13. Installing the System Unit Cover

2. Slowly lower the cover onto the system unit.
3. Guide the cover down so that the plastic retainer clip snaps the cover to the rear panel. Push down on the left and right sides of the cover. Refer to Figure 3-14.

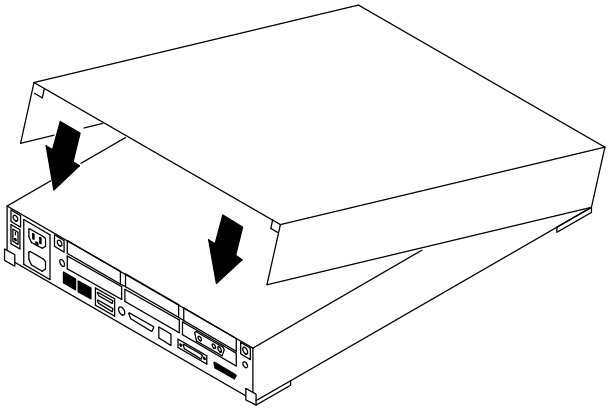


Figure 3-14. Pushing Down on the Cover Sides, Rear View

4. Tighten the captive screw on the rear panel. Refer to Figure 3-15.

   Note: Do not over tighten the screws.

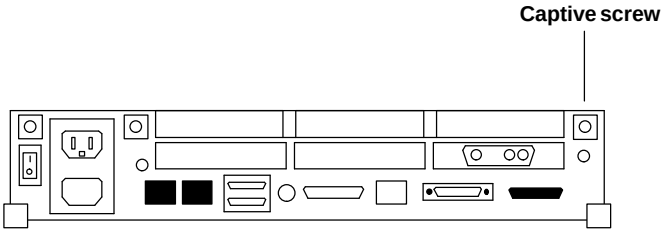


Figure 3-15. Location of Captive Screw on the Rear Panel

5. Push down on the unit top along the right and left edges so that the top cover seals properly to the system chassis.

3.7 Starting Up the System and Verifying Installation

Warning: Before powering on your system again, be sure to install the cover. It is not safe to operate the SPARCstation 10 without the top cover in place.

Warning: This device is equipped with a 3-wire grounded power cord. To reduce the risk of electrical shock, always plug the power cord into a properly grounded power outlet.

Caution: Always allow 10 seconds between turning off the power and turning the power back on. This pause prevents possible damage to power supply components in your system unit.

Turn the power switches on in this order:

a. Monitor

b. External drives

c. System Unit

To power-up the system and verify installation set the power switch on the chassis to the ON position.

Important: The power-on self test (POST) will run on each CPU. Therefore, the length of time for POST to complete will depend on the number of CPUs installed in your system. Do not be alarmed if initially you do not see any display on the monitor. In a configuration with four processors, POST completes in approximately eight minutes.

Note: Once `power-on self tests` are completed and functional modules are recognized, the operating system will configure itself automatically to take advantage of all available processors.

---

6. Watch the boot information displayed on the screen to confirm that all processors are recognized. For example:

```
SPARCstation 10 Series (4 X RT625), Keyboard Present
ROM Rev. 2.22, 64 MB memory installed, Serial #232.
Ethernet address 8:0:20:b:5f:7, Host ID: 710000e8.
SunOS Release 5.3 Version generic [UNIX(R) System V Release
4.0]
Copyright (c) 1983–1993, Sun Microsystems, Inc.
cpu = SUNW, Sun 4/600
mod0 = ROSS, RT625 (mid = 8)
mod1 = ROSS, RT625 (mid = 9)
mod2 = ROSS, RT625 (mid = 10)
mod3 = ROSS, RT625 (mid = 11)
mem = 65204K (0x3fad000)
avail mem = 63348736
Ethernet address = 8:0:20:b:5f:7
```

Note: *This screen display is an example only.* The actual message displayed on the screen will depend on the software running on the system.

The numbers in parentheses (`4 x RT625`) indicate the number of processors running (four), and the revision number of the hyperSPARC module that is installed.

The `mod0, mod1, mod2,` and `mod3` entries indicate that the system recognizes four hyperSPARC processors. `mod0` and `mod1` correspond to slot 0; `mod2` and `mod3` correspond to slot 1. If a single-CPU hyperSPARC module were installed (slot 0), the system would recognize only one processor in `mod0.` If a dual-CPU module were installed (slot 0), the system would recognize processors in `mod0` and `mod1`. If two single-CPU modules were installed (slot 0 and slot 1) the system would recognize processors in `mod0` and `mod2`.

Note: The most current revision for the boot PROMs is **2.22.1H**. However, during booting, only **2.22** is displayed on the screen. In order to verify the revision of the PROM, use the “Stop” (L1) and “A” key to enter the PROM monitor level. At the “ok” prompt, type:

`.version`

The screen will display a message similar to the following, where `Version 1H` indicates the exact revision of the PROM:

```
Release 2.22 Version 1H created 95/06/15 12:06:51
```

This message is an example only. The actual message displayed will depend on the PROM in the system*.

At the “ok” prompt, type

`go`

to return to the kernel.

* Call ROSS Technical Support at 1-800-ROSS-YES to obtain the latest PROM information.

---

7. Wait for the system to boot. When the `login:` prompt is displayed, log in and resume operations.

Chapter 4.
Installing the hyperSPARC Module in the SPARCstation 20

This chapter provides the information you need to remove the system unit cover, set the clock speed jumper, and remove and install a hyperSPARC module on the SPARCstation 20.

Note: Variations of the module may be referred to as the MBus module or hyperSPARC module. These terms may be used interchangeably in this chapter.

Caution: Dual-module configurations have a module in both the upper and lower MBus slots. Both modules must be hyperSPARC only or SuperSparc only. hyperSPARC and SuperSparc modules will not function correctly if installed together in the same machine.

Important: The hyperSPARC module is designed to run in a Sun SPARCstation 10, SPARCstation 20, or SPARCserver 600MP environment, which includes a minimum of 140W power supply. Operation of hyperSPARC in machines that deviate from this electrical environment is not guaranteed.

Caution: Refer to the “Shutting Down the System” section on page 1-2 to make sure the system is shut off. The green light-emitting diode (LED) at the front of the system unit should not be lit.

Caution: The system chassis power unit must be turned off and the power cord must remain plugged in to ensure a proper ground. Do not disconnect the power cord from the system unit power outlet or the wall socket. This connection provides the ground path necessary to safely remove and install the printed circuit boards and components.

4.1 Removing the System Unit Cover

Caution: Make sure that power to your system unit is turned off. The power cord must remain plugged into the system unit and to the power source to ensure a proper ground.

To remove the cover from the system unit:

1. Use a #2 Phillips screwdriver to fully loosen the captive screw holding the cover to the back panel.
2. Do not loosen the screw near the Power On/Standby switch. This screw holds the power supply in place.
3. Use a Phillips screwdriver to loosen the screw securing the lock block to the cover. Remove the lock block and put it aside.

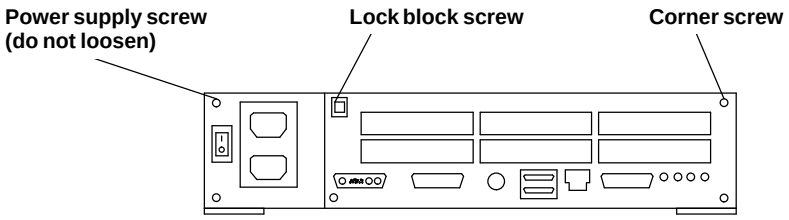


Figure 4-1. Lock Block Screw and Corner Screw

4. Grasping the cover at the back of the machine, lift it up and toward the front of the unit. When the cover is at a 60 degree angle to the chassis, push the cover away from the front panel, freeing the cover hinge tabs from the chassis slots. Put the cover aside

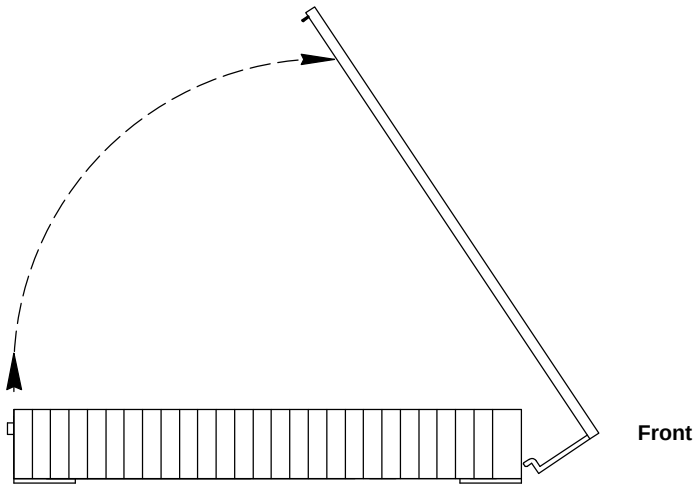


Figure 4-2. Removing the System Unit Cover, Side View

5. Attach a wrist strap to your wrist and to a metal part of the chassis.

Warning: Before powering on your system again, be sure to install the cover. Refer to section 4.6 “Replacing the System Unit Cover.” It is not safe to operate the SPARCstation 20 without the top cover in place.

4.2 Removing a Module

Warning: The heatsinks on MBus modules may be hot. Use caution when removing or installing MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

Caution: Printed circuit boards are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy the boards.

Wear a grounding wrist strap when handling the boards. Attach the wrist strap to the metal casing of the power supply at the rear of the unit top. Handle boards only by the edges. Do not touch the components themselves or any metal parts.

Do not disconnect the power cord from the system unit power outlet or from the wall socket. This connection provides the ground path necessary to safely remove and install the printed circuit boards and components. In addition, keep the internal power supply cable connected to the MLB.

Caution: Make sure that the system unit power is turned OFF by checking that the green LED at the front of the chassis is not lit and the fan in the power supply is not running.

To remove an MBus module from the system unit:

1. Check that the green LED at the front of the chassis is not lit.
2. Check that the system power cord remains connected to the system and the wall outlet.
3. Remove the system unit cover.

Caution: Place the antistatic mat (shiny side up) on a work surface near the system. Attach the wrist grounding strap as described on page 1-3.

4. Push back both card retainers for the module.

Refer to Figure 4-3. If the system has two modules (slot 1 on top of slot 0), remove the top module first.

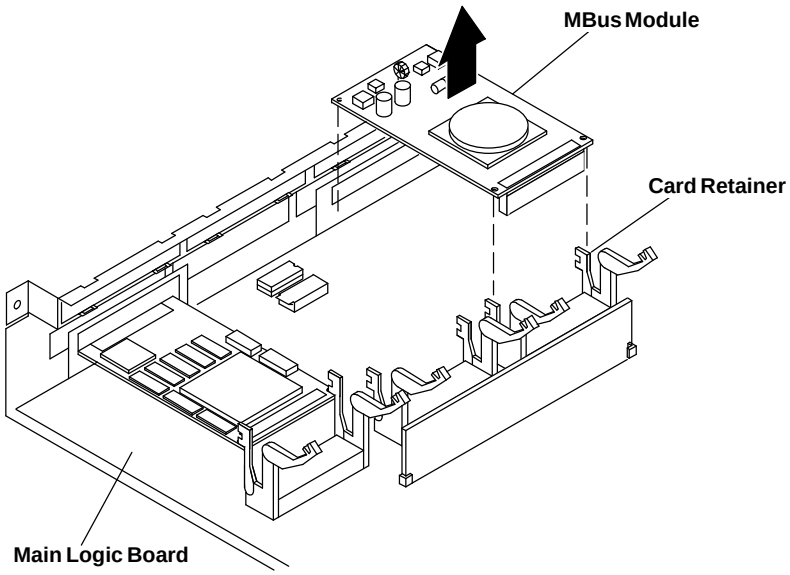


Figure 4-3. Removing the MBus Module

5. Carefully remove the module (lift vertically) until the MBus connector is out of the slot.
6. Place the module on the antistatic mat supplied with the hyperSPARC module kit.
7. Follow steps 4–6 to remove the module from the second slot if two modules were installed.

Note: Be sure to save the original boot PROM and module(s) in the new packaging after installation so that they can be used later if needed.

4.3 Setting the MBus Clock Speed Jumper

There are clock speed (J1401) and serial port (J0801 and J0802) jumpers on the system board. The jumpers are preset at the factory as shown in Figure 4-4.

Note: Leave the clock speed jumper set at 40/50 MHz for optimum performance.

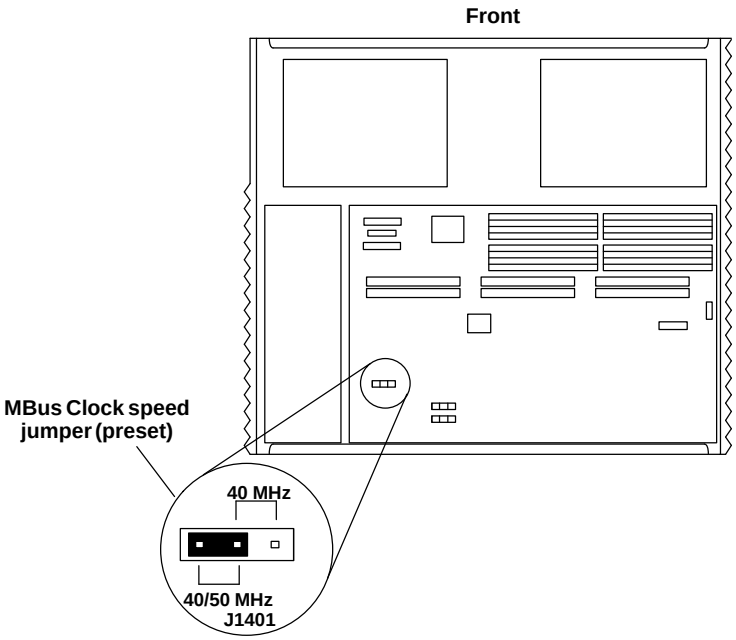


Figure 4-4. MBus Clock Speed Jumper on the SPARCstation 20

4.4 Removing and Replacing the Boot PROM

Warning: Record NVRAM configuration parameters (especially those that are non-standard) before installing the new boot PROM(s), as the new boot PROM(s) will reset values to the default setting. To print NVRAM configuration parameters type:

`eeprom | lp` (for systems running Solaris 2.x) or

`eeprom | lpr` (for systems running SunOS)

Resetting NVRAM parameters to their defaults includes turning on diagnostic mode and setting the default diagnostic boot device to network.

Use the following command to turn off the diagnostic switch:

```
setenv diag-switch? false
```

Note: Replacing the boot PROM will *not* change the system's host id.

Caution: Use ESD kit P/N 250-1088 (or equivalent) when installing integrated circuits, printed circuit boards, and drives in a SPARCstation 20. ESD kit P/N 250-1088 contains the approved ESD mat that has 0.25" of cushioning to protect underside components, prevent board flexing, and provide ESD protection.

Follow the instructions printed on the ESD mat and use the wrist grounding strap.

1. Refer to Figure 4-5. If you have an SBus card covering the boot PROM, remove it and set it aside on the antistatic mat.

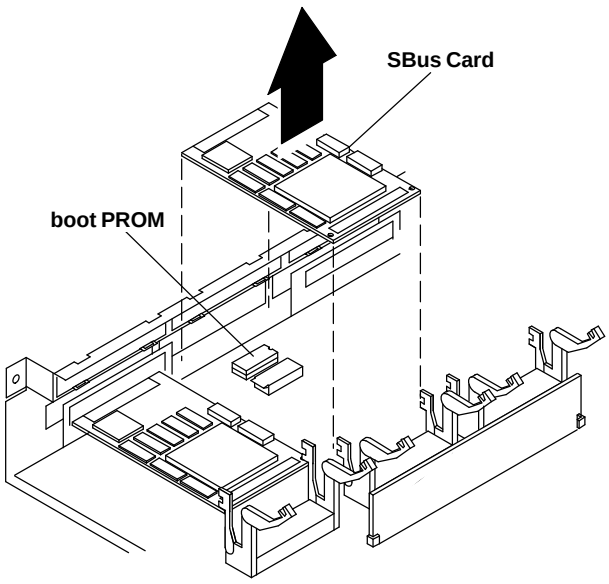


Figure 4-5. Removing an SBus card

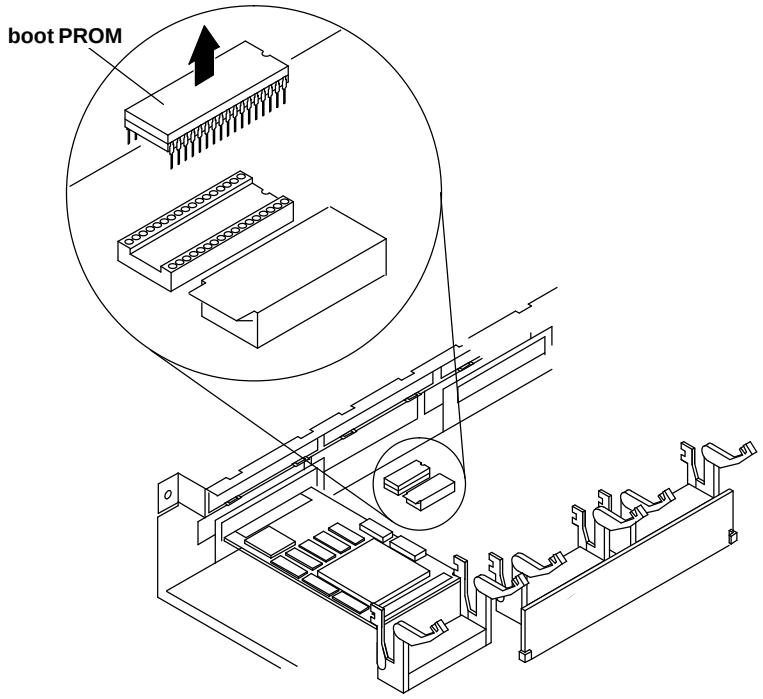


Figure 4-6. Removing the boot PROM

Warning: The heatsinks on the MBus modules may be hot. Use caution when removing or installing boot PROMs and MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

---

2. Locate the boot PROM. Refer to Figure 4-6 for the correct position of the boot PROM.
3. Carefully remove the old boot PROM and replace it with the new boot PROM supplied with the new hyperSPARC module. Ensure that the new boot PROM is firmly seated.
4. Replace the SBus card removed during step 1

Note: Be sure to save the original boot PROM and module(s) in the new packaging after installation so that they can be used later if needed.

4.5 Installing or Replacing a Module

Installing the hyperSPARC Module in MBus Slot 0 (Lower Slot)

Warning: The heatsinks on MBus modules may be hot. Use caution when removing or installing MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

To install a hyperSPARC module in the lower slot:

1. Make sure the wrist strap is securely attached to your wrist and the metal casing of the power supply.

The wrist strap comes with your hyperSPARC module.

2. Make sure the card retainers for the module are pushed back. Refer to Figure 4-7.
3. Open the protective packaging and take out the hyperSPARC module.
4. Insert the back edge of the module between the metal (lower) and plastic (upper) tabs on the back panel.

The connector on the module should be facing MBus slot 0, the lower slot. Refer to Figure 4-7.

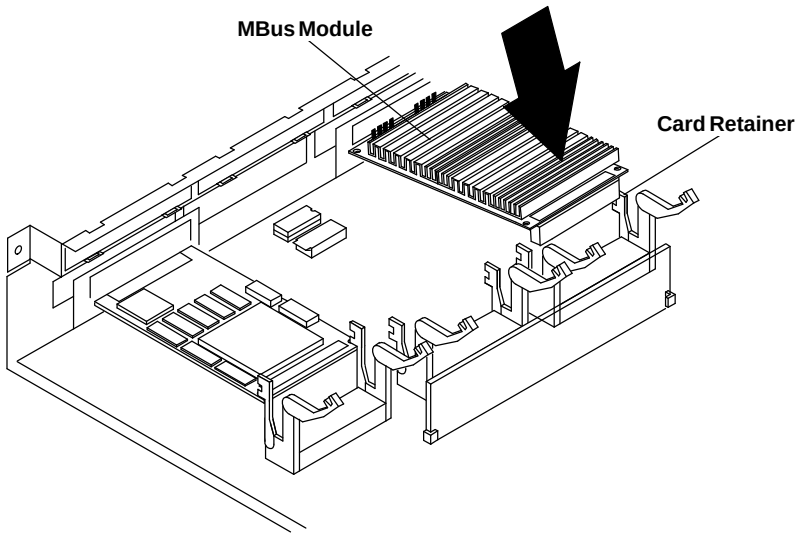


Figure 4-7. Installing the MBus Module

5. Push the module connector down into the socket as shown in Figure 4-7.

Hold the corners of the MBus module and press down firmly until the module is seated.

Caution: Excessive force may bend or damage pins.

Note: MBus slot 0, the lower slot, **must** have a module installed or the system will not function.

The top, upper slot—MBus slot 1—is optional and is used only for systems with a dual-module configuration.

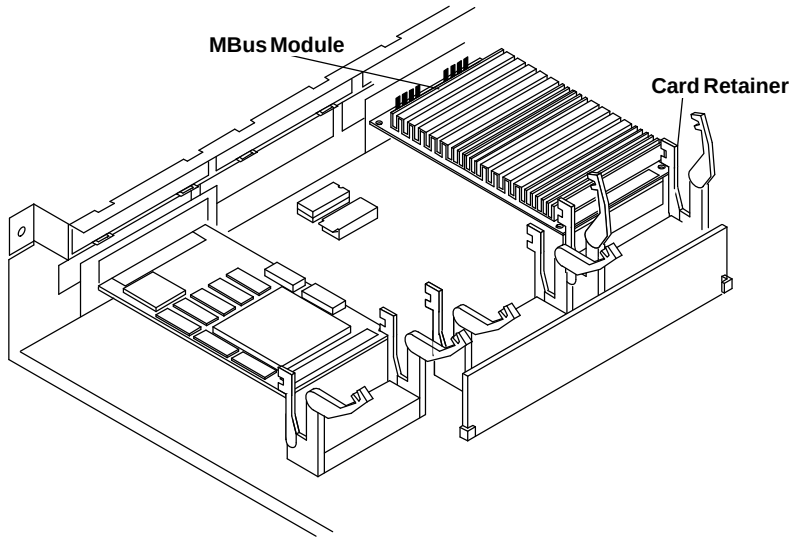


Figure 4-8. Locking Down Card Retainers for the MBus Module

6. Lock the arms of the card retainers on the module by pushing them over the edge of the module as shown in Figure 4-8.

If the system has two modules (slot 1 on top of slot 0), install the module in slot 0 first.

Note: Make sure the module is fully inserted into the slot. If the module is not fully inserted into the MBus slot connector, the card retainers may not lock over the edge of the module.

---

7. If a module was removed from slot 0, place the exchanged module in the antistatic bag you set aside when unpacking the hyperSPARC module.
8. Detach the wrist strap and remove and store the antistatic mat.

Installing the hyperSPARC Module in MBus Slot 1 (Upper Slot)

Warning: The heatsinks on MBus modules may be hot. Use caution when removing or installing MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

To install a hyperSPARC module in the upper slot:

1. Make sure the wrist strap is securely attached to your wrist and the metal casing of the power supply.

The wrist strap comes with your hyperSPARC module.

2. Make sure the card retainers for the module are pushed back. Refer to Figure 4-9.
3. Open the protective packaging and take out the hyperSPARC module.
4. Insert the back edge of the module between the metal (lower) and plastic (upper) tabs on the back panel.

The connector on the module should be facing MBus slot 1, the upper slot. Refer to Figure 4-9.

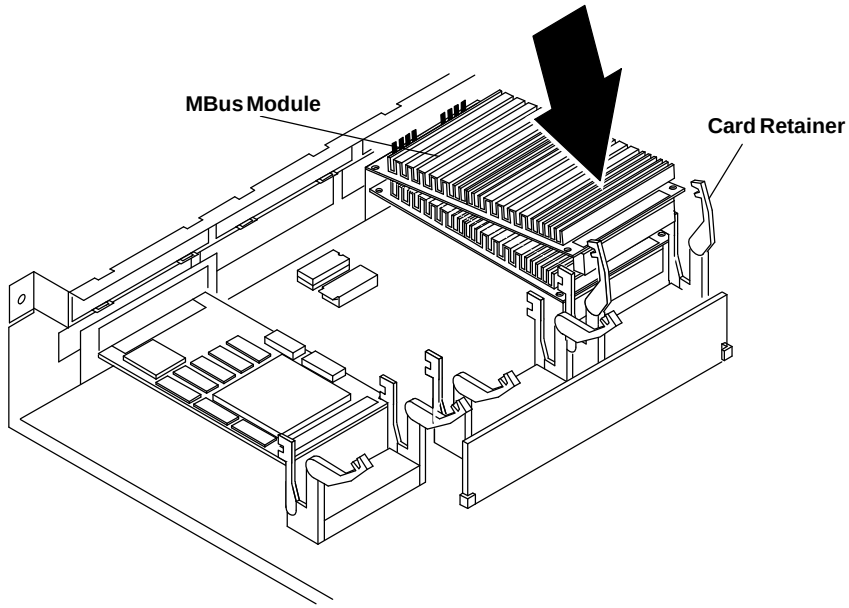


Figure 4-9. Installing the MBus Module

5. Push the module connector down into the socket as shown in Figure 4-9.

Hold the corners of the MBus module and press down firmly until the module is seated.

Caution: Excessive force may bend or damage pins.

Note: MBus slot 0, the lower slot, **must** have a module installed or the system will not function.

The top, upper slot—MBus slot 1—is optional and is used only for systems with a dual-module configuration.

---

6. Lock the arms of the card retainers on the module by pushing them over the edge of the module.

If the system has two modules (slot 1 on top of slot 0), install the module in slot 0 first.

Note: Make sure the module is fully inserted into the slot. If the module is not fully inserted into the MBus slot connector, the card retainers may not lock over the edge of the module.

---

7. If a module was removed from slot 1, place the exchanged module in the antistatic bag you set aside when unpacking the hyperSPARC module.
8. Detach the wrist strap and remove and store the antistatic mat.

4.6 Replacing the System Unit Cover

Note: The card retainers on the module should be pushed over the edge of the module.

To install the system unit cover:

1. Align the cover hinge tabs with the chassis tab slots on the bottom front of the system. Make sure the tabs are locked into the chassis slots. Lower the cover onto the chassis. See Figure 4-10.

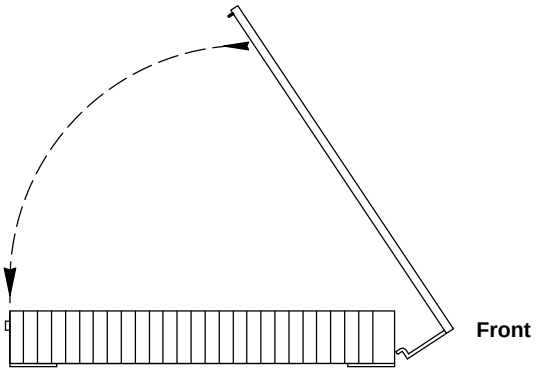


Figure 4-10. Installing the System Unit Cover

2. Replace the lock block and use a Phillips screwdriver to tighten the screw that secures the lock block to the cover. See Figure 4-11.

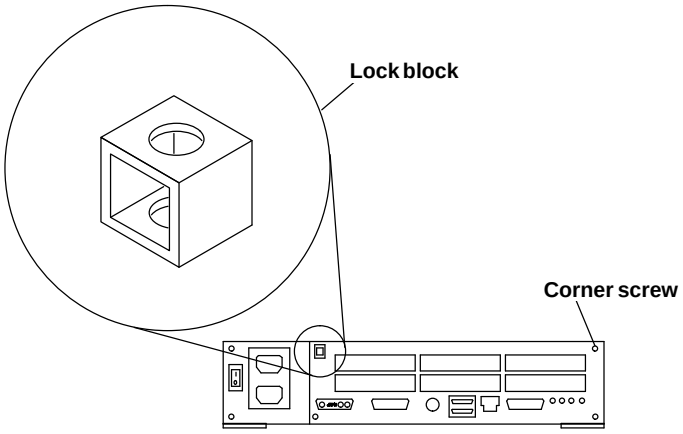


Figure 4-11. Lock Block and Corner Screw on Rear Panel

3. Use a Phillips screwdriver to tighten the screw on the corner for the back panel and secure the cover. See Figure 4-11.

4.7 Starting Up the System and Verifying Installation

Warning: Before powering on your system again, be sure to install the cover. It is not safe to operate the SPARCstation 20 without the top cover in place.

Warning: This device is equipped with a 3-wire grounded power cord. To reduce the risk of electrical shock, always plug the power cord into a properly grounded power outlet.

Caution: Always allow 10 seconds between turning off the power and turning the power back on. This pause prevents possible damage to power supply components in your system unit.

Turn the power switches on in this order:

a. Monitor

b. External drives

c. System Unit

To power-up the system and verify installation set the power switch on the chassis to the ON position.

Important: The power-on self test (POST) will run on each CPU. Therefore, the length of time for POST to complete will depend on the number of CPUs installed in your system. Do not be alarmed if initially you do not see any display on the monitor. In a configuration with four processors, POST completes in approximately eight minutes.

Note: Once `power-on self tests` are completed and functional modules are recognized, the operating system will configure itself automatically to take advantage of all available processors.

4. Watch the boot information displayed on the screen to confirm that all processors are recognized. For example:

```
SPARCstation 20 Series (4 X RT625), Keyboard Present
ROM Rev. 2.22, 64 MB memory installed, Serial #232.
Ethernet address 8:0:20:b:5f:7, Host ID: 710000e8.
SunOS Release 5.3 Version generic [UNIX(R) System V Release 4.0]
Copyright (c) 1983-1993, Sun Microsystems, Inc.
cpu = SUNW, Sun 4/600
mod0 = ROSS, RT625 (mid = 8)
mod1 = ROSS, RT625 (mid = 9)
mod2 = ROSS, RT625 (mid = 10)
mod3 = ROSS, RT625 (mid = 11)
mem = 65204K (0x3fad000)
avail mem = 63348736
Ethernet address = 8:0:20:b:5f:7
```

Note: *This screen display is an example only.* The actual message displayed on the screen will depend on the software running on the system.

The numbers in parentheses (`4 x RT625`) indicate the number of processors running (four), and the revision number of the hyperSPARC module that is installed.

The `mod0, mod1, mod2,` and `mod3` entries indicate that the system recognizes four hyperSPARC processors. `mod0` and `mod1` correspond to slot 0; `mod2` and `mod3` correspond to slot 1. If a single-CPU hyperSPARC module were installed (slot 0), the system would recognize only one processor in `mod0.` If a dual-CPU module were installed (slot 0), the system would recognize processors in `mod0` and `mod1`. If two single-CPU modules were installed (slot 0 and slot 1) the system would recognize processors in `mod0` and `mod2`.

Note: The most current revision for the boot PROMs is **2.22.1H**. However, during booting, only **2.22** is displayed on the screen. In order to verify the revision of the PROM, use the "Stop" (L1) and "A" key to enter the PROM monitor level. At the "ok" prompt, type:

`.version`

The screen will display a message similar to the following, where `Version 1H` indicates the exact revision of the PROM:

```
Release 2.22 Version 1H created 95/06/15 12:06:51
```

This message is an example only. The actual message displayed will depend on the PROM in the system*.

At the "ok" prompt, type

`go`

to return to the kernel.

* Call ROSS Technical Support at 1-800-ROSS-YES to obtain the latest PROM information.

---

5. Wait for the system to boot. When the `login:` prompt is displayed, log in and resume operations.

Chapter 5.
Installing the hyperSPARC Module on the 600MP System Board

This section provides the information you need to remove the 600MP system board and install or replace MBus Modules on the SPARCserver 600MP.

Caution: Individuals who remove any outer panels or open covers to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

Important: The hyperSPARC module is designed to run in a Sun SPARCstation 10, SPARCstation 20, or SPARCserver 600MP environment, which includes a minimum of 140W power supply. Operation of hyperSPARC in machines that deviate from this electrical environment is not guaranteed.

5.1 Handling System Boards and Assemblies

Caution: DO NOT use ESD kit P/N 560-1302 when working on 600MP system boards. Use ESD kit P/N 250-1088 (or equivalent). Instructions are included in the kit.

Caution: The system chassis power must be turned off and the AC power cord must remain plugged in to ensure a proper ground.

Caution: The 600MP system board, modules, and cards have surface-mount components that may break when the board is flexed.

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

- Hold the system board only by the edges near the middle of the board where the board stiffener is located. Do not hold the board only at the ends.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the ESD mat.
- Do not place the board or daughter cards on a hard surface. Use a cushioned antistatic mat. The board connectors and components have very thin pins that bend easily.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe unit.
- Transport the board in an antistatic bag.

5.2 Removing the System Board from the Enclosure

Caution: Refer to the “Shutting Down the System” section on page 1-2 to make sure the system is shut off. Turn off the power at the main AC breaker before you insert or remove boards and disk drives. Do not disconnect the AC power cord from its receptacle. The system chassis power must be turned off, and the power cord must remain plugged in to ensure a proper ground.

Caution: Use ESD kit P/N 250-1088 (or equivalent) when installing integrated circuits, printed circuit boards, and drives in a SPARCserver 600MP. ESD kit P/N 250-1088 contains the Sun approved ESD mat that has 0.25” of cushioning to protect underside components, prevent board flexing, and provide ESD protection. Instructions for use are included with the kit.

To access the system board:

1. Move the system so that you have easy access to the enclosure.
2. Place the ESD mat in the area where you are working.

The ESD mat and the wrist grounding strap will protect against electrostatic discharge. Connect the ground clip to the chassis and mat.

3. If the system is a 56-inch data cabinet, use a #2 Phillips screwdriver to remove the vented, rear panel. Refer to Figure 5-1. Then, go to step 4.

If the system is a 12-slot office pedestal, go to step 4.

There is no panel or cover to remove to access the board in a 12-slot system.

If the system is a 5-slot office pedestal, remove the top cover:

a. Locate the top cover release knob. Turn the knob counterclockwise one quarter turn until you hear a click. Refer to Figure 5-2.

b. Slide the top cover back and lift the cover off of the chassis. Set the cover aside. Go to step 4.

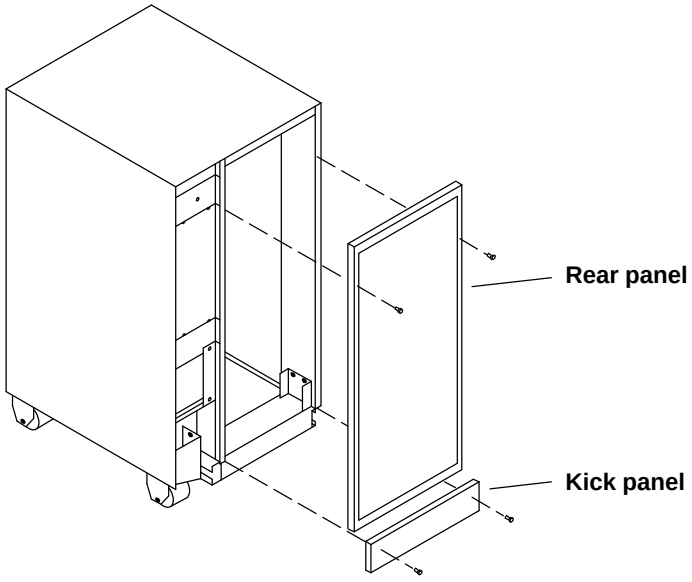


Figure 5-1. Removing the Panel to Access the Board in a 56-inch Data Cabinet

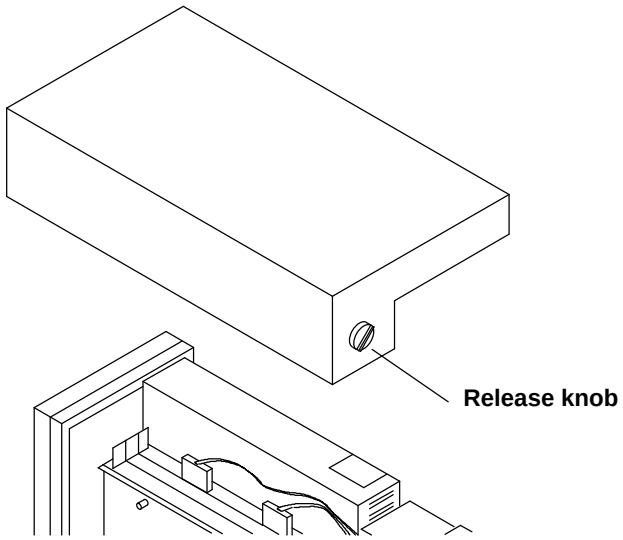


Figure 5-2. Removing the Top Cover to Access the Board in a 5-Slot Office Pedestal

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Caution: Attach the wrist grounding strap that came with the module.

---

4. Unfasten and set aside any cable connectors from the system board back panel.
   a. To remove the system board, first detach the keyboard, Ethernet, and other back panel connectors. Label these if necessary.
   b. Label all cables that are connected to serial ports A and B, and any cables that are connected to any SBus cards. Then, remove all of the cables.
5. Use a 2.5 mm Allen wrench to remove the screws securing the board to the card cage. Set the screws aside for later reinstallation.
6. Pull the curved ends of the extraction levers outward to release the board from the backplane connectors.
7. Gently remove the system board from the enclosure. Place the board on the ESD mat.

Caution: Avoid contact between the bottom of the board with adjacent cards and filler panels.

5.3 Removing and Replacing the Boot PROMs

Warning: Record NVRAM configuration parameters (especially those that are non-standard) before installing the new boot PROM(s), as the new boot PROM(s) will reset values to the default setting. To print NVRAM configuration parameters type:

`eeprom | lp` (for systems running Solaris 2.x) or

`eeprom | lpr` (for systems running SunOS)

Resetting NVRAM parameters to their defaults includes turning on diagnostic mode and setting the default diagnostic boot device to network.

Use the following command to turn off the diagnostic switch:

```
setenv diag-switch? false
```

Note: Replacing the boot PROM will *not* change the system's host id.

Caution: Use ESD kit P/N 250-1088 (or equivalent) when installing integrated circuits, printed circuit boards, and drives in a SPARCserver 600MP. ESD kit P/N 250-1088 contains the Sun approved ESD mat that has 0.25" of cushioning to protect underside components, prevent board flexing, and provide ESD protection.

Follow the instructions printed on the ESD mat and use the wrist grounding strap.

To remove the boot PROMs, first remove the system board from the card cage. Then refer to Section 5.2 "Removing the System Board from the Enclosure."

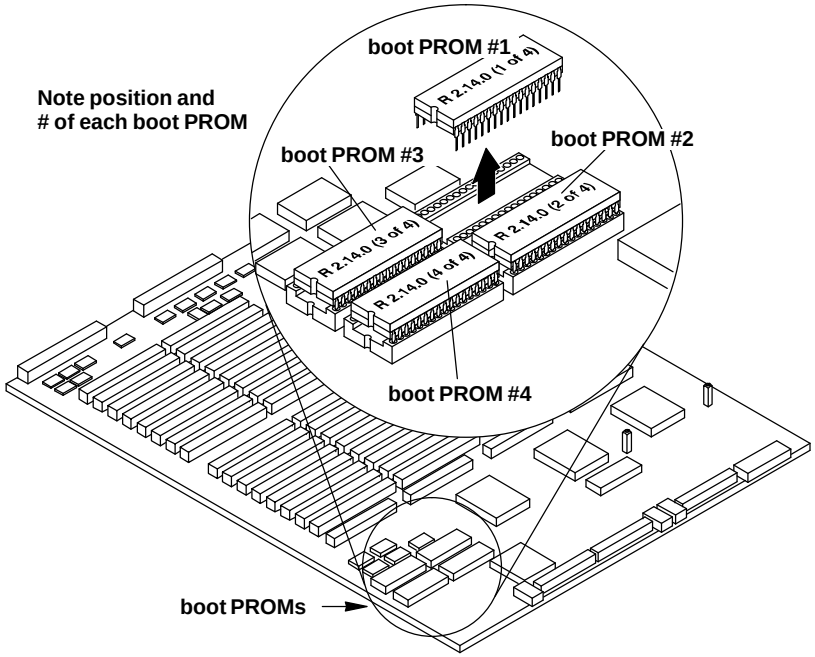


Figure 5-3. Removing the boot PROMs

Warning: The heatsinks on the MBus modules may be hot. Use caution when removing or installing boot PROMs and MBus modules and avoid contact with the heatsinks. Hold MBus modules only by the edges.

1. Locate the boot PROMs, carefully noting the position of each and its respective number, i.e., 1, 2, 3, or 4 (of 4). Refer to Figure 5-3 for the correct number and position of each boot PROM.
2. Carefully replace each of the old boot PROMs with a new boot PROM of the same number, i.e., 1, 2, 3, or 4 (of 4). These are supplied with the new hyperSPARC module. Ensure that each new boot PROM is firmly seated in its correct socket.

Caution: ***Boot PROMs must be replaced in the correct numbered locations.*** Failure to do so can yield unpredictable results.

Note: Be sure to save the original boot PROMs and module(s) in the new packaging after installation so that they can be used later if needed.

5.4 Removing the Module

Caution: Use ESD kit P/N 250-1088 (or equivalent) when installing integrated circuits, printed circuit boards, and drives in a SPARCserver 600MP. ESD kit P/N 250-1088 contains the Sun approved ESD mat that has 0.25” of cushioning to protect underside components, prevent board flexing, and provide ESD protection.

Follow the instructions printed on the ESD mat and use the wrist grounding strap.

To remove an MBus module, first remove the system board from the card cage. Then refer to Section 5.2 “Removing the System Board from the Enclosure.”

1. Remove the slotted fillister head screw from each standoff of the module.

Keep these screws to use when installing a replacement hyperSPARC module.

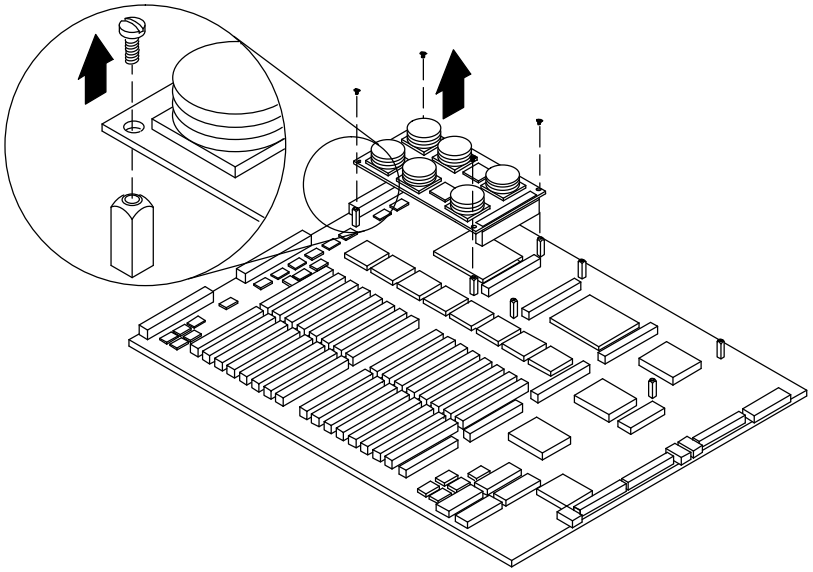


Figure 5-4. Removing the MBus Modules

2. Hold the module by the edges near the connector.
3. Lift the module off the connector.

Note: Do not “rock” the module while removing it; connector damage could result.

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4. Place the module on the ESD mat or in an antistatic bag.
5. To install a hyperSPARC module, follow the steps in “Installing or Replacing a Module.”

Note: Be sure to save the original boot PROMs and module(s) in a safe place after installation so that they can be used as spares if needed.

5.5 Installing or Replacing a Module

To install or replace a hyperSPARC module, first remove the system board from the card cage, then refer to Section 5.2 “Removing the System Board from the Enclosure.” The system board can have up to two hyperSPARC modules on the 600MP system board: module 0 and module 1.

A module **must** be installed in the *slot 0* position. A module in the second slot (1) is optional; the second slot is used only for dual-module configurations.

Caution: Use the wrist grounding strap that came with the module.

Note: Visually inspect the pins on the hyperSPARC module and in the MBus connector to make sure the pins are not bent before installing the module.

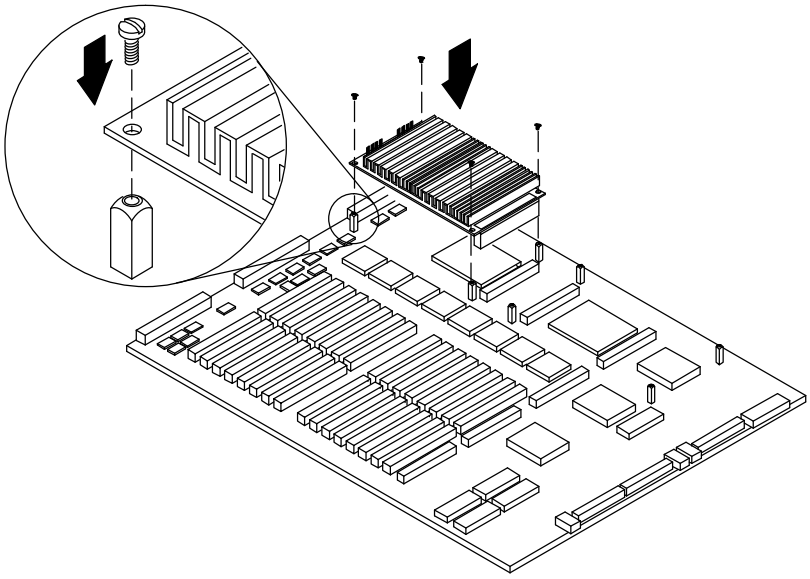


Figure 5-5. Installing the hyperSPARC Module – 600MP System Board

1. Remove the slotted fillister head screws from each standoff of the module.

When installing a module in slot 1 on the 600MP system board, you must first move the two standoffs used for SBus slot 3 to the slot 1 location.

2. Open the protective packaging and take out the hyperSPARC module.
3. Hold the card by the edges near the connector.
4. Place the module on the four screw-in standoffs.

Make sure the module is seated on the four standoffs.

5. Align the module on the module connector, ensuring that the keyed notches on the connector match the bumps on the receiving connector. Firmly but gently press down until the module is fully seated on the connector.

Do not “rock” the module onto the connector; press down on the corner of the module.

6. Starting from a corner opposite from the connector, press down on the corner of the module.

Repeat this step on the remaining corners.

7. Replace and fasten the slotted fillister screws on the four standoffs.

Note: Do not substitute pan head screws for the fillister head screws originally removed from the standoffs. Fillister head screws must be used because the head on a fillister head screw is taller. Refer to Figure 5-6.

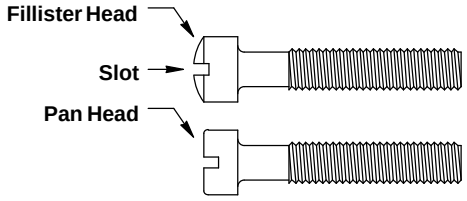


Figure 5-6. Fillister Head and Pan Head Screws

Caution: Because of the tight clearance, use caution when replacing the fillister head screws. Do not allow the screwdriver to contact the hyperSPARC module.

5.6 Installing the System Board in the Enclosure

To install or replace the system board in the enclosure:

Caution: Use ESD kit P/N 250-1088 (or equivalent) when installing integrated circuits, printed circuit boards, and drives in a SPARCserver 600MP. Follow the instructions printed on the ESD mat.

---

1. Carefully insert the board in the proper slot in the card cage, ensuring that the board does not slip out of the upper and lower card guides. The component side of the board must face to the right.
2. Ensure that the extraction levers are in the outward position as you slide the board toward the backplane connectors.

Caution: DO NOT FORCE any board into a slot—you may damage it. The board should insert and seat smoothly. If it binds, remove the board and inspect the card cage slot for any obvious obstruction. Also inspect both the board and the backplane for bent pins or other damage. Correct the problems before attempting to reinsert the board.

---

3. Press firmly on the board rear panel to seat the board onto the backplane connectors.

The extraction levers should swing into the locked position.

4. Use a 2.5 mm Allen wrench to replace the screws that secure the board to the card cage.
5. Reinstall all cables disconnected in Section 5.2 “Removing the System Board from the Enclosure.”
6. If the system is a 56-inch data cabinet, use a #2 Phillips screwdriver and replace the two screws that secure the vented rear panel to the enclosure. Then, go to step 7.

If the system is a 12-slot office pedestal, go to step 7.

If the system is a 5-slot office pedestal, replace the top cover:

   a. Slide the cover toward the front of the system until the tabs mate with the retaining slots at the front and rear of the system.
   b. Secure the top cover by turning the release knob clockwise one quarter turn until you hear a click. Go to step 7.

7. Move the system to its normal operation location.
8. Remove and store the wrist strap and the ESD mat.

5.7 Starting Up the System and Verifying Installation

See the following sections to power-up the system and verify installation.

600MP System

1. Set the power switch on the chassis to the ON position

Note: Once `power-on self tests` are completed and functional modules are recognized, the operating system will configure itself automatically to take advantage of all available processors.

---

2. Watch the boot information displayed on the screen to confirm that all processors are recognized. For example:

```
SPARCserver 600MP Series (4 X RT625), Keyboard Present
ROM Rev. 2.14, 512 MB memory installed, Serial #232.
Ethernet address 8:0:20:b:5f:7, Host ID: 710000e8.
SunOS Release 5.3 Version generic [UNIX(R) System V Release
4.0]
Copyright (c) 1983-1993, Sun Microsystems, Inc.
cpu = SUNW, Sun 4/600
mod0 = ROSS, RT625 (mid = 8)
mod1 = ROSS, RT625 (mid = 9)
mod2 = ROSS, RT625 (mid = 10)
mod3 = ROSS, RT625 (mid = 11)
mem = 65204K (0x3fad000)
avail mem = 63348736
Ethernet address = 8:0:20:b:5f:7
```

Note: *This screen display is an example only.* The actual message displayed on the screen will depend on the software running on the system.

The numbers in parentheses (`4 x RT625`) indicate the number of processors running (four), and the revision number of the hyperSPARC module that is installed.

The `mod0, mod1, mod2,` and `mod3` entries indicate that the system recognizes four hyperSPARC processors. `mod0` and `mod1` correspond to slot 0; `mod2` and `mod3` correspond to slot 1. If a single-CPU hyperSPARC module were installed (slot 0), the system would recognize only one processor in `mod0.` If a dual-CPU module were installed (slot 0), the system would recognize processors in `mod0` and `mod1`. If two single-CPU modules were installed (slot 0 and slot 1) the system would recognize processors in `mod0` and `mod2`.

Note: The most current revision for the boot PROMs is **2.14.3H**. However, during booting, only **2.14** is displayed on the screen. In order to verify the revision of the PROM, use the "Stop" (L1) and "A" key to enter the PROM monitor level. At the "ok" prompt, type:

`.version`

The screen will display a message similar to the following, where `Version 3H` indicates the exact revision of the PROM:

`Release 2.14 Version 3H created 95/06/01 10:37:57`

This message is an example only. The actual message displayed will depend on the PROM in the system*.

At the "ok" prompt, type

go

to return to the kernel.

* Call ROSS Technical Support at 1-800-ROSS-YES to obtain the latest PROM information.

---

3. Wait for the system to boot. When the `login:` prompt is displayed, log in and resume operations.

Appendix A.
Troubleshooting Guide (Potential Upgrade Problems)

ROSS Technical Support:
In the U.S.: 1-800-774-ROSS
International: (512) 892-7802 extension 648
Europe: +49 2401 97680

A.1 Correct Patches for Solaris 1.1 Operating System

Systems running without proper patches will be prone to erratic behavior, system hangs, and crashes. It is impossible to quantify the exact required patches for a given system because these patches are system dependent and application software dependent. **Customers should work with their software maintenance provider to ensure they are running with the latest patch base.**

Following is a partial list of required patches in Solaris 1.1.1 (SunOS 4.1.3):

Patch-ID# 101508-10
Synopsis: sun4m kernel jumbo patch*

*Please call ROSS Technical Support at 1-800-ROSS-YES before installing this patch.

Patch-ID# 101592-01
Synopsis: UFSfile system corruption and panic

Patch-ID# 101621-02
Synopsis: Jumbo tty patch

Patch-ID# 101759-01
Synopsis: Domestic libc jumbo patch

Patch-ID# 100452-01
Synopsis: XView 3.0 Jumbo patch

The latest release of Solaris 1.x is Solaris 1.1.2 (SunOS 4.1.4). This release offers full hyperSPARC support and comprehends many of the outstanding errata.

A.2 Correct Patches for Solaris 2.3 and 2.4 Operating System

The Solaris 2.3 operating system has a large number of patches that are vital to the operation of the system. Systems running without the proper patches will be prone to erratic behavior, system hangs, and crashes.

All systems should be running with the required Solaris 2.3 patches. **Customers should work with their software maintenance provider to ensure they are running with the latest patch base.**

Following is a partial list of Solaris 2.3 patches that should be installed to ensure proper performance:

Patch-ID# 101344-05
Synopsis: SunOS 5.3: Jumbo NFS patch

Patch-ID# 101347-01
Synopsis: SunOS 5.3: system hangs due to mblk memory leak

Patch-ID# 101406-01
Synopsis: SunOS 5.3: SPARCstation 10 Model 514 reliability problems

Patch-ID# 101384-01
Synopsis: SunOS 5.3: Admintool Jumbo patch

Patch-ID# 101409-03
Synopsis: SunOS 5.3: Jumbo linker patch

Patch-ID# 101318-75
Synopsis: SunOS 5.3: Jumbo patch for kernel, C2+, sx, cgfourteen, syslog, libc, lockd, tcp, ip, sockmod, timod

A.3 hyperSPARC Operating System (OS) Compatibility

In addition to OS compatibilities, we have listed the the Path ID #'s for the SunSoft Kernel Jumbo Patch. This patch is always included in the Recommended Patch List and fixes critical bugs in the kernel that can cause panics or hangs. For more information on how to obtain Sun's Recommended Patch List, refer to the "Suggestions" section below.

Operating System Release	ROSS hyperSPARC Patch Required?	SunSoft Kernel Jumbo Patch ID#
Solaris 1.1 (SunOS 4.1.3)	**yes**	**100726–18**
Solaris 1.1 (SunOS 4.1.3_U1)	**yes**	**100508*–10**
Solaris 1.1.2 (SunOS 4.1.4)	**no**	**Not released yet**
Solaris 2.3 (SunOS 5.3)	**no**	**101318–75**
Solaris 2.4 (SunOS 5.4)	**no**	**101945–36**
Solaris 2.5 (SunOS 5.5)	**no**	**Not released yet**

A.4 Operating Systems NOT Compatible with hyperSPARC:

- SunOS 4.1.2 and any previous releases
- Solaris 2.0, 2.1, and 2.2

Suggestions:

Please consult Sun's Recommended Patch List for your OS release. These patches are very important for correct operation of your system. The recommended patch list can be obtained in several ways:

1) Your local Sun Sales representative
2) The SunSolve CD distributed by Sun to customers with software maintenance contracts
3) Anonymous ftp on the Internet from the host **`sunsite.unc.edu`** in the directory **`/pub/sun-info/sun-patches`** as **`PatchReport`** or **`Recommended`**

Notes:

*101508 conflicts with the mandatory ROSS kernel patch for 4.1.3_U1. In order to remove this conflict ROSS has released a new version of the 101508 patch called 101508–10HS. This patch can be obtained from the ROSS ftp site ross.com as the file **`/pub/hypersparc-patches/101508-06HS.tar.Z.`** If you cannot access ROSS' ftp site please call 1-800-ROSS-YES and arrangements can be made to ship you the patch.

Solaris 1.1.2 (SunOS 4.1.4):

This release of the operating system is not directly bootable by the 55, 66, and 72 MHz ROSS hyperSPARCs. If you wish to install 4.1.4 on a 55, 66, or 72 MHz hyperSPARC system please obtain the file **`/pub/hypersparc-docs/414info.txt`** from the ROSS ftp site ross.com (login as **`anonymous`** and use your e-mail address as the password).

Solaris 1.1.1 (SunOS 4.1.3_U1):

The ROSS kernel patch for 4.1.3_U1 is NOT compatible with revision A of SunOS 4.1.3_U1. If you are running revision A, you must install the ROSS patch for 4.1.3 when running extract_patch. To determine which revision your machine is running, type the command **`showrev`** and look for the `Release` line. The `Release` line tells you the OS and the version (see the following information).

After typing **showrev** at the command line, information similar to the following will be displayed on your screen:

```
***************  showrev version 1.15  *****************

* Hostname: ”your machine name”
* Hostid: ”551407fa”
* Kernel Arch: ”sun4c”
* Application Arch: ”sun4”
* Kernel Revision:
  4.1.3_U1 Tue Mar 21 17:23:42 CST 1995
* Release: 4.1.3_U1

*****************************************************
```

The last line indicates that this machine is running **Revision A** of SunOS 4.1.3_U1. If the machine were running **Revision B** of SunOS 4.1.3_U1, the line would read:

```
* Release: 4.1.3_U1 Version B
```

A.5 SunOS 4.1.4 Issues

The SunOS 4.1.4 (Solaris 1.1.2) operating system is not directly bootable by hyperSPARC modules of speeds 55, 66 and 72 MHz. All hyperSPARCs of speeds 90MHz and higher will run 4.1.4 without modification. This problem pertains *only* to hyperSPARC processors of speeds 72MHz and slower. If you attempt to boot the SunOS 4.1.4 CD on 72MHz or slower hyperSPARC it will fail with the message “`Level 15 Interrupt`”.

Problem Solutions

SunOS 4.1.4 incorporates the available patches of SunOS 4.1.3_U1 and some bug fixes. If your are installing SunOS 4.1.4 there are ways to accomplish this with hyperSPARC. First, you can use either a 90MHz or faster hyperSPARC processor or any SuperSPARC to boot and install SunOS 4.1.4 on a system. Once installed you must make a modification to the kernel (`/vmunix`) to support the slower-than-90MHz hyperSPARCs. This can either be done by hand with `adb` or with the shell script `414fix` found on the ROSS anonymous ftp site in the directory **`/pub/hypersparc-docs`.** To modify it by hand invoke `adb` as root:

```
# adb -w /vmunix
```

(`adb` has no prompt. Type in the next line)

```
ross625_vac_init_asm+0x58?XXX
```

(`adb` should print the next line. If not, something is wrong!)

```
_ross625_vac_init_asm+0x58:         c0a00620  81c3e008      1000000
```

(Type the following line)

```
ross625_vac_init_asm+0x58?W 1000000 81c3e008 c0a00620
```

(`adb` will print the following three lines)

```
_ross625_vac_init_asm+0x58:         0xc0a00620    =    0x1000000
_ross625_vac_init_asm+0x5c:         0x81c3e008    =    0x81c3e008
_ross625_vac_init_asm+0x60:         0x1000000     =    0xc0a00620
```

(Exit `adb` by typing the next line)

```
$q
```

This same procedure should be repeated on the file **/sys/sun4m/OBJ/module_ross625_asm.o**. This will allow you to build future custom kernels and not have to do the above procedure on every vmunix.

 # adb –w /sys/sun4m/OBJ/module_ross625_asm.o. (same procedure as above for vmunix).

Once this is done the machine can be halted, powered off, and the slower-than-90MHz hyperSPARCs can be placed into the system and brought back up.

If you do not have one of the above mentioned processors to put in the system to do the installation then the following steps can be followed to boot and install SunOS 4.1.4 with the slower-than-90MHz hyperSPARC processors:

1) Backup the system and prepare for SunOS 4.1.4 installation in the normal way.

2) Bring the system to the standard OBP command prompt.

3) OBP prompts with "ok." Enter the following commands (not including the "**ok**"):

```
ok setenv auto–boot? false
ok reset
ok ross625
ok ibuf–off
ok boot cdrom
```

Note: Earlier boot prom revisions may not support `ibuf–off`. If this occurs please contact ROSS Technical Support. If your system is either SPARCstation 10 or SPARCstation 20, the minimum boot PROM revision supporting **ibuf–off** is 2.19.3. If your system is a SPARCserver 600MP, the minimum boot PROM revision is 2.14.3H.

4) Proceed with normal cdrom sequence to install the miniroot disk image. When this is completed, select the install command option to halt the system.

5) At the OBP "ok" prompt, enter the following commands (again not including the "**ok**"):

```
ok reset
ok ross625
ok ibuf–off
ok 1 switch–cpu
ok ibuf–off
ok 0 switch–cpu
ok boot disk:b –sw
```

Note: This last command assumes the miniroot image was installed in the standard swap device area. This is the default, but if a different option was selected, then boot the appropriate disk partition.

6) Proceed with the normal miniroot Solaris install routine. After the installation is complete, halt the system.

7) At the OBP "ok" prompt, enter the following (again not including the "**ok**"):

```
ok reset
ok ross625
ok ibuf–off
ok 1 switch–cpu
ok ibuf–off
ok 0 switch–cpu
ok boot vmunix
```

This will boot vmunix from the default disk partition. If a different install option was specified, boot the appropriate disk partition.

8) Once the `/vmunix` kernel has successfully booted, several kernel mod ules need to be patched. This must be done as superuser. Enter the following commands (not including the "#" prompt):

```
# adb –w /vmunix
```

(`adb` has no prompt. Type in the next line)

```
ross625_vac_init_asm+0x58?XXX
```

(`adb` should print the next line. If not, something is wrong!)

```
_ross625_vac_init_asm+0x58:     c0a00620        81c3e008        1000000
```

(Type the following line)

```
ross625_vac_init_asm+0x58?W 1000000 81c3e008 c0a00620
```

(`adb` will print the following three lines)

```
_ross625_vac_init_asm+0x58:         0xc0a00620   =   0x1000000
_ross625_vac_init_asm+0x5c:         0x81c3e008   =   0x81c3e008
_ross625_vac_init_asm+0x60:         0x1000000    =   0xc0a00620
```

(Exit `adb` by typing the next line)

```
$q
```

9) Once everything appears to be functioning correctly, reset the `auto–boot?` environment variable:

```
setenv auto–boot? true
```

For further information or assistance ROSS Technical Support can be contacted either by calling 1-800-ROSS-YES or by e-mail at techsupport@ross.com.

A.6 Peripheral Problems

1.) Solaris 2.3 Performance

Systems: SPARCserver 600MP & SPARCstation 10

Description: ROSS has uncovered several performance related errata in Solaris 2.3. Customers may see lower than expected performance with Solaris 2.3 while running certain applications.

Corrective Action: Get Sun patch id #101318–74 and install on your Solaris 2.3 system.

2.) Bad Disks and Memory

Systems: SPARCserver 600MP only

Description: After installing hyperSPARC upgrades some customers have reported disk and memory system problems which were not noticed in the system prior to the upgrade. Because hyperSPARC's performance is as much as 4 times greater than the original configuration, memory and I/O subsystems are exercised up to four times harder which may accelerate latent marginal quality and reliability problems in those subsystems.

Some customers have had to replace defective or old revisions of memory SIMMs, IPI drives, IPI drive controllers, IPI drive cables, mother boards, and other hardware. Customers should contact their maintenance provider to obtain latest revision hardware.

Corrective Action: Make sure your SPARCserver 600MP system has up-to-date system components (i.e., the latest revision). Below are two system component revisions as of 5-26-94.

SPARCserver 600 mother board: 501 2055 – 04

SPARCserver expansion memory board: 501 1901

3.) SPARCserver 600MP Sun Expansion Memory

Systems: SPARCserver 600MP only

Description: This problem has been encountered with SPARCserver 600MP systems with either 1 or 2 Sun Expansion Memory boards installed. (Our customers have reported that this problem also occurs, with any MBus module, including the original ROSS 605 module and the TI SuperSPARC module.) Sun is aware of this problem and is working to resolve it. The symptom of the problem is an abnormally high level of Uncorrectable Memory Errors (more than 1 per day) with memory SIMMs known to be good. Customers should contact their SunService representative and report the problem.

Corrective Action: Make sure the memory card is the latest revision and make sure all the memory on the expansion board are of the same speed grade. If the problem persists please call our Technical Support Hot line at 1-800-ROSS-937 to discuss possible solutions.

4.) Non-Functional DataRam Expansion Memory

Systems:SPARCserver 600MP

Description: This problem has been encountered with SPARCserver 600 MP systems with either 1 or 2 DataRam Expansion Memory boards installed. With this configuration, the system will not boot the operating system.

Corrective Action: Customers should remove the Dataram expansion memory and reboot the system. Dataram is aware of their problem and is working on a solution. Customers should contact Dataram technical support at 1-800-822-0071 to obtain a status update.

5.) Old revision Sun ZX device driver

Systems: SPARCstation 10

Description: The Sun ZX graphics card has a bug in the device driver which prevents it from working with virtual cache CPU modules like hyperSPARC.

Corrective Action: Get Sun patch id #101284–06 and install on your Solaris 2.3 system.

6.) Mentor Falcon Framework (4.1.3 only)

Systems: SPARCserver 600MP & SPARCstation 10

Description: Various applications under the Falcon Framework dump core when invoked. Falcon Framework for SunOS 4.1.3 does not conform to the SPARC version 8 specification because it does not use the IFLUSH instruction within its self-modifying code.

Corrective Action: Mentor has created a patch for SPARCstation 10, SPARCstation 20 and ROSS hyperSPARC-equipped systems to correct this problem. Contact Mentor Technical Support at 1-800-547-4303 and ask for MGC patch number 89.

Customers should contact the ROSS Technical Support line at 1-800-ROSS-YES to obtain the latest revision.

Appendix B.
Miscellaneous Technical Information

B.1 How to Identify the CPU(s) Already Installed in Your Machine:

At the OBP "ok" prompt, enter the following:

`module-info`

A message similar to the following is returned:

```
MBus: 40 MHz
SBus: 20 MHz
CPU # 0: 125 MHz  RT620 / RT625
CPU # 1: 125 MHz  RT620 / RT625
CPU # 2: 125 MHz  RT620 / RT625
CPU # 3: 125 MHz  RT620 / RT625
```

This returned message is an example only. It corresponds to a quad-processor configuration running at a CPU speed of 125 MHz. The actual message you receive depends on the CPU(s) that your system is running.

Note: Boot PROM revisions 2.22.1H (SPARCstation 10, 20), 2.14.3H (SPARCserver 600) and later will also display information regarding the external cache size of the CPU.

B.2 Current Boot PROM Revision Levels for Sun SPARCstation 10, 20, and SPARCserver 600MP Machines*

SPARCstation 10:	**2.22.1H**
SPARCstation 20:	**2.22.1H**
SPARCstation 600MP:	**2.14.3H**

*Call ROSS Technical Support at 1-800-ROSS-YES for the most up-to-date boot PROM revision.

B.3 Recommended Kernel Jumbo Patches:

OS Release:	**Sun Patch ID# for the Kernel Jumbo Patch**
Solaris 2.3	101318
Solaris 2.4	101945

Contact your normal software maintenance provider for the most up-to-date patch revision.

B.4 Identifying the CPU Configuration of hyperSPARC Modules

By reading the serial number located on the MBus connector of the hyperSPARC module, you can determine the number of CPUs it contains (see the following figure). The fourth through seventh numbers listed indicate the CPU configuration of the module:

6224 or **6324** indicates a single-CPU hyperSPARC module.
6226 or **6326** indicates a dual-CPU hyperSPARC module.

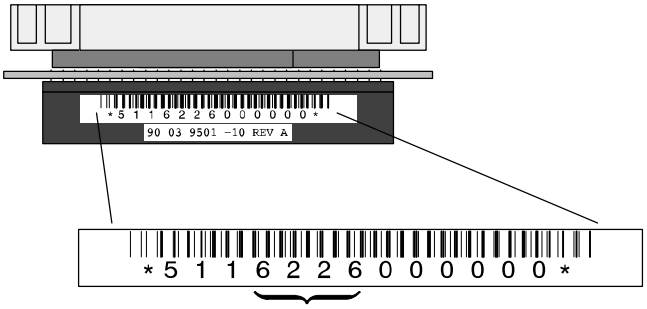


Figure B-1. Reading the Serial # to Identify the Number of CPUs on a hyperSPARC Module

B.5 Identifying the Speed of a hyperSPARC Module

The first two digits on the label located below the serial number on the MBus connector indicate the speed of the hyperSPARC module:

150 indicates a 150 MHz module
133 indicates a 133 MHz module
125 indicates a 125 MHz module
110 indicates a 110 MHz module
100 indicates a 100 MHz module
90 indicates a 90 MHz module
72 indicates a 72 MHz module
66 indicates a 66 MHz module
55 indicates a 55 MHz module

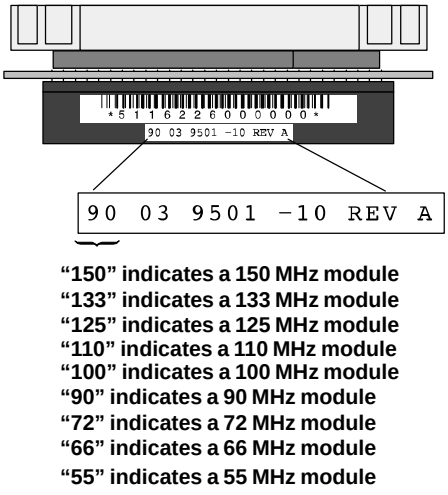


Figure B-2. Identifying the CPU Speed of a hyperSPARC Module

Appendix C.
Warranty and RMA Information

C.1 ROSS Technology Limited Warranty

1. Extent of Limited Warranty

a.) ROSS Technology warrants to the end-user customer that ROSS products will be free from defects in materials and workmanship, for (2) two years after the date of purchase by the customer. Conditions and limitations include:

i.) For software products, the warranty applies only to the media upon which the product is recorded; and

ii.) ROSS does not warrant the operation of any product to be uninterrupted or error free.

b.) ROSS' limited warranty covers only those defects which arise as a result of normal use of the product and do not apply to any:

i.) Software or interfacing not provided by ROSS;

ii.) Unauthorized modification or misuse.

c.) If ROSS receives, during the warranty period, notice of a defect in a hardware product which is covered by ROSS' warranty, ROSS shall either repair or replace the product, at its option within two working days to the customer's site but ROSS, in no way, guarantees that the replacement product will arrive within the specified two-day period. Any replacement product may either be new or like new, provided that it has functionality at least equal to that of the product being replaced.

d.) On-site warranty and return to ROSS warranty services are available from any authorized ROSS service facility worldwide. No product will be accepted by ROSS without the appropriate Return Merchandise Authorization documentation.

e.) This Limited Warranty Statement gives the customer specific legal rights. The customer may also have other rights which vary from state to state in the United States, from province to province in Canada and from country to country elsewhere in the world.

2. Limitations of Warranty

a.) NEITHER ROSS NOR ANY OF ITS THIRD PARTY SUPPLIERS MAKES ANY OTHER WARRANTY OF ANY KIND, WHETHER EXPRESS OR IMPLIED, WITH RESPECT TO ROSS PRODUCTS. ROSS AND ITS THIRD PARTY SUPPLIERS SPECIFICALLY DISCLAIM THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

b.) To the extent that this Limited Warranty Statement is inconsistent with the law of locality where the customer uses the ROSS product, this Limited Warranty Statement shall be deemed modified to be consistent with such local law. Under such local law, certain limitations to this Limited Warranty Statement may not apply to the customer.

c.) To the extent allowed by local law, the remedies provided in this Warranty Statement are the customers sole and exclusive remedies.

3. Limitations of Liability

a.) EXCEPT FOR THE OBLIGATIONS SPECIFICALLY SET FORTH IN THIS WARRANTY STATEMENT, IN NO EVENT SHALL ROSS BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY AND WHETHER ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

C.2 Returned Merchandise Authorization (RMA) Information

Your satisfaction is important to us, especially after the sale. This information is provided to ensure efficient and prompt procedures should you suspect problems with your ROSS product.

If you experience a system problem that you believe is related to your hyperSPARC module(s), please call 1-800-ROSS-YES for technical service. Our engineers are trained to handle system problems and in many cases solve problems directly over the phone. It is very important that all suspected hyperSPARC module failures go through our technical support department.

If ROSS' technical support staff determines CPU replacement should be pursued, please follow these steps in order to make your return process smooth.

Contact ROSS at 512-892-7802 extension 556 to request a return form. This form will be faxed to you by the end of the next working day. Fill out the form as completely as possible and fax it to 512-892-2471; Attention: **RMA Coordinator**. For failure analysis, it is very important that you describe the demonstrated failure mode as completely as possible. We will fax the form back within 2 working days with an RMA number.

Return the form with the product in the original box.

Once approved, all product must be returned to the following address:

ROSS Technology, Inc.
4007 Commercial Center Drive
Attn: Receiving Department
Austin, Texas 78744

No product will be received at ROSS without the proper authorization per the procedure as outlined above. If you have any questions, please feel free to contact our RMA Manager at 512-892-7802 extension 556.

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