# Sun™ Flash PROM Guide for Workstations and Workgroup Servers—Standalone Version

*for Sun Ultra™ 1, Ultra 2, Ultra 5, Ultra 10, Ultra 30, Ultra 60, Ultra 80, Sun Enterprise™ 220R, Sun Enterprise 250, Sun Enterprise 420R, and Ultra Enterprise™ 450 Systems*


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CHAPTER 1

# Changing Flash PROM Jumpers

## Introduction

Sun™ Ultra™, Sun Enterprise™, and Ultra Enterprise™ systems that conform to the Sun4u architecture use flash programmable read-only memory (PROM). Flash PROMs enable you to:

- Reprogram specific code blocks
- Remotely reprogram the PROM chip over a local area network (LAN)

This document accompanies the standalone CD-ROM containing the new firmware code for updating your system's flash PROM. This document is intended for:

- Network administrators
- System administrators
- Network and system service providers
- Advanced system users

This chapter describes the procedure for manually changing flash PROM jumper settings (or front-panel keyswitch settings) in your system.

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**Note –** The procedures in this document apply to the standalone flash PROM utility. These procedures do not apply to the flash PROM utility that is bundled with the Solaris™ operating environment.

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# Changing Flash PROM Jumpers

The motherboards in Ultra, Sun Enterprise, and Ultra Enterprise systems are equipped with flash PROM jumpers. These jumpers enable you to:

- Select or deselect the flash PROM
- Enable or disable updating of the flash PROM
- Select the location of the flash PROM code for system booting

## Changing Jumper or Keyswitch Settings

Before updating the flash PROM, use this procedure to change the write-protect/ write-enable jumper or keyswitch setting.

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**Note –** Most Sun systems are shipped from the factory with the flash PROM write-protect/enable jumper set to write-protect*.

* The Sun Enterprise 250 and Ultra Enterprise 450 are shipped with the write-protect/enable jumper set to write-enable, but use a front-panel keyswitch to disable or enable write protection. See the note about jumper J2704 on page 1-9 for the Sun Enterprise 250 or jumper J3103 on page 1-10 for the Ultra Enterprise 450.

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1. **Halt the system by typing** `init 0` **at the superuser prompt.**
2. **Power off the system.**

---

**Caution –** Use proper grounding procedures, such as wearing an antistatic wrist strap to avoid electrostatically damaging system components.

---

3. **Remove the system cover (for Sun Enterprise 250 and Ultra Enterprise 450 systems, do not remove the cover—see note below).**

---

**Note –** If your system is a Sun Enterprise 250 or an Ultra Enterprise 450, do not remove the system cover. The default position for the write-protect/enable jumper on the motherboard is write-enable. Therefore, unless you have reset the jumper at an earlier time, it is not necessary to remove the system cover before updating the flash PROM. Instead, set the front-panel keyswitch to Power-on ( **|** ) and continue with the procedure in Chapter 2.

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4. **Locate the flash PROM jumpers on the motherboard in your system:**
   - For a Sun Ultra 1 or Ultra 1 Creator system, see FIGURE 1-1 on page 1-4.
   - For a Sun Ultra 2 system, see FIGURE 1-2 on page 1-4.
   - For a Sun Ultra 5 or Ultra 10 system, see FIGURE 1-3 on page 1-5.
   - For a Sun Ultra 30 system, see FIGURE 1-4 on page 1-5.
   - For a Sun Ultra 60 system, see FIGURE 1-5 on page 1-6.
   - For a Sun Ultra 80 system, see FIGURE 1-6 on page 1-6.
   - For a Sun Enterprise 220R system, see FIGURE 1-5 on page 1-6.
   - For a Sun Enterprise 250 system, see FIGURE 1-7 on page 1-7.
   - For a Sun Enterprise 420R system, see FIGURE 1-6 on page 1-6.
   - For an Ultra Enterprise 450 system, see FIGURE 1-8 on page 1-7.

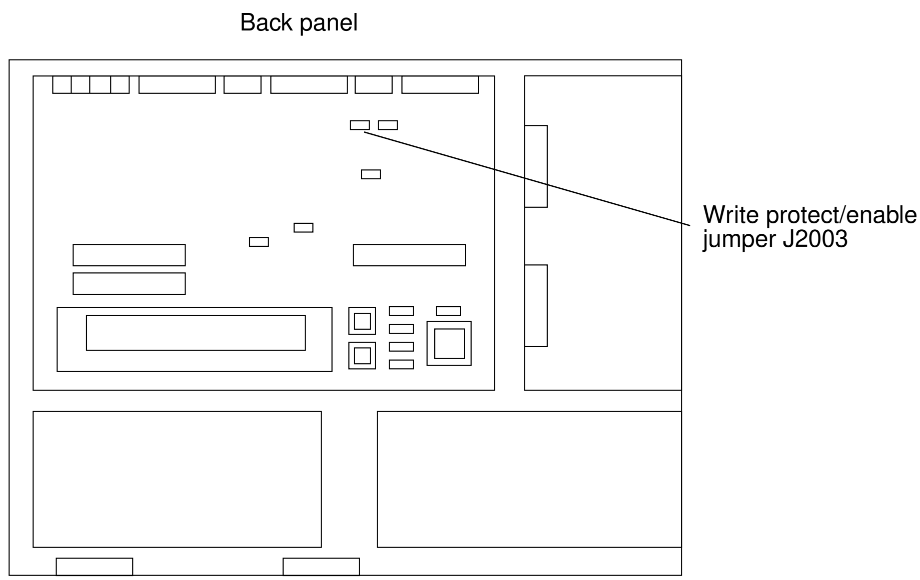


**FIGURE 1-1** Sun Ultra 1/Ultra 1 Creator Flash PROM Jumper Location on Motherboard

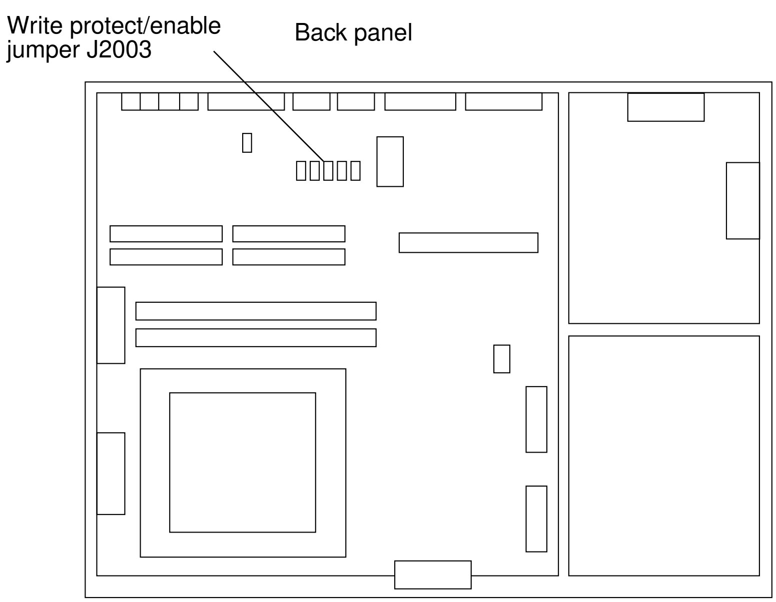


**FIGURE 1-2** Sun Ultra 2 Flash PROM Jumper Location on Motherboard

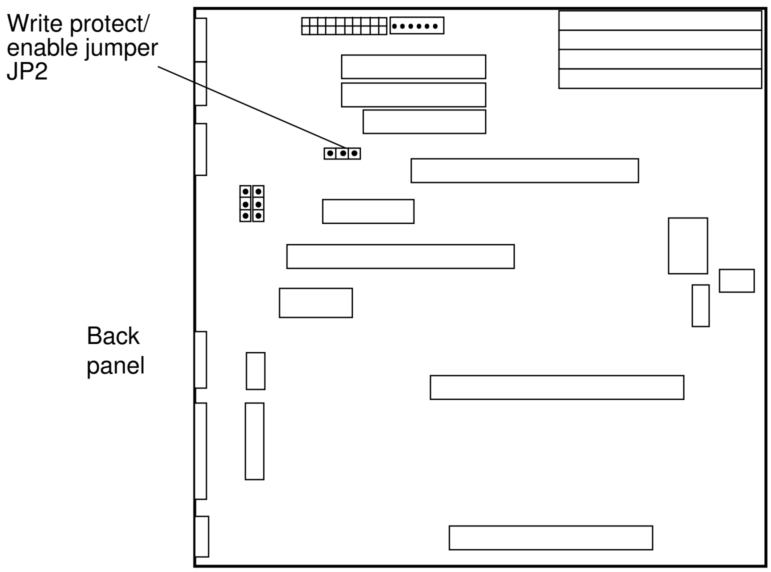


**FIGURE 1-3** Sun Ultra 5/Ultra 10 Flash PROM Jumper Location on Motherboard

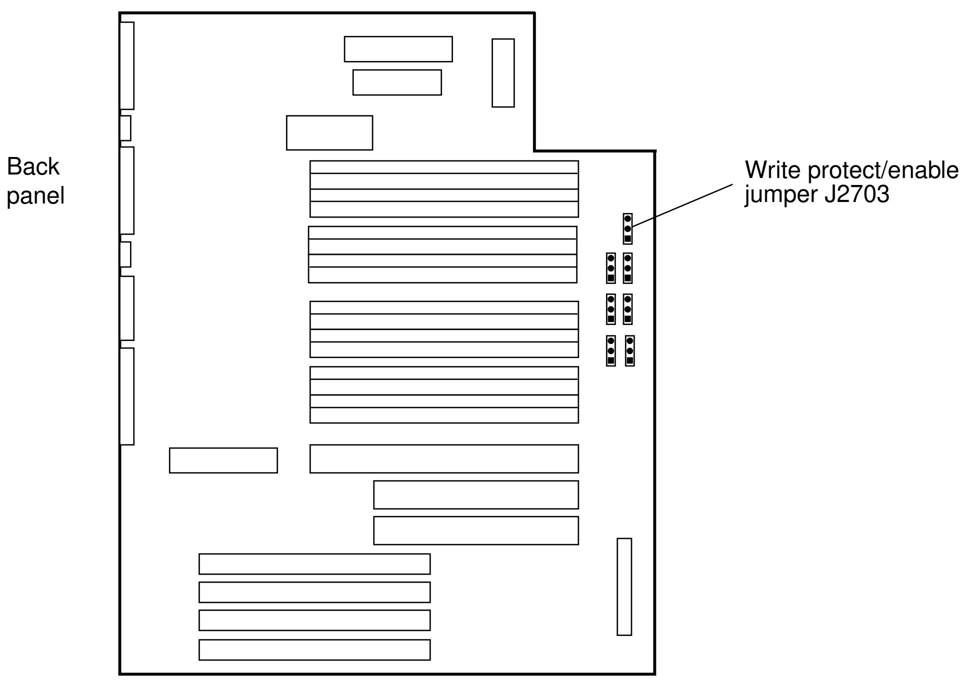


**FIGURE 1-4** Sun Ultra 30 Flash PROM Jumper Location on Motherboard

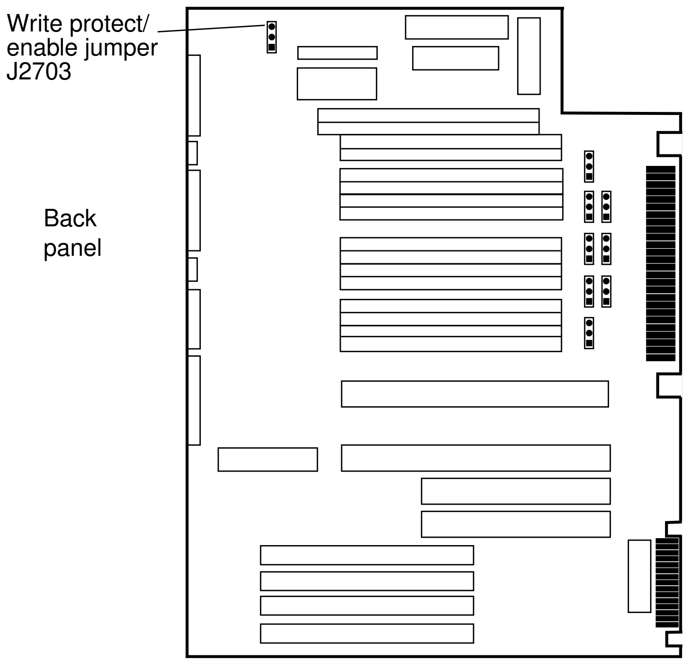


**FIGURE 1-5** Sun Ultra 60/Enterprise 220R Flash PROM Jumper Location on Motherboard

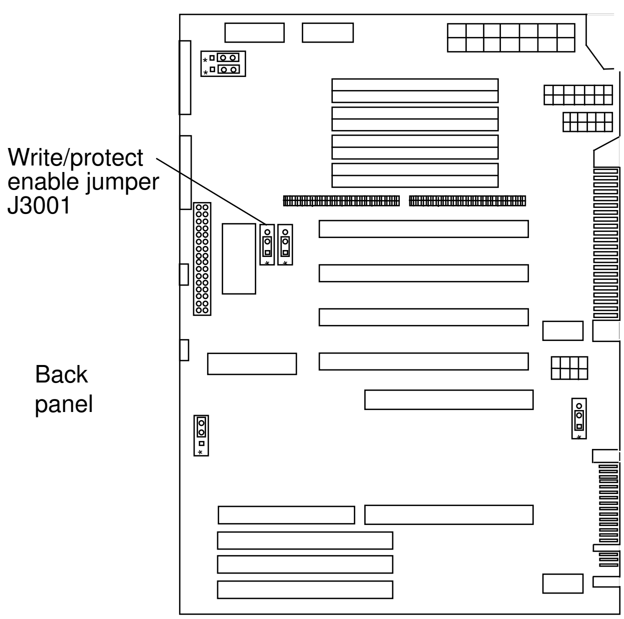


**FIGURE 1-6** Sun Ultra 80/Enterprise 420R Flash PROM Jumper Location on Motherboard

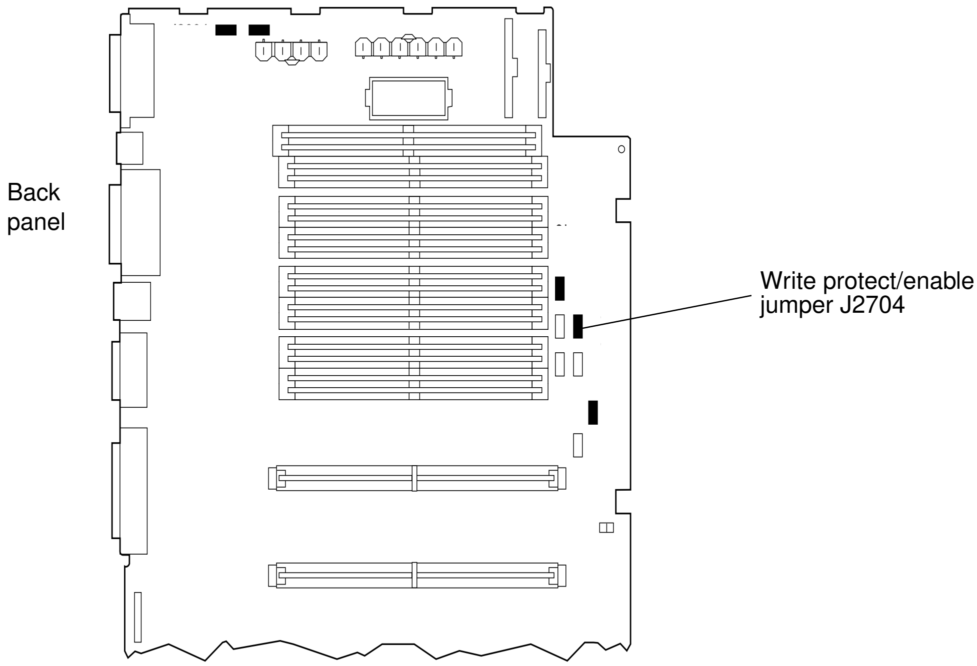


**FIGURE 1-7** Sun Enterprise 250 Flash PROM Jumper Location on Motherboard

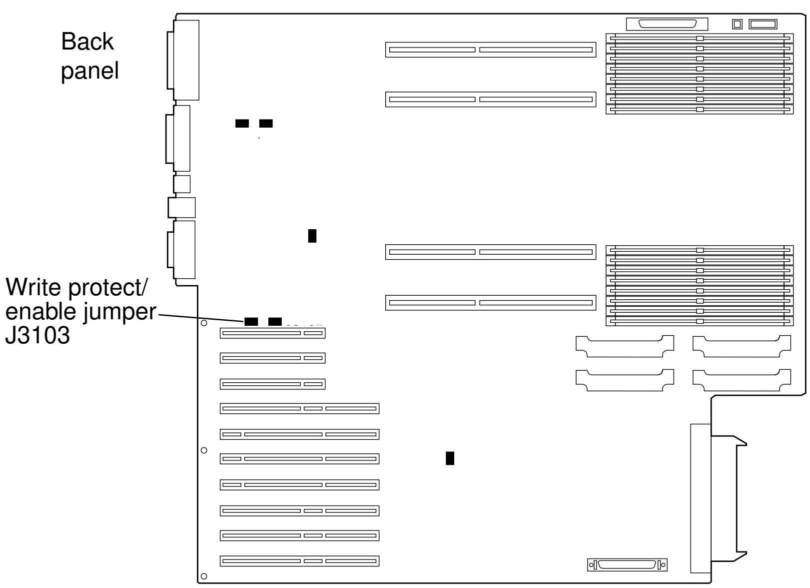


**FIGURE 1-8** Ultra Enterprise 450 Flash PROM Jumper Location on Motherboard

5. **Compare your system's existing jumper settings with the settings and functions described in** TABLE 1-1 **through** TABLE 1-6**.**

**TABLE 1-1** Flash PROM Jumper Settings for Ultra 1, Ultra 1 Creator, and Ultra 2 Systems

| Jumper | Name | Pins 1 + 2 Select | Pins 2 + 3 Select | Default Jumper on Pins |
|---|---|---|---|---|
| J2003 | Write-protect/ enable | Write-protect | Write-enable | 1 + 2 |
| J2204 | Boot control | High-half booting | Normal booting | 2 + 3 (see note below) |

---

**Note –** *Do not* change the position of jumper J2204 unless directed to do so by the instructions in Appendix A. The position of jumper J2204 does not need to be changed unless the programming sequence is interrupted.

---

**TABLE 1-2** Flash PROM Jumper Settings for Ultra 5 and Ultra 10 Systems

| Jumper | Name | Pins 1 + 2 Select | Pins 2 + 3 Select | Default Jumper on Pins |
|---|---|---|---|---|
| JP2 | Write-protect/ enable | Write-protect | Write-enable | 1 + 2 |

**TABLE 1-3** Flash PROM Jumper Settings for Ultra 30 and Ultra 60/Enterprise 220R Systems

| Jumper | Name | Pins 1 + 2 Select | Pins 2 + 3 Select | Default Jumper on Pins |
|---|---|---|---|---|
| J2703 | Write-protect/ enable | Write-protect | Write-enable | 1 + 2 |
| J2804 | Boot control | High- half booting | Normal booting | 2 + 3 (see note below) |

---

**Note –** *Do not* change the position of jumper J2804 unless directed to do so by the instructions in Appendix A. The position of jumper J2804 does not need to be changed unless the programming sequence is interrupted.

---

**TABLE 1-4** Flash PROM Jumper Settings for Ultra 80/Enterprise 420R Systems

| Jumper | Name | Pins 1 + 2 Select | Pins 2 + 3 Select | Default Jumper on Pins |
|---|---|---|---|---|
| J3001 | Write-protect/ enable | Write-protect | Write-enable | 1 + 2 |
| J3102 | Boot control | High-half booting | Normal booting | 2 + 3 (see note below) |

---

**Note –** *Do not* change the position of jumper J3102 unless directed to do so by the instructions in Appendix A. The position of jumper J3102 does not need to be changed unless the programming sequence is interrupted.

---

**TABLE 1-5** Flash PROM Jumper Settings for Enterprise 250 Systems

| Jumper | Name | Pins 1 + 2 Select | Pins 2 + 3 Select | Default Jumper on Pins |
|---|---|---|---|---|
| J2704 | Write-protect/ enable | Write-protect | Write-enable | 2 + 3 (see note* below) |
| J2804 | Boot control | High-half booting | Normal booting | 2 + 3 (see note** below) |

---

**Note –** *Jumper J2704 is factory-set so that the flash PROM is write-enabled. You use the keyswitch located on the front panel to write-protect the flash PROM. When the switch is set to the Locked position ( ), the flash PROM is write-protected. When the switch is set to the Power-on position ( | ) or to the Diagnostics position ( ), the flash PROM is write-enabled.

---

**Note –** *******Do not* change the position of jumper J2804 unless directed to do so by the instructions in Appendix A. The position of jumper J2804 does not need to be changed unless the programming sequence is interrupted.

---

**TABLE 1-6** Flash PROM Jumper Settings for Ultra Enterprise 450 Systems

| Jumper | Name | Pins 1 + 2 Select | Pins 2 + 3 Select | Default Jumper on Pins |
|---|---|---|---|---|
| J3103 | Write-protect/ enable | Write-protect | Write-enable | 2 + 3 (see note* below) |
| J5501 | Boot control | High-half booting | Normal booting | 2 + 3 (see note** below) |

---

**Note –** *Jumper J3103 is factory-set so that the flash PROM is write-enabled. You use the keyswitch located on the front panel to write-protect the flash PROM. When the switch is set to the Locked position ( ), the flash PROM is write-protected. When the switch is set to the Power-on position ( | ) or to the Diagnostics position ( ), the flash PROM is write-enabled.

---

---

**Note –** ***Do not* change the position of jumper J5501 unless directed to do so by the instructions in Appendix A. The position of jumper J5501 does not need to be changed unless the programming sequence is interrupted.

---

6. **If an installed plug-in card in your system covers the flash PROM jumpers, remove the card from the system before changing the desired jumper.**

   Refer to your product's service or reference manual for instructions.

7. **Use a pair of small needlenose pliers to move the jumper to the desired pins.**

   For products covered in this guide, you set the write-protect/enable jumper to write-enable by moving the jumper to pins 2 and 3 (see FIGURE 1-9).

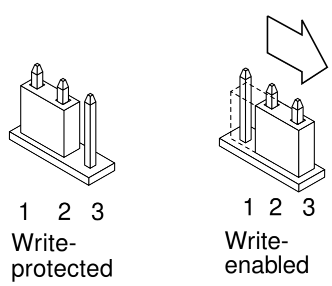


**FIGURE 1-9** Setting the Write-Protect/Enable Jumper to the Write-Enable Position

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**Note –** When you are finished updating your flash PROM, return the flash PROM write-protect/enable jumper to the write-protect position to ensure system security. (If your system is a Sun Enterprise 250 or Ultra Enterprise 450, do not change the jumper; instead, return the front-panel keyswitch to the Locked position ( 🔒 ).)

---

8. **If you removed a plug-in card from the system before changing the jumper, replace the card now.**

   Refer to your product's service or reference manual for instructions.

9. **Remove your wrist strap and replace the system access cover.**

CHAPTER 2

# Updating the Flash PROM Using Utility Version 2.0 or Later

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**Note –** If you are using a version of the Flash Update utility earlier than version 2.0, you must use the instructions in Appendix B “Updating the Flash PROM Using Utility Versions Earlier Than 2.0."

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**Note –** Before you can update your system’s flash PROM, you must set the appropriate jumper (or front-panel keyswitch) to disable write-protection. Refer to "Changing Flash PROM Jumpers" on page 1-2.

---

## Updating the Flash PROM

1. **Power on the system.**

   The banner screen is displayed, and the system might attempt to autoboot, depending on how the system’s non-volatile RAM (NVRAM) configuration variables are set.

   The banner screen identifies the system type, the amount of memory installed, the `hostid`, and the Ethernet address. Note that the information displayed is different for every system.

   *YourSunSystem*, Keyboard Present
   OpenBoot 3.0, 32 MB memory installed, Serial #54528.
   Ethernet address 8:0:20:1a:b3:c8, Host ID: 7200d500.

2. **Press Stop-A (or press the Break key if running from a terminal connected to a serial port) to abort the autoboot sequence.**
3. **Insert the flash PROM CD into the CD-ROM drive.**
4. **At the** `ok` **prompt, type** `boot cdrom` **to start the flash PROM update utility.**

```
Type help for more information
ok boot cdrom

Rebooting with command:
boot /sbus@1f,0/espdma@e,8400000/esp@e,8800000/sd@6,0:f
flash/SUNW,XXX-XXXX-latest
```

---

**Note –** The boot path shown in the example above will vary depending on your system and its hardware configuration.

---

A hard drive or network are also possible sources of booting, depending on your system configuration. See "Booting the Utility From the Server" on page 3-4 for more information.

The initial utility banner screen is then displayed.

```
Standalone Flash PROM Update Utility, Rev. 2.x
                      Ultra(tm) 1
                      Ultra(tm) 2
                      Ultra(tm) 5/10
                      Ultra(tm) 30
                      Ultra(tm) 60 / E220R
                      Ultra(tm) 80 / E420R
                      Ultra(tm) Enterprise(tm) 250
                      Ultra(tm) Enterprise(tm) 450

This utility allows you to interactively update the firmware
revisions in specific system Flash PROM components.

Type h for help, q to quit, Return or Enter to continue:
```

5. **Type** `h` **to view the help screen or Enter to continue.**

   If you view the help screen, the following information is displayed:

```
If the update completes normally then most customized values
contained in the NVRAM will be retained. The following parameters
are the exceptions;
* If you are using the PROM-level security feature, you *MUST*
re-enter the 'security-password' value after the update but
before turning the security feature back on! (Use the PROM's
'password' command.)
* 'use-nvramrc?' will always be set to 'false' (which is the
default value).

If for some reason the utility is unable to retain a customized
value other than those mentioned above, then a detailed message
will be printed during the update, indicating the parameter name
and its post-update value. If the update process is interrupted
then it is possible that one or more of the customized values may
be lost. For this reason it is recommended that you make a paper
copy of any customized NVRAM values. You may 'quit' out of the
program now if you need to create the list. (Use the 'printenv'
command at the PROM's ok prompt to list all parameters.)

WARNING: If the contents of the system's CPU Flash PROM(s) have
been previously modified by methods other than the flash update
utilities released by Sun, then running this utility may render
the system useless!

Type h for help, q to quit, Return or Enter to continue:
```

6. **If you viewed this help screen, press Return or Enter to continue.**

```
Every precaution should be taken to prevent the loss of system
power during the Flash PROM programming process!

Type h for help, q to quit, Return or Enter to continue:
```

7. **Type** `h` **for further information or Enter to continue.**

   If you view the help screen, the following information is displayed:

```
WARNING: If power is interrupted when the Flash PROM is being
reprogrammed, you MAY have to change a hardware jumper on the
system board if the system does not boot. If this program is
interrupted before it completes, you MUST reboot this program to
allow it to complete its reprogramming of the Flash PROM - even
if the system appears to function properly.

Type h for help, q to quit, Return or Enter to continue:
```

8. **If you viewed the help screen, press Return or Enter to continue.**

   The firmware selection menu is displayed, as shown in the example below. The menu lists the OBP and POST revisions currently existing in your system and the revisions available on the CD.

```
      Firmware Release(s)                 Firmware Release(s)
Currently Existing in the System      Available for Installation  /  Install?
-------------------------------- ---------------------------------------------
OBP 3.11.6 1997/12/08 10:42      OBP 3.17.1 1998/11/10 19:10           no
POST 2.2.8 1997/12/09 15:56      POST 2.3.1 1998/08/07 16:33           no

Type sa if you wish to select all available firmware releases for
installation. Type h for help, quit to exit, or cont to continue:
```

9. **Type** `h` **for further information before making a selection.**

   If you view the help screen, the following information is displayed:

```
Usage: < ActionCode DeviceCode(s) | ServiceCode >

ActionCodes:  s = select; d = deselect
DeviceCodes:  o = OpenBoot (OBP); p = POST; a = all
ServiceCodes: quit = Exit the program.
              cont = Continue with the program after making selections.

Type the letter h for help.
Command:
```

10. **Read dates and version numbers in the firmware selection screen, then take one of the actions described below:**
    - If the revisions and date codes of OBP and/or POST shown in the `Available for Installation` column are later than those shown in the `Currently Existing in the System` column, you must update OBP and/or POST to the latest releases available. **Go to Step 11.**
    - If the revisions and date codes of OBP and/or POST shown in the `Available for Installation` column are the same or earlier than those shown in the `Currently Existing in the System` column, no firmware update is required. **Type** `quit` **to exit the Flash PROM utility, then go to Step 15.**
11. **Type the appropriate code for your update.**
    - To update OBP and POST, type **`sa`** (select all).
    - To update OBP only, type **`so`** (select OpenBoot).
    - To update POST only, type **`sp`** (select POST).

    The firmware selection menu is then displayed with `YES` in the `Install?` column for each item that you selected for updating. The example below shows the selection screen after both OBP and POST have been selected for update.

```
      Firmware Release(s)                  Firmware Release(s)
Currently Existing in the System      Available for Installation  /  Install?
-------------------------------- -------------------------------------------
OBP 3.11.6 1997/12/08 10:42      OBP 3.17.1 1998/11/10 19:10          YES
POST 2.2.8 1997/12/09 15:56      POST 2.3.1 1998/08/07 16:33          YES

Type sa if you wish to select all available firmware releases for
installation.  Type h for help, quit to exit, or cont to continue:
```

12. **At the command prompt, type** `cont` **to continue the utility.**

    An information screen is displayed.

```
The Flash programming process is about to begin.

Type h for help, q to quit, Return or Enter to continue:
```

**13. Type** `h` **for more information or Enter to continue.**

If you view the help screen, the following information is displayed:

```
This program will issue a reset command after the Flash PROM has
been successfully reprogrammed. If an error occurs during
programming then an error message will be printed and the program
will exit without issuing the reset command.

WARNING: If power is interrupted when the Flash PROM is being
reprogrammed, you MAY have to change a hardware jumper on the
system board if the system does not boot. If this program is
interrupted before it completes, you MUST reboot this program to
allow it to complete its reprogramming of the Flash PROM - even
if the system appears to function properly.

Refer to the following document for a complete set of
instructions; "Sun(tm) Flash PROM Guide for Workstations and
Workgroup Servers - Standalone Version"

The Flash programming process is about to begin.

Type h for help, q to quit, Return or Enter to continue:
```

**14. If you viewed this help screen, press Return or Enter to continue.**

As the utility updates the flash PROM firmware, progress information is displayed on the screen, as in the following example:

```
Erasing the top half of the Flash PROM.
Programming OBP into the top half of the Flash PROM.
Verifying OBP in the top half of the Flash PROM.

Erasing the bottom half of the Flash PROM.
Programming OBP into the bottom half of Flash PROM.
Verifying OBP in the bottom half of the Flash PROM.

Erasing the top half of the Flash PROM.
Programming POST into the top half of Flash PROM.
Verifying POST in the top half of the Flash PROM.

Programming was successful.

Resetting...

Restoring previous NVRAM environment settings...
#power-cycles =       10
auto-boot? =          false
security-#badlogins =  0
keymap =              <custom keymap>
OK
Resetting...
```

**Note –** The text in the above example from `Restoring previous NVRAM environment settings` through `Resetting` at the end of the example appears only if you are running the utility from a serial port A connection (e.g., a TIP or telnet connection); the text does not appear if you are running the utility from a standard console interface.
The NVRAM variables listed in the `Restoring previous NVRAM environment settings` section above are examples; you may see a different set of variables listed, depending on what has been customized in your system.

If there were no errors during the update, the system resets. If there were errors (for example, if any of the PROM's security features were enabled), the system does not reset and an error message is displayed. See "Error Messages" on page 2-8.

**Note –** The NVRAM configuration variable, `use-nvramrc?`, might be modified to its default value (`False`) during the update process.

**Note –** If power to your site is interrupted during flash PROM updating, see Appendix A for system recovery instructions.

15. **After successful updating, return the flash PROM write-protect/enable jumper to the write-protect position to ensure system security (see Chapter 1).**
    **If your system is a Sun Enterprise 250 or Ultra Enterprise 450, do not change the jumper; instead, return the front-panel keyswitch to the Locked position ( ).**

# Error Messages

If the flash PROM is write-protected or if the NVRAM configuration variable `security-mode` is enabled and an attempt is made to update the flash PROM, one of the following error messages is displayed.

## Example 1—Write-Protect/Enable Jumper Message on System With No Front-Panel Keyswitch

The following is an example of an error message received when the utility is loaded on a system that has no front-panel keyswitch when the motherboard write-protect/enable jumper has not been set to write-enable.

```
Could not communicate with the Flash PROM on the system board.

It is possible that the part is defective, or that the Flash PROM
is write protected via the hardware 'Write Protect/Enable' jumper.
Check the setting of the CPU board jumper <Jxxxx>.

Program terminated
ok
```

---

**Note –** The jumper number shown in the above example (<*Jxxxx*>) will change, depending on your hardware platform. See "Changing Flash PROM Jumpers" on page 1-2 for instructions on setting jumpers.

---

## Example 2—Write-Protect/Enable Jumper Message on System With Front-Panel Keyswitch

The following is an example of an error message received when the utility is loaded on a system with a front-panel keyswitch (Sun Enterprise 250 or Ultra Enterprise 450), when the keyswitch has not been set to write-enable.

```
Could not communicate with the Flash PROM on the system board.

It is possible that the part is defective, or that the Flash PROM
is write protected via the hardware 'Write Protect/Enable' jumper.
Verify that the front panel keyswitch is not in a secure position,
and if necessary, check the setting of the CPU board jumper <Jxxxx>.

Program terminated
ok
```

---

**Note –** The jumper number shown in the above example (<*Jxxxx*>) will change, depending on your hardware platform. See "Changing Flash PROM Jumpers" on page 1-2 for instructions on setting jumpers or keyswitches.

---

## Example 3—NVRAM Configuration Variable

The following is an example of an error message received when the utility is loaded but system security is set via the `security-mode` NVRAM configuration variable.

```
**ERROR: System security is set:
System firmware was not modified.
```

## Example 4—Flash PROM Sectors Protected

The following is an example of an error message received when the utility is loaded on a system for which flash PROM sectors were programmed as "protected" at the factory. For example, if one or more sectors are programmed as write-protected at a vendor site (prior to having the flash PROM soldered to the system board), then the utility will not be able to update the flash PROM, even if the write-protect/enable jumper is set to enable.

```
The FLASH PROM device in this system cannot be reprogrammed.
You need to contact your service provider for information on
updating the FLASH PROM device in this system.  For further
details, please refer to the latest revision of "Sun(tm) Flash PROM
Guide for Workstations and Workgroup Servers - Standalone
Version".

Protected sectors: 0 1 6 7 10 11 12 13

Program terminated
```

---

**Note –** The sectors shown above are examples. The sectors displayed for your system may vary.

---

If you encounter this error, it is necessary to replace the system motherboard to upgrade the firmware. Contact Sun Service or your service provider for more information.

CHAPTER 3

# Setting Up a Flash PROM Boot Server

The procedures in this chapter are optional. Use this chapter only if you want set up a boot server so that clients can boot the flash PROM utility from the network. This chapter does not contain the procedure for setting up a client server. See your software documentation for the client server setup procedure.

**Note –** These procedures are to be followed only for networks and users running the Solaris operating environment.

## Using Volume Manager to Install Flash PROM Packages

If Volume Manager is running on your system, you can use its automount CD feature when installing flash PROM packages to your server. Use the following procedure to determine if Volume Manager is running on your system, then install the packages either with or without Volume Manager.

## Checking Volume Manager Status

1. **Use the operating system `ps` utility to determine whether Volume Manager (`vold`) is running.**

   Consult the `man` pages for `ps` if necessary.

2. **If Volume Manager is not running, but you would like to use its automount CD feature:**

   a. **Log in as superuser with the `su` command and your superuser password.**

   b. **As superuser, start Volume Manager. Type:**
   `/etc/init.d/volmgt start`

## Installing Packages With Volume Manager

1. **Insert the Flash Update CD into the CD-ROM drive.**

   The CD-ROM is mounted automatically by Volume Manager.
   The mount point is `/cdrom`.

2. **To add a package, type**
   `/usr/sbin/pkgadd -d` *device* `-R` *root_path* *package_name* `.`

   For example, `/usr/sbin/pkgadd -d /cdrom/sun4u_flash_prom_upd/s0/SMCC SUNWflnel .`

   ---

   **Note –** The period at the end of the `pkgadd` line must be typed as shown above; it is UNIX notation designating "current directory" as the destination for the package.

   ---

   The *root_path* depends on how the client boot partitions were set up. To determine your root path, look at the root path that is specified in the server's `/etc/bootparams` file. If the package is being installed on a standalone basis, then the `-R` *root_path* section of the `pkgadd` command is not required.

3. **Remove the CD from the CD-ROM drive by typing:** `eject cdrom`

## Installing Packages Without Volume Manager

---

**Note –** All the commands below must be run as superuser.

---

1. **Use the** `su` **command and your superuser password to become superuser.**
2. **If the** `/cdrom` **directory is not already present, create it.**
   **Type:** `mkdir /cdrom`
3. **Mount the CD. Type:**
   `mount -o ro -F hsfs /dev/dsk/c0t6d0s0 /cdrom`
4. **Change directories to the CD.**
   **Type:** `cd /cdrom/SMCC`
5. **To add a package, type:**
   `/usr/sbin/pkgadd -d device -R` *root_path package_name* `.`

   For example,
   `/usr/sbin/pkgadd -d 'pwd' SUNWflnel .`

   ---

   **Note –** The period at the end of the `pkgadd` line must be typed as shown above; it is UNIX notation designating "current directory" as the destination for the package.

   ---

   The *root_path* depends on how the client boot partitions were set up. To determine your root path, look at the root path that is specified in the server's `/etc/bootparams` file. If the package is being installed on a standalone basis, then the `-R` *root_path* section of the `pkgadd` command is not required.
6. **When finished, exit the** `cdrom` **directory. Type:** `cd /`
7. **Unmount the CD. Type:** `umount /cdrom`
8. **Remove the CD from the CD-ROM drive by typing:** `eject cdrom`

# Booting the Utility From the Server

---

**Note –** Do not move files from the directories into which `pkgadd` has placed them.

---

## Booting the Utility as a Client

This assumes you copied the system binary for your platform into the *root_path* directory specified in the `pkgadd` command line:

● **Set up your clients to boot from the system binary for your platform.**

## Booting the Utility as a Server

If the flash PROM utility package was installed on a standalone basis, you must supply some or all of the *root_path* information in your boot command.

- If the default *root_path* was used in the `pkgadd` command line, the package was added to the `/` directory. Since the booter automatically looks for the boot file in `/platform/sun4u`, you must specify only the flash/<*PlatformNumber*-latest> portion in the boot command, where *PlatformNumber*-`latest` is the number given for your platform in the "Number" column of TABLE 3-1 on page 3-6. Typing the word, "`latest`" provides a link to the latest version of the software on the CD. For example, if your boot disk is `disk3` and your system is an Ultra 1 Creator 3D, Model 200E, to boot the utility from the PROM monitor, type:
  ```
  boot disk3 flash/SUNW,501-4134-latest
  ```
  This command is equivalent to typing:
  ```
  boot disk3 /platform/sun4u/flash/SUNW,501-4134-latest
  ```
- If the *root_path* was specified as other than `/`, you must supply the *root_path* as a prefix to /platform/sun4u/flash/<*PlatformNumber-latest*>. For example, if you specified `/Flash` as the *root_path* on `disk2` of an Ultra 60 system, then from the PROM monitor you would boot the utility with the following command:
  ```
  boot disk2 /Flash/platform/sun4u/flash/SUNW,501-4450-latest
  ```

# Package Names and Contents

Two packages are available for each hardware platform:

- A package name ending with the letter “l” contains only the latest firmware revisions.
- A package name ending with the letter “b” contains the latest firmware revisions *and* all previously released revisions.

Typically, only the latest revisions are used, meaning that only the package ending with “l” is added.

---

**Note –** *Do not* add a “b” package or load old firmware revisions unless your system administrator directs you to do so.

---

If you are directed to load an old firmware revision, you must boot the image directly:

```
# boot cdrom flash/SUNW,xxx-xxxx-yy
```

In the above example, `xxxx` is a number that represents the platform, and `yy` is a number that indicates the specific firmware revision to be booted.

**TABLE 3-1** Platform Numbers and Packages

| Platform | Number | Packages |
|---|---|---|
| Ultra 1 Model 140 | SUNW,501-2836 | SUNWflnel SUNWflneb |
| Ultra 1 Model 170 | SUNW,501-3082 | SUNWflnel SUNWflneb |
| Ultra 1 Creator Model 140E | SUNW,501-4291 | SUNWfle1l SUNWfle1b |
| Ultra 1 Creator Model 170E | SUNW,501-2486 | SUNWflell SUNWflelb |
| Ultra 1 Creator Model 200E | SUNW,501-4134 | SUNWfle2l SUNWfle2b |
| Ultra 1 Creator 3D Model 140E | SUNW,501-4291 | SUNWfle1l SUNWfle1b |
| Ultra 1 Creator 3D Model 170E | SUNW,501-2486 | SUNWflell SUNWflelb |
| Ultra 1 Creator 3D Model 200E | SUNW,501-4134 | SUNWfle2l SUNWfle2b |
| Ultra Enterprise 1 Model 140 | SUNW,501-2836 | SUNWflnel SUNWflneb |
| Ultra Enterprise 1 Model 170 | SUNW,501-3082 | SUNWflnel SUNWflneb |
| Ultra 2 Creator, all models | SUNW,501-3132 | SUNWflpul SUNWflpub |
| Ultra 2 Creator 3D, all models | SUNW,501-3132 | SUNWflpul SUNWflpub |
| Ultra Enterprise 2, all models | SUNW,501-3132 | SUNWflpul SUNWflpub |
| Ultra 5/Ultra 10, all models | SUNW,375-0009 | SUNWfldal SUNWfldab |
| Ultra 30, all models | SUNW,501-3139 | SUNWflqul SUNWflqub |
| Ultra 60/Enterprise 220R, all models | SUNW,501-4450 | SUNWfldel SUNWfldeb |

**TABLE 3-1** Platform Numbers and Packages *(Continued)*

| Platform | Number | Packages |
|---|---|---|
| Ultra 80/Enterprise 420R, all models | SUNW,501-5168 | `SUNWflqrl`<br>`SUNWflqrb` |
| Sun Enterprise 250, all models | SUNW,501-4681 | `SUNWfljal`<br>`SUNWfljab` |
| Ultra Enterprise 450, all models | SUNW,501-2996 | `SUNWfltal`<br>`SUNWfltab` |

APPENDIX **A**

# Power Interruption During Updating

## Power Interruption Recovery Scenarios

If power to your system is interrupted during updating of the flash PROM:

1. **Turn the power switch to the standby position to prevent power surge to the system when power is restored.**
2. **After power is restored to the system location, return the power switch to the on position.**

   After power is restored, one of the following two recovery scenarios should happen on your system. Follow the instructions described for the appropriate scenario.

### Scenario 1—System Recovers After Power Restoration

If your system attempts to autoboot after power is restored, or if it returns to the flash PROM's `ok` prompt, you *must* complete the programming process by rebooting the flash PROM utility. See "Updating the Flash PROM" on page 2-1.

# Scenario 2—System Does Not Recover After Power Restoration

If your system does not boot or return to the `ok` prompt after power is restored:

---

**Note –** The Ultra 5 and Ultra 10 systems do not have a jumper for high-half booting. Therefore, if your system is an Ultra 5 or Ultra 10, you cannot perform this procedure; you must contact your service provider.

---

1. **If the update was being run via a serial port and the system also has a frame buffer and keyboard installed, or if the system has a keyboard and more than one frame buffer installed:**

   a. **Connect a monitor to each frame buffer.**

   b. **Confirm that output has been redirected to one of the frame buffers.**

      - The NVRAM configuration variables *might* have been modified because of the firmware update just before power was lost. If this happened, then the system output was possibly redirected to a device other than the one originally used to display it. This could only have happened if a keyboard was connected to the system.
      - If there is no keyboard connected to the system and the NVRAM configuration variables are set to their default values, then system input and output are directed to serial port A.

2. **If output cannot be found on any of the installed frame buffers, follow the procedure in the "Changing Jumper or Keyswitch Settings" on page 1-2 to set the boot control jumper to boot from the half of the PROM that is not currently selected:**

   - If the jumper is set for "high-half booting," move it to "normal booting."
   - If the jumper is set for "normal booting," move it to "high-half booting."

3. **Power on the system.**

   - If the system recovers, complete the updating process by rebooting the flash PROM utility. See "Updating the Flash PROM" on page 2-1.
   - If the system does not recover, repeat Step 1 and Step 2 a second time.

4. **If the system *still* does not recover after you complete Step 1 and Step 2 a second time, contact your service provider.**

APPENDIX **B**

# Updating the Flash PROM Using Utility Versions Earlier Than 2.0

## Updating the Flash PROM

**Note –** Before you can update your system's flash PROM, you must set the appropriate jumper (or front-panel keyswitch) to disable write-protection. Refer to "Changing Flash PROM Jumpers" on page 1-2.

### Updating the Flash PROM

1. **Power on the system.**

   The banner screen is displayed, and the system might attempt to autoboot, depending on how the system's non-volatile RAM (NVRAM) configuration variables are set.

   The banner screen identifies the system type, the amount of memory installed, the `hostid`, and the Ethernet address. Note that the information displayed is different for every system.

   *YourSunSystem*, Keyboard Present
   OpenBoot 3.0, 32 MB memory installed, Serial #54528.
   Ethernet address 8:0:20:1a:b3:c8, Host ID: 7200d500.

2. **Press Stop-A (or press the Break key if running from a terminal connected to a serial port) to abort the autoboot sequence.**
3. **Insert the flash PROM CD into the CD-ROM drive.**
4. **At the `ok` prompt, type `boot cdrom` to start the flash PROM update utility.**

```
Type help for more information
ok boot cdrom


Now rebooting to load correct binary.
Resetting...

Rebooting with command:
boot /sbus@1f,0/espdma@e,8400000/esp@e,8800000/sd@6,0:f
flash/SUNW,XXX-XXXX-latest
```

---

**Note –** The boot path shown in the example above will vary depending on your system and its hardware configuration.

---

A hard drive or network are also possible sources of booting, depending on your system configuration. See "Booting the Utility From the Server" on page 3-4 for more information.

The initial utility banner screen is then displayed.

```
Standalone Flash PROM Update Utility, Rev. 1.y
                      Ultra(tm) 1
                      Ultra(tm) 2
                      Ultra(tm) 5/10
                      Ultra(tm) 30
                      Ultra(tm) 60
                      Ultra(tm) Enterprise(tm) 250
                      Ultra(tm) Enterprise(tm) 450

This utility allows you to interactively update the firmware
revisions in specific system Flash PROM components.
```

5. **Type `h` to view the help screen or Enter to continue.**

   If you view the help screen, the following information is displayed:

```
This program is used to update the firmware in this system’s CPU
PROM.

Updating the CPU Flash PROM may cause the contents of the NVRAM
configuration variables to be reset to their default values
(except variable ‘diag-switch?’, which may be set to ‘true’). If
you have customized NVRAM contents which must be retained, then
you will need to save (or note) the contents of the NVRAM before
the Flash PROM gets updated and restore the NVRAM contents after
the update.
NOTE: Failure to note and restore the NVRAM values may cause the
      system to behave in an unexpected manner after the update.

WARNING: If the contents of the system’s CPU Flash PROM(s) have
been modified by methods other than this utility, then running
this utility may render the system useless!

Type h for help, q to quit, Return or Enter to continue:
```

6. **If you viewed this help screen, press Return or Enter to continue.**

```
Every precaution should be taken to prevent the loss of system
power during the Flash PROM programming process!

Type h for help, q to quit, Return or Enter to continue:
```

7. **Type** `h` **for further information or Enter to continue.**

   If you view the help screen, the following information is displayed:

```
WARNING: If power is interrupted when the Flash PROM is being
reprogrammed, you MAY have to change a hardware jumper on the
system board if the system does not boot. If this program is
interrupted before it completes, you MUST reboot this program to
allow it to complete its reprogramming of the Flash PROM - even
if the system appears to boot normally.

Type h for help, q to quit, Return or Enter to continue:
```

8. **If you viewed the help screen, press Return or Enter to continue.**

   The firmware selection menu is displayed, as shown in the example below. The menu lists the OBP and POST revisions currently existing in your system and the revisions available on the CD.

```
      Firmware Release(s)                  Firmware Release(s)
Currently Existing in the System      Available for Installation  /  Install?
-------------------------------- --------------------------------------------
OBP 3.3.9 1996/07/07 11:21       OBP 3.5.0 1996/12/18 09:10            no
POST 1.0.4 1996/07/10 13:16      POST 1.0.7 1996/12/17 18:10           no

Type sa if you wish to select all available firmware releases for
installation. Type h for help, quit to exit, or cont to continue:
```

9. **Type** `h` **for further information before making a selection.**

   If you view the help screen, the following information is displayed:

```
Usage: < ActionCode DeviceCode(s) | ServiceCode >

ActionCodes:  s = select; d = deselect
DeviceCodes:  o = OpenBoot (OBP); p = POST; a = all
ServiceCodes: quit = Exit the program.
               cont = Continue the program.

Type the letter h for help.
Command:
```

10. **Read dates and version numbers in the firmware selection screen, then take one of the actions described below:**
    - If the revisions and date codes of OBP and/or POST shown in the `Available for Installation` column are later than those shown in the `Currently Existing in the System` column, you must update OBP and/or POST to the latest releases available. **Go to Step 11.**
    - If the revisions and date codes of OBP and/or POST shown in the `Available for Installation` column are the same or earlier than those shown in the `Currently Existing in the System` column, no firmware update is required. **Type `quit` to exit the Flash PROM utility, then go to Step 15.**

11. **Type the appropriate code for your update.**
    - To update OBP and POST, type **`sa`** (select all).
    - To update OBP only, type **`so`** (select OpenBoot).
    - To update POST only, type **`sp`** (select POST).
    - If no update is required, type **`quit`** to exit the utility.

    The firmware selection menu is displayed with `YES` in the `Install?` column for each item that you selected for updating. The example below shows the selection screen after both OBP and POST have been selected for update.

```
      Firmware Release(s)                  Firmware Release(s)
Currently Existing in the System     Available for Installation   /  Install?
-------------------------------- --------------------------------------------
OBP 3.3.9 1996/07/07 11:21       OBP 3.5.0 1996/12/18 09:10          YES
POST 1.0.4 1996/07/10 13:16      POST 1.0.7 1996/12/17 18:10         YES

Type sa if you wish to select all available firmware releases for
installation.  Type h for help, quit to exit, or cont to continue:
```

12. **At the command prompt, type `cont` to continue the utility.**

    An information screen is displayed.

```
The Flash programming process is about to begin.

Type h for help, q to quit, Return or Enter to continue:
```

13. **Type** `h` **for more information or Enter to continue.**

If you view the help screen, the following information is displayed:

```
This program will issue a reset command after the Flash PROM has
been successfully reprogrammed. If an error occurs during
programming then an error message will be printed and the program
will exit without attempting to reboot.

WARNING: If power is interrupted when the Flash PROM is being
reprogrammed, you MAY have to change a hardware jumper on the
system board if the system does not boot. If this program is
interrupted before it completes, you MUST reboot this program to
allow it to complete its reprogramming of the Flash PROM - even
if the system appears to boot normally.

Refer to the "Ultra(tm) Systems Flash PROM Programming Guide" for
a complete set of instructions.

The Flash programming process is about to begin.

Type h for help, q to quit, Return or Enter to continue:
```

---

**Note –** The *Ultra Systems Flash PROM Programming Guide* referenced in the above screen text is the former title of this document, the *Sun Flash PROM Guide for Workstations and Workgroup Servers—Standalone Version*.

---

14. **If you viewed this help screen, press Return or Enter to continue.**

As the utility updates the flash PROM, the percentage completed is displayed on the screen.

```
100% complete.
Programming was successful: Rebooting...

Resetting...
```

If there were no errors during the update, and if there are no customized NVRAM configuration variables, the system resets. If there were errors (for example, if any of the PROM's security features were enabled), the system does not reset and an error message is displayed. Refer to "Error Messages" on page B-8 for error message examples.

The following information may be displayed on the screen:

```
**IMPORTANT** As a consequence of the firmware upgrade that just
took place, it is very possible (but not certain) that the
customized values in the configuration variables will revert to
their *default values* upon the next system power-cycle or soft-
reset. (The exception is that "diag-switch?" may be automatically
set to "true".) If this happens then it could have a significant
effect on the behavior of the system after the power-cycle/soft-
reset.

Following is a list of the system's NVRAM configuration variables
which have been customized (i.e. they are different than the
default values). You may wish to write down the values of the
indicated configuration variables so that they may be restored (if
necessary) after the next power-cycle or soft-reset. (Type "help
system" at the PROM monitor's ok prompt to get information about
setting the configuration variables.
```

The system does not reset if any assigned default values of the PROM's NVRAM configuration variables have been modified. Instead, the system's customized NVRAM configuration variables are listed on the screen. An example listing is given below (the actual display will vary, depending on the system's setup).

```
Variable Name  Customized Value
fcode-debug?   true
auto-boot?     false
use-nvramrc?   true
nvramrc      <type 'printenv nvramrc' to see full buffer contents>

*NOTE*  The "use-nvramrc?" variable is active (true) and the
"nvramrc" buffer is not empty, so you will want to evaluate whether
or not to reinstall the code in nvramrc if the configuration
variables are indeed reset to their default values - and if they
are *not* reset to default values then you may also want to
evaluate if the contents of nvramrc are still valid and necessary.
For help on restoring/modifying the contents of nvramrc, type "help
nvram" at the PROM's ok prompt.
```

The NVRAM configuration variables might be modified during the reboot process. Such change might cause the system to boot differently than it would have prior to the firmware update. For example, the flash PROM updating procedure might result in automatically setting the `diag-switch?` NVRAM parameters to true. If this occurs, the system might attempt to boot from the network (`net`), which is the default setting.

If the system attempts to boot from the net:
1. Press Stop-a.
2. At the `ok` prompt, type `setenv diag-switch? false`

Also, assignment of console input/output devices might be modified such that output is no longer visible on a previously assigned output device.

---

**Note –** If power to your site is interrupted during updating, see Appendix A for system recovery instructions.

---

15. **After successful updating, return the flash PROM write-protect/enable jumper to the write-protect position to ensure system security.**
    **If your system is a Sun Enterprise 250 or Ultra Enterprise 450, do not change the jumper; instead, return the front-panel keyswitch to the Locked position ( ).**

# Error Messages

If the flash PROM is write-protected or if the NVRAM configuration variable `security-mode` is enabled and an attempt is made to update the flash PROM, one of the following error messages is displayed.

## Example 1—Write-Protect/Enable Jumper

The following is an example of an error message received when the utility is loaded but the write-protect/enable jumper is not set to write-enable.

```
Could not communicate with the Flash PROM on the system board.

It is possible that the part is defective, or that the Flash PROM
is write protected via the hardware 'Write Protect/Enable'
jumper.

UNABLE TO PROCEED WITH THE REQUESTED FIRMWARE MODIFICATIONS

Program terminated
ok
```

## Example 2—NVRAM Configuration Variable

The following is an example of an error message received when the utility is loaded but system security is set via the `security-mode` NVRAM configuration variable.

```
**ERROR: System security is set:
System firmware was not modified.
```