Sun microsystems

Solaris 7 Sun Hardware Platform Guide

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Contents

Preface

The *Solaris 7 Sun Hardware Platform Guide* contains important information about the Sun™ hardware supported by this Solaris™ 7 software environment.

Note – For Solaris 7 installation instructions, refer to Chapter 1 ".".

This manual:

■ Provides platform-specific installation instructions for the Solaris 7 software

■ Describes software provided on the Sun Computer Systems Supplement CD and explains how to install product software

■ Describes flash PROM update procedures necessary for some systems to run in 64-bit mode.

■ Describes installation issues affecting the Sun Enterprise 10000 system

■ Identifies installation issues affecting the SPARCstorage™ Array

■ Describes hardware and software requirements affecting Power Management™ software

Note – For information about how to install software contained on the Sun Computer Systems Supplement CD and information about supported hardware, refer to Chapter 3, "Installing Software from the Sun Computer Systems Supplement CD".

Where to Find Installation Information

The Solaris 7 software is delivered on two CDs:

- Solaris 7 SPARC Platform Edition (called the Solaris CD throughout this manual)
- *Supplement for Solaris 7 Operating Environment for Sun Computer Systems* (called the Supplement CD throughout this manual).

Before installing the Solaris 7 software, check TABLE P-1 for listings of manuals with information that may apply to your situation and TABLE P-2 for specific installation information.

Note – All Solaris and SPARC documentation can be found on the Documentation CD. All Sun Sun hardware specific documentation can be found on the Supplement CD. Some co-packaged products contain documentation on their respective CDs.

TABLE P-1   Related Manuals

Title	Description
Solaris 7 SPARC Installation Instructions	Primary installation manual for this release of the Solaris operating environment from the Documentation CD
Solaris 7 (SPARC Platform Edition) Installation Library	Supplements the *Solaris Start Here* card by providing detailed installation information
Solaris Advanced Installation Guide	Contains additional information about how to install the Solaris operating environment on Server systems

TABLE P-2   Specific Installation Information

If you want to	Go to
Know more about new products and peripherals	The Chapter 3 in this manual
Know about late breaking news	1. *Solaris 7 Release Notes Supplement for Sun Hardware* 2. *Solaris 7 Release Notes*
Begin the install process from the Solaris CD	1. *Solaris 7 Sun Hardware Platform Guide* 2. *Solaris 7 SPARC Installation Instructions*
Install software for your platform/peripheral from the Sun Computer Systems Supplement CD, as needed	Chapter 3 in this manual
Update your flash PROM for 64-bit operation	Chapter 4 and Chapter 5 of this manual

TABLE P-2   Specific Installation Information

If you want to	Go to
Install Solaris on a Sun Enterprise 10000 system	Chapter 6 in this manual
Install Solaris on a SPARCstorage Array	Chapter 7 in this manual
Install an AnswerBook from the Sun Computer Systems Supplement CD, as needed	Chapter 3 in this manual

How This Book Is Organized

This book is organized as follows:

Chapter 1 supports the *Solaris 7 Start Here* card by providing additional installation instructions on how to install or upgrade the Solaris 7 software on specific Sun platforms and hardware options.

Chapter 2 is a list of supported Sun hardware.

Chapter 3 describes how to install the software for Sun platforms and hardware options, and value-added software provided to users of Sun hardware.

Chapter 4 describes the procedure for updating the flash PROMs for 64-bit operation on Ultra 1, Ultra 2, Ultra 450, and Sun Enterprise 450 systems.

Chapter 5 describes the procedure for updating the flash PROMs for 64-bit operation on Sun Enterprise 3x00, 4x00, 5x00, and 6x00 systems.

Chapter 6 describes how to install Solaris 7 software on a Sun Enterprise 10000 Domain. It also describes how to upgrade Solaris on a host domain.

Chapter 7 describes how to install the Solaris 7 software either as a new installation or as an upgrade on systems where the SPARCstorage Array™ may be used as the boot device.

Chapter 8 describes the hardware and software requirements for running Power Management on Sun hardware.

Typographic Conventions

The following table describes the typographic changes used in this book.

TABLE P-3 Typographic Conventions

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

Sun Documentation on the Web

The `docs.sun.com` web site enables you to access Sun technical documentation on the Web. You can browse the `docs.sun.com` archive or search for a specific book title or subject at:

`http://docs.sun.com`

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docfeedback@sun.com

Please include the part number of your document in the subject line of your email.

Installing Software From the Solaris CD

Automatic Installation of Solaris Software

For the Sun™ hardware listed in TABLE 1-1, this release of Solaris 7 requires no special installation or upgrade instructions. If you plan to perform an automatic installation of Solaris 7 on your Sun hardware, refer to the *Solaris 7 (SPARC Platform Edition) Installation Library* or the *Solaris Advanced Installation Guide* for all your installation needs.

Manual Installation of Solaris Software

If you are installing Solaris 7 using the manual (or interactive) method, you may need to add some software packages and clusters. This section identifies platform-specific installation needs and lists the required software packages and clusters. The manual installation method is described in the "Planning Your Installation" module of the *Solaris 7 (SPARC Platform Edition) Installation Library*.

Platform Names and Groups

You need to know your system architecture (platform group), if you are:

- Setting up a boot server on a subnet
- Adding clients for network installation (standalone, servers, dataless, diskless),

If you are writing a custom JumpStart™ installation rules file, you need to know the platform name.

TABLE 1-1 shows the platform names and platform groups of various Sun hardware systems.

TABLE 1-1   Platform Names for Sun Systems

System	Platform Name	Platform Group
SPARCstation SLC	SUNW,Sun_4_20	sun4c
SPARCstation ELC	SUNW,Sun_4_25	sun4c
SPARCstation IPC	SUNW,Sun_4_40	sun4c
SPARCstation IPX	SUNW,Sun_4_50	sun4c
SPARCstation 1	SUNW,Sun_4_60	sun4c
SPARCstation 1+	SUNW,Sun_4_65	sun4c
SPARCstation 2	SUNW,Sun_4_75	sun4c
SPARCclassic	SUNW,SPARCclassic	sun4m
SPARCstation LX	SUNW,SPARCstation-LX	sun4m
SPARCstation LX+	SUNW,SPARCstation-LX+	sun4m
SPARCstation 4	SUNW,SPARCstation-4	sun4m
SPARCstation 5	SUNW,SPARCstation-5	sun4m
SPARCstation 5Model 170	SUNW,SPARCstation-5	sun4m
SPARCstation 10	SUNW,SPARCstation-10	sun4m
SPARCstation 10SX	SUNW,SPARCstation-10,SX	sun4m
SPARCstation 20	SUNW,SPARCstation-20	sun4m
SPARCstation Voyager	SUNW,S240	sun4m
Ultra 1 Model 140	SUNW,Ultra-1	sun4u
Ultra 1 Model 170	SUNW,Ultra-1	sun4u
Ultra 1 Creator Model 140E	SUNW,Ultra-1	sun4u
Ultra 1 Creator3D Model 140E	SUNW,Ultra-1	sun4u
Ultra 1 Creator Model 170E	SUNW,Ultra-1	sun4u
Ultra 1 Creator 3D Model 170E	SUNW,Ultra-1	sun4u
Ultra 1 Creator Model 200E	SUNW,Ultra-1	sun4u
Ultra 1 Creator3D Model 200E	SUNW,Ultra-1	sun4u

TABLE 1-1 Platform Names for Sun Systems *(Continued)*

System	Platform Name	Platform Group
Sun Enterprise 1 Model 140	SUNW,Ultra-1	sun4u
Sun Enterprise 1 Model 170	SUNW,Ultra-1	sun4u
Sun Enterprise 1 Model 170E	SUNW,Ultra-1	sun4u
Ultra 2 Creator Model 1170	SUNW,Ultra-2	sun4u
Ultra 2 Creator3D Model 1170	SUNW,Ultra-2	sun4u
Ultra 2 Creator Model 2170	SUNW,Ultra-2	sun4u
Ultra 2 Creator3D Model 2170	SUNW,Ultra-2	sun4u
Ultra 2 Creator Model 1200	SUNW,Ultra-2	sun4u
Ultra 2 Creator3D Model 1200	SUNW,Ultra-2	sun4u
Ultra 2 Creator Model 2200	SUNW,Ultra-2	sun4u
Ultra 2 Creator 3D Model 2200	SUNW,Ultra-2	sun4u
Ultra 2 Creator Model 1300	SUNW,Ultra-2	sun4u
Ultra 2 Creator Model 2300	SUNW,Ultra-2	sun4u
Ultra 5	SUNW,Ultra-5/10	sun4u
Ultra 10	SUNW,Ultra-5/10	sun4u
Ultra 30	SUNW,Ultra-30	sun4u
Ultra 60	SUNW,Ultra-60	sun4u
Ultra 450	SUNW,Ultra-4	sun4u
Sun Enterprise 2 Model 1170	SUNW,Ultra-2	sun4u
Sun Enterprise 2 Model 2170	SUNW,Ultra-2	sun4u
Sun Enterprise 2 Model 1200	SUNW,Ultra-2	sun4u
Sun Enterprise 2 Model 2200	SUNW,Ultra-2	sun4u
Sun Enterprise 2 Model 1300	SUNW,Ultra-2	sun4u
Sun Enterprise 2 Model 2300	SUNW,Ultra-2	sun4u
Sun Enterprise 150	SUNW,Ultra-1	sun4u
Sun Enterprise 250	SUNW,Ultra-250	sun4u
Sun Enterprise 450	SUNW,Ultra-4	sun4u
Sun Enterprise 3000	SUNW,Ultra-Enterprise	sun4u
Sun Enterprise 4000	SUNW,Ultra-Enterprise	sun4u
Sun Enterprise 5000	SUNW,Ultra-Enterprise	sun4u

TABLE 1-1   Platform Names for Sun Systems *(Continued)*

System	Platform Name	Platform Group
Sun Enterprise 6000	SUNW,Ultra-Enterprise	sun4u
Sun Enterprise 3500		sun4u
Sun Enterprise 4500		sun4u
Sun Enterprise 5500		sun4u
Sun Enterprise 6500		sun4u
Sun Enterprise 10000	SUNW,Ultra-Enterprise	sun4u
SPARCserver 1000	SUNW,SPARCserver-1000	sun4d
SPARCcenter 2000	SUNW,SPARCcenter-2000	sun4d

Refer to the *Solaris 7 SPARC (SPARC Platform Edition) Installation Instructions* manual for further information on platform groups for all other systems.

Setting Up Diskless Clients Using Solstice AdminSuite

If you are setting up a diskless client on a platform other than a sun4c, sun4d, or sun4m, you need to select Entire Distribution Plus OEM as the client OS service.

Caution – If you do not select this metacluster, you will not be able to boot your sun4u system as a diskless client.

Interactive Installation of Solaris Software

Installing the Solaris 7 software environment from the Solaris CD automatically loads all of the required software clusters and packages for your Sun hardware. If you choose to customize your Solaris 7 software configuration using the interactive method, refer to TABLE 1-2 and TABLE 1-3 to identify which software packages and clusters are needed.

TABLE 1-2   Required Software Clusters and Packages for Sun Hardware

If your system is or has	This cluster or package is required	Cluster or package name
S24 frame buffer	SUNWCtcx	TCX API Support
SX frame buffer	SUNWCsx	SX Support
Creator and Creator3D	SUNWxilvl SUNWCffb	Creator Graphics Device Drivers and Pipelines
	SUNWffbx	64-bit Support
Creator and Creator3D (Series 2)	SUNWxilvl SUNWCffb	Creator Graphics Device Drivers and Pipelines
	SUNWffbx	64-bit Support
Elite3D	SUNWCafb	Elite3D Device Drivers and Pipelines
	SUNWafbmn	Elite3D Online Manual Pages
	SUNWxfb.u	Elite3D/FFB (Creator) Common Driver Routines
	SUNWafbx	64-bit Support
PGX Graphics Frame Buffer	SUNWCm64	M64 Graphics Support
	SUNWm64x	64-bit Support
SPARCstorage Array (Models 100 or 200)	SUNWssad SUNWssaop	SPARCstorage Array Support Software
	SUNWssdx	64-bit Support
Sun StorEdge A5000	SUNWClux SUNWses	Sun StorEdge A5000 Support Software
	SUNWluxdx.u SUNWluxlx	64-bit Support
SunSwift SBus Adapter	SUNWChmd	SunSwift SBus Adapter Drivers
	SUNWhmdx	64-bit Support
SunSwift PCI Adapter	SUNWChmd	SunSwift PCI Adapter Drivers
	SUNWhmdx	64-bit Support
SPARCstation 4	SUNWCtcx	TCX API Support
SPARCstation 5	SUNWCtcx	TCX API Support
SPARCstation 10SX	SUNWCsx	SX End User
SPARCstation 20	SUNWCsx	SX End User

TABLE 1-2 Required Software Clusters and Packages for Sun Hardware *(Continued)*

If your system is or has	This cluster or package is required	Cluster or package name
Ultra 1 Series	SUNWxilvl	VIS/XIL Support
Ultra 1 Creator Series, Ultra 2 Creator Series, and Sun Enterprise X000 Series	SUNWxilvl SUNWCffb	VIS/XIL Support Creator Graphics Device Drivers and Pipelines
	SUNWChmd	SunSwift SBus Adapter Drivers
	SUNWffbx SUNWhmdx	64-bit Support
Ultra 5, Ultra 10, and Ultra 30	SUNWxilvl	VIS/XIL Support
	SUNWCffb	Creator Graphics Device Drivers and Pipelines
	SUNWCm64	M64 Graphics Support
	SUNWChmd	SunSwift SBus Adapter Drivers
	SUNWffbx SUNWhmdx SUNWm64x	64-bit Support
Ultra 60	SUNWxilvl	VIS/XIL Support
	SUNWCffb	Creator Graphics Device Drivers and Pipelines
	SUNWCm64	M64 Graphics Support
	SUNWChmd	SunSwift SBus Adapter Drivers
	SUNWffbx SUNWm64x	64-bit Support
Ultra 450 and Sun Enterprise 450	SUNWCpd	Drivers for SPARC platforms with PCI bus
	SUNWpdx	64-bit Support
Sun Enterprise 10000	SUNWC4u1	Sun Enterprise 10000 Support
	SUNWcvcx	64-bit Support

Manual Installation of Packages

If you are installing at the package level, refer to TABLE 1-3 for the software packages required for specific hardware.

TABLE 1-3   Required Packages for Hardware Platforms and Options

If you have	You must install

SX frame buffer	`SUNWsxr.m`
	`SUNWsx`
	`SUNWsxow`
	`SUNWxilcg`
	`SUNWsxxgl`

S24 or FSV frame buffer	`SUNWtcx.m`
	`SUNWtcxu`
	`SUNWtcxow`

Creator and Creator3D (including Series 2)	`SUNWffb.u`
	`SUNWffbcf`
	`SUNWffbw`
	`SUNWffbxg`
	`SUNWxilvl`

Elite3D	`SUNWafb.u`
	`SUNWafbcf`
	`SUNWafbmn`
	`SUNWafbr`
	`SUNWafbw`
	`SUNWafbxg`
	`SUNWxfb.u`

PGX Graphics Frame Buffer	`SUNWm64.u`
	`SUNWm64w`
	`SUNWm64cf`

SunSwift SBus Adapter	`SUNWhmd` `SUNWhmdu`
SunSwift PCI Adapter	`SUNWhmd` `SUNWhmdu`
SPARCstorage Array, model 100/200	`SUNWssad` `SUNWssaop`

Sun StorEdge A5000	`SUNWluxal`
	`SUNWluxdv.d`
	`SUNWluxdv.u`
	`SUNWluxdv.u1`
	`SUNWluxmn`
	`SUNWluxop`
	`SUNWses`

Ultra 1 Series	`SUNWxilvl`

TABLE 1-3   Required Packages for Hardware Platforms and Options *(Continued)*

If you have	You must install

Ultra 1 Creator Series, Ultra 2 Creator Series, Ultra 5, Ultra 10, Ultra 60, or Sun Enterprise X000 Series	`SUNWffb.u`
	`SUNWffbcf`
	`SUNWffbw`
	`SUNWffbxg`
	`SUNWxilvl`
	`SUNWhmd`
	`SUNWhmdu`

Ultra 5, Ultra 10, Ultra 60, Ultra 250, Ultra 450 and Sun Enterprise 450	`SUNWpd` `SUNWpdu`
Sun Enterprise 10000	`SUNWcvcr.u`

Custom JumpStart Profiles

For information on the availability of the custom JumpStart™ method at your site, consult your system administrator. TABLE 1-4 lists platforms and hardware and software options that may require additional entries in custom profiles. These clusters might not be installed with the core distribution software group. Refer to the *Solaris 7 SPARC Installation Instructions* manual for more information.

When writing Custom JumpStart profiles, be sure to allow sufficient space in the root partition for software from the Supplement CD, such as software for SunVTS™ diagnostics.

Note – For more information about automating Solaris installations, refer to *Automating Solaris Installations: A Custom JumpStart Guide* (Kasper/McClellan), a SunSoft Press/Prentice Hall publication.

TABLE 1-4   Additional Entries for Custom JumpStart Installations

If your system is or has	Add the following lines to the profile
SX Frame Buffer	`cluster  SUNWCsx`
S24 or FSV Frame Buffer	`cluster  SUNWCtcx`
Creator and Creator3D Graphics (including Series 2)	`cluster  SUNWCffb` `package  SUNWxilvl`

Elite3D	`cluster  SUNWCafb`
	`package  SUNWafbmn`
	`package  SUNWxfb.u`

TABLE 1-4   Additional Entries for Custom JumpStart Installations *(Continued)*

If your system is or has	Add the following lines to the profile
PGX Graphics Frame Buffer	`cluster SUNWCm64`
SunSwift SBus Adapter	`cluster SUNWChmd`
SunSwift PCI Adapter	`cluster SUNWChmd`
SPARCstation 10SX	`cluster SUNWCsx`
SPARCstation 20	`cluster SUNWCsx`
Ultra 5, Ultra 10, Ultra 60, Ultra 250, Ultra 450 and Sun Enterprise 450	`cluster SUNWCpd`
Sun Enterprise 10000	`cluster SUNWC4u1`

32-bit Kernel the Default on 200MHz or Lower UltraSPARC Systems

On UltraSPARC systems with 200MHz or lower processors, it is possible for a user to run a 64-bit program designed to exploit a problem that could cause a processor to stall. Since 64-bit programs cannot run on the Solaris 32-bit kernel, the Solaris 32-bit kernel is booted by default on these systems.

The code sequence that exploits the problem is very unusual, and is not likely to be generated by a compiler. Assembler code had to be specifically written to demonstrate the problem. It is highly unlikely that a legitimate handwritten assembler routine would use this code sequence.

Users willing to assume the risk that a user might accidentally or deliberately run a program that was designed to cause a processor to stall may choose to run the Solaris 64-bit kernel on these systems.

You can determine the speed of your processor(s) by typing:

```
# /usr/sbin/psrinfo -v
```

You can change the default kernel from 32-bit on a system by modifying the `boot` policy file. Edit the `/platform/`*platform-name*`/boot.conf` file so that it contains an uncommented line with the variable named `ALLOW_64BIT_KERNEL_ON_UltraSPARC_1_CPU` set to the value `true` as shown in the example that follows:

```
ALLOW_64BIT_KERNEL_ON_UltraSPARC_1_CPU=true
```

See `boot`(1M) for more information about changing the default kernel.

You may also purchase an upgrade to your system; contact your Sun representative for details.

Supported Sun Hardware

Supported Platforms

Note – Not all platforms and peripheral devices listed in this chapter are compatible. Contact your authorized Sun support provider for support information.

- SPARCclassic™
- SPARCstation SLC™
- SPARCstation ELC™
- SPARCstation LX
- SPARCstation IPC™
- SPARCstation IPX™
- SPARCstation 1
- SPARCstation 1+
- SPARCstation 2
- SPARCstation 4
- SPARCstation 5
- SPARCstation 5 Model 170
- SPARCstation 10
- SPARCstation 10SX
- SPARCstation 20
- SPARCstation 20 Model HS11, HS12, HS14, HS21, HS22, 151, and 152
- SPARCstation Voyager™
- Ultra 1 Model 140, 170
- Ultra 1 Creator Model 140E, 170E, 200E
- Ultra 1 Creator3D Model 140E, 170E, 200E
- Sun Enterprise 1 Model 140, 170, 170E
- Ultra 2 Creator Model 1170, 2170, 1200, 2200, 1300, 2300
- Ultra 2 Creator3D Model 1170, 2170, 1200, 2200

- Ultra 5
- Ultra 10
- Ultra 30
- Ultra 60
- Ultra 450
- Sun Enterprise 2 Model 1170, 2170, 1200, 2200, 1300, 2300
- Sun Enterprise 150
- Sun Enterprise 250
- Sun Enterprise 450
- Sun Enterprise 3000
- Sun Enterprise 4000
- Sun Enterprise 5000
- Sun Enterprise 6000
- Sun Enterprise 3500
- Sun Enterprise 4500
- Sun Enterprise 5500
- Sun Enterprise 6500
- Sun Enterprise 10000
- SPARCserver 1000 and 1000E
- SPARCcenter 2000 and 2000E

Supported Storage Peripherals

The following peripherals are supported:

- SPARCstorage Array
- Sun StorEdge A5000
- Sun StorEdge D1000/A1000

SCSI Disks

Sun StorEdge UniPack

- 1.05-Gbyte
- 1.05-Gbyte Fast/Wide
- 2.1-Gbyte
- 2.1-Gbyte Fast/Wide
- 4.2-Gbyte Fast/Wide
- 9-Gbyte Ultra
- 18-Gbyte Ultra

Sun StorEdge MultiPack

- 2.1-Gbyte (2 x 1.05-Gbyte)
- 4.2-Gbyte (2 x 2.1-Gbyte Fast SCSI-2)
- 4.2-Gbyte (4 x 1.05-Gbyte)
- 4.2-Gbyte (2 x 2.1-Gbyte 7200 rpm)
- 8.4-Gbyte (4 x 2.1-Gbyte Fast SCSI-2)
- 8.4-Gbyte (2 x 4.2-Gbyte 5400 rpm)
- 8.4-Gbyte (4 x 2.1-Gbyte 7200 rpm)
- 8.4-Gbyte (2 x 4.2-Gbyte)
- 9-Gbyte (2 x 9-Gbyte 7200 rpm Ultra)
- 9-Gbyte (4 x 9-Gbyte 7200 rpm Ultra)
- 9-Gbyte (6 x 9-Gbyte Ultra)
- 16.8-Gbyte (4 x 4.2-Gbyte)
- 16.8-Gbyte (4 x 4.2-Gbyte 5400 rpm)
- 18-Gbyte (2 x 9-Gbyte)
- 36-Gbyte (2 x 18-Gbyte)
- 36-Gbyte (4 x 9-Gbyte)
- 54-Gbyte (6 x 9-Gbyte)
- 72-Gbyte (4 x 18-Gbyte)
- 108-Gbyte (6 x 18-Gbyte)

Desktop Storage Pack (3.5-inch)

- 104-Mbyte
- 207-Mbyte
- 207-Mbyte Low profile (LP)
- 424-Mbyte
- 535-Mbyte (LP)
- 1.05-Gbyte
- 1.05-Gbyte (LP)
- 2.1-Gbyte
- 4.2-Gbyte

External Storage Module/External Expansion Module (5.25-inch)

- 327-Mbyte
- 669-Mbyte

Multi-Disk Pack (3.5-inch)

- 4.2-Gbyte (4 x 1.05-Gbyte)
- 4.2-Gbyte (2 x 2.1-Gbyte)

- 8.4-Gbyte (4 x 2.1-Gbyte)
- 8.4-Gbyte (2 x 4.2-Gbyte)
- 16.8-Gbyte (4 x 4.2-Gbyte

Desktop Storage Module

- 16.8-Gbyte (4 x 4.2-Gbyte 5.25-inch)
- 1.3-Gbyte (5.25-inch)

Differential SCSI Disk Tray (5.25-inch)

- 2.1-Gbyte
- 2.9-Gbyte
- 9.0-Gbyte

Differential SCSI Expansion Pedestal (5.25-inch)

- 2.1-Gbyte

SCSI Disk Cards (3.5-inch)

- 2.1-Gbyte (4 x 535-Mbyte, narrow)
- 4.2-Gbyte (4 x 1.05-Gbyte, wide)
- 8.4-Gbyte (4 x 2.1-Gbyte, wide)

Enterprise Disk Cards

- 4.2-Gbyte (2 x 2.1-Gbyte)
- 8.4-Gbyte (2 x 4.2-Gbyte)

CD Drives

- SunCD™ drive
- SunCD Plus™ drive
- SunCD 2Plus™ drive
- SunCD 4 drive
- Sun StorEdge CD12 drive
- SunCD 16 drive
- SunCD 24 drive
- SunCD 32 drive

SCSI Tape Drives

- 60-Mbyte 1/4 inch QIC Sun3 Mass Storage subsystem
- 150-Mbyte 1/4 inch QIC Desktop Backup Pack and External Storage Module
- 2.5-Gbyte 1/4-inch QIC Sun StorEdge UniPack
- 1/2-inch Front Load (800/1600/6250 bpi) Tape
- 5-Gbyte 4mm Tape Desktop Backup Pack and Sun StorEdge UniPack
- 20-Gbyte 4mm Tape Auto-Loader Desktop Backup Module
- 2.3-Gbyte 8mm Desktop Backup Pack and External Storage Module
- 5.0-Gbyte 8mm Desktop Backup Pack
- 10-Gbyte 8mm Desktop Backup Pack
- 14-Gbyte 8mm Desktop Backup Pack and Sun StorEdge UniPack
- Multi-Tape Tray and Dragon Media Tray
- 20-Gbyte 4mm tape autoloader
- 5.0-Gbyte 8mm
- 10-Gbyte 8mm
- 14-Gbyte 8mm
- Internal
- 4-Gbyte 4mm DDS2 tape drive
- 4-Gbyte 4mm DDS2CR tape drive
- 4-Gbyte DDS3 tape drive
- 7-Gbyte 8mm 8505XL tape drive
- 7-Gbyte 8mm 8705DX tape drive
- SPARCstorage Library (up to two 14-Gbyte tape drives with 10 magazine cartridges and a robotic mechanism to select cartridges) (SCSI)

Diskette Drives

- 3.5-inch dual density diskette drive
- 3.5-inch tri-density diskette drive
- 3.5-inch tri-density manual eject diskette drive

Expansion Subsystems

- SBus Expansion Subsystem/Chassis (SES/C)
- SBus Expansion Subsystem/Board (SES/B)

Controllers

Sun StorEdge SCSI Host Adapters

- Sun SCSI Host Adapter (SSHA)
- SBus SCSI Buffered Ethernet (SBE/S)
- SBus Fast SCSI Buffered Ethernet (FSBE/S)
- SBus Single-ended Fast/Wide Intelligent SCSI-2 (SWIS/S)
- SBus Single-ended Fast/Wide SCSI-2 (SunSwift)
- SBus Differential Fast/Wide Intelligent SCSI-2 (DWIS/S)
- SBus Differential SCSI Buffered Ethernet (DSBE/S)

PCI Host Adapters

- PCI Single-ended Fast/Wide SCSI-2 (SunSwift/PCI)
- Dual Differential UltraSCSI (UD2S)
- Dual Single-ended UltraSCSI (US2S)

Fibre Channel Host Adapters

- FC/S
- FC-OM (FC/S only)
- FC100/S
- GBIC (FC100/S only)

PCMCIA

The PCMCIA interfaces are provided with the following products:

- SPARCstation Voyager (uses STP4020 PCMCIA controller chip)
- PCMCIA Interface/SBus (uses STP4020 PCMCIA controller chip)

The supported PC cards are:

- Serial RS-232 communication cards
- Data and fax modem cards
- SRAM, DRAM, MROM memory cards

Graphics Accelerators

The following frame buffers are supported:

Frame Buffer Support Matrix

TABLE 2-1   Supported Frame Buffers

Product Name	Common Name	Device Driver X	Bus Architecture
n/a	CG3	`/dev/fbs/cgthree`X	SBus
GX	CG6	`/dev/fbs/cgsix`X	SBus
GXplus	CG6	`/dev/fbs/cgsix`X	SBus
TGX	TurboGX	`/dev/fbs/cgsix`X	SBus
TGX4	TurboGX+	`/dev/fbs/cgsix`X	SBus
SX	CG14	`/dev/fbs/cgfourteen`X	embedded SPARCstation 10SX SPARCstation 20
S24	tcx	`/dev/fbs/tcx`X	AFX Bus
FSV	tcx	`/dev/fbs/tcx`X	AFX Bus (embedded)
SunVideo	rtvc	`/dev/rtvc`X	SBus
Creator	ffb	`/dev/fbs/ffb`X	UPA Bus
Creator3D	ffb	`/dev/fbs/ffb`X	UPA Bus
Creator Series 2	ffb2	`/dev/fbs/ffb`X	UPA Bus
Creator3D Series 2	ffb2	`/dev/fbs/ffb`X	UPA Bus
PGX	M64	`/dev/fbs/m64`X	PCI Bus

Note – X denotes the device number for the device driver and FSV (`tcx`) is integrated on the SPARCstation 4 system motherboard.

TTY Graphics Input Devices

- SunDials™
- SunButtons™

Note – The SunDials and SunButtons products are not supported on all hardware. Contact your authorized Sun Support provider for more information.

Networking and Communications

The following network and communications devices are supported:

- SBus Second Ethernet
- SBus SCSI/Buffered Ethernet Card (SBE/S)
- SBus Fast SCSI Buffered Ethernet Card (FSBE/S)
- SBus Differential SCSI Buffered Ethernet Card (DSBE/S)
- SBus Quad Ethernet Controller (SQEC)
- SunSwift SBus Adapter
- SunFastEthernet-2 SBus Adapter
- SunSwift PCI Adapter

Unbundled Options

- SBus Fiber Distributed Data Interface (FDDI/S)
- SBus High-Speed Interface (HSI/S)
- SBus Token Ring Interface (TRI/S)
- SBus Prestoserve™
- SBus SunATM™ 155
- SBus SunATM 622
- SBus Fibre Channel Card (FC/S)
- NVSIMM
- Integrated Services Digital Network (ISDN)
- Serial Parallel Controller/SBus (SPC/S)
- SunPC™ Accelerator
- SunFDDI Single-Attach PCI Adapter
- SunFDDI Dual-Attach PCI Adapter
- SUNTRI Token Ring Interface PCI Adapter
- SUNHSI High-Speed Serial Interface PCI Adapter

- Sun Serial Asynchronous Interface PCI Adapter

Keyboard and Mouse Options

The following keyboard and mouse options are supported:

Keyboard Options

- Type 3 keyboard
- Type 4 keyboard
- Type 5 keyboard
- Compact 1 keyboard

Mouse Options

- M3 mouse
- M4 mouse
- Type 5 mouse
- Compact 1 mouse

Installing Software from the Sun Computer Systems Supplement CD

This chapter describes the contents and the installation of the Sun Computer Systems Supplement CD, which contains software for these Sun products:

- Open Data Base Connectivity Driver Manager
- SunVTS™
- OpenGL software
- PC file viewer software
- ShowMe TV 1.2.1 Software
- Sun Hardware Manual Pages
- Solaris™ 7 AnswerBook Set
- Sun FDDI Drivers

Note – Some software options that were on the Supplement CD in previous releases are no longer included on the Sun Computer Systems Supplement CD. Refer to "Supplement CD Differences from Previous Releases" on page 54 for more information.

Software Support

Sun Computer Systems supplies the software on the Supplement CD. If you have support issues concerning this software, contact your authorized support provider.

You can use one of two methods to install software package clusters from the Supplement CD:

- `swmtool`
- `pkgadd`

`swmtool`, the Software Manager, is the recommended method to use when installing software package clusters from the Supplement CD. It provides a graphical user interface (GUI) that simplifies the task of installing the software package clusters. To use `swmtool` you must be running the Common Desktop Environment (CDE) or OpenWindows and have the X Window system installed on your system.

Note – Unless otherwise noted, `swmtool` is the installation method described throughout this chapter.

`pkgadd` is another method used to install software package clusters from the Supplement CD. `pkgadd` differs from `swmtool` in that you do not need to run CDE or OpenWindows. You can invoke the `pkgadd` command at the operating system prompt. For instructions on using `pkgadd`, go to "Installing Sun Computer Systems Supplements for Solaris 7 Software on a Standalone System Using pkgadd" on page 24.

Note – You can use the Solaris Web Start method to install most of the software from the Supplement CD at the same time you are installing from the Solaris CD. For more information on the Solaris Web Start method of installation, see the "*Using Solaris Web Start*" module in the Information Library.

Installing Sun Computer Systems Supplements for Solaris 7 Software Using `swmtool`

If you use `swmtool` to install packages from the Supplement CD, you can install packages for more than one software product during the same installation session.

Note – The individual software product sections later in this chapter contain complete procedures for installing each product. It may be more convenient for you to install more than one product during a single `swmtool` session.

The general process for installing clusters and packages using `swmtool` is:

- Insert the Supplement CD into your CD-ROM drive.
- Become superuser.
- Start `swmtool`.
- Select the clusters and packages you want to install.
- In the swmtool GUI, select Add.

Some products may require a customized installation. For example, if the packages should be installed in a directory other than the defauld directory, `/opt`. Specific directions for any customized installations are included in the individual software product sections in this chapter.

Installing Sun Computer Systems Supplements for Solaris 7 Software on a Standalone System Using `pkgadd`

To install packages for supported products from the Supplement CD using `pkgadd`:

1. **Insert the Supplement CD into your CD-ROM drive.**

   The File Manager window is displayed.

2. **Open a command window and become superuser using the `su` command and superuser password.**

3. **Type:**

   ```
   # /usr/sbin/pkgadd -d /cdrom/cdrom0/Product package_names
   ```

   The argument to the `-d` option must be a full path name to a device or directory. If you do not specify the device on which the package resides, `pkgadd` checks the default spool directory (`/var/spool/pkg`). If the package is not there, installation fails.

To install a particular product, choose the appropriate packages:

TABLE 3-1

Software Product	Packages
Open Data Base Connectivity Driver Manager (ODBC)	`ISLIodbc` `ISLIodbcD`

Online Validation Test Suite (SunVTS)	`SUNWvts`
	`SUNWvtsmn`
	`SUNWodu`
	`SUNWsycfd`
	`SUNWvtsx`

OpenGL Software	`SUNWglrt`
	`SUNWglrtu`
	`SUNWffbgl`
	`SUNWglwrt`
	`SUNWafbgl`
	`SUNWffbxg`
	`SUNWafbgx`
	`SUNWffbgx`
	`SUNWglrtx`

PC file viewer	`SUNWdtpcv` `SUNWdtpcz`

ShowMe TV	`SUNWsmtvh`
	`SUNWsmtvr`
	`SUNWsmtvt`
	`SUNWsmtvu`

TABLE 3-1

Software Product	Packages
Solaris 7 AnswerBook Set	`SUNWabhdw`

Sun Computer Systems Manual Pages	`SUNWnfm`
	`SUNWpfm`
	`SUNWvtsmn`

SunFDDI	`SUNWnfd`
	`SUNWnfh`
	`SUNWnfm`
	`SUNWnfu`
	`SUNWpfd`
	`SUNWpfh`
	`SUNWpfm`
	`SUNWpfu`

If `pkgadd` encounters a problem during package installation, information about the problem is displayed, followed by this prompt:

```
Do you want to continue with this installation?
```

Respond with either `yes`, `no`, or `quit`.

Open Data Base Connectivity (ODBC) Driver Manager

ODBC is an open database connectivity standard for data access. The InterSolv DataDirect ODBC Driver Manager allows you to access the ODBC API interface. The driver manager determines the appropriate database requests from client applications, loads the ODBC database drivers, and routes ODBC function calls to the drivers. In addition to the DataDirect ODBC Driver Manager, you need ODBC drivers to provide the critical link between your ODBC-compliant client/server applications and your database.

Note – The ODBC Driver Manager is not a Sun Microsystems Inc. supported product. ODBC Driver Manager is a product of InterSolv. For all technical questions or support please contact InterSolv.

For support questions or information about the ODBC Drivers, contact Intersolv at `sunsoft@intersolv.com` or through one of the following phone numbers:

- USA and Canada: 800-547-4000; FAX 919-461-4526
- Asia Pacific: 1-301-838-5241
- Australia: 61(3) 816-9977
- France: 33 (1) 49-03-09-99
- Germany: 49 (89) 962-71-152
- United Kingdom: 44(1727) 812-812

The mailing address is: InterSolv, 9420 Key West Avenue, Rockville, Maryland, 20850, USA.

Further information is available at `http://www.intersolv.com`.

ODBC is a standard for data access from Microsoft and X/Open. Databases supporting ODBC include Clipper, dBASE, FoxBase, FoxPro, INFORMIX, INGRES, Microsoft SQL Server, Oracle, Sybase System 10, Sybase SQL Server, and Sybase NetGateway to DB2 and other databases, and ASCII text files.

The Supplement CD includes a demo version of the InterSolv ODBC dBASE driver. This demo software can display only 30 records and process 100 SQL statements, but is otherwise fully functional.

InterSolv ODBC Clusters and Packages

TABLE 3-2 provides a list of InterSolv ODBC packages provided on the Supplement CD.

TABLE 3-2   InterSolv ODBC Clusters and Packages

Cluster Name	Includes Cluster/ Package	Description
SUNWCodbc	ISLIodbc	ODBC (Open DataBase Connectivity) Driver Manager
	ISLIodbcD	Demo ODBC (Open DataBase Connectivity) Mutli-Dialect dBASE Driver

Installing InterSolv ODBC Software

To install the InterSolv ODBC software, follow these steps:

1. Start CDE or OpenWindows.

2. **Insert the Supplement CD into your CD-ROM drive.**

   The File Manager window is displayed.

3. **Open a command window and become superuser using the `su` command and superuser password.**

4. **Enter the `swmtool` command at the `#` prompt:**

   ```
   # /usr/sbin/swmtool
   ```

   The Admintool:Software window is displayed.

5. **Select `Add` from the Edit Menu.**

   The Admintool:Set Source Media window is displayed.

6. **Type**

   ```
   # cd /cdrom/cdrom0/Product
   ```

   The Admintool:Add Software window is displayed.

7. **In the Admintool:Add Software window, select ODBC Driver Manager Software 2.11.**

   This will install the `SUNWCodbc` cluster, which includes both the driver manager package (`ISLIodbc`) and the demo dBASE driver package (`ISLIodbcD`).

8. **Click the Customize option if you want to select only one of these packages or change the destination directory from `/opt`.**

   The Admintool:Customize Installation window appears. When you have made the choices you want, click the `Add` option to return to the Admintool: Add Software window.

9. **In the Admintool:Add Software window, click Add.**

   The installation process should take a few minutes. You'll need to respond to prompts to install each InterSolv package you've selected. This message window is closed when installation is complete.

10. **Quit the Admintool:Software window.**

Using InterSolv ODBC Software

To use InterSolv ODBC software, refer to the PostScript files installed in the `/opt/ISLIodbc/2.11/doc` directory. For further details on the driver manager and the demo dBASE driver, refer to the man pages for `odbc.ini` and `qedbf` installed in the `/opt/ISLIodbc/2.11/man/man4` directory. Also refer to the comments about installation on your system in the `/opt/ISLIodbc/2.11/install.log` file.

Online Validation Test Suite Software (SunVTS)

The SunVTS™ online validation test suite is a diagnostic tool designed to test Sun hardware. By running multiple diagnostic hardware tests, the SunVTS software verifies the configuration and functionality of most hardware controllers and devices in a 32-bit or 64-bit environment.

Within this environment, you can run individual tests designed to validate all currently supported hardware that Sun sells. The SunVTS environment also allows programmers to develop their own tests and run them on SunVTS interfaces.

You can find the software for the SunVTS application on the Supplement CD. To use the SunVTS software, refer to the *SunVTS 3.0 User's Guide*, *SunVTS 3.0 Test Reference Manual*, and the *SunVTS Quick Reference Card*.

TABLE 3-3 describes the main features of the SunVTS environment:

TABLE 3-3 SunVTS Diagnostic Tools

Features	Description
SunVTS kernel (`vtsk`)	The SunVTS kernel controls all aspects of the testing. It is a daemon designed to stay in the background, and to be used when needed. Upon starting, the SunVTS kernel probes the hardware configuration of the system under test and waits for instructions from a user interface. During testing, the SunVTS kernel coordinates the running of individual tests, and manages all the messages (informational and error messages) sent by these tests.
SunVTS OPEN LOOK user interface (`vtsui.ol`)	This interface is designed to be run on top of OpenWindows. Through its numerous buttons and windows, users can set options, select tests, read log files, and start and stop testing sessions (plus many other options).
SunVTS CDE user interface (`vtsui`)	This interface is designed to run on top of the Common Desktop Environment (CDE). It will also run on top of OpenWindows if the CDE package `SUNWdtbas` is installed. Features are similar to the interface listed above (`vtsui.ol`).
SunVTS TTY user interface (`vtstty`)	Because not every system has a monitor, SunVTS has a TTY interface. This ASCII menu-based interface accepts various key sequences to control the test options and the test sessions. It can be used from a terminal, a shelltool, or a modem.
Running an individual test from the command line	Besides being run from a SunVTS user interface, each individual hardware test can be run from a UNIX® command line. Running a test alone can be helpful to validate only one piece of hardware.
Custom test support	A SunVTS user can run third-party executable test binaries under the SunVTS environment in the way that the test, rather than the SunVTS kernel, fully controls its input argument list and output log files. A user can simply modify the `.customtest` file provided by SunVTS to make it loosely coupled to the environment.

SunVTS Clusters and Packages

TABLE 3-4 provides a list of SunVTS clusters and packages needed to run the SunVTS diagnostic tool.

TABLE 3-4 SunVTS Clusters and Packages on the Supplement CD

Cluster	Includes Packages	Name	Description
SUNWCvts	SUNWvts	Online Validation Test Suite	SunVTS kernel, User Interface (UI), tests and tools
	SUNWvtsmn	Online Validation Test Suite Manual Pages	Manual pages for SunVTS utilities/binaries
	SUNWsycfd		Standalone configuration reader
SUNWCvtsx	SUNWvtsx	Online Validation Test Suite	64-bit Online Validation Test Suite software
SUNWCondg	SUNWodu	Online Validation Test Suite Diagnostics	Online diagnostics tool software Note: SUNWodu is not installed via WebStart. You must install it using pkgadd.

Installing SunVTS Software

To install the SunVTS software, follow these steps:

1. **Start CDE or OpenWindows.**

2. **Insert the Supplement CD into your CD-ROM drive.**

   The File Manager window is displayed.

3. **Open a command window and become superuser using the** su **command and superuser password.**

4. **Enter the** swmtool **command at the** # **prompt:**

```
# /usr/sbin/swmtool
```

   The Admintool:Software window is displayed.

5. **Select** Add **from the Edit Menu.**

   The Admintool:Set Source Media window is displayed.

6. **Type :**

```
# cd /cdrom/cdrom0/Product
```

The Admintool:Add Software window is displayed.

7. **In the Admintool:Add Software window, select the package clusters you want: Online diagnostics Tool Software 3.0, Online Validation Test Suite Software 3.0, and/or 64 Bit Online Validation Test Suite Software 3.0.**

8. **Click Add.**

The installation process should take a few minutes.

9. **Quit Admintool.**

Using SunVTS Software

To use SunVTS software, refer to the *SunVTS 3.0 User's Guide* in the Solaris 7 on Sun Hardware AnswerBook set. For SunVTS test and quick reference information, refer to the *SunVTS 3.0 Test Reference Manual* and *SunVTS Quick Reference Card*.

OpenGL Software

The Solaris OpenGL software is Sun's native implementation of the OpenGL application programming interface (API). The OpenGL API is an industry-standard, vendor-neutral graphics library. It provides a small set of low-level geometric primitives and many basic and advanced 3D rendering features, such as modeling transformations, shading, lighting, anti-aliasing, texture mapping, fog, and alpha blending.

Supported Platforms

The Solaris OpenGL 1.1.2 software supports the following devices:

- Creator Graphics and Creator3D Graphics – OpenGL functionality is accelerated in hardware.
- SX, GX, GX+, TGX, TGX+, S24 – OpenGL functionality is performed in software.

■ All Sun SPARC™ systems equipped with the following frame buffers are supported on the OpenGL 1.1.2 software: the TCX, SX, GX, Creator, and Elite3D families of frame buffers. This includes Ultra™ desktop, Sun Enterprise™ and all the legacy SPARCstation™ family.

Removing Old Packages

If you have older versions of the Solaris OpenGL software packages, you must use the pkgrm command to remove them. Follow these steps:

1. **Check to see whether any older versions of the OpenGL packages are installed using the** pkginfo **command.**

   The pkginfo | egrep -i "OpenGL" command lists any existing OpenGL packages that you have installed.

```
% pkginfo | egrep -i "OpenGL"
application SUNWffbgl     Creator Graphics (FFB) OpenGL Support
application SUNWglrt      OpenGL Runtime Libraries
application SUNWglrtu     OpenGL Platform Specific Runtime Libraries
application SUNWglwrt     OpenGL Widget Library
application SUNWafbgl     Loadable pipeline for UPA Bus Elite3D graphics
application SUNWgldoc     Solaris OpenGL Documentation and Man Pages
application SUNWglh       Solaris OpenGL Header Files
application SUNWglut      Solaris OpenGL Utilities and Example Programs
application SUNWglwh      Solaris OpenGL Widget Header Files
```

2. **To remove the packages, become superuser:**

```
% su
Password: superuser password
```

3. **Run** pkgrm **to remove all existing Solaris OpenGL packages.**

```
# pkgrm SUNWglrt SUNWglh...
```

Installing the OpenGL Software

To install the OpenGL software, follow these steps:

1. **Start CDE or OpenWindows.**

2. **Insert the Supplement CD into your CD-ROM drive.**

   The File Manager window is displayed.

3. **Open a command window and become superuser using the** `su` **command and superuser password.**

4. **Enter the** `swmtool` **command at the** # **prompt:**

   ```
   # /usr/sbin/swmtool
   ```

   The Admintool:Software window is displayed.

5. **Select Add from the Edit Menu.**

   The Admintool:Set Source Media window is displayed.

6. **Type:**

   ```
   # cd /cdrom/cdrom0/Product
   ```

   The Admintool:Add Software window is displayed

7. **In the Admintool:Add Software window, select Open GL Runtime Libraries 1.1.2.**

8. **Click Add.**

   The installation process should take a few minutes.

9. **Quit Admintool.**

OpenGL Clusters and Packages

TABLE 3-5 lists the clusters and packages that are provided with Solaris OpenGL.

TABLE 3-5   OpenGL Clusters and Packages

Cluster Name	Package Name	Description	Default Install Location
SUNWCogl	SUNWglrt	OpenGL client-side runtime libraries	/usr/openwin/lib
	SUNWglrtu	UltraSPARC-specific OpenGL libraries	/usr/openwin/ platform/sun4u/lib/ GL
	SUNWffbgl	Device pipeline for Creator and Creator3D Graphics frame buffers	/usr/openwin/lib/GL/ devhandlers
	SUNWglwrt	OpenGL widget library	/usr/openwin/lib
	SUNWafbgl	Loadable pipeline for UPA Bus Elite3D graphics	/usr/openwin
	SUNWglrtx	Sun OpenGL 64-bit Runtime Libraries	/usr/openwin
	SUNWafbgx	Sun OpenGL 64-bit loadable pipeline for the UPA Bus Elite3D graphics accelerator	/usr/openwin
	SUNWffbgx	Sun OpenGL 64-bit loadable pipeline for the UPA Bus Creator graphics accelerator	/usr/openwin

After Installing the Packages

After installing the packages, do the following:

1. **Exit the window system and restart it so that the window system loads the newly installed GLX server extension.**

2. **To verify that the OpenGL libraries are installed correctly, run**
   `ogl_install_check`.

   The `ogl_install_check` test program prints the version of the OpenGL library
   and renderer used, and renders a rotating wheel. The program returns the following
   output when it is run on an UltraSPARC Creator3D:

   ```
   OpenGL Vendor:              Sun Microsystems, Inc.
   OpenGL Version:             1.1.2 Solaris OpenGL 1.1.2_08
   ```

   For diagnostic purposes, the following values should be noted anytime that Solaris
   OpenGL problems are seen:

   ```
   OpenGL Renderer:             Creator 3D, VIS
   OpenGL Extension Support:    GL_EXT_texture3D
                                GL_SGI_color_table
                                GL_SUN_geometry_compression
                                GL_EXT_abgr
                                GL_EXT_rescale_normal
   OpenGL GLX Server:           Detail Status Report
        GLX:      Context is direct.
        GLX:      OpenGL Rendering in use
        GLX:      Double Buffering in use
        GLX:      Color Buffer (GLX_BUFFER_SIZE) = 24 bits
        GLX:      Depth Buffer (GLX_DEPTH_SIZE) = 28 bits
        GLX:      Stencil Buffer (GLX_STENCIL_SIZE) = 4 bits
        GLX:      RGBA (True Color/Direct Color) Visual in use
   OpenGL Library:              Detail Status Report
        Number of color bits (R/G/B/A): 8/8/8/0
        Frame Buffer Depth (GL_DEPTH_BITS):28
   ```

Unexpected Slow Local Rendering

Whenever possible, Solaris OpenGL renders directly to the frame buffer, bypassing
the X server. This is enabled by Sun's DGA mechanism for locking portions of the
screen. However, a Solaris security feature only allows the user who originally
logged in to the window system to use DGA to lock portions of the screen. Only
owners of the window system have access to DGA.

If you notice poor performance when rendering locally, the cause may be this Solaris
security feature. For example, if you start the window system, and another user at
the workstation changes to that user's own environment using `su`, the application
will not run via DGA even though the second user is running the application locally.

If you notice slow local rendering, run the `ogl_install_check` diagnostic program (found in `/usr/openwin/demo/GL`) to determine whether the application is running via DGA. If the OpenGL GLX Server status report from the `ogl_install_check` program says that the GLX context is indirect, the login permissions need to be edited to enable DGA access for all users.

To give all local users access to DGA, follow these steps:

1. **Become superuser.**

```
% su
Password: superuser password
```

2. **Edit permissions to allow world read/write access to the following devices:**

```
% chmod 666 /dev/mouse /dev/kbd /dev/sound/* /dev/fbs/*
```

This will enable DGA access by all users for the duration of the current window system session (subject to X authorization, see `xhost`(1)).

3. **Edit the** `/etc/logindevperm` **file and change the default permissions of all devices listed in the file to 0666 to allow world read/write access.**

For example, in the following lines in `logindevperm`, the 0600 should be changed to 0666 so that the next time you log in and restart your window system, it will still be accessible by all users.

```
/dev/console    0600     /dev/mouse:/dev/kbd
/dev/console    0600     /dev/sound/*      # audio devices
/dev/console    0600     /dev/fbs/*        #frame buffers
```

Note that your system is no longer secure.

PC File Viewer

The PC file viewer software provides you with an application to view popular PC file formats such as Word, PowerPoint, Excel, Lotus 1-2-3, and AutoCAD. The viewer allows you to choose a file and to copy and paste information from the viewer to another application, such as a text editor. CDE applications will be able to

identify these filetypes and launch this application by double-clicking on the icon in your mail attachment or from File manager (dtfile). PC file viewer supports the following file formats:

- Word Processing Formats
  - Microsoft Word for Windows Version through 7.0 and Word 97
  - Microsoft Windows Works Version through 4.0
  - Word Perfect for Windows Version through 7.0
  - AMI/AMI Professional Version through 3.1
- Spreadsheet Formats
  - Microsoft Excel Windows Version 2.2 through 7.0 and Excel 97
  - Microsoft Excel Chart Version 2.x through 7.0
  - Microsoft Windows Works Version through 4.0
  - Lotus 1-2-3 Windows Version through 6.x
  - Lotus 1-2-3 Chart Windows Version through 5.0
  - QuattroPro for Windows Version through 7.0
- Presentation Formats
  - Microsoft PowerPoint Version through 7.0 and PowerPoint 97
  - Corel Presentation Version through 7.0
  - FreelanceVersion 1.0 and 2.0
- Graphics Formats
  - BMP (Windows)
  - DXF Version through 13
  - GEM (Bitmap & vector)
  - PIC (Lotus)

PC File Viewer Limitations

PC file viewer is limited to the following products and configurations for this Solaris release:

- SPARC architecture ONLY
- Printing is not supported

The following limitations are related to displaying items in a supported file:

- Charts are not supported in QuattroPro

- Text that is designed to be shown vertically is shown horizontally in the viewer. This vertical text may overlap adjacent cells making reading what is in them difficult.
- Figures and footers are aligned with the anchors in the text. If font sizes on the viewing system are not identical to those on the authoring system, then anchored objects will not be at the appropriate place in the text.
- There is limited support for incremental shading in presentation file formats
- There is no support for drawing objects in MS Word, and Lotus.
- Borders in Word Perfect and AmiPro files are not supported
- Copy & paste does not work for Japanese text in Microsoft Office applications

Note – All of the above limitations also exist in the Microsoft Windows version of the product from Inso Corporation.

- There is no support for OLE objects
- If a font that is used in a document is not on the system, the default system font will be used and the viewed text may look different than what was seen in the authoring application.
- If a special character is used in a document that is not in the available character set, it will be replaced by an asterisk in the document as shown by the file viewer.

PC File Viewer Packages

TABLE 3-6 lists the packages that are provided with PC file viewer.

TABLE 3-6 PC file viewer Packages

Locale	Package Name	Description
English	SUNWdtpcv	US base package
	SUNWdtpcz	US base actions and messages
Japanese	SUNWjdpcv	Japanese EUC/PCK/UTF-8 common messages
	SUNWjepcv	Japanese EUC messages
	SUNWjppcv	Japanese PCK messages
	SUNWjupcv	Japanese UTF-8 messages
	SUNWjepcz	Japanese EUC action files
	SUNWjppcz	Japanese PCK action files
	SUNWjupcz	Japanese UTF-8 action files

TABLE 3-6 PC file viewer Packages *(Continued)*

Locale	Package Name	Description
Korean	SUNWkcpcv	Korean EUC/UTF-8 common messages
	SUNWkupcv	Korean UTF-8 messages
	SUNWkdpcv	Korean EUC messages
	SUNWkupcz	Korean UTF-8 action files
	SUNWkdpcz	Korean EUC action files
Traditional Chinese	SUNWhcpcv	Traditional Chinese EUC/BIG5 common files
	SUNW5pcv	Traditional Chinese BIG5 messages
	SUNWhdpcv	Traditional Chinese EUC messages
	SUNW5pcz	Traditional Chinese BIG5 action files
	SUNWhdpcz	Traditional Chinese EUC action files
Simplified Chinese	SUNWccpcv	Simplified Chinese EUC/GBK common messages
	SUNWcdpcv	Simplified Chinese EUC messages
	SUNWgpcv	Simplified Chinese GBK messages
	SUNWcdpcz	Simplified Chinese EUC action files
	SUNWgpcz	Simplified Chinese GBK action files
German	SUNWdepcv	German messages
	SUNWdepcz	German action files
French	SUNWfrpcv	French messages
	SUNWfrpcz	French action files
Spanish	SUNWespcv	Spanish messages
	SUNWespcz	Spanish action files
Italian	SUNWitpcv	Italian messages
	SUNWitpcz	Italian action files
Swedish	SUNWsvpcv	Swedish messages
	SUNWsvpcz	Swedish action files

Installing PC File Viewer

To install PC file viewer, follow these steps:

1. **Start CDE or OpenWindows.**

2. **Insert the Supplement CD into your CD-ROM drive.**

   The File Manager window is displayed.

3. **Open a command window and become superuser using the** `su` **command and superuser password.**

4. **Enter the** `swmtool` **command at the** # **prompt:**

   ```
   # /usr/sbin/swmtool
   ```

   The Admintool:Software window is displayed.

5. **Select Add from the Edit Menu.**

   The Admintool:Set Source Media window is displayed.

6. **Type:**

   ```
   # cd /cdrom/cdrom0/Product
   ```

   The Admintool:Add Software window is displayed.

7. **In the Admintool:Add Software window, select PC File Viewer 1.0.1.**

   The software is installed in the `/opt` directory (default).

8. **In the Admintool: Add Software window, click Add.**

   The installation process should take a few minutes.

9. **Quit Admintool.**

Using PC File Viewer (Command Line Usage)

To use PC file viewer *without* the icons, run the following command:

```
% /opt/SUNWdtpcv/bin/sdtpcv &
```

Adding PC File Viewer to the CDE Front Panel

To add PC file viewer to the CDE front panel, dtfile, dtpad, etc., do the following:

1. **Open File Manager (dtfile)**

2. **Go to the** `/opt/SUNWdtpcv/bin` **directory.**

   You will see the PC file viewer icon there.

3. **Open the CDE front panel where you want the icon.**

   For example, Application or File sub folder.

4. **Drag and drop the PC file viewer icon from File Manager to InstallIcon in the selected subfolder.**

   Now the PC file viewer can be launched by just clicking on the icon in the CDE front panel. You can also promote the icon to appear on the front panel by default.

ShowMe TV 1.2.1 Software

ShowMe TV is a television system for local- and wide-area networks. You can use it to view and broadcast live or prerecorded video programs on your network. Here are some examples of how you can use ShowMe TV:

- Broadcast and view training courses
- Lectures
- Corporate messages
- Monitor important news events

ShowMe TV contains the following components:

- ShowMe TV Receiver
- ShowMe TV Transmitter
- ShowMe TV Address Book

ShowMe TV Packages

TABLE 3-7 lists the packages that are provided with ShowMe TV.

TABLE 3-7   ShowMe TV Packages

Package Name	Description	Default Install Location	Disk Space (Kbytes)
SUNWsmtvh	Online help binaries and documentation	/opt/SUNWsmtv	287
SUNWsmtvr	ShowMe TV receiver application and support files	/opt/SUNWsmtv	10743
SUNWsmtvt	ShowMe TV transmitter application and support files	/opt/SUNWsmtv	7698
SUNWsmtvu	Support utilities	/opt/SUNWsmtv	842

Removing Old Packages

If you have ShowMe TV 1.1 or 1.2 installed, you need to remove it before installing ShowMe TV 1.2.1.

● **To remove ShowMe TV 1.1, type:**

```
# pkgrm SUNWsmUtl SUNWstv SUNWstvs
```

If you have an earlier release of ShowMe TV 1.2 installed, you need to remove it before installing any new software packages.

● **To remove ShowMe TV 1.2, type:**

```
# pkgrm SUNWsmtvt SUNWsmtvu SUNWsmtvr SUNWsmtvh
```

Installing the ShowMe TV 1.2.1 Software

To install the ShowMe TV software, follow these steps:

1. **Start CDE or OpenWindows.**

2. **Insert the Supplement CD into your CD-ROM drive.**

   The File Manager window is displayed.

3. **Open a command window and become superuser using the** `su` **command and superuser password.**

4. **Enter the** `swmtool` **command at the** `#` **prompt:**

   ```
   # /usr/sbin/swmtool
   ```

   The Admintool:Software window is displayed.

5. **Select** `Add` **from the Edit Menu.**

   The Admintool:Set Source Media window is displayed.

6. **Type:**

   ```
   # cd /cdrom/cdrom0/Product
   ```

   The Admintool:Add Software window is displayed.

7. **In the Admintool:Add Software window, select ShowMe TV 1.2.1.**

8. **Click Add.**

   The installation process should take a few minutes.

9. **Quit Admintool.**

Translated Documentation

The CD-ROM contains the *ShowMe TV User's Guide* in the following languages:

- French
- German
- Spanish
- Italian
- Swedish
- Japanese
- Korean
- Simplified Chinese
- Traditional Chinese

▼ Accessing the ShowMe TV Users Guide

The `/Docs/showmetv` directory on the Supplement CD contains the following files:

TABLE 3-8   ShowMe TV Translated Documents

File Name	Description
UG_en.ps	English PostScript™ file
UG_de.ps	German PostScript file
UG_fr.ps	French PostScript file
UG_es.ps	Spanish PostScript file
UG_it.ps	Italian PostScript file
UG_sv.ps	Swedish PostScript file
UG_ja.ps	Japanese PostScript file
UG_ko/	Korean HTML files
UG_zh/	Simplified Chinese HTML files
UG_zh_TW/	Traditional Chinese HTML files

● **To view the desired PostScript manual, type the following at the command line:**

```
# imagetool filename
```

● **To print the manual, either use the File menu in Image Tool or type the following at the command line:**

```
# lp filename
```

● **To view the manuals in HTML format, use a web browser and type the following in the address field:**

```
file://cdrom/cdrom0/Docs/directory
```

If you have copied the HTML files to a different directory, type in the path to that directory. Open the table of contents to determine which file to open.

Solaris 7 AnswerBook Set

For customers using Sun hardware, a set of online manuals in AnswerBook format is provided on the Supplement CD. The *Solaris 7 on Sun Hardware Collection* is contained in a package named `SUNWabhdw`.

Refer to the *SPARC: Solaris 7 SPARC Installation Instructions* that accompanies the AnswerBook CD for information about installing the Solaris 7 on Sun Hardware AnswerBook set.

Refer to the "Accessing Online Documentation" module in the *Solaris 7 Installation Library* for information about how to install document collections on an AnswerBook2 server.

The AnswerBook sets include general manuals as well as *Platform Notes*, which are manuals that cover use of Solaris 7 software with specific Sun hardware products.

TABLE 3-9 lists the manuals (online versions) found on this AnswerBook.

TABLE 3-9   Solaris 7 on Sun Hardware Manuals

Title	Description
Solaris 7 on Sun Hardware Documentation Guide	Describes other manuals in this set, and helps you determine which manuals are useful for the work you do with your hardware.
Solaris on Sun Hardware Reference Manual Supplement	Information to help you find a compilation of manual pages provided in packages on the Supplement CD. This includes man pages that cover SunVTS™ software.
Solaris Handbook for Sun Peripherals	Information about installing drives and other peripherals for use with the Solaris 7 software environment. Covers issues such as configuring SCSI addresses.
Solaris Handbook for Sun Frame Buffers	How to use features of the TurboGXPlus, SX, PGX (m64) and Creator Graphics Accelerator frame buffers. Also explains how to configure multiple monitors on a system. (In some past Solaris releases, this manual was titled *Platform Notes: SMCC Frame Buffers*.)
NFS Server Performance and Tuning Guide	Information about the performance and tuning of an NFS server.
SunVTS 3.0 User's Guide	Basic instructions on using the SunVTS diagnostic software.
SunVTS 3.0 Test Reference Manual	Information about each test provided with the SunVTS diagnostic software.
SunVTS Quick Reference Card	A quick reference card about how to use the SunVTS diagnostic software.
PCI: SBus Comparison	Describes feature differences between SBus and PCI.

TABLE 3-9 Solaris 7 on Sun Hardware Manuals *(Continued)*

Title	Description
Platform Notes: The hme FastEthernet Device Driver	Describes how to configure the hme device driver for use with the Ultra Workstation Series platform, Sun Enterprise Servers, SunSwift SBus Adapter, SunSwift PCI Adapter, and PCI SunFastEthernet Card.
Platform Notes: SPARCstation 10SX and 20 System Configuration Guide	How to take advantage of graphics memory and acceleration features of these systems.
Platform Notes: SPARCstation Voyager Software Guide	Information about Supplement CD software used with the SPARCstation Voyager system. Also contains information for system administrator's supporting users with SPARCstation Voyager systems.
Platform Notes: Sun Enterprise 3000, 4000, 5000, and 6000 Systems	Lists and describes Sun Enterprise X000-specific OpenBoot commands, including those for board hot-plug operations. Also contains board hot-plug procedures, and miscellaneous small pieces of related information.
Platform Notes: Sun Enterprise 250 Server	Covers new OpenBoot commands, configuration variables, and disk drive hot-plug procedures. Also provides procedures for mapping between logical and physical device names for internal storage devices.
Platform Notes: Sun Ultra 450 Workstation and Sun Enterprise 450 Server	Covers new OpenBoot commands, configuration variables, and disk drive hot-plug procedures. Also provides procedures for mapping between logical and physical device names for internal storage devices.
Platform Notes: Using luxadm Software	Describes how to use the luxadm administrative program with the Sun StorEdge A5000 and the SPARCstorage Array.
Platform Notes: Sun FDDI Adapters	Describes how to configure the SunFDDI driver software and use the SunFDDI network utilities.
Dynamic Reconfiguration User's Guide for Sun Enterprise 3x00,4x00/5x00/6x00 Systems	Information about how to use Dynamic Reconfiguration software features on these Sun Enterprise servers.

Additional documentation can be found on the Supplement CD in the `/cdrom/cdrom0/Docs` directory.

Solaris 7 AnswerBook Clusters and Packages

The following table lists the clusters and packages that are provided for Solaris 7 AnswerBooks.

TABLE 3-10   Solaris 7 AnswerBook Clusters and Packages on the Supplement CD

Cluster Name	Includes Package	Description
SUNWCabks	SUNWabhdw	Solaris 7 on Sun Hardware Collection

Installing AnswerBooks

To install the AnswerBook cluster or a particular AnswerBook, follow these steps:

1. **Start CDE or OpenWindows.**

2. **Insert the Supplement CD nto your CD-ROM drive.**

   The File Manager window is displayed.

3. **Open a command window and become superuser using the** su **command and superuser password.**

4. **Enter the** swmtool **command at the** # **prompt:**

   ```
   # /usr/sbin/swmtool
   ```

   The Admintool:Software window is displayed.

5. **Select Add from the Edit Menu.**

   The Admintool:Set Source Media window is displayed.

6. **Type:**

   ```
   # cd /cdrom/cdrom0/Product
   ```

   The Admintool:Add Software window is displayed.

7. **In the Admintool:Add Software window, select SMCC AnswerBooks Cluster 1.0.**

8. **Click the Customize option.**

   The Admintool:Customize Installation window is displayed.

9. **In the Admintool:Customize Installation window, click the Deselect All option.**

10. **Click on the box beside the AnswerBook cluster or AnswerBook you desire.**

11. **In the Installation Directory window, enter the directory where you want the AnswerBook installed.**

    Leaving this blank will install the software in the `/opt` directory (default).

    Note – `/opt` is recommended as the home directory for the Solaris 7 AnswerBooks.

    ---

12. **Click OK.**

13. **In the Admintool: Add Software window, click Add.**

    The installation process should take a few minutes.

14. **Quit Admintool.**

    Note – For further information on installing AnswerBooks, refer to the "Accessing Online Documentation" module in the *Solaris 7 Installation Library*.

Using the Solaris 7 AnswerBook Set

To determine which of the manuals in this AnswerBook set are of interest to you, see the *Solaris 7 on Sun Hardware Documentation Guide* in this set.

To use any AnswerBook set, see the *Solaris User's Guide* in the Solaris 7 User AnswerBook on the Solaris CD.

Sun Computer Systems Manual Page Clusters and Packages

The `SUNWCman` cluster will install all the manual (man) pages for software on the Supplement CD. This provides a way to install the man pages on a system without installing the software they describe on that system.

TABLE 3-11 Sun Computer Systems Manual Page Clusters and Packages on the Supplement CD

Cluster Name	Includes Package	Name	Description
SUNWCman	SUNWvtsmn	Online Validation Test Suite Manual Pages	All manual pages for SunVTS drivers/binaries
	SUNWnfm	SunFDDI SBus Manual Pares	All manual pages for SunFDDI SBus
	SUNWpfm	SunFDDI PCI Manual Pages	All manual pages for SunFDDI PCI

Installing Sun Computer Systems Manual Pages

To install the Sun Computer Systems Manual Pages, follow these steps:

1. Start CDE or OpenWindows.

2. Insert the Supplement CD into your CD-ROM drive.

The File Manager window is displayed.

3. Open a command window and become superuser using the `su` command and superuser password.

4. Enter the `swmtool` command at the `#` prompt:

```
# /usr/sbin/swmtool
```

The Admintool:Software window is displayed.

5. Select Add from the Edit Menu.

The Admintool:Set Source Media window is displayed.

6. **Type:**

```
# cd /cdrom/cdrom0/Product
```

The Admintool:Add Software window is displayed.

7. **In the Admintool:Add Software window, select SMCC Manual Page Cluster 1.0.**

8. **Click the Customize option.**

The Admintool:Customize Installation window is displayed.

9. **In the Admintool:Customize Installation window, click the Deselect All option.**

10. **Click on the box beside Manual Page Cluster.**

11. **In the Installation Directory window, enter the directory where you want the SMCC Manual Page Cluster installed.**

Leaving this blank will install the software in the /opt directory (default).

Note – /opt is recommended as the home directory for the Sun Computer Systems Manual Page Cluster.

---

12. **Click OK.**

13. **In the Admintool: Add Software window, click Add.**

The installation process should take a few minutes.

14. **Quit Admintool.**

Using Sun Computer Systems Manual Pages

To view the man pages you have installed, use the man command as you would for the man pages installed as part of the Solaris installation. These additional man pages are also available in the *Solaris on Sun Hardware Reference Manual Supplement* in the Solaris 7 on Sun Hardware AnswerBook set.

SunFDDI Drivers Included on the Supplement CD

The following FDDI drivers are provided on the Supplement CD contained in your Solaris 7 Media Kit:.

TABLE 3-12   SunFDDI Clusters and Packages

Cluster Name	Includes Packages	Description
SUNWCfdis	SUNWnfd	SunFDDI Sbus drivers
	SUNWnfh	SunFDDI Sbus header files
	SUNWnfm	SunFDDI Sbus man pages
	SUNWnfu	SunFDDI Sbus utilities
SUNWCfdip	SUNWpfd	SunFDDI PCI drivers
	SUNWpfh	SunFDDI PCI header files
	SUNWpfm	SunFDDI PCI man pages
	SUNWpfu	SunFDDI PCI utilities

Note – SunFDDI supports booting from the 32-bit kernal or the 64-bit kernal. SunFDDI will attach to whichever you choose to boot from with no special user interaction.

Installing SunFDDI Drivers

To install SunFDDI, follow these steps:

1. **Start CDE or OpenWindows.**

2. **Insert the Supplement CD into your CD-ROM drive.**

   The File Manager window is displayed.

3. **Open a command window and become superuser using the** su **command and superuser password.**

4. **Enter the** `swmtool` **command at the** # **prompt:**

```
# /usr/sbin/swmtool
```

The Admintool:Software window is displayed.

5. **Select Add from the Edit Menu.**

The Admintool:Set Source Media window is displayed.

6. **Type:**

```
# cd /cdrom/cdrom0/Product
```

The Admintool:Add Software window is displayed.

7. **In the Admintool:Add Software window, select either SunFDDI PCI Driver Software 2.0 or SunFDDI Sbus Driver Software 6.0, whichever is appropriate for your system.**

8. **Click Add.**

The installation process should take a few minutes.

9. **Quit Admintool.**

Note – For more infornation about the SunFDDI Drivers, refer to *Platform Notes: SunFDDI Drivers*.

Supplement CD Differences from Previous Releases

TABLE 3-13   Supplement CD Differences from Previous Releases

Software	Description
Power Management	The Power Management software option is now included as a standard part of the Solaris 7 product on the Solaris CD.
SPARCstation Voyager	The SPARCstation Voyager software option is now included as a standard part of the Solaris 7 product on the Solaris CD.
Solstice SyMON	The Solstice SyMON software option is not included on this Sun Computer Systems Supplement CD.
OpenGL Developer	The OpenGL Developer packages are no longer included on the Sun Computer Systems Supplement CD.
Sun Enterprise 10000 system	The Sun Enterprise 10000 software options are no longer included on the Sun Computer Systems Supplement CD.
Alternate Pathing	The Alternate Pathing software option is not included on this Sun Computer Systems Supplement CD.

Updating the Flash PROM on the Ultra 1, Ultra 2, Ultra 450, and Sun Enterprise 450 Systems

The steps in this chapter describe how to update the flash PROM on the Ultra™ 1, Ultra 2, Ultra 450, and the Sun™ Enterprise™ 450 systems.

Some systems will need to be updated to a higher level of OpenBoot™ firmware in the flash PROM before they can run the 64-bit mode of the Solaris™ 7 operating environment. The OpenBoot firmware is contained within a single flash PROM for the Ultra 1, Ultra 2, Ultra 450, and the Sun Enterprise 450 systems.

Note – Only those systems identified in this chapter and the following chapter need the flash PROM upgrade.

The flash PROM devices, which contain OpenBoot, are electrically erasable and writable devices. This means that the firmware can be updated without removing the flash PROM from the system board.

Related Material

You can also use the Flash PROM Update Multimedia Collection containing videos of how to upgrade the Flash PROM in the Ultra 1, Ultra 2, Ultra 450, and Sun Enterprise 450 systems. This collection is located on the Flash PROM Update Multimedia AnswerBook CD. For more information, see "Flash PROM Update Multimedia Collection" on page 79.

Determining If the Flash PROM Needs Updating

Only sun4u systems that can run the 64-bit mode of the Solaris 7 operating environment might need the flash PROM update. Systems that can only run the 32-bit mode (such as those in the sun4c, sun4d, and sun4m platform groups) do not require updated firmware to run Solaris 7 software.

Note – If the Solaris 7 operating environment notified you that the flash PROM in your system needs updating, skip the steps in the procedure "To Determine If Your System Requires a Flash PROM Update" on page 56 and go directly to "Updating the Flash PROM" on page 57.

▼ To Determine If Your System Requires a Flash PROM Update

1. **Determine the architecture type of your system.**

```
% uname -m
```

TABLE 4-1   Determining the System Architecture

If your system architecture type is . . .	Then . . .
• sun4u	Go to Step 2.
• sun4c, sun4d, sun4m	You do not need a flash PROM update. Do not proceed further.

2. **Determine the system type of your system.**

```
% uname -i
```

TABLE 4-2 Determining the System Type

If your system type is one of the following systems. . .	Then . . .
SUNW, Ultra-1 SUNW, Ultra-2 SUNW, Ultra-4 SUNW, Ultra-Enterprise	Go to Step 3 for each system type.
Not in the above list	You do not need a flash PROM update. Do not proceed further.

3. **Determine the version level of the firmware in your system. Type:**

```
% prtconf -V
```

TABLE 4-3 Determining the Firmware Version Level

If your system type is . . .	And you see a number lower than . . .	Then . . .	Otherwise . . .
SUNW, Ultra-1	3.11.1	Proceed to "Updating the Flash PROM" on page 57.	You do not need a flash PROM update. Do not proceed further.
SUNW, Ultra-2	3.11.2	Proceed to "Updating the Flash PROM" on page 57.	You do not need a flash PROM update. Do not proceed further.
SUNW, Ultra-4	3.7.107	Proceed to "Updating the Flash PROM" on page 57.	You do not need a flash PROM update. Do not proceed further.
SUNW, Ultra-Enterprise	3.2.16	Proceed to Chapter 5.	You do not need a flash PROM update. Do not proceed further.

Updating the Flash PROM

This section describes the following:

- Capturing configuration variable settings
- Installing the Solaris 7 operating environment
- Making the flash PROM write-enabled
- Steps to perform before updating the flash PROM
- Updating the flash PROM

Note – For step-by-step instructions, follow the procedures beginning with "To Capture the Configuration Variable Settings" on page 58.

After installing the Solaris 7 operating environment, on your hardware set the write-protect/enable flash PROM jumper to the write-enable position (Sun Ultra 1 and Ultra 2 systems) before you attempt to update the firmware in the flash PROM. To change the write protection state of the Sun Enterprise 450 system, turn the external front panel keyswitch.

Refer to the recovery procedure covered later in this chapter if there is a power interruption during the update process.

Return the write-protect/enable jumper (Sun Ultra 1 and Ultra 2 systems) to the write-protect position after updating the firmware in the flash PROM.

When your system has been updated to the proper firmware revision, you can run the Solaris 7 software in 64-bit mode.

Capturing Configuration Variable Settings

While the Solaris operating environment is still running, capture the NVRAM configuration variable settings *before* you install the Solaris 7 operating environment or begin the flash PROM update process. This will enable you to restore customized settings if there is a problem during the flash PROM upgrade.

▼ To Capture the Configuration Variable Settings

1. **Using the** `eeprom` **utility, capture the system's configuration variable settings in a file. The** *filename* **is any file name you choose.**

```
% eeprom > filename
```

Note – If you have custom values installed in `oem-logo` or `keymap`, those values cannot be displayed or printed properly by the `eeprom` utility because the contents contain binary information. If it is necessary to restore these values after a power loss, you should determine the original method by which these values were placed into NVRAM and use that method to restore the values.

2. **Print out the values captured by the** `eeprom` **command. You must have a printed copy of the configuration values before you install the Solaris 7 operating environment and begin to update the flash PROM. Type the following:**

```
lp filename
```

▼ To Install the Solaris 7 Operating Environment

● **Install the Solaris 7 operating environment on your system.**

Refer to the *Installation Library* shipped in your Solaris 7 media kit. As the Solaris 7 operating environment is installed, you will be notified whether the flash PROM in your system needs updating. Installing this Solaris release will provide the software that can upgrade your system's flash PROM to the required level.

Making the Flash PROM Write-Enabled

Before you update the OpenBoot firmware contained in the flash PROM, you must set a jumper to the write-enable position (Sun Ultra 1 and Ultra 2 systems) or set the front panel keyswitch to the proper position (Sun Enterprise 450 system and the Sun Ultra 450 workstation).

The Sun Ultra 1 and Ultra 2 systems, which do not have a front panel keyswitch, are equipped with jumpers on their motherboards that allow the flash PROM to be either write-protected or write-enabled. The default position as shipped from the factory is for the flash PROM to be write-protected. In order for the flash PROM to be updated, you must change the jumper to the write-enable position.

▼ Sun Ultra 1 and Ultra 2 Systems: To Change the Jumper to the Write-Enable Position

1. **Shut down the system. Type the following:**

```
% su
Type your superuser password
# init 0
System shutdown messages
```

2. **Power off the system unit.**

   Refer to the installation guide or service manual for your system.

3. **Remove the system access cover.**

   Refer to the installation guide or service manual for your system for this procedure.

4. **Use proper grounding procedures such as wearing a wrist strap to avoid electrostatically damaging system components.**

   Refer to the installation guide or service manual for your system for this procedure.

5. **Locate the flash PROM J2003 write-protect/enable jumper on the motherboard in your system:**

   - See FIGURE 4-1 if you have a Sun Ultra 1 Series system.
   - See FIGURE 4-2 if you have a Sun Ultra 1 Creator Series system.
   - See FIGURE 4-3 if you have a Sun Ultra 2 system.

   You may have to remove a plug-in card if the card is covering the flash PROM jumper. Refer to your service manual for your system to remove the card.
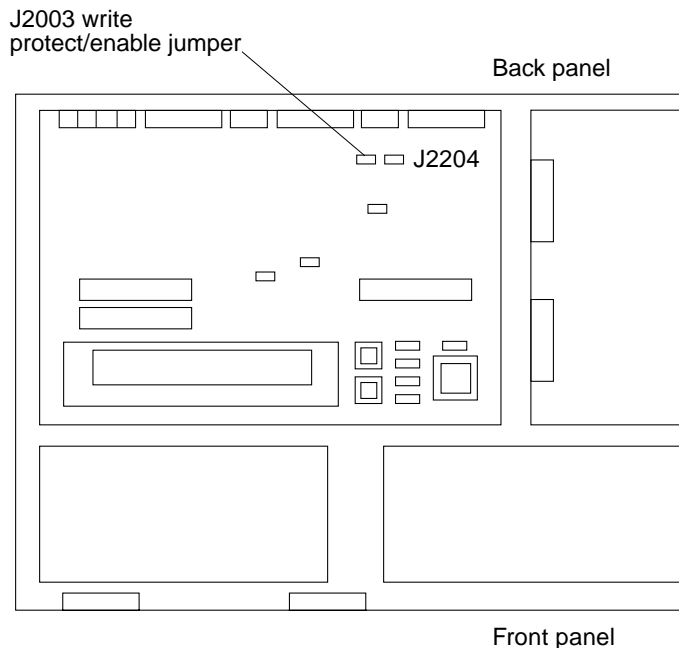
FIGURE 4-1 Sun Ultra 1 Series Write-Protect/Enable Jumper Location on Motherboard

J2003 write
protect/enable jumper

Back panel
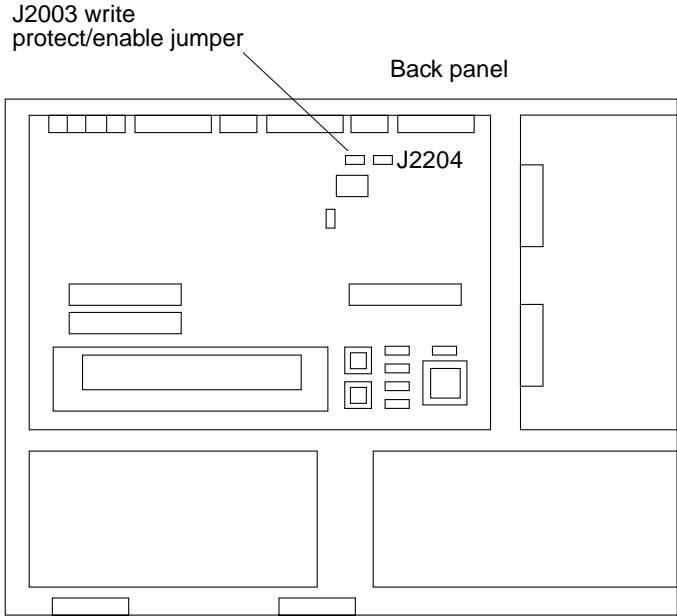
FIGURE 4-2 Sun Ultra 1 Creator Series Write-Protect/Enable Jumper Location on Motherboard

J2003 write
protect/enable jumper

Back panel
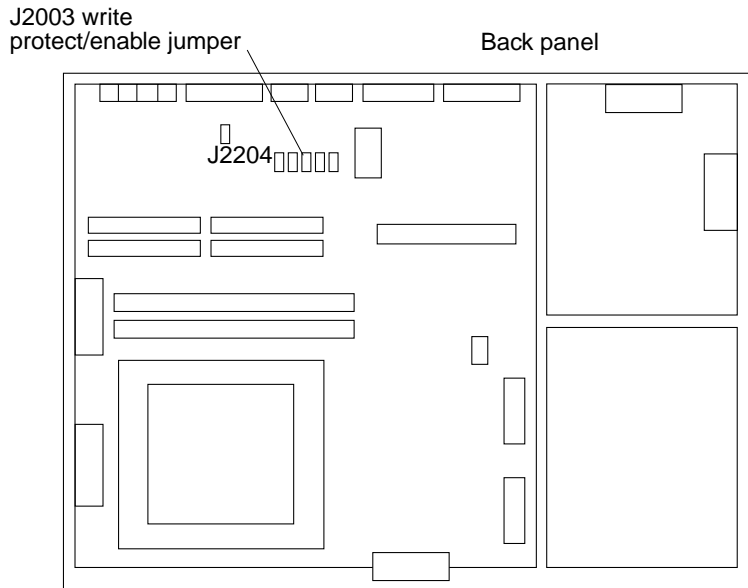
FIGURE 4-3 Sun Ultra 2 System Write-Protect/Enable Jumper Location on Motherboard

6. **Set the J2003 write-protect/enable jumper to pins 2 and 3 jumpered (write enabled) using needlenose pliers (see** FIGURE 4-4**). Pin 1 is noted by an asterisk (*).**

```
  *              *
  1 2 3          1 2 3
  Write          Write
  protected      enabled
```
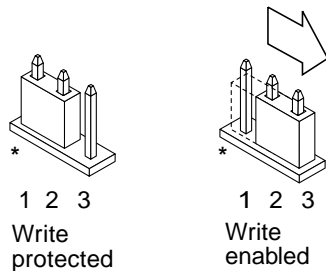
FIGURE 4-4   Setting the Write-Protect/Enable Jumper to the Write-Enable Position

TABLE 4-4   Jumper Setting

Jumper	Pins 1 + 2 Jumpered	Pins 2 + 3 Jumpered	Default Jumper on Pins	Name
J2003	Write-protect	Write-enable	1 + 2	Write-protect/enable

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

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

Refer to the installation guide or service manual for your system for this procedure.

9. **Go to "Before Updating the Flash PROM" on page 64.**

Sun Enterprise 450 System and the Sun Ultra 450 Workstation: Disabling Write Protection

For the Sun Enterprise 450 system and the Sun Ultra 450 workstation you do not have to change jumper pins. Instead, you move the keyswitch to allow the flash PROM to be write-enabled.

When the switch is set to the Locked position (FIGURE 4-5), the flash PROM is write-protected. When the switch is set to the On or Diagnostics position, the flash PROM is write-enabled.

▼ To Write Enable the Flash PROM on the Sun Enterprise 450 System and the Sun Ultra 450 Workstation

● **Turn the keyswitch to the On or Diagnostics position (**FIGURE 4-5**) before updating the flash PROM.**

Note – Disabling write-protection the Sun Enterprise 450 system or the Ultra 450 workstation assumes that the write-protect/enable jumper was set in the default position (enabled). If you previously changed the write-protect/enable jumper to be write protected, perform the steps to make the flash PROM write enabled in "Location of Flash PROM Jumpers in Sun Enterprise 450 System and the Ultra 450 Workstation" on page 77. You must change the jumper to be write enabled before continuing with the flash PROM update procedure.
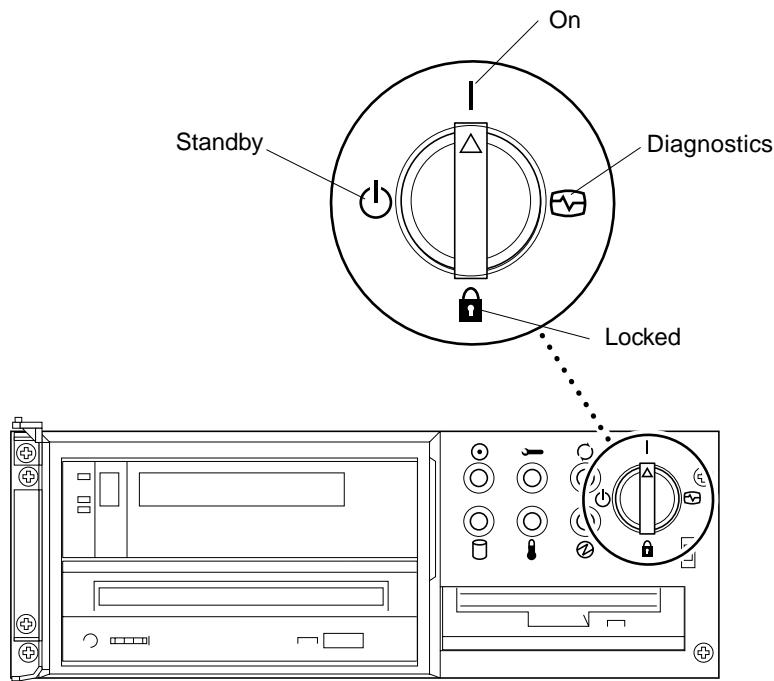
FIGURE 4-5   Sun Enterprise 450 and Sun Ultra 450 Keyswitch Location

Before Updating the Flash PROM

Before you begin updating the flash PROM, please note the following.

> ⚠ **Caution –** Do not interrupt power during flash PROM updating. When you are using the update routine, do not remove or insert system boards.

> **Note –** If power is interrupted during flash PROM updating, follow the power interruption recovery procedures covered later in this chapter.

Running the Flash PROM Update Script Manually

The flash PROM update script is typically run at bootup. You can also run the flash PROM update script manually by doing the following:

1. **If you shut down the system in order to set the write-enable jumper (Sun Ultra 1 and Ultra 2 systems), turn the system on so it can boot.**

2. **Bring the system down to single user mode. Type the following:**

```
% su
Type your superuser password
# init S
```

3. **Execute the flash PROM update script by typing the following:**

```
/bin/sh /usr/platform/sun4u/lib/prom/`/usr/bin/uname -i`
```

Follow the step-by-step instructions when running the script in the section "To Update the Flash PROM" on page 64. Begin with Step 2 (do not execute the reboot command).

▼ To Update the Flash PROM

1. **If you shut down your system to set the write-enable jumper (Ultra 1, Ultra 2 systems), turn the system on so it can boot. Go to Step 1.**

2. **If you did not need to shut down the system (for example, with the Sun Enterprise 450 system or the Sun Ultra 450 workstation), reboot your system. Type** `reboot` **at the superuser prompt.**

```
# reboot
```

3. **If your flash PROM needs to be updated, the flash PROM update script displays the following message**

```
This system has older firmware. Although the current firmware is
fully capable of running the 32-bit packages, you will not be able
to run the 64-bit packages installed on this system until you
update the system flash PROM.

This system ships with flash PROM write-protect jumpers in the
"write disabled" position. Before running the flash PROM update,
please verify that the flash PROM jumpers are in the "write-
enabled" position.

See the Hardware Platform Guide for more information.

Please answer the next question within 90 seconds, or press the
ENTER key to disable the timer.

Would you like to run the system flash PROM update now?
(By default the system flash PROM update will not be run now.) yes
or no? [y,n] y

Flash Update 2.0: Program and system initialization in progress...
```

4. **If you see the line** `Current Flash PROM Revision` **on your screen, go to Step 1. If you see the error message** `Flash Update: System Security is set`, **complete Step 1. If the Open Boot** `security-mode` **was set to either** `full` **or** `command`, **then you have PROM-level security turned on and you cannot update the flash PROM. With security turned on you will see the following error message. You need to set the** `security-mode` **variable to** `none`.

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

5. **If you need to change the OpenBoot** `security-mode`**, as the system boots go to the** `ok` **prompt by** *one* **of the following methods. Then follow the steps in the screen which follows.**

   ■ Press Stop-a from the keyboard.
   ■ If you are running on a terminal and connected to serial port A of the system, press the Break key.
   ■ If you are connected to serial port A via telnet connection send a Break sequence by pressing the Control and] keys simultaneously. This returns you to the telnet command line. Type `send brk` at the telnet command line.
   ■ If you are connected to serial port A via a tip connection, send a Break sequence by typing the characters ~# in quick succession.

```
Type boot, go (continue), or login (command mode)
> login
Firmware Password: Type your security password
Type help for more information
ok setenv security-mode none
ok boot
```

6. **When the flash update process begins, it displays the current and available OpenBoot firmware revisions. Type yes to the question about updating the firmware in the system flash PROM. If the NVRAM configuration variable** `use-`

nvramrc? **is set to true, the update script resets** use-nvramrc? **to false. You will only see the message about the** use-nvramrc? **variable if** use-nvramrc? **is set to true.**

```
Current System Flash PROM Revision:
-----------------------------------
OBP 3.5.2 1997/01/06 17:40

Available System Flash PROM Revision:
-------------------------------------
OBP 3.11.1 1997/12/03 15:44

NOTE: The system will be rebooted (reset) after the firmware has
been updated.

Do you wish to update the firmware in the system Flash PROM? yes/
no :yes

The NVRAM variable 'use-nvramrc?' was 'true'. This program will
reset it to the default value 'false'. This is being done because
the contents of the NVRAM variable 'nvramrc' may or may not be
appropriate for use with the new firmware. Do not change the value
of 'use-nvramrc?' until you evaluate the contents of 'nvramrc'.
```

7. **Next, the update script asks you if you want to continue. Type yes. Also, if any of the NVRAM configuration variables have been customized, the update displays both the default value and the current value.**

```
Are you sure that you wish to continue? yes/no :yes

**IMPORTANT**  If the power fails during the firmware update that
is about to take place, it is possible that the customized values
in the NVRAM configuration variables will revert back to their
*default values* once the system power is restored. *If* this event
occurs then it could have a significant effect on the behavior of
the system after power is restored. Following is a list of the
system's NVRAM configuration variables which have default values
and have been customized. You may wish to write this information
down so that the values may be restored after recovery from a power
loss.

Name: sbus-probe-list
Default: 01
Current: 10
Name: nvramrc
Default: <null>
Current: ." This is a sample message which indicates that nvramrc
has been modified." cr
```

8. **The update script asks you again if you want to continue. Type yes. If the default value of any variable changed from the old revision to the new revision and you have a customized value, the update script lists the old default value, the customized value, and the new default value. If you did not print the contents of NVRAM with the** `eeprom` **utility at the beginning of the flash update process,**

then you may want to write down your customized value. Note that the new firmware default value will replace the customized value and the old default value.

```
Are you sure that you wish to continue? yes/no :yes

Note this change to the default value for NVRAM variable 'sbus-
probe-list'
The default value for the old firmware: '01'
Your customized value in NVRAM:          '10'
The default value for the new firmware: 'e01'
The new firmware default value is replacing your custom value *and*
the old default value in NVRAM. This change *will* have an effect
on the system after the system has been reset.
```

Note – After the update, you may wish to evaluate if the customized values displayed on the previous screen need to be modified.

9. **If the jumper is not set so that the flash PROM can be written to or the keyswitch is set to the locked position, you will see the following error message. To remedy the problem, make the flash PROM write-enabled.**

```
Couldn't determine the flash PROM component type.
```

a. **On the Sun Ultra 1 and Ultra 2 systems, halt the system by typing** init 0 **at the superuser prompt. Power off the system. Set the J2003 jumper to be write enabled (pins 2 and 3 jumpered). Then, power on the system and complete the flash PROM update process. For more details, see the section "Making the Flash PROM Write-Enabled" on page 59.**

b. **On the Sun Enterprise 450 system or the Sun Ultra 450 workstation, turn the keyswitch to the On or Diagnostics position then type** reboot **at the # prompt.**

10. **At this point, the flash PROM is updated. After the update, the system reboots if the update completed successfully or unsuccessfully.**

```
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.

The system's Flash PROM firmware has been updated.

Please wait while the system is rebooted . . .
The system's reboot messages are displayed.
```

11. **At this point any NVRAM configuration variable that had a customized value will be restored except** use-nvramrc? **and the customized values displayed in Step 1. You will see messages similar to the following:**

```
rebooting...
Resetting ...
Restoring previous NVRAM environment settings...
#power-cycles =        376
security-#badlogins =  5
nvramrc <custom nvramrc>
OK
Resetting ...
```

Note – You may see variables listed above that were not shown earlier in the process when the customized values were displayed. This is because some of the variables shown above may not have assigned default values.

12. **If you changed the write-enable jumper settings on Sun Ultra 1 or Ultra 2 systems earlier, change the jumper back to the write-protect position (see** FIGURE 4-1, FIGURE 4-2, FIGURE 4-3, **and** TABLE 4-4**.)**

   a. **Allow the system to boot so you can become superuser.**

b. **Halt the system by typing** `init  0` **at the superuser prompt.**

c. **Power off the system.**

d. **Open the system unit (refer to the installation or service manual for your system).**

e. **Attach a wrist strap properly (refer to the installation or service manual for your system).**

f. **Reset the J2003 write-enable/protect jumper to the write-protect position. In the write-protect position pins 1 and 2 are jumpered (see** FIGURE 4-1, FIGURE 4-2, FIGURE 4-3, FIGURE 4-6, **and** TABLE 4-4**). You may need to remove a plug-in card from the system before resetting the jumper if the card is covering the jumper. Pin 1 is noted by an asterisk (*).**

Write
enabled
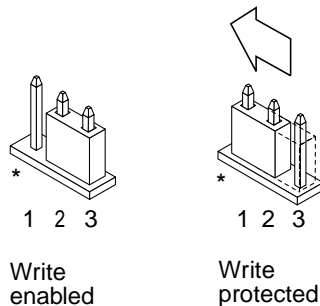
Write
protected

FIGURE 4-6   Moving the Write-Protect/Enable Jumper Back to the Write-Protect Position

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

Refer to the installation guide or service manual for your system for this procedure.

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

Refer to the installation guide or service manual for your system for this procedure.

i. **Turn the power on to the system.**

13. **If you have a Sun Enterprise 450 system or a Sun Ultra 450 workstation, after the flash PROM update is completed, turn the keyswitch to the Standby position, wait a few seconds, and then power on again.**

This power-cycling flushes any old firmware code out of system memory.

Recovering From a Power Failure During the Flash PROM Update

If the power was lost during the flash PROM update, complete the power interruption recovery procedure for your system.

Sun Ultra 1 and Ultra 2 Systems, Sun Enterprise 450 System, Sun Ultra 450 Workstation

If power to your system was interrupted during updating of the flash PROM, complete the following steps:

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, you *must* complete the flash PROM updating process. Complete the section "Running the Flash PROM Update Script Manually" on page 64.

Scenario 2—System Does Not Recover After Power Restoration

If your system does not boot, run diagnostics, or return to the PROM monitor's `ok` prompt after power is restored, complete the following steps:

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 or serial port A, set the boot control jumper to boot from the half of the PROM that is not currently selected. See** FIGURE 4-1 FIGURE 4-2**,** FIGURE 4-3**,** FIGURE 4-7**, and** FIGURE 4-8**. An asterisk (*) on the main logic board notes the location of pin 1.**

- If the jumper is set for high-half booting, move it to low-half booting (pins 2 and 3 jumpered). See FIGURE 4-7.

- If the jumper is set for low-half booting, move it to high-half booting (pins 1 and 2 jumpered). See FIGURE 4-7.

TABLE 4-5   Boot Control Jumper

System	Jumper	Pins 1 + 2 Jumpered	Pins 2 + 3 Jumpered	Default Jumper on Pins	Name
Ultra 1, 2	J2204	High-half booting	Low-half booting	2 + 3	Boot control
Sun Enterprise 450 or Sun Ultra 450 workstation	J5501	High-half booting	Low-half booting	2 + 3	Boot control
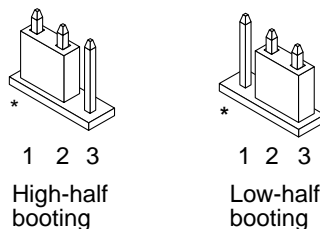
FIGURE 4-7   Setting the Boot Control Jumper to Low-Half Booting or High-Half Booting

3. **Power on the system unit.**

- If the system recovers, complete the programming process by rebooting. Complete the steps in the section "Running the Flash PROM Update Script Manually" on page 64.

■ If the system does not recover, repeat Step 1 and Step 2 a second time.

4. **If the system** *still* **does not recover, contact your Sun service provider or local Sun service Authorized Service Provider.**

Restoring NVRAM Configuration Variables

If for any reason, the flash PROM update process did not complete successfully, for example if you lost power, you may have to restore `diag-switch?` to its default value of false and restore any customized values to the other NVRAM configuration variables.

Note – Use the steps in this section only if for any reason your NVRAM configuration variables were not reset to their customized values or if `diag-switch?` was not set to its proper value.

---

1. **Reboot the system by typing** `reboot` **at the prompt. If** `diag-switch?` **was set to true and the system is power cycled, diagnostics will be run. Running diagnostics could take several minutes. Also, the system will attempt to boot from the network once the diagnostics have completed running.**

Note – Other NVRAM variables may be reset to their default values, which could affect the system in other ways. For example, if you ran the flash PROM update through the serial port and the system still has its keyboard plugged in, you will no longer get any response from the serial port connection. The firmware will be waiting for input from the keyboard.

---

2. **As the system boots, go to the** `ok` **prompt by one of the following methods.**

   a. **Press Stop-a from the keyboard.**

   b. **If you are running on a terminal and connected to serial port A of the system, press the Break key.**

   c. **If you are connected to serial port A via telnet connection send a Break sequence by pressing the Control and] keys simultaneously. This returns you to the telnet command line. Type** `send brk` **at the telnet command line.**

   d. **If you are connected to serial port A via a tip connection, send a Break sequence by typing the characters ~# in quick succession.**

3. **Reset the configuration variables default value to the current value (see the values you captured with the** `eeprom` **command in "To Capture the Configuration Variable Settings" on page 58 and the values you wrote down earlier in this procedure in Step 1). At the** `ok` **prompt, type the following for** *each* **configuration variable:**

```
ok setenv variablename  currentvalue
```

For example:

```
ok setenv auto-boot? false
```

The `setenv` command resets each configuration variable you entered to the current value.

4. **If the OpenBoot** `diag-switch?` **variable was set to** `true` (`false` **is the default). and the system is power cycled, diagnostics will run. Also, when you boot the system, the system will attempt to boot from the network. Unless you had** `diag-switch?` **set to true before the flash PROM update, set** `diag-switch?` **to** `false`, **the default value:**

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

5. **If the** `use-nvramrc?` **configuration variable was set to true before the flash PROM update, as part of the update the** `use-nvramrc?` **variable was set to false because the contents of the NVRAM configuration variable** `nvramrc` **may or may not be appropriate for use with the new firmware. If you want to change the** `use-nvramrc?` **variable back to true, evaluate the contents of** `nvramrc` **first with** `printenv nvramrc` **then change the** `use-nvramrc?` **configuration variable back to true with the** `setenv use-nvramrc? true` **command.**

6. **Make sure that other configuration variables are set properly.**

   a. **Use the** `printenv` **OpenBoot command to display the NVRAM configuration variables and their settings.**

   b. **At the PROM monitor's** `ok` **prompt, you can use OpenBoot commands to restore the values of the configuration variables. Refer to the** *OpenBoot 3.x Command Reference Manual*. **You can also use the** `eeprom` **utility as superuser in the Solaris operating environment. See the** `eeprom` **man page description for more information.**

7. **If you have a Sun Enterprise 450 or an Ultra 450, turn the keyswitch to the Standby position, wait a few seconds, and then power on again. If you have an Ultra 1 or Ultra 2 system, type** `reset-all`**.**

   If you set the `auto-boot?` NVRAM configuration variable to `true`, and the `boot-device` variable contains the device or device alias where the Solaris 7 operating environment was installed, then the system will boot the Solaris 7 operating environment.

Error Messages

Most of the error messages were documented within the flash PROM update procedure. This section contains error messages that were not part of the flash PROM update procedure.

Retained Page/mmap Failure

If you see an error message similar to the following, just after the flash update program logs on `Flash Update 2.0: Program and system initialization in progress... eeprom:(attach) No retained page found in device tree` then the update will fail with the following message if the Flash PROM Update is attempted:

```
Do you wish to update the firmware in the system Flash PROM? yes/
no : yes
eeprom:(mmap) on retained page failed: no retained page found
Flash Update: MMAP call failed.
: No such device or address
```

If this error occurs, issue a `reboot` command at the superuser prompt and allow the system to return to the Flash PROM Update inquiry WITHOUT INTERRUPTION. Attempt the flash PROM Update once again by completing the steps in the section "To Update the Flash PROM" on page 64. If the reboot was uninterrupted and the flash PROM Update fails a second time for the same reason, contact your Authorized Service Provider.

Location of Flash PROM Jumpers in Sun Enterprise 450 System and the Ultra 450 Workstation

The flash PROM update procedure for the Sun Enterprise 450 and the Ultra 450 systems assumes that the write-protect/enable jumper was set in the default position (enabled). In order to update the flash PROM, you must move the write-protect/enable jumper to the write-enable position.

Three jumpers on the main logic board affect flash PROM operation. FIGURE 4-8 shows the jumper locations, and TABLE 4-6 describes their functions.
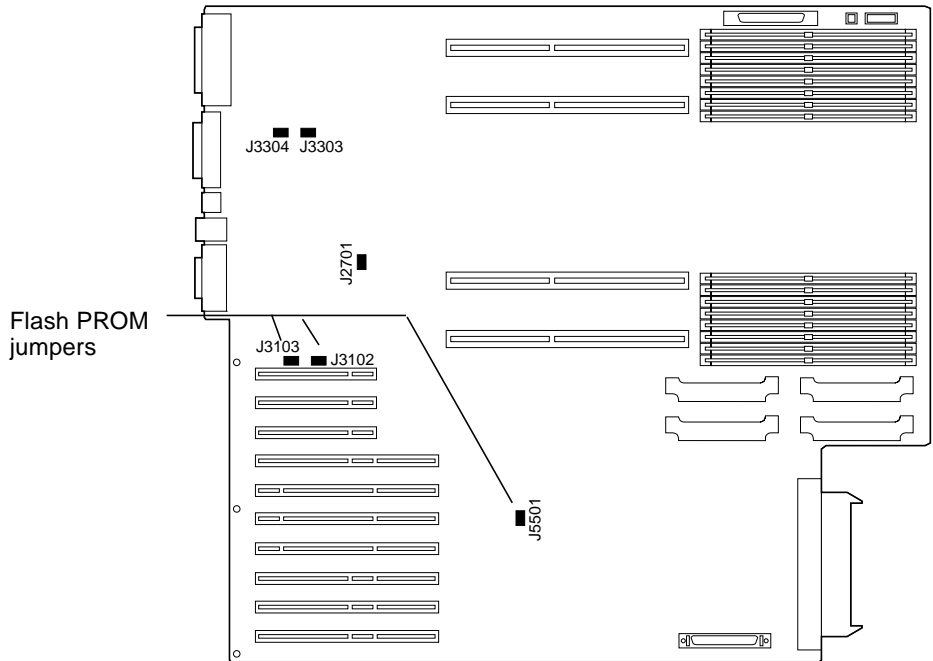
FIGURE 4-8 Flash PROM Jumpers on the Sun Enterprise 450 System and the Sun Ultra 450 Workstation

TABLE 4-6 Sun Enterprose 450 and Ultra 450 Flash PROM Jumper Settings

Jumper	Pins 1 + 2 Jumpered	Pins 2 + 3 Jumpered	Default on Pins	Signal Controlled
J3102	Flash PROM	Not to be used	1 + 2	FLASH PROM SEL
J3103	Write-protect	Write-enable	2 + 3	FLASH PROM PROG ENABLE
J5501	High-half booting	Low-half booting	2 + 3	XOR LOGIC SET

Make sure that the write-protect/write-enable jumper is set to the write-enable position, pins 2 and 3 jumpered (see FIGURE 4-9). Pin 1 is noted by an asterisk (*).
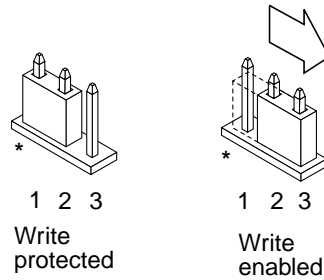
FIGURE 4-9 Setting the J3103 Write Protect ∕ Enable Jumper on the Sun Enterprise 450 or Ultra 450

Flash PROM Update Multimedia Collection

The video content of the AnswerBook2 collection is very large. You may want to view it directly from the CD rather than installing this software package on a system already running an AnswerBook2 server. You also can view the video clips directly without using AnswerBook software or a browser.

▼ Running the Video Clips from the CD

To run the video clips contained in this AnswerBook collection directly from the CD, perform the following steps:

1. **Insert the Flash PROM Update Multimedia AnswerBook CD into your CD-ROM drive.**

2. **Change directory to, or bring up file manager, and go to the top level of the CD-ROM volume. This should look similar to:**

```
% cd /cdrom/flash_answerbook
```

where *cdrom* is the mount-point for the CD-ROM device and *flash_answerbook* is the name of the CD-ROM volume.

3. **To run the viewing script, type:**

```
% ./watch-videos
```

4. **Select the first video clip you want to see.**

5. **Before you view another video clip, dismiss the viewer that displayed the previous video clip.**

▼ Running an AnswerBook2 Server from the CD

To run the AnswerBook2 server directly from the CD, perform the following steps:

1. **Insert the Flash PROM Update Multimedia AnswerBook CD into your CD-ROM drive.**

2. **Open a command window and become superuser using the su command and superuser password.**

3. **Change directory to the top level of the CD-ROM volume.**

   This should look similar to:

```
# cd /cdrom/flash_answerbook
```

   where *cdrom* is the mount-point for the CD-ROM device and *flash_answerbook* is the name of the CD-ROM volume.

   Among other things, this directory contains the executable script ab2cd.

4. **Run the following command:**

```
# ./ab2cd
```

5. **If you have existing AnswerBook2 documentation collections installed on your server machine and you want the CD-driven server software to recognize those collections, use the following command:**

```
# ./ab2cd -s
```

   This causes the CD-driver server software to scan for other collections installed on this system and add them to its database.

6. **You can now access the document server using the following URL:**
   `http://`*server*`:8888/`

   Where *server* is the name of the machine to which the CD is attached.

7. **To view video clips that are contained in an AnswerBook document, edit your browser's preferences to specify an MPEG Video application.**

   For example, to make use of the ShowMe™ TV™ software provided on this CD in a Netscape Communicator browser, perform these steps:

   a. **In the top bar menu of the browser, select Edit --> Preferences.**

   b. **In the Preferences window, select the category Navigator and the subcategory Applications.**

   c. **In the list of Applications, specify that MPEG Video is handled by the following: showmetv -nowrap %s.**

   d. **Click OK to apply this change to the Preferences.**

8. **In the document, click the video clip icon to launch the viewer.**

9. **Before you view another video clip, dismiss the viewer that displayed the previous video clip.**

10. **To stop running the AnswerBook server from the CD, run the following command:**

```
# /cdrom/flash_answerbook/ab2cd stop
```

Notes on Running AnswerBook2 from a CD

The following paragraphs provide important information about running the AnswerBook2 server from the CD.

Default AnswerBook2 Port

The AnswerBook2 server run from the CD always runs on port **8888**. If you already have an AnswerBook2 server running on your system using the default port (**8888**), the ab2cd script will display the following message:

```
A document server is already running on this system as server:8888.
```

Shut down the current server before running the ab2cd command. Use the following command to shut down the existing server:

```
# /usr/lib/ab2/bin/ab2admin -o stop
```

Stopping the AnswerBook2 Server Process

Always use `ab2cd stop` to stop the server running from the CD. Do not use `/etc/init.d/ab2mgr stop` to stop the CD-based server.

The `ab2cd stop` command stops the AnswerBook2 server process and cleans up all files in the `/tmp/.ab2/` and `/tmp/ab2cd_config/` directories. The `/etc/init.d/ab2mgr stop` command stops all server processes, but does not clean up the files in the `/tmp/.ab2/` and `/tmp/ab2cd_config/` directories.

Running Two AnswerBooks

To run two AnswerBook2 servers (one on your system, one from the CD), keep these rules in mind:

Startup

- The `/etc/init.d/ab2mgr start` command always starts the server on your system.
- The `ab2cd` command always starts the server from the CD.

Shutdown

- Always use the `ab2cd stop` command to stop the server running from the CD.
- To stop both servers, first use the `ab2cd stop` command to stop the server running from the CD, then use either `/etc/init.d/ab2mgr stop` or `/usr/lib/ab2/bin/ab2admin -o stop` to stop the server running on your system.

CHAPTER **5**

Updating the Flash PROM on the Sun Enterprise 3*x*00, 4*x*00, 5*x*00, and 6*x*00 Systems

The steps in this chapter describe how to update the flash PROMs in your Sun Enterprise 3*x*00, 4*x*00, 5*x*00, or 6*x*00 system.

Some systems will need to be updated to a higher level of OpenBoot™ firmware in the flash PROM before they can run the 64-bit mode of the Solaris™ 7 operating environment. The OpenBoot firmware is contained in several PROMs that are located on several different boards.

The flash PROM devices, which contain OpenBoot, are electrically erasable and writable devices. This means that the firmware can be updated without removing the flash PROM from the system board. This Solaris 7 kit includes the routines and instructions you need to update the flash PROM in your system.

Determining If the Flash PROM Needs Updating

Note – If your system is an Ultra™ Enterprise™ 10000, you do not need to do this update because the Ultra Enterprise 10000 does not have a flash PROM.

Only sun4u systems that can run the 64-bit mode of the Solaris 7 operating environment might need the flash PROM update. Systems that can only run the 32-bit mode (such as those in the sun4c, sun4d, and sun4m platform groups) do not require updated firmware to run Solaris 7 software.

> **Note –** If the Solaris 7 operating environment notified you that the flash PROM in your system needs updating, skip the steps in the procedure "To Determine If Your System Requires a Flash PROM Update" on page 84 and go directly to "Updating the Flash PROM" on page 85.

▼ To Determine If Your System Requires a Flash PROM Update

1. **Determine the architecture type of your system.**

```
% uname -m
```

TABLE 5-1

If your system architecture type is . . .	Then . . .
• sun4u	Go to Step 2.
• sun4c, sun4d, sun4m	You do not need a flash PROM update. Do not proceed further.

2. **Determine the system type of your system.**

```
% uname -i
```

TABLE 5-2

If your system type is one of the following systems. . .	Then . . .
SUNW, Ultra-1 SUNW, Ultra-2 SUNW, Ultra-4 SUNW, Ultra-Enterprise	Go to Step 3 for each system type.
Not in the above list	You do not need a flash PROM update. Do not proceed further.

3. **Determine the version level of the firmware in your system. Type** `prtconf -V`
(upper case V).

```
% prtconf -V
```

TABLE 5-3

If your system type is . . .	And you see a number lower than . . .	Then . . .	Otherwise . . .
SUNW, Ultra-Enterprise	3.2.16	Proceed to "Updating the Flash PROM" on page 85.	You do not need a flash PROM update. Do not proceed further.
SUNW, Ultra-1	3.11.1	Proceed to Chapter 4.	You do not need a flash PROM update. Do not proceed further.
SUNW, Ultra-2	3.11.2	Proceed to Chapter 4.	You do not need a flash PROM update. Do not proceed further.
SUNW, Ultra-4	3.7.107	Proceed to Chapter 4.	You do not need a flash PROM update. Do not proceed further.

Updating the Flash PROM

This section describes the following:

- Flash PROM update process
- Capturing NVRAM configuration variable settings
- Making the flash PROM write-enabled
- Steps to perform before updating the flash PROM
- Updating the flash PROM

Flash PROM Update Process

Note – For step-by-step instructions, follow the procedures beginning with "Capturing Configuration Variable Settings" on page 86.

After installing the Solaris 7 operating environment, make sure that the external front panel keyswitch is set to the On or Diagnostics position.

Take note of screen messages, during the flash PROM update, that report configuration variables that may be reset to their default values. When the update is complete and after you either reset the system or power cycle the system, revise the configuration variables as needed to restore your preferences.

Refer to the recovery procedure covered later in this chapter if there is a power interruption during the update process.

When your system has been updated to the proper firmware revision, you can run Solaris 7 software in 64-bit mode.

Capturing Configuration Variable Settings

While the Solaris operating environment is still running, capture the NVRAM configuration variable settings *before* you install the Solaris 7 operating environment or begin the flash PROM update process.

As part of the flash PROM update, your NVRAM configuration variables might change to the default values. To ensure that you can change the default values back to the values you customized, you need to save the current state of the NVRAM configuration variables using the `eeprom` command.

▼ To Capture the Configuration Variable Settings

1. **Using the `eeprom` utility, capture the system's configuration variable settings in a file. Type `eeprom` > *filename*. The *filename* is any file name you choose.**

```
% eeprom > filename
```

Note – If you have custom values installed in `oem-logo` or `keymap`, those values cannot be displayed or printed properly by the `eeprom` utility because the contents contain binary information. If it is necessary to restore these values after a power loss, you should determine the original method by which these values were placed into NVRAM and use that method to restore the values.

2. **Print out the values captured by the** `eeprom` **command. You must have a printed copy of the configuration values before you install the Solaris 7 operating environment and begin to update the flash PROM. Type the following:**

```
lp filename
```

▼ To Install the Solaris 7 Operating Environment

- **Install the Solaris 7 operating environment on your system.**

  Refer to the *Installation Library* which is in your Solaris 7 media kit. As the Solaris 7 operating environment is installed, you will be notified whether the flash PROM in your system needs updating. Installing this Solaris release will provide the software that can upgrade your system's flash PROM to the required level.

Making the Flash PROM Write-Enabled

Before you update the OpenBoot firmware, which is contained in the flash PROM, you must set the front panel keyswitch to the proper position to allow the flash PROM to be write-enabled.

When the switch is set to the Locked position (FIGURE 5-1), the flash PROM is write-protected. When the switch is set to the On position or to the Diagnostics position, the flash PROM is write-enabled.

FIGURE 5-1 shows the keyswitch positions on a 16-slot Sun Enterprise 6000 system. The server systems described in this section have the same keyswitch positions.

▼ To Write Enable the Flash PROM

- **Turn the keyswitch to the On or Diagnostics position (**FIGURE 5-1**) before updating the flash PROM.**

Note – Disabling write-protection on servers assumes that the system's write-protect/enable jumpers were set in the default position (enabled). If you previously removed the write-protect/enable jumper, perform the steps to make the flash PROM write enabled in "Location of Flash PROM Jumpers in Sun Enterprise Server Systems" on page 97.
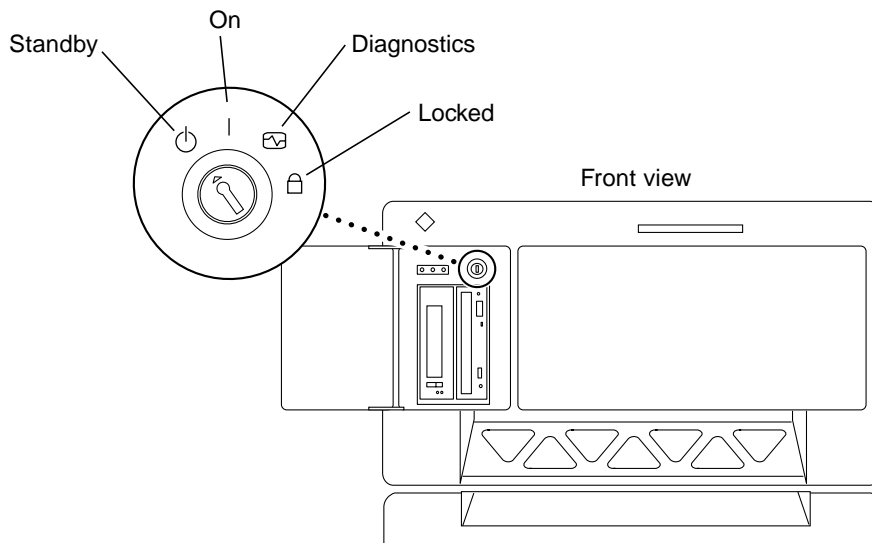
FIGURE 5-1   Sun Enterprise 6*x*00, 5*x*00, 4*x*00, 3*x*00 Keyswitch Locations

Before Updating the Flash PROM

Before you begin updating the flash PROM, please note the following cautions.

> ⚠ **Caution –** Do not interrupt power during flash PROM updating. When you are using the update routine, do not remove or insert system boards.

> ⚠ **Caution –** The flash update may cause default NVRAM values to overwrite customized NVRAM variables. Be sure to record the custom and default values displayed so that you can restore them after you perform the flash PROM update.

> **Note –** If power is interrupted during flash PROM updating, follow the power interruption recovery procedures covered later in this chapter.

Running the Flash PROM Update Script Manually

The flash PROM update script is typically run at bootup. You can also run the flash PROM update script manually by doing the following:

1. **Bring the system down to single user mode. Type the following:**

```
% su
Type your superuser password
# init S
```

2. **Execute the flash PROM update script by typing the following:**

```
/bin/sh /usr/platform/sun4u/lib/prom/'/usr/bin/uname -i'
```

Follow the step-by-step instructions when running the script in the section "To Update the Flash PROM" on page 89. Begin with Step 2 (do not execute the `reboot` command).

▼ To Update the Flash PROM

1. **Reboot your system. Type** `reboot` **at the superuser prompt.**

```
# reboot
```

2. **If your flash PROM needs to be updated, the flash PROM update script displays the following message:**

```
This system has older firmware.  Although the current firmware is
fully capable of running the 32-bit packages, you will not be able
to run the 64-bit packages installed on this system until you
update the system flash PROM.

This system ships with flash PROM write-protect jumpers in the
"write enabled" position.  Unless the jumpers on this system have
been changed, there is no need to change them in order to run the
system flash PROM update.

The front panel keyswitch on this system must NOT be in the
"SECURE" position while the system flash PROM update is running.
Please check the keyswitch position before answering the next
question.

See the Hardware Platform Guide for more information.

Please answer the next question within 90 seconds, or press the
ENTER key to disable the timer.

Would you like to run the system flash PROM update now?
(By default the system flash PROM update will not be run now.)
yes or no? [y,n] y
Extracting files
Loading flashprom driver
```

3. **When the flash update process begins, it displays the current and available system board PROM revisions.**

```
Current System Board PROM Revisions:
------------------------------------
Board  0: CPU/Memory OBP   3.2.16 1998/06/08 16:58 POST  3.9.4 1998/06/09 16:25
Board  2: CPU/Memory OBP   3.2.16 1998/06/08 16:58 POST  3.9.4 1998/06/09 16:25
Board  4: CPU/Memory OBP   3.2.16 1998/06/08 16:58 POST  3.9.4 1998/06/09 16:25
Board  6: CPU/Memory OBP   3.2.16 1998/06/08 16:58 POST  3.9.4 1998/06/09 16:25
Board  1: I/O Type 2 FCODE 1.8.3  1997/11/14 12:41 iPOST 3.4.6 1998/04/16 14:22
Board  3: I/O Type 5 FCODE 1.8.7  1997/12/08 15:39 iPOST 3.4.6 1998/04/16 14:22
Board  7: I/O Type 5 FCODE 1.8.7  1997/12/08 15:39 iPOST 3.4.6 1998/04/16 14:22

Available 'Update' Revisions:
------------------------------------
CPU/Memory OBP   3.2.16 1998/06/08 16:58 POST  3.9.4 1998/06/09 16:25
I/O Type 1 FCODE 1.8.3  1997/11/14 12:41 iPOST 3.4.6 1998/04/16 14:22
I/O Type 2 FCODE 1.8.3  1997/11/14 12:41 iPOST 3.4.6 1998/04/16 14:22
I/O Type 3 FCODE 1.8.7  1997/05/09 11:18 iPOST 3.0.2 1997/05/01 10:56
I/O Type 4 FCODE 1.8.7  1997/12/08 15:39 iPOST 3.4.6 1998/04/16 14:22
I/O Type 5 FCODE 1.8.7  1997/12/08 15:39 iPOST 3.4.6 1998/04/16 14:22
```

4. **If any of the NVRAM configuration variables have been customized, the update displays both the default value and the customized (current) value.**

```
Verifying Checksums: Okay

Do you wish to flash update your firmware? y/[n] : y
**IMPORTANT**  As a consequence of the firmware upgrade that is
about to take place, it is very possible that the customized values
in the configuration variables will revert to their *default
values* upon the next system power-cycle or soft-reset. If this
happens, it could have a significant effect on the behavior of the
system after the power-cycle or 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.
Name: auto-boot?
Default: true
Current: false

Name: boot-file
Default: <null>
Current: kadb -d
```

5. **Take note of the variables and values for current settings. Either write down the current values or mark up the** eeprom **output you captured in "To Capture the Configuration Variable Settings" on page 86 so that you know which NVRAM configuration variables will need to be changed from their default values after the flash PROM update.**

6. **If the keyswitch is set to the locked position, you will see the following error message. To remedy the problem, make the flash PROM write-enabled by turning keyswitch to the On or Diagnostics position then type** reboot **at the # prompt.**

```
FPROM Write Protected: Check Write Enable Jumper or Front Panel
Key Switch.
```

7. **The update then prompts you if you want to continue. Make sure that you have turned the keyswitch to the On or Diagnostics position then type y. The flash PROMs are updated.**

```
Are you sure that you wish to continue? y/[n] : y

Updating Board 0: Type 'cpu' (PromID=1a4)
1 Erasing            ............................... Done.
1 Verifying Erase    ............................... Done.
1 Programming        ............................... Done.
1 Verifying Program ............................... Done.

Updating Board 1: Type 'upa-sbus' (PromID=1a4)
1 Erasing            ............................... Done.
1 Verifying Erase    ............................... Done.
1 Programming        ............................... Done.
1 Verifying Program ............................... Done.

Updating Board 4: Type 'dual-pci' (PromID=1a4)
1 Erasing            ............................... Done.
1 Verifying Erase    ............................... Done.
1 Programming        ............................... Done.
1 Verifying Program ............................... Done.

Updating Board 6: Type 'dual-pci' (PromID=1a4)
1 Erasing            ............................... Done.
1 Verifying Erase    ............................... Done.
1 Programming        ............................... Done.
1 Verifying Program ............................... Done.

Unloading flashprom driver

The new firmware will not take effect until the system is power-
cycled.
```

8. **After the flash PROMs are updated, the system asks if you would like to halt the system. Type yes.**

```
Do you wish to halt the system now? yes or no? yes
```

The system's shutdown messages are displayed.

```
Program terminated
ok
```

Note – If you answered no to the question on halting the system, the installation will continue but the updated firmware will not become effective until the next system reboot. The NVRAM configuration variables are changed to default values at the next system reboot. If you customized NVRAM configuration variables you must change the values back to their customized settings.

9. **Turn the keyswitch to the Standby position.**

10. **Turn the power on to the system. As the system boots, diagnostics will be run at boot up because the OpenBoot** `diag-switch?` **was set to** `true` **in the flash PROM update procedure. Running diagnostics could take several minutes.**

Note – Other NVRAM variables may be reset to their default values, which could affect the system in other ways. For example, if you ran the flash PROM update through the serial port and the system still has its keyboard plugged in, you will no longer get any response from the serial port connection. The firmware will be waiting for input from the keyboard. TABLE 5-4, which follows, describes the workarounds for NVRAM settings.

11. **As the system boots, go to the** `ok` **prompt by one of the following methods.**

    a. **Press Stop-a from the keyboard.**

    b. **If you are running on a terminal and connected to serial port A of the system, press the Break key.**

    c. **If you are connected to serial port A via telnet connection send a Break sequence by pressing the Control and] keys simultaneously. This returns you to the telnet command line. Type** `send brk` **at the telnet command line.**

    d. **If you are connected to serial port A via a tip connection, send a Break sequence by typing the characters ~# in quick succession.**

12. **Reset the configuration variables default value to the current value (see the values you captured with the** `eeprom` **command in "To Capture the Configuration Variable Settings" on page 86 and the values you wrote down earlier in this procedure in Step 1). At the** `ok` **prompt, type the following for** *each* **configuration variable:**

```
ok setenv variablename currentvalue
```

For example:

```
ok setenv auto-boot? false
```

The `setenv` command resets each configuration variable you entered to the current value.

13. **When you updated the flash PROM, the OpenBoot** `diag-switch?` **variable was also set to** `true`. **With** `diag-switch?` **set to true, diagnostics will run when you reboot the system. If you don't want diagnostics to be run at boot up, set** `diag-switch?` **to false with the** `setenv diag-switch? false` **command.**

14. **Make sure that other configuration variables are set properly.** TABLE 5-4 **describes what might occur if you did not have the default NVRAM configuration variables set before the flash PROM update.**

   a. **Use the** `printenv` **OpenBoot command to display the NVRAM configuration variables and their settings.**

   b. **Use the** `setenv` **OpenBoot command to restore the NVRAM configuration variables to the customized values except for the** `nvramrc` **configuration variable.**

c. **For the `nvramrc` configuration variable refer to** TABLE 5-4 **for how to restore the configuration variable to the customized settings. For additional information on the NVRAM configuration variables, refer to the** *OpenBoot 3.x Command Reference Manual.*

TABLE 5-4

Variable Name	Default Value	Description
output-device	screen	If output-device is not set to the default value before the flash PROM update, then it is possible that the output device may be other than what you anticipate.
input-device	keyboard	If input-device is not set to the default value before the flash PROM update, then it is possible that the input device may be other than what you anticipate.
ttyb-mode	9600,8,n,1,-	If you are running anything from the serial ports A or B with port settings other than what is default (baud rate, number of bits, parity, number of stop bits, handshake), then those communications lines may not function after the flash PROM update.
ttya-mode	9600,8,n,1,-	If you are running anything from the serial ports A or B with port settings other than what is default (baud rate, number of bits, parity, number of stop bits, handshake), then those communications lines may not function after the flash PROM update.
boot-command	boot	If there are any custom flags to boot, then the system may not boot as anticipated after the flash PROM update.
auto-boot?	true	The system may attempt to autoboot after the first reset or power cycle following the flash PROM update. With auto-boot? set to false, the system will not autoboot.
diag-switch?	true	After you reboot or power cycle the system after the flash PROM update, the diag-switch? may be set to true. With diag-switch? set to true, diagnostics will be run at boot up. Also, the system may attempt to boot from a different device than was booted prior to the flash PROM update.
diag-device	disk	If you had diag-switch? set to true before the update then this is the device that would probably have been booted. This device might not be the boot device after the flash PROM update.
diag-file	Empty string	If you were booting a customized kernel file before the update, and diag-switch? was set to true after the flash PROM update, the customized kernel file might not be booted after the flash PROM update.

TABLE 5-4

Variable Name	Default Value	Description
`boot-file`	Empty string	If you were booting a customized kernel file before the flash PROM update, and `diag-switch?` was false (default), the customized kernel file might not be booted after the flash PROM update.
`boot-device`	`disk net`	If you had a different sequence of boot-devices specified, after the flash PROM update an incorrect device might be booted.
`use-nvramrc?`	`false`	If you had customized commands in the nvramrc, and `use-nvramrc?` was set to true, then those customized commands might not be used after the flash PROM update.
`nvramrc`	Empty	If you had customized commands in the `nvramrc`, then those customized commands might be lost after the flash PROM update. Do not use `setenv` to change the `nvramrc` variable. Instead use `nvedit` and `nvstore`. If you know that the `nvramrc` variable contains a firmware patch which is no longer compatible with the newly programmed firmware, do not change the `nvramrc` variable to its previously customized value.
`oem-logo?`	`false`	If `oem-logo?` was true before the flash PROM update, the oem-logo might be lost after the update, and `oem-logo?` might be set to false.
`oem-banner?`	`false`	If `oem-banner?` was true before the flash PROM update, the oem-banner might be lost after the flash PROM update, and `oem-banner?` might be set to false.

15. **Turn the keyswitch to the Standby position, wait a few seconds, and then power on again.**

This power-cycling flushes any old firmware code out of system memory.

If you set the `auto-boot?` NVRAM configuration variable to `true`, and the `boot-device` variable contains the device or device alias where the Solaris 7 operating environment was installed, then the system will boot the Solaris 7 operating environment. This concludes the flash PROM update procedure.

Location of Flash PROM Jumpers in Sun Enterprise Server Systems

If you previously removed the write-protect/enable jumper, you must reinstall it in order to successfully perform the flash PROM update procedure.

Sun Enterprise 3*x*00, 4*x*00, 5*x*00, and 6*x*000 systems have a jumper on the clock board, P0601, which controls if the flash PROM can or cannot be updated.

- With the jumper P0601 *installed*, *all* the flash PROM *can* be updated.
- With the jumper P0601 *removed*, *all* the flash PROM *cannot* be updated.

If you previously removed jumper P0601, you must reinstall it before you can complete the flash PROM update procedure.

Installing the P0601 Jumper

To install the P0601 jumper, follow these steps:

1. **Halt the system then turn the keyswitch to the Standby position.**

Caution – The clock board is not hot-pluggable. Do not remove the clock board until the system has been halted and powered off.

2. **Remove the clock board from the system (see** FIGURE 5-2**).**
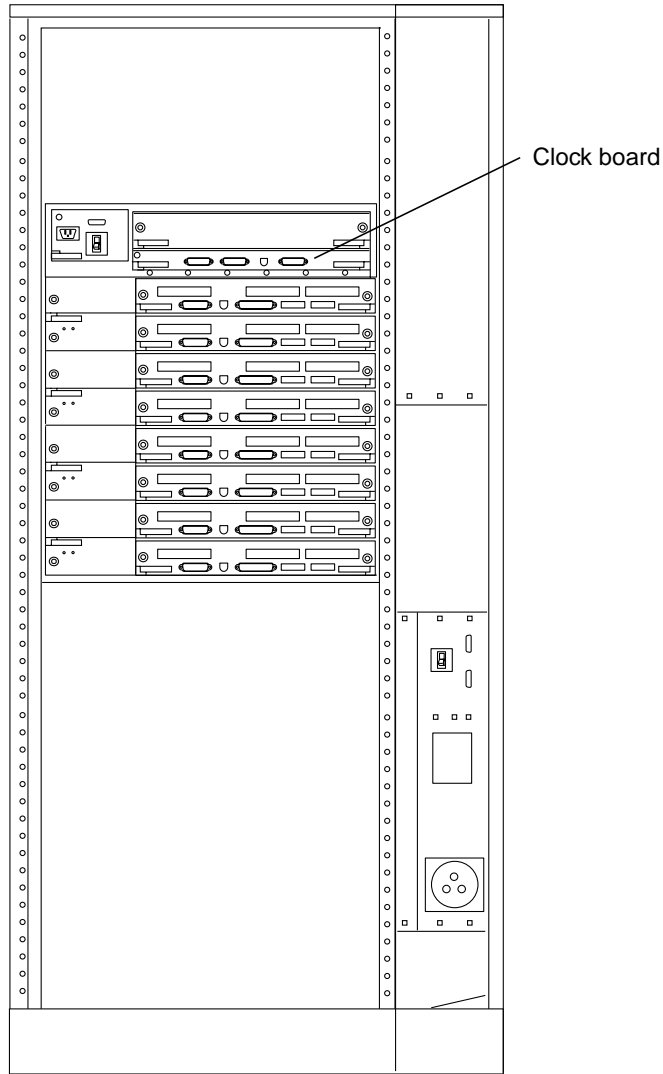
Clock board

FIGURE 5-2   Rear View of the Sun Enterprise 6000 System

Note – FIGURE 5-2 shows a 16-slot system. Systems also come in 4-, 5-, and 8-slot configurations.

3. Locate the P0601 jumper location (FIGURE 5-3**) on the clock board.**
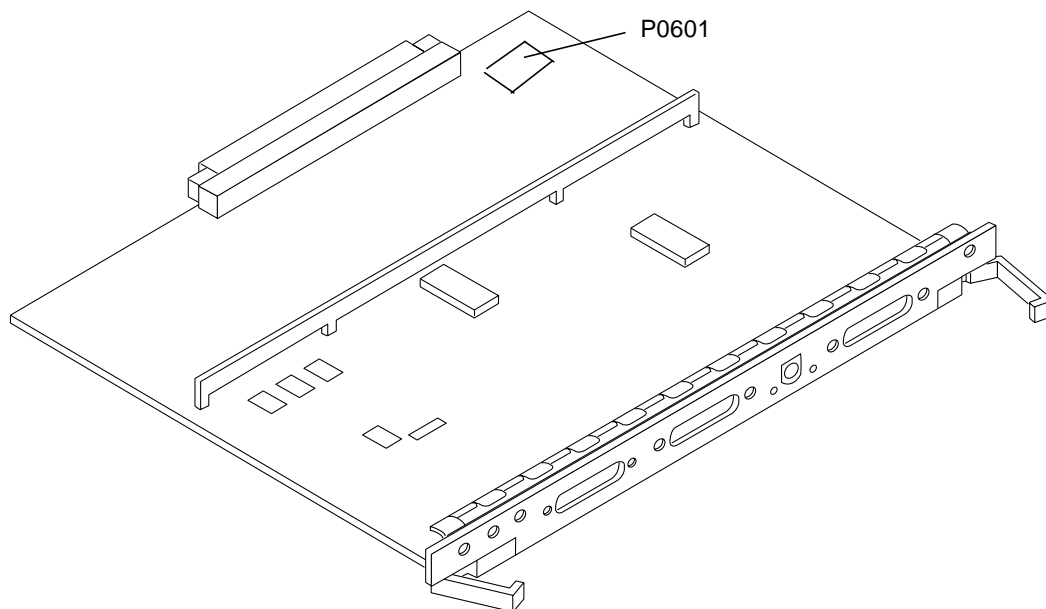
FIGURE 5-3   Clock Board and Jumper P0601 Jumper Location

4. **Insert the P0601 jumper on the clock board.**

5. **Replace the clock board in the system.**

   Refer to Chapter 6 in your reference manual for the detailed procedure.

6. **Turn the keyswitch to the On or Diagnostics position.**

Recovering From a Power Failure During the Flash PROM Update

If the power was lost during the flash PROM update, complete the power interruption recovery procedure for your system.

Sun Enterprise 3*x*00, 4*x*00, 5*x*00, and 6*x*00 Systems

There are three scenarios for the Sun Enterprise 3*x*00, 4*x*00, 5*x*00, and 6*x*00 systems:

- Completing the update of the flash PROM
- Recovering a one-board system after power interruption
- Recovering a multi-board system after power interruption

▼ To Complete the Update of the Flash PROM

If power was interrupted during the flash PROM update procedure, it is possible that one or more system boards were not updated successfully. You must become superuser and complete the flash PROM update.

● **At the # prompt, type the following:**

```
# /bin/sh /usr/platform/sun4u/lib/prom/'uname -i'
```

▼ To Recover a One-Board System After Power Interruption

● **Call your Sun service provider or local Sun service Authorized Service Provider.**

▼ To Recover a Multi-Board System After Power Interruption

Only one board is updated at any given time in the flash PROM updating process. If there is a power interruption to the system while the flash PROMs are being updated, only one board will have its flash PROMs in an inconsistent state.

Note – Power interruption during updating of the flash PROMs aborts the updating at the point of the power interruption. Turn the keyswitch to the Standby position (FIGURE 5-1) to prevent power surge to the system when power is restored.

The following recovery procedure requires another board of the same type with an uncorrupted PROM image (if you are updating an "I/O Type 1" board, you must use another "I/O Type 1" board). In the following code examples, the flash PROM on board 3 recovers by copying the flash PROM image from board 0.

1. **Connect a null modem cable to port A and to either a terminal or a Sun™ Workstation™.**

2. **Set the serial port at 9600 bps, 8-bit word, no parity, and 1 stop bit.**

3. **Remove the board that was being programmed when the power went out.**

4. **Turn the keyswitch to the On position (**FIGURE 5-1**).**

   The system responds with the message:

   ```
   Hardware Power ON
   ```

● **Wait 15 seconds and type** s **on the keyboard terminal or the tip window connected to the serial port.**

   The system responds:

   ```
   0,0>
   *** Toggle Stop POST Flag = 1 ***
   ```

   This message shows that POST (power-on self-test) has recorded your request to stop after testing is completed.

   When POST stops, it will display the following options menu:

   ```
   0,0>Extended POST Menus
   0,0>Select one of the following functions
   0,0>     '0'      Return
   0,0>     '1'      Reset
   0,0>     '2'      Peek/Poke device
   0,0>     '3'      Environmental Status
   0,0>     '4'      Test Menus
   0,0>     '5'      State Dump
   0,0>     '6'      Frequency Margining
   0,0>     '7'      Display System Summary
   0,0>     '8'      Display Fatal Reset Info
   0,0>     '9'      Scan System Board Ring
   0,0>     'a'      Set Memory Test Megs
   0,0>     'b'      Print SIMM Info
   0,0>     'c'      Focus CPU
   0,0>     'd'      CPU State
   0,0>     'f'      fcopy
   0,0>     'g'      System Power Off
   0,0>     'h'      Bounce Patterns
   0,0>     'i'      Focus I/O Board
   0,0>
   ```

1. **Type** `f` **to select** `fcopy`.

```
Command ==> f
0,0>Flash PROM Copy Menu
0,0>Select one of the following functions
0,0>    '0'        Return
0,0>    '1'        Copy
0,0>    '2'        Verify
0,0>    '3'        Display Version
0,0>    '4'        Activate System Board
0,0>

Command ==>
```

2. **Without powering off the system, plug in the board with the corrupted flash PROM. Be sure its power LED is lit.**

3. **Type** `4` **to select** `Activate System Board`.

   The system prompts you to enter the board number in hexadecimal notation from 0 through 9 and "a" through "f". In the example below, board 3 is entered as the board to be activated.

```
Command ==> 4
0,0>Input board number in hex ('0' thru '9' and 'a' thru 'f')
?3
0,0>
0,0>Flash PROM Copy Menu
0,0>    '0'        Return
0,0>    '1'        Copy
0,0>    '2'        Verify
0,0>    '3'        Display Version
0,0>    '4'        Activate System Board
0,0>

Command ==>
```

4. **Type** 1 **to select** Copy. **Respond to the prompts for source (where to copy from) and destination (where to copy to) board numbers in hexadecimal notation.**

   In the example below, board 0 is entered as the source and board 3 is entered as the destination:

```
Command ==> 1
0,0>Input board number in hex ('0' thru '9' and 'a' thru 'f')
0,0>
from board? 0
to board? 3
0,0>    Mfg code 04, Dev code a4
0,0>Erasing prom at 000001cc.f8000000
0,0>Copy prom at 000001c0.f8000000 to prom at 000001cc.f8000000
0,0>..............................
0
```

5. **Type** 3 **to select** Display Version.

   The system responds by showing all PROM versions in the system.

```
Command ==> 3
0,0>Slot 0 CPU/Memory  OBP    3.2.1 1996/3/11 09:57 POST   3.0.1
1996/3/11 18:38
0,0>Slot 1 IO Type 1   FCODE  1.6.0 1996/1/23 13:44 iPOST  1.1.4
1996/3/05 04:06
```

6. **Turn the keyswitch to the Standby position (**FIGURE 5-1**). Wait 15 seconds.**

7. **Complete the procedure "To Update the Flash PROM" on page 89 to reattempt the flash PROM update process.**

Solaris 7 on the Sun Enterprise 10000

This section includes fresh install and upgrade instructions for the Solaris™ 7 operating environment on the Sun Enterprise 10000.

![caution icon] **Caution –** If you are installing Solaris 7 on an Enterprise 10000 domain, your system must have SSP 3.1 running on the System Service Processor (SSP). SSP 3.0 does not support domains running Solaris 7. Please refer to your SSP media kit for instructions on how to install the SSP software.

Performing a Fresh Install

This section contains procedures for performing a fresh install of Solaris 7 on a host domain. If you have a new Enterprise 10000 or if you want to create a new domain, you must perform all of the procedures in this section. If you are installing Solaris 7 on an existing domain, or a domain that crashed, start at "Setting Up the SSP As a Boot Server" on page 109

Creating Additional Domains

Domains other than the one created by the factory require software to be loaded on a bootable disk. The following instructions assume that you have an SSP window open.

Creating the `eeprom.image` File

You must have the system identification key and the host ID *before* you perform the following instructions. You can obtain the key and ID from your service provider. This key is used to generate an `eeprom.image` file.

1. **Log in to the SSP as user ssp.**

2. **When prompted for the** `SUNW_HOSTNAME` **variable, use either the platform name or the name of an existing domain.**

3. **Create the** `eeprom.image` **file:**

```
ssp% sys_id -h hostid -k key \
-f $SSPVAR/.ssp_private/eeprom_save/eeprom.image.domain_name
```

Where *hostid* is the number provided with the key in the form of `0X80A66`*xxx*, *key* is the EEPROM key number, and *domain_name* is the host name of the domain.

Note – All *key* and *hostid* numbers are case-sensitive and must be entered exactly as they are received.

---

4. **Execute the following** `sys_id` **command to check the results:**

```
ssp% sys_id -d -f $SSPVAR/.ssp_private/eeprom_save/eeprom.image.domain_name
```

In the following example, 49933C54C64C858CD4CF is the *key* and `0x80a66e05` is the *hostid*:

```
ssp% sys_id -h 0x80a66e05 -k 49933C54C64C858CD4CF \
-f $SSPVAR/.ssp_private/eeprom_save/eeprom.image.domain_name
ssp% sys_id -d -f $SSPVAR/.ssp_private/eeprom_save/eeprom.image.domain_name

 IDPROM in eeprom.image.domain_name

                    Format= 0x01
              Machine Type= 0x80
          Ethernet Address= 0:0:be:a6:6e:5
        Manufacturing Date= Wed Dec 31 16:00:00 1997
Serial number (machine ID)= 0xa66e05
                  Checksum= 0x3f
```

● **Back up the SSP** eeprom.image **files to tape or disk where they can be accessed in case of an SSP boot-disk failure.**

Creating a New Domain

This section contains instructions for creating a new domain.

1. **Log in to the SSP as user ssp.**

   The default password is ssp.

2. **When prompted for the** SUNW_HOSTNAME **variable, specify the name of the domain that you wish to create.**

   Ensure that the domain name corresponds with the domain in which the operating system is to be installed. Domain names cannot be longer than 14 characters.

3. **Use the** domain_create(1M) **command to create the domain:**

```
ssp% domain_create -d domain_name -b board_numbers -o OS_version -p platform_name
```

   Where *domain_name* is the name of the domain specified in Step 2, *board_numbers* is a list of the system boards to be included in the domain, *OS_version* is the version of the domain's operating system, and *platform_name* is the name of the platform as defined during the SSP package configuration.

   Refer to the *Sun Enterprise 10000 SSP 3.1 User's Guide* for additional information.

4. **Check the power to the domain:**

```
ssp% power
```

5. **If the domain is powered off, power on the domain:**

```
ssp% power -on
```

Preparing the SSP for the Fresh Install

This section contains instructions for preparing the SSP for the fresh install. You must set up the SSP as an install server by configuring the domain network information and as a boot server by adding the domain as a install client. However, before you set up the SSP as a boot server, you must install a patch that enables the Solaris 7 operating environment to be installed on a domain.

Configuring the Domain Network Information

1. **Log in to the SSP as superuser.**

2. **Manually edit the** `/etc/hosts` **file to include the IP address of the new domain.**

   The correct entries would look similar to the following `/etc/hosts` sample:

   ```
   129.153.49.185  tacos
   127.0.0.1       localhost
   129.153.49.179  snax-ssp vegetables    loghost
   129.153.49.181  snax-cb0
   129.153.49.182  snax-cb1
   129.153.49.180  pizza
   129.153.49.183  chips
   129.153.49.1    marvin-49
   110.0.0.1       vegetables-priv
   110.0.0.5       chips-priv
   ```

   The `/etc/hosts` file is actually a link to `./inet/hosts`.

   ⚠️ **Caution –** If the new domain entry follows any other host or SSP entry, the add_install_client command may not work in Step 1 in "Preparing the SSP for the Fresh Install" on page 107.

3. **Manually edit the** `/etc/ethers` **file to include the Ethernet address of the new domain.**

   The correct entries would look similar to the following `/etc/ethers` sample:

   ```
   8:0:20:87:58:a5          snax-ssp vegetables
   0:0:be:01:00:1e          snax-cb0
   0:0:be:01:00:57          snax-cb1
   0:0:be:a6:50:2f          pizza
   0:0:be:a6:6f:19          chips-priv
   0:0:be:a6:6f:23          nachos
   0:0:be:a6:6f:2a          tacos
   ```

Updating the OpenBoot™ PROM

Before you can install Solaris 7 on a domain, you need to update the OBP on the SSP by performing the following steps:

1. **Insert the Sun Computer Systems Supplement CD into the CD-ROM drive.**

   After inserting the CD, wait about one minute for the Volume Manager to mount the CD-ROM.

2. **Log in to the SSP as superuser if you skipped the previous section.**

3. **Change to the 105684-04 patch directory on the CD:**

```
ssp# cd /cdrom/cdrom0/Patches/105684-04
```

4. **Install the patch:**

```
ssp# ./installpatch .
```

5. **Remove the CD:**

```
ssp# cd /
ssp# eject cdrom
```

Setting Up the SSP As a Boot Server

Perform these instructions for each domain on which the Solaris operating environment will be installed.

1. **Insert the Solaris CD into the CD-ROM drive.**

   After inserting the CD, wait about one minute for the Volume Manager to mount the CD-ROM.

2. **Change to the /Tools directory on the CD:**

```
ssp# cd /cdrom/cdrom0/s0/Solaris_2.7/Tools
```

3. **Set up the host domain as an install client:**

```
ssp# ./add_install_client domain_name sun4u
```

The `add_install_client` command should share the CD across the net. If you receive the following warning, perform the `share(1M)` command in Step 3a.

```
prom_panic: Could not mount filesystem
```

a. **Share the CD across the net:**

```
ssp# share -F nfs -o ro,anon=0 /cdrom/cdrom0/s0
```

4. **Exit the superuser level.**

Installing Solaris 7

If the boot disk for the domain has crashed and suitable backup files do not exist or if the disk partition is to be changed, you must perform the instructions in this section. These instructions assume that you have an SSP window open.

You can use these instructions to upgrade the Solaris operating environment without saving any previous files. For upgrades that preserve existing files and disk partitions, see "Performing an Upgrade" on page 49.

During the installation, you will use the `suninstall` utility, which has its own instructions. The following instructions are specific to the Enterprise 10000. For more information about the `suninstall` utility, refer to the *Solaris 7 (SPARC Platform Edition) Installation Library* AnswerBook.

1. **Ensure that** SUNW_HOSTNAME **is set to the proper domain name.**

If the SUNW_HOSTNAME variable is not set to the proper domain name, use the `domain_switch(1M)` command, as in the following example.

```
ssp% domain_switch domain_name
```

Note – The `domain_switch(1M)` command must be executed from a C shell.

2. **Check for blacklisted components.**

If SBus boards have been added to a system board, confirm that the processors on those system boards are not blacklisted. Processors are blacklisted at the factory when a system board does not have SBus cards installed.

During the bring-up process, observe the list of blacklisted components. Alternatively, for instructions on how to retrieve the blacklist file, refer to the `blacklist(1M)` man page.

Blacklisted processors need to be removed from the blacklist before you create a domain that includes those processors.

For instance, you want to create a domain using system boards 14 and 15. However, when you check the blacklist at `$SSPVAR/etc/starfire1/blacklist`, you discover that system boards 14 and 15 have processors on the blacklist, as in the following example.

```
ssp% more $SSPVAR/etc/starfire1/blacklist
pc 2.2 3.2 5.2 6.2 7.2 10.2 11.2 12.2 13.2 14.2 15.2
```

To remove the processors on system boards 14 and 15 from the blacklist, edit the `$SSPVAR/etc/starfire1/blacklist` file and remove `14.2` and `15.2` from the `pc` line.

3. **Bring up the domain:**

```
ssp% bringup -A off
```

If this is the first domain to be brought up, you will be prompted to configure the centerplane. Type y to confirm.

```
This bringup will configure the Centerplane. Please confirm (y/n)?
y
```

After a few minutes the SSP prompt is displayed.

4. **In the SSP window, open a** `netcon(1M)` **session:**

```
ssp% netcon
```

After a few minutes the `ok` prompt is displayed.

5. **Check for duplicate** devaliases **entries in OBP.**

   The suninstall utility may not work properly if you have defined duplicate devaliases in OBP. Use the devalias command to check the aliases. The output may resemble the following example.

```
ok devalias
net              /sbus@41,0/qec@0,20000/qe@1,0
ttya             /ssp-serial
ssa_b_example    /sbus@40,0/SUNW,soc@0,0/SUNW,pln@b0000000,XXXXXX/SUNW,ssd@0,0:a
ssa_a_example    /sbus@40,0/SUNW,soc@0,0/SUNW,pln@a0000000,XXXXXX/SUNW,ssd@0,0:a
isp_example      /sbus@40,0/QLGC,isp@0,10000/sd@0,0
net_example      /sbus@40,0/qec@0,20000/qe@0,0
net              /sbus@41,0/qec@0,20000/qe@0,0
ok
```

Note – If any devaliases are defined twice (net is defined twice in the above example), you should remove the extra devalias entries.

---

6. **If any duplicate entries exist in the** devalias **file, remove them.**

   The following example removes the last-created net devalias. You may have to issue a second nvunalias command if the second net alias is the incorrect one. Then issue an nvalias command to create the correct net device alias.

```
ok nvunalias net
```

7. **Remove duplicate boot-device entries.**

   a. **If you are at the** ok **prompt, use the** setenv **command to set the default boot-device alias to the correct device.**

```
ok setenv boot-device boot_device_alias
```

   Where *boot_device_alias* corresponds to the correct default boot-device alias.

   b. **If** diag-switch? **is set to true, use the OBP** setenv **command to set the** diag-device **variable to the correct device.**

```
ok setenv diag-device boot_device_alias
```

Note – If `diag-switch?` is set to true, OBP uses `diag-device` and `diag-file` as the default boot parameters. If `diag-switch?` is false, OBP uses `boot-device` and `boot-file` as the default boot parameters.

c. **If you are at the domain prompt, log in as superuser on the domain, then use the** `eeprom(1M)` **command to set the boot-device variable:**

```
domain_name# eeprom boot-device=boot_device_alias
```

If an alias does not exist for the network interface that is on the same subnet as the SSP, you can create one by typing a command similar to the following example:

```
ok nvalias net /sbus@41,0/SUNW,hme@0,8c00000
```

Where `/sbus@41,0` refers to system board 0 and SBus 1. The `/SUNW,hme@0` portion of the device name defines a 100BASE-T network interface installed in Slot 0. Your configuration may vary.

The following table contains the SBus numbers used in the `devalias` file.

TABLE 6-1 SBus Numbers in the `devalias` File

system board	sysio 0	sysio 1	system board	sysio 0	sysio 1
0	/sbus@40	/sbus@41	8	/sbus@60	/sbus@61
1	/sbus@44	/sbus@45	9	/sbus@64	/sbus@65
2	/sbus@48	/sbus@49	10	/sbus@68	/sbus@69
3	/sbus@4c	/sbus@4d	11	/sbus@6c	/sbus@6d
4	/sbus@50	/sbus@51	12	/sbus@70	/sbus@71
5	/sbus@54	/sbus@55	13	/sbus@74	/sbus@75
6	/sbus@58	/sbus@59	14	/sbus@78	/sbus@79
7	/sbus@5c	/sbus@5d	15	/sbus@7c	/sbus@7d

The OBP command `watch-net-all` displays the functioning network interfaces.

Caution – The next step starts the `suninstall` utility. During the installation, you will be asked to specify the device name of the boot disk. Do not begin the installation until you know the device name.

8. In the `netcon(1M)` **window, boot the system from the network:**

```
ok boot net
```

Note – You should have an alias (usually `net`) in OBP for the proper network interface. Use that alias with the `boot(1M)` command, as shown in the example above. Otherwise, you must type in a very long path. If you specify an alias (or path) that does not describe the proper network interface, the `boot(1M)` command will fail.

If you install the operating system on a drive other than the one designated as the `bootdrive`, the `suninstall` utility displays a warning message similar to the following:

```
Warning
You have an invalid disk configuration because of the condition(s)
displayed in the window below. Errors should be fixed to ensure a
successful installation. Warnings can be ignored without causing
the installation to fail.

> To go back and fix errors or warnings, select Cancel.
> To accept the error conditions or warnings and continue with the
installation, select Continue.

WARNING: The boot disk is not selected or does not have a "/" mount
point (c0t3d0)
```

You can safely ignore this warning and press F2 to continue.

The `boot net` command starts the `suninstall` utility. This utility prompts you to provide site and platform-specific information. Refer to the following table for the platform-specific information you may need to supply. If you have questions about the `suninstall` utility, refer to the *Solaris 7 (SPARC Platform Edition) Installation Library* in your media kit.

TABLE 6-2 Platform-Specific Information for the `suninstall` Utility

If you are asked to	Do this
Set the network information	Select the appropriate level of information you want to provide. If you select any option other than `None`, the `suninstall` utility displays a series of dialogs that request configuration information. Provide that information.
Select an installation option	Select `Initial` for fresh install.
Select software	Select `Entire Distribution plus OEM Support.`
Customize software	Click "Select To Include Solaris 64-bit Support" to install the 64-bit kernel. Refer to the *Solaris 7 Release Notes Supplement* for instructions on how to check the operating mode, to set the default mode, and to switch the operating mode.
Select disk(s)	Select the disk(s) on which the software is to be installed. If you choose a drive other than the one designated as the boot drive, a warning message appears later in the installation process. At that point, you can choose whether to continue, or not.
Select file system layout options	Select `manual` and `customize` as the file system layout options. The `suninstall` utility enables you to customize the root disk by specifying disk partitions. Use TABLE 5-3 on page 39 as a guide.
Determine if the domain should be mounted as a remote file system	Press F4 if file systems are to be mounted from a remote file server. Press F2 if they are not.
Reboot after installation	Select `manual reboot` and press F2 to begin the installation. This step, which installs the software and the patches from the Solaris release CD, takes many minutes to complete. When the install ends successfully, the superuser prompt is displayed in the domain's `netcon` console window.

Customizing the File System

When you perform a full install of Solaris 7 operating environment on a domain, the `suninstall` utility allows you to manually enter the disk partition sizes for your file systems. Do not use disk partitions that are less than the minimum sizes in TABLE 6-3.

If two disks are used, root (/) and /usr must be on the device specified in the OBP boot alias.

TABLE 6-3   Minimum Partition Sizes

Partition		Minimum Sizes	Notes
0	/	256 Mbyte	Bare minimum size
1	swap	1024 Mbyte	Bare minimum size
2	overlap		Actual total disk size
3	/var	512 Mbyte	
4		2 Mbyte	This slice must be reserved for the Alternate Pathing and Solstice™ DiskSuite™ products. Otherwise, subsequent Alternate Pathing installations will overwrite the operating system.
5	/opt	512 Mbyte	This may be larger depending upon remaining space.
6	/usr	1 Gbyte	Asian-language users may need more space here.

Use the Tab key to move the cursor, and use the keyboard to type the size for each partition. Press F2 when you are done.

Use the following table to record the actual disk partitions.

TABLE 6-4   Disk Partition Form

Domain Name:			Domain Name:		
Boot Disk:			Boot Disk:		
	Partition Name	Size		Partition Name	Size
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
Domain Name:			Domain Name:		

TABLE 6-4   Disk Partition Form *(Continued)*

Boot Disk:			Boot Disk:		
	Partition Name	Size		Partition Name	Size
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		

Domain Name:			Domain Name:		
Boot Disk:			Boot Disk:		
	Partition Name	Size		Partition Name	Size
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		

TABLE 6-4 Disk Partition Form *(Continued)*

Domain Name:			Domain Name:		
Boot Disk:			Boot Disk:		
	Partition Name	Size		Partition Name	Size
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		

Note – Return to TABLE 5-2 on page 37 to continue the `suninstall` installation information.

Configuring the Solaris Operating Environment

1. **After the operating system is loaded and the superuser prompt is displayed, list the** `devices` **entry for your boot disk:**

```
domain_name# ls –l /dev/dsk/root_partition_device
```

where *root_partition_device* is in the form `cxtxdxsx`.

2. **Copy the part of the string that begins with either** `/sbus` **or** `/pci`**.**

Example:

`/sbus@65,0/SUNW,fas@1,8800000/sd@3,0:a.`

Record your string here:

    /

3. **Shut down the domain from the** `netcon(1M)` **window:**

```
domain_name# init 0
```

4. **In the** `netcon(1M)` **window, assign the string to an alias:**

```
ok nvalias bootdisk_name /sbus@48,0/SUNW,soc@0,0/SUNW,pln@a0000000,78ca3b/ssd@0,0:a
```

Where */sbus@48,0/SUNW,soc@0,0/SUNW,pln@a0000000,78ca3b/ssd@0,0:a* is the string from step 2. As in this example, the `nvalias` command should be entered on a single line.

5. **Set up the boot-device alias.**

a. **If you are at the** `ok` **prompt, use the OBP** `setenv` **command to set the default boot-device alias to the correct device.**

```
ok setenv boot-device boot_device_alias
```

Where *boot_device_alias* corresponds to the correct default boot-device alias.

b. **If** `diag-switch?` **is set to true, use the OBP** `setenv` **command to set the** `diag-device` **variable to the correct device.**

```
ok setenv diag-device boot_device_alias
```

Note – If `diag-switch?` is set to true, OBP uses `diag-device` and `diag-file` as the default boot parameters. If `diag-switch?` is false, OBP uses `boot-device` and `boot-file` as the default boot parameters.

---

c. **If you are at the domain prompt, log in as superuser on the domain, then use the** `eeprom(1M)` **command to set the boot-device variable:**

```
domain_name# eeprom boot-device=boot_device_alias
```

6. **In an SSP window, verify that the** `SUNW_HOSTNAME` **variable is set to the proper domain name.**

If `SUNW_HOSTNAME` is not set to the proper domain name, use `domain_switch(1M)` to change the value.

7. **Bring up the domain:**

```
ssp% bringup -A on
```

If this is the first domain to be brought up, you will be prompted to configure the centerplane. Type y to confirm.

```
This bringup will configure the Centerplane. Please confirm (y/n)? y
```

8. **Change to the** /Tools **directory:**

```
ssp# cd /cdrom/cdrom0/s0/Solaris_2.7/Tools
```

9. **Remove the host domain as an install client:**

```
ssp# ./rm_install_client domain_name
```

10. **Remove the Solaris CD from the CD-ROM drive:**

```
ssp# cd /
ssp# unshare /cdrom/cdrom0/s0
ssp# eject cdrom
```

11. **After the system reboots, type the superuser password then re-enter the password when prompted in the** netcon(1M) **window:**

```
Root password: password
Please re-enter your root password: password
```

Your entry will become the new superuser password for the domain.

12. **Respond to the prompts for Solaris configuration information.**

You may be asked for the following items:

- Name service (such as none, NIS, NIS+)
- Net domain name (answer **yes** to subnet question)
- Net domain mask
- Server selection (usually automatic)
- Timezone
- Time

13. **Enter the host name and IP address of the SSP.**

   The `ssp_config(1M)` command automatically tries to determine the default hostname of the SSP. If it is correct, press Return. Otherwise, type the correct SSP host name.

14. **Verify or type the IP address of the SSP:**

```
SSP Host Name: ssp_hostname
SSP IP Address: nnn.nnn.nn.nn

Is this correct (y or n): y
```

15. **Enable** `savecore` **by editing the** `/etc/init.d/sysetup` **file to uncomment the** `savecore` **setup.**

Installing the Sun Computer Systems Supplement Packages

You should install the supplement packages as needed from the Sun Computer Systems Supplement CD.

1. **Insert the Sun Computer Systems Supplement CD.**

2. **Log in as superuser on the SSP and share the CD-ROM:**

```
ssp# share -F nfs -o ro,anon=0 /cdrom/cdrom0
```

3. **Log in as superuser in the** `netcon(1M)` **window.**

4. **Create and mount the** `/cdrom` **directory and add the** `SUNWabhdw` **package:**

```
domain_name# mkdir /cdrom
domain_name# mount ssp_name:/cdrom/cdrom0 /cdrom
domain_name# cd /cdrom/Product
domain_name# pkgadd -d . SUNWabhdw
```

> **Note –** Perform this step only for those domains in which you want to use the AnswerBook files.

> In the Solaris 2.6 operating environment, the `SUNWxntp` packages were replaced by the `SUNWntp` packages, which are installed by the `suninstall` utility.

The `pkgadd(1M)` command may display several messages and ask several installation questions for each package, some relating to space, others asking whether it is OK to continue. After answering these questions, and when asked whether to proceed, answer Yes.

The `pkgadd(1M)` command installs the following package:

TABLE 6-5   Sun Computer Systems Supplement Packages

Includes Cluster/Package	Description
SUNWabhdw	Solaris 7 on Sun Hardware Collection AnswerBook

5. **Install the SSP 3.1 `Y2000 sys_id` patch:**

```
ssp# cd cdrom/Patches/106281-01
ssp# ./installpatch .
```

6. **Install the SSP 3.1 `Y2000` patch:**

```
ssp# cd ../106282-01
ssp# ./installpatch .
```

7. **If needed, add the Online Validation Test Suite Software (SunVTS™):**

```
ssp# cd ../../Product
ssp# pkgadd -d . SUNWvts SUNWvtsmn SUNWvtsx
```

The `SUNWCvts` cluster includes the following packages.

TABLE 6-6   SunVTS Software Cluster and Packages

Cluster Name	Includes Cluster/Package	Name	Description
SUNWCvts			SunVTS Cluster
	SUNWvts	Online Validation Test Suite	SunVTS kernel, user interface tests and tools
	SUNWvtsmn	Online Validation Test Suite Manual Pages	Manual pages for SunVTS utilities and binaries
	SUNWvtsx	Online Validation Test Suite (64-bit version)	SunVTS kernel, user interface tests and tools

If you need more information about the SunVTS software, refer to *SunVTS 3.0 User's Guide*.

8. **If necessary, install and configure the Sun™ Enterprise Volume Manager™ software.**

If you need more information about the Sun Enterprise Volume Manager, refer to the Solaris 7 *on Sun Hardware Collection* AnswerBook.

9. **If needed, install and configure the preloaded Sun™ Enterprise NetBackup™ software.**

The Enterprise NetBackup product has been included with your system. To configure and customize the software to your requirements, refer to the Sun Enterprise NetBackup and Media Manager Installation Guide.

10. **Configure the NTP packages.**

Perform the following steps to configure the `ntp.conf` file, which resides at `/etc/inet/ntp.conf`.

a. **Log in to the domain as superuser.**

b. **Open the** `ntp.conf` **file in your text editor.**

c. Edit the file so that it resembles the following example:

```
# example Starfire domain /etc/inet/ntp.conf
# configuration file ntp.conf
# for Solaris 7
# substitute actual ssp name for <ssp-name>

server <ssp-name> prefer
# we can always fall back to the local clock.
server 127.127.1.0
fudge 127.127.1.0 stratum 9

# Other ntp files.
driftfile /etc/inet/ntp.drift

# Encryption:
disable auth
controlkey 1
requestkey 1
authdelay 0.000793

# precision declaration
precision -18              # clock reading precision (1 usec)
```

Each domain should use the SSP as its source for time, and the SSP should use at least two other sources, besides its internal clock, to avoid a single point of failure in case the SSP's clock fails. For more information about NTP commands, refer to.*Man Pages(1M): Network Time Protocol Commands.*

11. **In the** `netcon(1M)` **window, unmount the CD:**

```
domain_name# cd /
domain_name# umount /cdrom
```

12. **Log in to the SSP as superuser and remove the Sun Computer Systems Supplement CD from the CD-ROM drive:**

```
ssp# cd /
ssp# unshare /cdrom/cdrom0
ssp# eject cdrom
```

13. **Install and configure any other purchased software packages.**

14. **Check the operating mode:**

```
domain_name# isalist
```

If you are running in 64-bit mode, you should get the following output:

```
sparcv9+vis sparcv9 sparcv8plus+vis sparcv8plus sparcv8
sparcv8-fsmuld sparcv7 sparc
```

15. **Reboot the domain with the proper operating mode.**

For the Solaris 7 operating environment, you can use either the 32-bit mode or the 64-bit mode. The 64-bit mode is the default for most sun4u platforms.

a. **For 32-bit mode, type the following command:**

```
domain_name# boot boot_alias kernel/unix
```

b. **For 64-bit mode, type one of the following commands.**

If you are not already in 32-bit mode, use the following command:

```
domain_name# boot boot_alias
```

If you are switching from the 32-bit mode, use the following command:

```
domain_name# boot boot_alias kernel/sparcv9/unix
```

Licensing Your Software

The Enterprise 10000's domain feature requires different approaches to software licensing when compared to systems that cannot be logically partitioned.

FLEXlm-Based Licensing

License management (the license server) is normally tied to a machine host ID. On an Enterprise 10000 system, the license server is tied to the domain host ID. Each domain receives its own domain host ID.

Therefore, if licensing is installed on an Enterprise 10000 system, it must be installed in a domain that will not be removed. Adding or removing processors from the domain will not affect licensing, as long as the domain always has at least one active processor.

If licensing ever needs to be moved from one domain to another, the licenses will need to be regenerated using the new domain host ID. This is identical to the situation when moving the license server from one machine to another. This process is called a *server move*; contact the Sun License Center to request a *server move*.

For more licensing information, use the following Sun License Center URL:

■ `http://www.sun.com/licensing`

To obtain the Enterprise 10000 system domain host ID, type `hostid` in a shell window.

Software Licensing Issues

Software vendors may have unique software licensing policies on the Enterprise 10000 system. For additional information, contact your service provider.

Performing an Upgrade

This section includes upgrade instructions for the Solaris 7 operating environment on a host domain. These upgrade instructions are intended only for the Sun Enterprise 10000 server. You should read this entire section before you attempt to upgrade the domain.

Caution – To upgrade a domain to Solaris 7, the `/usr` partition on your boot disk must be larger than 653-Mbytes. If the partition is smaller than 653-Mbytes, you must repartition the drive before you attempt to upgrade the domain. Sun Microsystems suggests that you use the disk-partition sizes in TABLE 6-10 on page 139. With the introduction of the 64-bit kernel into the Solaris operating environment, the environment's size has grown significantly; thus, if you are still using a single 2.1-Gbyte disk as your boot disk, you should migrate from one 2.1-Gbyte disk to two 2.1-Gbyte disks or one 4.2-Gbyte disk at some point in the near future.

These procedures explain how to upgrade the operating environment while preserving existing data and file structures. To install the Solaris operating environment without preserving existing files and disk partitions, "Performing a Fresh Install" on page 105.

Caution – If you are installing Solaris 7 on an Enterprise 10000 domain, the SSP must be running SSP 3.1. SSP 3.0 does not support Solaris 7. Please refer to your SSP media kKit for instructions on how to install the SSP software.

Backing Up Your Domain

Always back up an existing domain before you use the `upgrade` option in the `suninstall` utility. The safest backup to perform is a level 0 dump of the file systems connected to the domain being upgraded. If you do not have an established backup procedure, see the *System Administration Guide*.

Caution – In Solaris 2.5 and compatible versions, the kernel resides in `/platform/`*arch*`/kernel/unix`, not in `/kernel/unix`. If you override the boot file location by explicitly setting it to `/kernel/unix`, you can successfully install the Solaris software, but you will not be able to boot the domain.

Using the `Upgrade` Option

The `upgrade` option in the `suninstall` utility determines how the Solaris software is copied to the disk. It merges the new version of the Solaris software with the existing files on the domain's disk, saving as many local modifications as possible.

Note – The `upgrade` option may require deleting software packages if the disk is full; this requires knowledge of packages and dependencies.

Upgrading Installed Patches

You do not need to back out installed patches before you perform the upgrade.

Checking Other Software Documentation

Check the documentation of other software you are running, such as any disk volume managers, before you use the `upgrade` option. There may be additional instructions you need to follow to preserve existing configurations.

Upgrading Important Files

The following files must be present on stand alone systems, servers, and each diskless client being upgraded.

- `/var/sadm/softinfo/INST_RELEASE`
- `/var/sadm/install/contents`
- `/var/sadm/system/admin/.clustertoc`
- `/var/sadm/system/admin/CLUSTER`

Preserving Local Modifications

During an upgrade, the `suninstall` utility attempts to preserve local modifications to the server whenever possible; however, local modifications might make an upgrade fail or perform differently than you would expect.

Caution – AP 2.0 and 2.1 are not supported by Solaris 7. If you have either version of AP on the domain, you must deconfigure the software and remove the packages before you perform the upgrade.

The following table includes tasks you should perform before you upgrade the domain.

TABLE 6-7 Upgrading Tasks

What to Do Before Upgrading	How to	Why

Preserve symbolic links	Replace symbolic links that use absolute paths with symbolic links that use relative paths.
	
	For example, if `/usr/openwin` is a symbolic link to
	
	`/export/openwin`
	
	change the symbolic link to
	
	`../export/openwin`
		During an upgrade, the `suninstall` utility cannot reference symbolic links that use absolute paths because the Solaris installation program mounts the root (`/`) file system at `/a`. For example, a symbolic link to `/export/openwin` would fail because during an upgrade, `/export/openwin` is really `/a/export/openwin`.
		
		When the `suninstall` utility cannot reference a symbolic link, it will overwrite the symbolic link and install the software (the installation program doesn't think the software exists). As a result, duplicate software will be installed, and the upgrade may fail because of insufficient disk space.

Preserve symbolic links to automounted file systems	Remove packages (by using Software Manager or the `pkgrm(1M)` command) that will create files or directories currently automounted.	The automounter is not active during an upgrade, so the `suninstall` utility installs any package's files or directories that are symbolic links to automounted file systems. If a symbolic link is overwritten, the upgrade may fail because of insufficient disk space. (If you cannot remove a package, you can replace the symbolic link after the upgrade is completed.) *Note:* The `/var/mail` and `/var/news` directories, which usually reside on an automounted file system, are not affected by an upgrade.
Prevent unneeded file systems from being mounted	In the `/etc/vfstab` file, comment out file systems that you do not want mounted during the upgrade.	During an upgrade, the `suninstall` utility attempts to mount all of the file systems listed in the `/etc/vfstab` file on the root file system being upgraded. If the Solaris installation program cannot mount a file system, it reports the failure and exits.

Preparing the SSP for the Upgrade

This section contains instructions for preparing the SSP for the upgrade. For existing systems, the SSP should already be configured as an install server; therefore, you will only check to ensure that the information is correct. You must install a patch t update the OBP on the SSP, and you must set up the SSP as a boot server for all Enterprise 10000 domains.

Checking the Domain Network Information

For existing machines, the SSP should already be configured as an install server; however, to ensure that the information is correct, perform the following steps:

1. **Log in to the SSP as superuser.**

2. **Ensure that the Enterprise 10000 host name and host-name IP address are correct in the** /etc/hosts **file.**

3. **Ensure that the Enterprise 10000 host name and Ethernet address are correct in the** /etc/ethers **file.**

Updating the OBP On the SSP

Before you can install Solaris 7 on a domain, you must update the OBP on the SSP by performing the following steps:

Note – Back out PatchID 105848-02 if you installed it during the Solaris 7 Beta-Refresh period.

---

1. **Insert the Sun Computer Systems Supplement CD into the CD-ROM drive.**

2. **Change to the 105684-03 patch directory on the CD:**

```
ssp# cd /cdrom/cdrom0/Patches/105684-03
```

3. **Install the patch:**

```
ssp# ./installpatch .
```

4. **Remove the CD:**

```
ssp# cd /
ssp# eject cdrom
```

Setting Up the SSP As a Boot Server

Perform this procedure for each domain on which the Solaris 7 will be loaded.

1. **Insert the Solaris CD disk.**

   The Volume Manager takes about one minute to mount the CD-ROM.

2. **Change to the** /Tools **directory:**

```
ssp# cd /cdrom/cdrom0/s0/Solaris_2.7/Tools
```

3. **Set up the host domain as an install client:**

```
ssp# ./add_install_client domain_name sun4u
```

   The add_install_client command should share the CD across the net. If you receive the following warning, perform the share(1M) command in Step 3a.

```
prom_panic: Could not mount filesystem
```

   a. **Share the CD across the net:**

```
ssp# share -F nfs -o ro,anon=0 /cdrom/cdrom0/s0
```

4. **Exit the superuser level.**

Preparing the Domain

This section contains instructions for preparing the domain to be upgraded to the Solaris 7 operating environment. You must perform the following instructions before you attempt the upgrade.

1. **Log in to each domain as superuser and backup the domain.**

   Using `ufsdump(1M)`, backup all operating-system file systems.

2. **Comment out all file systems in the** `/etc/vfstab` **file except root (/),** `/usr`, `/export`,`/var`, `/opt`, `/proc`, `/dev/fd`, `/tmp`, **and** `swap`.

3. **Comment out all swap partitions that are not on the same controller as the root disk.**

   During an upgrade, the `suninstall` utility attempts to mount all file systems listed in the `/etc/vfstab` file on the root file system being upgraded. If the `suninstall` utility cannot mount a file system, it reports the failure and exits.

4. **If any file systems shown in the** `/etc/vfstab` **file are metadevices (for example, mirrored, striped, concatenated) for Solstice DiskSuite, Veritas, or Alternate Pathing and have not already been commented out, reconfigure them as non-metadevices for the upgrade.**

   This step is necessary because the `suninstall` utility cannot handle metadevices. For more information about these products, refer to their respective user's guides.

   Caution – Make certain that all metadevices are commented out. If any are not, the upgrade will fail.

   ---

5. **Save all of the information regarding pathgroups (for example,** `apconfig -S` **and** `apconfig -N`**) for later retrieval.**

   Note – AP 2.0 and 2.1 are not supported by Solaris 7; therefore, if you have either version of AP installed, you must convert all of the AP metadevices to physical devices. Refer to the *Sun Enterprise Server Alternate Pathing User's Guide* for more information on how to convert metadevices.

   ---

6. **If you do** *not* **plan to upgrade the AP software to AP 2.2 Beta, convert metanetworks to their respective physical network device.**

7. **If you do** *not* **plan to upgrade the AP software to AP 2.2 Beta, convert metadevices to their respective physical devices.**

8. **If the boot device is under AP control, use the** `apboot(1M)` **command to convert the boot device to a physical device.**

9. **Reboot the domain:**

   ```
   domain_name# init 6
   ```

10. **Remove all of the AP databases.**

11. **Kill the** `ap_daemon` **process.**

12. **Remove all of the AP packages from the domain by using the** *pkgrm(1M)* **command.**

    You should remove the following packages from the domain:

    - `SUNWapu`

    - `SUNWapr`

    - `SUNWapdoc`

13. **If you are upgrading from Solaris 2.5.1, remove the** `SUNWxntp` **packages by using the** `pkgrm(1M)` **command.**

14. **Remove duplicate boot-device entries.**

    a. **If you are at the** `ok` **prompt, use the OBP** `setenv` **command to set the default boot-device alias to the correct device.**

    ```
    ok setenv boot-device boot_device_alias
    ```

    Where *boot_device_alias* corresponds to the correct default boot-device alias.

    b. **If** `diag-switch?` **is set to true, use the OBP** `setenv` **command to set the** `diag-device` **variable to the correct device.**

    ```
    ok setenv diag-device boot_device_alias
    ```

    Note – If `diag-switch?` is set to true, OBP uses `diag-device` and `diag-file` as the default boot parameters. If `diag-switch?` is false, OBP uses `boot-device` and `boot-file` as the default boot parameters.

    c. **If you are at the domain prompt, log in as superuser on the domain, then use the** `eeprom(1M)` **command to set the boot-device variable:**

    ```
    domain_name# eeprom boot-device=boot_device_alias
    ```

15. **Shut down the domain before you begin the upgrade:**

    ```
    domain_name# cd /
    domain_name# lockfs -fa
    domain_name# shutdown -i0 -g60 -y
    ```

> **Note –** The `lockfs -fa` command is unnecessary when running 2.5.1 kernel
> update 103640-12.

Upgrading the Solaris Operating Environment

The steps that follow modify the `suninstall` procedures. For more information,
refer to *Solaris 7 (SPARC Platform Edition) Installation Library* AnswerBook.

1. **In an SSP window, ensure that the** `SUNW_HOSTNAME` **variable is set to the proper domain name.**

   If the variable does not have the correct value, use the `domain_switch(1M)`
   command to set the variable to the proper value. The `domain_switch(1M)`
   command must be executed from the C shell.

2. **Remove the existing domain:**

   ```
   ssp% domain_remove -d domain_name
   ```

   Answer y when prompted to save the directories.

3. **Re-create the domain with the new OS version number:**

   ```
   ssp% domain_create -d domain_name -o 2.7
   ```

4. **Bring up the domain:**

   ```
   ssp% bringup -A off
   ```

   If this is the first domain to be brought up, you will be prompted to configure the
   centerplane. Type y to confirm:

   ```
   This bringup will configure the Centerplane. Please confirm (y/n)? y
   ```

   After a few minutes the SSP prompt is displayed.

5. **At the** `ssp` **prompt, open a** `netcon(1M)` **session:**

```
ssp% netcon
```

After a few minutes the `ok` prompt is displayed.

6. **Check for duplicate devalias entries in OBP.**

The `suninstall` utility may not work properly if you have defined duplicate devaliases in OBP. Use the `devalias` command to check the aliases. The output may resemble the following example.

```
ok devalias
net             /sbus@41,0/qec@0,20000/qe@1,0
ttya            /ssp-serial
ssa_b_example   /sbus@40,0/SUNW,soc@0,0/SUNW,pln@b0000000,XXXXXX/SUNW,ssd@0,0:a
ssa_a_example   /sbus@40,0/SUNW,soc@0,0/SUNW,pln@a0000000,XXXXXX/SUNW,ssd@0,0:a
isp_example     /sbus@40,0/QLGC,isp@0,10000/sd@0,0
net_example     /sbus@40,0/qec@0,20000/qe@0,0
net             /sbus@41,0/qec@0,20000/qe@0,0
ok
```

Note – If any devaliases are defined twice (for example, `net` is defined twice in the above example), you should remove the extra `devalias` entries.

---

7. **If any duplicate entries exist in the** `devalias` **file, remove them.**

The following example removes the last created `net` devalias. You may have to issue a second `nvunalias` command if the second `net` alias is the incorrect one. Then issue an `nvalias` command to create the correct `net` device alias.

```
ok nvunalias net
```

8. **If an alias does not exist for the network interface that is on the same subnet as the SSP, you can create one by typing a command similar to the following example:**

```
ok nvalias net /sbus@41,0/SUNW,hme@0,8c00000
```

Where /sbus@41,0 refers to system board 0 and SBus 1. The /SUNW,hme@0 portion of the device name defines a 100Base-T network interface installed in Slot 0. Your configuration will vary.

The following table contains the SBus numbers that are used in the devalias file.

TABLE 6-8   SBus Numbers in the devaias File

system board	sysio 0	sysio 1	system board	sysio 0	sysio 1
0	/sbus@40	/sbus@41	8	/sbus@60	/sbus@61
1	/sbus@44	/sbus@45	9	/sbus@64	/sbus@65
2	/sbus@48	/sbus@49	10	/sbus@68	/sbus@69
3	/sbus@4c	/sbus@4d	11	/sbus@6c	/sbus@6d
4	/sbus@50	/sbus@51	12	/sbus@70	/sbus@71
5	/sbus@54	/sbus@55	13	/sbus@74	/sbus@75
6	/sbus@58	/sbus@59	14	/sbus@78	/sbus@79
7	/sbus@5c	/sbus@5d	15	/sbus@7c	/sbus@7d

The OBP command watch-net-all displays the functioning network interfaces.

Caution – The next step starts the suninstall utility. During the installation, you will be asked to specify the device name of the boot disk. Do not begin the installation until you have the device name.

9. **In the netcon(1M) window, boot the system from the network:**

```
ok boot net
```

Note – You should have an alias (usually `net`) in OBP for the proper network interface. Use that alias with the `boot(1M)` command, as shown in the example above. Otherwise, you must type in a very long path. If you specify an alias (or path) that does not describe the proper network interface, the `boot(1M)` command will fail.

The `boot net` command starts the `suninstall` utility. This utility prompts you to provide site and platform-specific information. Refer to the following table for the platform-specific information you may need to supply. If you have questions about the `suninstall` utility, please refer to the *Solaris 7 (SPARC Platform Edition) Installation Library* in your media kit.

TABLE 6-9   Platform-Specific Information for the `suninstall` Utility

If you are asked to	Do this
Set the network information	Select the appropriate level of information you want to provide. If you select any option other than `None`, the `suninstall` utility displays a series of dialogs that request configuration information. Provide that information.
Select an installation option	Select `Upgrade`.
Select software	Select `Entire Distribution plus OEM Support`.
Customize software	Click "Select To Include Solaris 64-bit Support" to install the 64-bit kernel. Refer to the *Solaris 7 Release Notes Supplement* for instructions on how to check the operating mode, to set the default mode, and to switch the operating mode.

TABLE 6-9 Platform-Specific Information for the `suninstall` Utility *(Continued)*

If you are asked to	Do this
Select disk(s)	Select the disk(s) on which the software is to be installed. If you choose a drive other than the one designated as the bootdrive, a warning message appears later in the installation process. At that point, you can choose whether to continue, or not. *Note:* For Solaris 7, you may see a warning stating that the system needs more disk space. Refer to TABLE 6-10 on page 139 for more information.
Determine if the domain should be mounted as a remote file system	Press F4 if file systems are to be mounted from a remote file server. Press F2 if they are not.
Select post installation option (`manual reboot`)	Select `manual reboot` and press F2 to begin the installation. This step, which installs the software and the patches on the Solaris release CD, takes many minutes to complete. When the installation is complete, the `suninstall` utility does not reboot the domain if you select `manual reboot`. The Enterprise 10000 host displays the superuser prompt in the `netcon(1M)` window. Do *not* use the `reboot(1M)` command to shut down the domain.

Customizing the File System

When you perform a full install of the Solaris 7 operating environment on a domain, the `suninstall` utility allows you to manually enter the disk partition sizes for your file systems. Sun Microsystems suggests that you do not use disk partitions that are less than the minimum sizes in TABLE 6-10.

If two disks are used, root (/) and /usr must be on the device specified in the OBP boot alias.

TABLE 6-10   Minimum Partition Sizes

Partition		Minimum Sizes	Notes
0	/	256 Mbyte	Bare minimum size
1	swap	1024 Mbyte	Bare minimum size
2	overlap		Actual total disk size
3	/var	512 Mbyte	
4		2 Mbyte	This slice must be reserved for the Alternate Pathing and Solstice DiskSuite products. Otherwise, subsequent Alternate Pathing installations will overwrite the operating system.
5	/opt	512 Mbyte	This may be larger depending upon remaining space.
6	/usr	1 Gbyte	Asian-language users may need more space here.

Use the Tab key to move the cursor, and use the keyboard to type the size for each partition. Press F2 when you are done.

During the upgrade, the suninstall utility may notify you that your disk partition sizes are not large enough for Solaris 7, as in the following example:

```
- More Space Needed -----------------------------------------
```

If you see this message during the upgrade, you should check the /usr partition. If this partition is smaller than 653-Mbytes, you must repartition the boot disk by performing the following steps:

1. Press F2 to select Auto Layout.

The File System Modification screen appears.

```
     File System        Slice         Size    Modification    Existing    Existing
                                       (MB)                    Slice       Size (MB)
     --------------------------------------------------------------------------------
     -                   c0t0d0s0        64    None            ----        ----
   | swap                c0t0d0s1       512    None            ----        ----
   | /var                c0t0d0s3       512    None            ----        ----
   | <       >           c0t0d0s4         2    None            ----        ----
   | /opt                c0t0d0s5       512    None            ----        ----
   | /usr                c0t0d0s6       512    None            ----        ----
   | /export             c0t0d0s7      1975    None            ----        ----
   | /                   c0t1d0s0        64    None            ----        ----
   | swap                c0t1d0s1       512    None            ----        ----
   | /var                c0t1d0s3       512    None            ----        ----
   | <       >           c0t1d0s4         2    None            ----        ----
   | /opt                c0t1d0s5       425    None            ----        ----
   | /usr                c0t1d0s6       512    None            ----        ----
   |                     c0t1d0       2062    Unused
   | /                   c0t2d0s0       128    None            ----        ----
   | swap                c0t2d0s1      2511    None            ----        ----
   v /var                c0t2d0s3       512    None            ----        ----
```

<table>
<tr><td>⚠ !</td><td>Caution – Make sure that the partition sizes for the root (/), /swap, /usr, and /var file systems are not reduced below the minimum sizes shown in TABLE 6-10 on page 139.</td></tr>
</table>

2. If the proposed modifications are acceptable, press F2 to continue.

Otherwise, press F4 to change the constraints that the suninstall utility uses to reconfigure the disk partitions. Your data will be temporarily backed up during the partition reconfiguration, and then it will be restored. For more information, refer to the *Solaris Advanced Installation Guide.*

Note – For systems with a large Volume Manager configuration (100 disks or more), the size of the root (/) file system should be increased. Sun Microsystems suggests that you use sizes of approximately 256 Mbyte to 512 Mbyte to allow for additional space, which will be required for device name entries.

1. **Shut down the domain from the superuser prompt:**

```
domain_name# init 0
```

2. **Bring up the domain:**

```
ssp% bringup -A on
```

Note – This step assumes that you are upgrading the boot disk that is defined in the OBP boot-device variable. If you are upgrading a different boot disk, you must supply the device's alias as an argument to the command.

3. **Change to the** `/Tools` **directory:**

```
ssp# cd /cdrom/cdrom0/s0/Solaris_2.7/Tools
```

4. **Remove the host domain as an install client:**

```
ssp# ./rm_install_client domain_name
```

5. **If you are done with the upgrade, remove the Solaris 7 CD:**

```
ssp# cd /
ssp# unshare /cdrom/cdrom0/s0
ssp# eject cdrom
```

Upgrading the Sun Computer Systems Supplement Packages

You should upgrade any supplement packages your system needs from the Sun Computer Systems Supplement CD at this point in the upgrade process.

1. **Insert the Sun Computer Systems Supplement CD.**

2. **Log in to the SSP as superuser and share the CD-ROM:**

```
ssp# share -F nfs -o ro,anon=0 /cdrom/cdrom0
```

3. **Create and mount the** `/cdrom` **directory and add the Sun Computer Systems Supplement packages:**

```
domain_name# mkdir /cdrom [if it does not already exist]
domain_name# mount ssp_name:/cdrom/cdrom0 /cdrom
domain_name# cd /cdrom/Product
domain_name# pkgadd -d . SUNWabhdw
```

Note – Perform this step only for those domains in which you want to use the AnswerBook files.

The `pkgadd(1M)` command may display several messages and ask several installation questions for each package, some relating to space, others asking whether it is OK to continue. After answering these questions, and when you are asked whether to proceed, answer Yes.

The `pkgadd(1M)` command will install the following package.

TABLE 6-11 Sun Computer Systems Supplement Package

Includes Cluster/Package	Description
SUNWabhdw	Solaris 7 on Sun Hardware Collection AnswerBook

4. **Install the SSP 3.1** `Y2000 sys_id` **patch:**

```
ssp# cd cdrom/Patches/106281-01
ssp# ./installpatch .
```

5. **Install the SSP 3.1** `Y2000` **patch:**

```
ssp# cd ../106282-01
ssp# ./installpatch .
```

6. If needed, add the Online Validation Test Suite Software (SunVTS):

```
ssp# cd ../../Product
ssp# pkgadd -d . SUNWvts SUNWvtsmn SUNWvtsx
```

The `SUNWCvts` cluster includes the following packages.

TABLE 6-12   SunVTS Software Cluster and Packages

Cluster Name	Includes Cluster/Package	Name	Description
`SUNWCvtsx`			SunVTS Cluster
	`SUNWvts`	Online Validation Test Suite	SunVTS kernel, user interface tests and tools
	`SUNWvtsmn`	Online Validation Test Suite Manual Pages	Manual pages for SunVTS utilities and binaries
	`SUNWvtsx`	Online Validation Test Suite (64-bit version)	SunVTS kernel, user interface tests and tools

If you need more information about SunVTS, refer to the *SunVTS 2.1 User's Guide.*

7. If necessary, install and configure the Sun Enterprise Volume Manager software.

If you need more information about Sun Enterprise Volume Manager, refer to the Solaris 7 on Sun Hardware Collection AnswerBook.

8. If needed, install and configure the preloaded Sun Enterprise NetBackup software.

The Enterprise NetBackup product has been included with your system. To configure and customize the software to your requirements, refer to the Sun Enterprise NetBackup and Media Manager Installation Guide.

9. Configure the NTP packages.

Perform the following steps to configure the `ntp.conf` file, which resides at `/etc/inet/ntp.conf`.

a. Log in to the domain as superuser.

b. Open the `ntp.conf` file in your text editor.

c. Edit the file so that it resembles the following example:

```
# example Starfire domain /etc/inet/ntp.conf
# configuration file ntp.conf
# for Solaris 7
# substitute actual ssp name for <ssp-name>

server <ssp-name> prefer
# we can always fall back to the local clock.
server 127.127.1.0
fudge 127.127.1.0 stratum 9

# Other ntp files.
driftfile /etc/inet/ntp.drift

# Encryption:
disable auth
controlkey 1
requestkey 1
authdelay 0.000793

# precision declaration
precision -18              # clock reading precision (1 usec)
```

Each domain should use the SSP as its source for time, and the SSP should use at least two other sources, besides its internal clock, to avoid a single point of failure in case the SSP's clock fails. For more information about NTP commands, refer to *Man Pages(1M): Network Time Protocol Commands.*

10. **In the** `netcon(1M)` **window, unmount the CD:**

```
domain_name# cd /
domain_name# umount /cdrom
```

11. **Log in to the SSP as superuser and remove the CD:**

```
ssp# cd /
ssp# unshare /cdrom/cdrom0
ssp# eject cdrom
```

12. **Install and configure any other purchased software packages.**

If you plan to upgrade the AP software, refer to the *Sun Enterprise Server AP 2.2 Installation and Release Notes* for more information about the upgrade.

13. **Uncomment all file systems in the** `/etc/vfstab` **file that you commented out when you prepared the domain for the upgrade.**

Caution – Do not uncomment any of the AP-related file systems unless you upgraded the AP software.

14. **Uncomment all swap partitions that are not on the same controller as the root disk.**

15. **Set up the boot-device alias.**

    a. **If you are at the** `ok` **prompt, use the OBP** `setenv` **command to set the default boot-device alias to the correct device.**

    ```
    ok setenv boot-device boot_device_alias
    ```

    Where *boot_device_alias* corresponds to the correct default boot-device alias.

    b. **If** `diag-switch?` **is set to true, use the OBP** `setenv` **command to set the** `diag-device` **variable to the correct device.**

    ```
    ok setenv diag-device boot_device_alias
    ```

    Note – If `diag-switch?` is set to true, OBP uses `diag-device` and `diag-file` as the default boot parameters. If `diag-switch?` is false, OBP uses `boot-device` and `boot-file` as the default boot parameters.

    c. **If you are at the domain prompt, log in as superuser on the domain, then use the** `eeprom(1M)` **command to set the boot-device variable:**

    ```
    domain_name# eeprom boot-device=boot_device_alias
    ```

16. **Check the operating mode:**

```
domain_name# isalist
```

If you are running in 64-bit mode, you should get the following output:

```
sparcv9+vis sparcv9 sparcv8plus+vis sparcv8plus sparcv8
sparcv8-fsmuld sparcv7 sparc
```

17. **Reboot the domain with the proper operating mode.**

For the Solaris 7 operating environment, you can use either the 32-bit mode or the 64-bit mode. The 64-bit mode is the default for most sun4u platforms.

a. **For 32-bit mode, type the following command:**

```
domain_name# boot boot_alias kernel/unix
```

b. **For 64-bit mode, type one of the following commands.**

If you are not already in 32-bit mode, use the following command:

```
domain_name# boot boot_alias
```

If you are switching from the 32-bit mode, use the following command:

```
domain_name# boot boot_alias kernel/sparcv9/unix
```

Installing Solaris With the SPARCstorage Array

This chapter describes how to install Solaris 7 software either as a new installation or as an upgrade on systems where the SPARCstorage Array may be used as the boot device.

Note – The installation instructions in this chapter are specific to systems configured with SPARCstorage Arrays.

⚠ **Caution –** The following installation instructions should be performed by an experienced system administrator. Failure to comply with this requirement may result in a loss of data stored on your disks.

Disk Management Software

⚠ **Caution –** If you are currently running disk management software on your system, refer to your disk management software documentation before proceeding with these instructions or you may lose the data on your disks.

SPARCstorage Array Firmware

In the installation and upgrade scenarios below, you will be instructed to check, and if necessary, upgrade the firmware for your SPARCstorage Array(s).

This Solaris 7 software contains SPARCstorage Array firmware revision level 3.12, which is the latest version of firmware for all SPARCstorage Array models (100 and 200 series).

If your SPARCstorage Array has a firmware revision level below 3.12, you must upgrade the firmware revision level to 3.12 as instructed.

If the firmware revision level on your SPARCstorage Array(s) is at a revision level of 3.12 or higher, you do not need to upgrade your firmware.

Installation and Upgrade Scenarios

This chapter is divided into several installation and upgrade scenarios. Refer to the tables below to select the installation or upgrade method that describes your current situation.

Note – Read through the entire scenario before performing any installation or upgrade. A thorough comprehension of the material is necessary to ensure a successful installation.

TABLE 7-1   New Installations

New Installations	Go to
New installation of Solaris 7 on a SPARCstorage Array disk	"Scenario 1: New Installation of Solaris 7 on Systems Booting From the SPARCstorage Array Disk" on page 149
New installation of Solaris 7 on a non SPARCstorage Array disk	"Scenario 2: New Installation of Solaris 7 on Systems Not Booting From the SPARCstorage Array Disk" on page 154

TABLE 7-2   Upgrades

Upgrades:	Go to:
Upgrading to Solaris 7 from: • Solaris 2.3 • Solaris 2.4 Hardware 11/94 • Solaris 2.4 Hardware 3/95 • Solaris 2.5 • Solaris 2.5.1 • Solaris 2.6 Hardware: 3/98 • Solaris 2.6 Hardware: 5/98	"Scenario 3: Upgrading to Solaris 7" on page 155

Scenario 1: New Installation of Solaris 7 on Systems Booting From the SPARCstorage Array Disk

Using the FC/S SBus Card

If the disk that you intend to use as your boot device is on a SPARCstorage Array that is connected to the system through an FC/S SBus card, note that the FC/S SBus card FCode revision level must be at 1.33 or higher to allow booting.

The following FC/S SBus cards are configured from the factory with an FCode revision level of 1.33 or higher:

- 501-2069-07 or higher
- 501-2553-03 or higher

To check the FCode revision level of your FC/S SBus card, refer to "Checking the FCode Level of Your FC/S SBus Card" on page 152.

Using the Onboard FC Ports

If the SPARCstorage Array is connected to the system through an onboard FC port, it is not necessary to check the FCode revision level; these systems come configured from the factory with the minimum FCode revision level to allow booting.

▼ Installing Solaris 7 on a SPARCstorage Array Disk

1. **Install the Solaris software environment with the no reboot option.**

   Refer to Chapter 1, "" and the *SPARC: Installing Solaris Software* manual for more information.

   Note – Keep track of which disk you select as your boot device as you will need this information to set your boot path.

   ⚠ **Caution –** Do not select the system to reboot at the end of the Solaris installation setup.

   ---

2. **Determine which level of SPARCstorage Array firmware is in each SPARCstorage Array. Type:**

   ```
   # ssaadm display controller
   ```

   where *controller* is the logical controller name of the SPARCstorage Array (for example, c1). Look for the line that gives the firmware revision information, similar to the following:

   ```
   Firmware Rev: 3.12
   ```

3. **If the firmware revision is lower than 3.12, download the new firmware. Type:**

   ```
   # ssaadm download -f /usr/lib/firmware/ssa/ssafirmware
   controller
   ```

4. **Set your boot device. Type:**

   ```
   # ssaadm set_boot_dev <boot device pathname>
   ```

   Where *<boot device pathname>* is the path to the device you selected as your boot device in Step 1. This command is interactive and requires user confirmation before setting the boot path. This command sets the OBP environmental variable *boot device* to the path of the device you selected as the boot device. You should create an OBP *devalias* to keep track of the boot path in case of accidental loss.

5. **If you need to upgrade your FCode, use the** `ssaadm` **command:**

```
# ssaadm fc_download
```

6. **Halt the system. Type:**

```
# /usr/sbin/init 0
```

7. **If you downloaded new firmware, press the** SYS OK **button on the back of the SPARCstorage Array(s) to reset.**

Note – Before booting your system, wait for the SPARCstorage Array to complete POST.

---

8. **Reset and boot your system.**

```
ok reset
ok boot
```

Note – You have completed the new installation of Solaris 7. If you would like to install disk management software, refer to your disk management software documentation.

Trouble Booting?

If your system does not boot, check that:

- Your boot-device environmental variable is correctly set to your boot device.
- The FCode revision level is at 1.33 or higher if you are attempting to boot through an FC/S SBus Card. To check the FCode revision level, refer to "Checking the FCode Level of Your FC/S SBus Card" on page 152.

▼ Checking the FCode Level of Your FC/S SBus Card

1. Determine your FCode level. Type the following at the `ok` prompt:

```
ok setenv fcode-debug? true
ok reset
ok show-devs
```

When you type the `show-devs` command, you should see output similar to this:

```
.
.
.
/iommu@0,10000000/sbus@0,10001000/le@1,c00000
/iommu@0,10000000/sbus@0,10001000/SUNW,soc@0,0
/iommu@0,10000000/sbus@0,10001000/ledma@4,8400010
/iommu@0,10000000/sbus@0,10001000/SUNW,bpp@4,c800000
/iommu@0,10000000/sbus@0,10001000/espdma@4,8400000
/iommu@0,10000000/sbus@0,10001000/SUNW,DBRIe@2,10000/mmcodec
/iommu@0,10000000/sbus@0,10001000/SUNW,soc@0,0/SUNW,pln@a0000800,201cac11
/iommu@0,10000000/sbus@0,10001000/SUNW,soc@0,0/SUNW,pln@a0000800,201cac11/
SUNW,ssd
```

2. Look at the output from the `show-devs` command and find the lines for the FC/S card(s) that is attached to the SPARCstorage Array that you want to boot from.

The output for an FC/S card will be the lines containing `soc@`*x,x* similar to:

```
/iommu@0,10000000/sbus@0,10001000/SUNW,soc@0,0
/iommu@0,10000000/sbus@0,10001000/SUNW,soc@0,0/SUNW,pln@a0000800,201cac11
/iommu@0,10000000/sbus@0,10001000/SUNW,soc@0,0/SUNW,pln@a0000800,201cac11
SUNW,ssd
```

3. To determine which version of FCode is in the FC/S card, type:

```
ok cd short_path
ok sccsid type
1.33 95/04/19
ok device-end
```

where *short_path is the shortest* line containing *soc@x,x* from the output. Using the previous output as an example, you would enter:

```
ok cd /iommu@0,10000000/sbus@0,10001000/SUNW,soc@0,0
ok sccsid type
1.33 95/04/19
ok device-end
```

If the FCode version is not at 1.33 or higher you must upgrade to the minimum FCode level.

Note – You can upgrade your FCode after installing the Solaris 7 software.

The following part numbers refer to the FC/S SBus Cards that contain the minimum FCode revision level to allow booting:

- 501-2069-07 or higher
- 501-2553-03 or higher

● **Reset your OBP environment variable** `fcode-debug?`

```
ok setenv fcode-debug? false
ok reset
```

Scenario 2: New Installation of Solaris 7 on Systems Not Booting From the SPARCstorage Array Disk

1. **Install the Solaris software environment with the no reboot option.**

   Refer to Chapter 1, "" and the *SPARC: Installing Solaris Software* manual for more information.

   ⚠ **Caution –** Do not select the system to reboot at the end of the Solaris installation setup.

   ---

2. **Determine which level of SPARCstorage Array firmware is in each SPARCstorage Array. Type:**

   ```
   # ssaadm display controller
   ```

   where *controller* is the logical controller name of the SPARCstorage Array (for example, c1). Look for the line that gives the firmware revision information, similar to the following:

   ```
   Firmware Rev: 3.12
   ```

3. **If the firmware revision is lower than 3.12, download the new firmware. Type:**

   ```
   # ssaadm download -f /usr/lib/firmware/ssa/ssafirmware controller
   ```

4. **Halt the system. Type:**

   ```
   # /usr/sbin/init 0
   ```

5. **If you downloaded new firmware, press the** SYS OK **button on the back of the SPARCstorage Array(s) to reset.**

   Note – Before you proceed, wait for the SPARCstorage Array to complete POST.

   ---

6. Boot your system. Type:

```
ok boot
```

Note – You have completed the new installation of Solaris 7. If you would like to install disk management software, refer to your disk management software documentation.

Scenario 3: Upgrading to Solaris 7

If you are currently using one of the Solaris releases below and would like to upgrade to Solaris 7, follow the instructions in this section.

- Solaris 2.3
- Solaris 2.4 Hardware 11/94
- Solaris 2.4 Hardware 3/95
- Solaris 2.5
- Solaris 2.5.1
- Solaris 2.5.1 Hardware: 8/97
- Solaris 2.5.1 Hardware 11/97
- Solaris 2.6
- Solaris 2.6 Hardware: 3/98
- Solaris 2.6 Hardware: 5/98

Caution – If you are currently running disk management software on your system, *do not* follow these instructions or you may lose the data on your disks. Refer to your disk management software documentation for instructions.

---

1. Type su **to become superuser.**

2. Back up the data on your system.

Refer to the *System Administration Guide, Volume I* for information.

3. Stop all processes (database or other applications) that are accessing SPARCstorage Array disks except /, swap, /usr, **and** /opt.

4. Insert the Solaris 7 CD into the CD-ROM drive, and upgrade your system to Solaris 7.

Refer to Chapter 1, "Installing Software from the Solaris CD" and the SPARC: Installing Solaris Software manual for more information.

Caution – Do not select the system to reboot at the end of the Solaris installation setup.

5. **Determine which level of SPARCstorage Array firmware is in your SPARCstorage Array(s) by entering the following command at the prompt for each SPARCstorage Array:**

```
# ssaadm display controller
```

where *controller* is the logical controller name of the SPARCstorage Array (for example, c1). Look for the line that gives the firmware revision information, similar to the following:

```
Firmware Rev 3.12
```

6. **If the firmware revision is below 3.12, download the new firmware for each SPARCstorage Array:**

```
# ssaadm download -f /usr/lib/firmware/ssa/ssafirmware controller
```

7. **Halt your system. Type:**

```
# /usr/sbin/init 0
```

8. **If you downloaded new firmware, press the** SYS OK **button on the back of the SPARCstorage Array(s) to reset.**

Note – Before booting your system, wait for the SPARCstorage Array to complete POST.

9. **Boot your system.**

```
ok boot
```

Power Management on Sun Hardware

The U.S. Environmental Protection Agency has launched the Energy Star Computers program to encourage the introduction and use of energy-efficient computer systems and to reduce air pollution associated with energy generation.

In response to this policy, Sun is providing Power Management™ software. In order to reduce the amount of power your Sun workstation uses, your Sun workstation is now capable of entering a lower power state when the display is inactive for a period of time.

This section supplements *Using Power Management* in the Solaris 7 User Collection.

Supported Platforms

Power Management software supports the sun4m and sun4u platform groups. Software features and defaults may vary between the two platform groups. Refer to *Using Power Management* in the Solaris 7 User AnswerBook set for more information when you identify the platform group that applies to your system.

TABLE 8-1 Platform Names and Groups Supported by Power Management

System Name	Platform Name	Platform Group
SPARCstation 4	SUNW,SPARCstation-4	sun4m
SPARCstation 5	SUNW,SPARCstation-5	sun4m
SPARCstation 10	SUNW,SPARCstation-10	sun4m
SPARCstation 10SX	SUNW,SPARCstation-10,SX	sun4m
SPARCstation 20	SUNW,SPARCstation-20	sun4m
SPARCstation LX	SUNW,SPARCstation-LX	sun4m
SPARCstation LX+	SUNW,SPARCstation-LX+	sun4m
SPARCclassic	SUNW,SPARCclassic	sun4m
SPARCclassic X	SUNW,SPARCclassic-X	sun4m
SPARCstation Voyager	SUNW,S240	sun4m
Ultra 1 (all models)	SUNW,Ultra-1	sun4u
Ultra 5	SUNW,Ultra-5	sun4u
Ultra 10	SUNW,Ultra-10	sun4u
Ultra 30	SUNW,Ultra-30	sun4u
Ultra 60	SUNW,Ultra-60	sun4u
Ultra 450	SUNW,Ultra-4	sun4u
Ultra 2 Creator (all models)	SUNW,Ultra-2	sun4u
Sun Enterprise 1 Model 140	SUNW,Ultra-1	sun4u
Sun Enterprise 1 Model 170	SUNW,Ultra-1	sun4u
Sun Enterprise 1 Model 170E	SUNW,Ultra-1	sun4u
Sun Enterprise 2 Model 1300	SUNW,Ultra-2	sun4u
Sun Enterprise 2 Model 2300	SUNW,Ultra-2	sun4u

Hardware and Software Requirements

Power Management software in Solaris 7 requires the following hardware and software:

- Hardware options
  - Type 5 or Compact 1 keyboard
  - 17-inch, 20-inch, or 24-inch color monitor
- Software
  - Solaris 7 software environment (already installed)

Supported Peripherals

TABLE 8-2 shows the peripherals supported by Power Management software.

TABLE 8-2   Power Management Supported Peripherals

Peripheral	Description
Frame Buffers	Black and white frame buffer driver
	24-bit color frame buffer driver
	Accelerated 8-bit color frame buffer driver
	8-bit color frame buffer driver
	SX graphic driver
	Creator and Creator3D graphics accelerators
	FFB2 graphics
	PGX graphics frame buffer
	ATI graphics (m64)
SBus	SBus driver
	SBus memory driver
	SBus DMA gate array driver
	Sysio SBus driver
SCSI	Emulex Intelligent SCSI Processor driver
	Emulex SCSI Processor host adapter driver
	SCSI disk driver

TABLE 8-2   Power Management Supported Peripherals *(Continued)*

Peripheral	Description
	SCSI tape driver
	Symbios SCSI host adapter
Miscellaneous	Intel 82072/82077 floppy disk driver
	LANCE (Am7990) Ethernet driver
	Zilog 8530 SCC Serial Communications driver
	Serial I/O driver for Multi-Interface Chip (MIC)
	Dual Basic Rate ISDN and audio interface driver
	CS 4231 Audio Chip driver
	AMD AM79C30A Audio Chip driver
	Bi-directional Parallel Port driver
	Profile driver
	SunSwift SBus Adapter drivers
	SunSwift PCI Adapter drivers
	SunFDDI Single-Attach PCI Adapter
	SunFDDI Dual-Attach PCI Adapter
	SUNTRI Token Ring Interface PCI Adapter
	Dual Single-ended UltraSCSI PCI Adapter
	Dual Differential UltraSCSI PCI Adapter

SPARCstation 4 Issues

This section describes a workaround to a limitation of the SPARCstation 4 when used with Power Management.

The AC accessory outlet on the SPARCstation 4 system unit is an unswitched outlet. The AC power switch does not control power flowing through the accessory outlet. If you connect a monitor to the accessory outlet, you cannot turn it off using the system unit power switch. Similarly, if you use Power Management software, the software cannot turn off the monitor automatically. To conserve energy, consider using an Energy Star compliant monitor. Sun offers a variety of Energy Star compliant monitors in its standard SPARCstation 4 system configurations. This information does not apply to SPARCserver 4 configurations. The SPARCserver 4 includes a switched accessory outlet.

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