

Solaris 2.5.1 Server Release Notes

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SunSoft
A Sun Microsystems, Inc. Business

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Preface

The *Solaris 2.5.1 Server Release Notes* provides an overview of new Solaris™ 2.5.1 features and provides system administrators and developers with supplemental information that did not arrive in time to be included in other documentation.

How This Book Is Organized

- Chapter 1, “What’s New in Solaris 2.5.1,” provides brief descriptions of new features and enhancements to existing features in the Solaris 2.5.1 release.
- Chapter 2, “Large User and Group IDs,” describes limits on User ID and Group ID values, which have been raised, and notes limitations and restrictions. This new functionality is primarily used by system administrators who need to create UIDs or GIDs larger than 60000. Application developers may need to know which related interfaces have changed to support the extended UIDs and GIDs.
- Chapter 3, “Solaris 2.5.1 PowerPC Edition Administration,” provides an overview of Solaris 2.5.1 system administration on PowerPC™ systems and a list of differences for administrators of SPARC™, x86, and PowerPC systems running the Solaris 2.x release.
- Chapter 4, “Booting a PowerPC System,” provides overview information and step-by-step instructions for booting a PowerPC system.
- Chapter 5, “PowerPC: Adding a Disk,” provides overview information and step-by-step instructions for adding a disk to a PowerPC system.

Ordering Hardcopy Documentation

The SunDocsSM program makes available for individual sale product documentation from Sun MicrosystemsTM Computer Company and SunSoftTM. For a list of documents and order information, see the catalog section of the SunExpressTM On The Internet site at <http://www.sun.com/sunexpress>.

What Typographic Changes Mean

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

Table P-1 Typographic Conventions

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

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

Table P-2 Shell Prompts

Shell	Prompt
C shell prompt	machine_name%
C shell superuser prompt	machine_name#
Bourne shell and Korn shell prompt	\$
Bourne shell and Korn shell superuser prompt	#

What's New in Solaris 2.5.1



This chapter provides brief descriptions of new and enhanced features implemented in the Solaris 2.5.1 release. It also includes information on the Supplemental System Administration AnswerBook and ordering printed documentation.

Security

Large User IDs and Group IDs

In the Solaris 2.5.1 release, the limit on User ID and Group ID values has been raised to 2147483647, or the maximum value of a signed integer. The `nobody` user and group (60001) and the `noaccess` user and group (60002) retain the same UIDs and GIDs as previous Solaris 2.x releases. Sun recommends that you keep UIDs and GIDs under 60000 because there are interoperability issues and limitations with previous Solaris releases and products.

See Chapter 2, “Large User and Group IDs,” for more information on this change, including limitations and restrictions. Or, see the following man pages:

```
tar(1)
pax(1)
edquota(1)
cpio(1)
```

```
login(1)
passwd(4)
group(4)
```

Imaging

KCMS Calibrator Tool

The Kodak Color Management System (KCMS) Calibrator Tool provides adjustments for accurate color representation to scanners, color monitors, and other output devices. The Solaris 2.5.1 release includes a loadable driver module (in the SUNWkcspg package) for the X-Rite DTP92 Incident Colorimeter. The driver supports the X-Rite colorimeter, which connects to the serial port to obtain color measurement data.

This information is supplemental to the *KCMS Calibrator Tool Loadable Interface Guide*. See the *Solaris 2.5.1 Software Developers Kit: Release Notes* for an updated chapter that describes new procedures for adding and removing color calibration modules to the system configuration file, `OWconfig`.

PowerPC: System Administration

PowerPC: System Administration for the PowerPC System

Administering PowerPC systems differs in some ways from SPARC and x86 systems. Because the PowerPC system runs Open Firmware (OF) or Virtual Open Firmware (VOF), booting the system and adding a disk is different. The VOF has commands and configurable variables—similar to a SPARC System's PROM monitor—that are used to either display or reset the way the system behaves before the operating system is loaded. Disk management is slightly different on a PowerPC system.

See Chapter 3, Chapter 4, and Chapter 5 for information on administration differences between SPARC, x86, and PowerPC systems; concepts and procedures for booting a PowerPC System; and procedures for adding a disk on a PowerPC system.

Supplemental Documentation

The Solaris Server Supplement 1.1 CD contains the following System Administration AnswerBooks™:

- The System Administration AnswerBook, which contains 2.5. system administration documentation
- The Solaris 2.5.1 Supplemental System Administration AnswerBook, which contains the following documents:
 - *Solaris PowerPC Edition: Installing Solaris Software*

This document describes how to install Solaris software on servers and clients in a networked environment. It provides examples of using custom JumpStart™ to automate installations.

- *Solaris 2.5.1 Server Release Notes*

This document provides an overview of new Solaris 2.5.1 features and provides system administrators and end users with supplemental information that did not arrive in time to be included in other documentation. This supplemental information includes information on large User and Group IDs, booting a PowerPC system, and adding a disk to a PowerPC system.

Ordering Hard Copy Documentation

The SunDocs program makes available for individual sale product documentation from Sun Microsystems Computer Company and SunSoft. Documentation previously available only in sets or shipped with a system now can be purchased separately. For a list of documents and order information, see the catalog section of SunExpress On The Internet at <http://www.sun.com/sunexpress>.

Large User and Group IDs



Previous Solaris 2.x software releases used 32-bit data types to contain the user IDs (UIDs) and group IDs (GIDs), but UIDs and GIDs were constrained to a maximum useful value of 60000. In the Solaris 2.5.1 release, the limit on UID and GID values has been raised to the maximum value of a signed integer, or 2147483647.

The `nobody` user and group (60001) and the `noaccess` user and group (60002) retain the same UIDs and GIDs as previous Solaris 2.x releases.

Caution – UIDs and GIDs over 60000 do not have full functionality and are incompatible with many Solaris features, so avoid using UIDs or GIDs over 60000. See Table 2-1 for a complete list of interoperability issues with Solaris 2.x products and commands.

Table 2-1 describes interoperability issues with previous Solaris and Solaris product releases.

Table 2-1 Interoperability Issues for UIDs/GIDs over 60000

Category	Product/Command	Issues/Cautions
NFS™ Interoperability	SunOS 4.x NFS software	SunOS 4.x NFS server and client code truncates large UIDs and GIDs to 16 bits. This can create security problems if SunOS 4.x machines are used in an environment where large UIDs and GIDs are being used. SunOS 4.x systems require a patch. The patch IDs are 100173-13 for SunOS 4.1.3, 102177-04 for SunOS 4.1.3_u1, and 102394-02 for SunOS 4.1.4. See bug ID 1227246 for more information.

Table 2-1 Interoperability Issues for UIDs/GIDs over 60000 (Continued)

Category	Product/Command	Issues/Cautions
Name Service Interoperability	NIS name service	Users with UIDs above 60000 can log in or use the <code>su</code> command on systems running earlier versions of the Solaris 2.x operating environment, but their UID and GIDs will be set to 60001 (<code>nobody</code>).
	File-based name service	
	NIS+ name service	Users with UIDs above 60000 are denied access on systems running older Solaris 2.x versions and the NIS+ name service.
Administration Utilities	Solstice™ AdminSuite™ 2.1 software	Solstice AdminSuite 2.1 software enforces the 60000 limit. Use the Solstice AdminSuite 2.2 software to administer systems using large UIDs and GIDs.
Printed UIDs/GIDs	OpenWindows™ File Manager	Large UIDs and GIDs will not display correctly if the OpenWindows File Manager is used with the extended file listing display option.

Archive Format Limitations

The `cpio -c` and the `cpio -H crc` commands support the full range of UIDs and GIDs. Other archive formats have restrictions because the space allocated in the header to contain the UID and GID is not large enough to contain the extended range of UIDs and GIDs.

In general, if the archive format does not permit the correct UID or GID to be saved into the archive, the archiver will use a UID or GID of `nobody`, clear the relevant `setuid` or `setgid` bit, and continue.

If the UID or GID of a file is larger than 2097152 and is archived using the USTAR format of `tar`, `pax`, or `cpio`, the UID or GID field is set to `nobody`. No error message is printed in this situation because the user name and group name information encoded in this format is used to restore the file ownership, and the stored UID and GID information in the header is usually ignored.

See `pax(1)`, `tar(1)`, `ar(1)` and `cpio(1)` for further details.

SunOS 4.x to SunOS 5.x Migration Issues

As stated previously, the `nobody` user and group (60001) and the `noaccess` user and group (60002) retain the same UIDs and GIDs as previous Solaris releases.

SunOS 4.x systems support UIDs up to 65533, which means users with UIDs of 60001 and 60002 are valid on these systems. Change these UIDs when moving to the Solaris 2.x release, otherwise users with these UIDs will conflict with the default value of these UIDs.

To reserve the old values of 65534 on SunOS 4.x systems, a new user `nobody4` set to UID 65534 and group name `nogroup4` set to GID 65534 are provided in the Solaris 2.5.1 release.

Caution – If systems running releases earlier than the SunOS 4.1 release have UIDs greater than 65535 in their local or NIS `passwd` files, the associated *username* will be able to log into the system as root. Therefore, UIDs greater than 65535 should not be used in an environment where there are machines still running a release earlier than the SunOS 4.1 release. This bug (bug ID 1008472) was fixed in the SunOS 4.1 release.

x86: Restrictions When Mounting System V File Systems

An x86 system running the Solaris 2.x release can mount but not create System V file systems. If an x86 system running the Solaris 2.5.1 release attempts to create an inode owned by a user with a large UID or GID on a mounted System V file system, the System V file system returns an `EOVERFLOW` error.

Some System Databases Grow Larger

Certain system databases are indexed by UID. For example, the per file system quota database and the “last login” database held in `/var/adm/lastlog`. While these files have always been “holey”, if large UIDs are used, the size of these files can become very large too. This may in turn cause administrative problems with backing up and copying the databases. The `ufsdump` and `ufsrestore` commands know how to deal with “holey” files correctly.

Summary of Large UID/GID Limitations

Table 2-2 provides a summary of UID/GID limitations for UIDs or GIDs over 60000.

Table 2-2 Large UID/GID Limitation Summary

A UID or GID Of ...	Limitations
60003 or greater	<ul style="list-style-type: none"> Is unsupported in the Solstice AdminSuite 2.1 software but supported in Solstice AdminSuite 2.2 software. Users in this category logging into systems running previous Solaris releases and the NIS or files name service will get a UID and GID of <i>nobody</i>.
65535 or greater	<ul style="list-style-type: none"> SunOS 4.x systems running the NFS version 2 software will truncate UIDs in this category to 16 bits, creating possible security problems. Users in this category using the <code>cpio</code> command (using the default archive format) to copy files will see an error message for each file and the UIDs and GIDs will be set to <i>nobody</i> in the archive. SPARC systems: Users in this category running SunOS 4.x-compatible applications will see <code>E_OVERFLOW</code> returns from some system calls, and their UIDs and GIDs will be mapped to <i>nobody</i>. x86 systems: Users in this category on x86 systems running SVR3-compatible applications will probably see <code>E_OVERFLOW</code> return codes from system calls. x86 systems: If users in this category attempt to create a file or directory on a mounted System V file system, the System V file system returns an <code>E_OVERFLOW</code> error.
100000 or greater	<ul style="list-style-type: none"> The <code>ps -l</code> command displays a maximum five-digit UID so the printed column won't be aligned when they include a UID or GID larger than 99999.
262144 or greater	<ul style="list-style-type: none"> Users in this category using the <code>cpio</code> command (using <code>-H odc</code> format) or the <code>pax -x cpio</code> command to copy files will see an error message returned for each file, and the UIDs and GIDs will be set to <i>nobody</i> in the archive.
1000000 or greater	<ul style="list-style-type: none"> Users in this category using the <code>ar</code> command will have their UIDs and GIDs set to <i>nobody</i> in the archive.
2097152 or greater	<ul style="list-style-type: none"> Users in this category using the <code>tar</code> command, the <code>cpio -H ustar</code> command, or the <code>pax -x tar</code> command will have their UIDs and GIDs set to <i>nobody</i>.

Table 2-2 Large UID/GID Limitation Summary (Continued)

A UID or GID Of ...	Limitations
67108864 or greater	<ul style="list-style-type: none">• The quota database exceeds the two-Gbyte maximum file size in the Solaris 2.5.1 release. Above this limit, users cannot be assigned file system quotas.
76695844 or greater	<ul style="list-style-type: none">• The “last login” database exceeds the two-Gbyte maximum file size in the Solaris 2.5.1 release. Users with UIDs above this limit are not informed of their last login time.• Password aging does not work for these users.
100000000 or greater	<ul style="list-style-type: none">• The column alignment of the numeric forms of <code>ls</code> and <code>find</code> output become ragged, which may break shell scripts or other commands depending on the column output format.

Solaris 2.5.1 PowerPC Edition Administration



The information in this section is for people administering the Solaris 2.5.1 release on PowerPC systems. This section only covers the differences in administration of PowerPC systems running the Solaris 2.5.1 release. The rest of SunSoft's system administration documentation set provides information about administration tasks common to all hardware types.

This chapter provides a table of where to find appropriate SunSoft administration documentation and also describes system administration differences between SPARC, x86, and PowerPC systems.

This is a list of information in this chapter.

<i>Where to Find System and Network Information</i>	<i>page 12</i>
<i>System Administration Differences Between SPARC, x86, and PowerPC Systems</i>	<i>page 14</i>

Where to Find System and Network Information

Table 3-1 lists the information covered in each of the Solaris system and network administration books. Use this table as a high-level guide to find the right book for the information you need.

Table 3-1 Where to Find System and Network Administration Information

If You Need Information On ...	Then Go To ...	
<ul style="list-style-type: none"> • Backing up and restoring data • Managing <ul style="list-style-type: none"> - File systems - Removable Media (CDs, diskettes, PCMCIA) - Software (packages, patches, AnswerBook) - Server and client support - User accounts and groups • Working with remote files 	<i>System Administration Guide, Volume I</i>	System Administration
<ul style="list-style-type: none"> • Managing <ul style="list-style-type: none"> - Printing Services - System resources (accounting, crash dumps, disk use and quotas, crontabs, system information) - System performance - Terminals and modems • System security (ACLs, file permissions, ASET) 	<i>System Administration Guide, Volume II</i>	
<ul style="list-style-type: none"> • Managing mail 	<i>Mail Administration Guide</i>	
<ul style="list-style-type: none"> • Setting up auditing 	<i>SunSHIELD Basic Security Module Guide</i>	
<ul style="list-style-type: none"> • Managing runtime libraries 	<i>Direct Xlib User's Guide</i>	
<ul style="list-style-type: none"> • Managing NIS+, DNS, or FNS 	<i>NIS+ and DNS Setup and Configuration Guide</i> <i>NIS+ and FNS Administration Guide</i>	Network Administration
<ul style="list-style-type: none"> • Transitioning from NIS to NIS+ 	<i>NIS+ Transition Guide</i>	
<ul style="list-style-type: none"> • Managing NFS 	<i>NFS Administration Guide</i>	
<ul style="list-style-type: none"> • Configuring TCP/IP, PPP, or UUCP 	<i>TCP/IP and Data Communications Administration Guide</i>	

Table 3-1 Where to Find System and Network Administration Information (Continued)

If You Need Information On ...	Then Go To ...	
<ul style="list-style-type: none">• Error messages and troubleshooting	<i>Solaris Common Messages and Troubleshooting Guide</i> <i>Undocumented Messages</i>	Troubleshooting
<ul style="list-style-type: none">• Installing Solaris	<i>Solaris 2.5.1 PowerPC Edition: Installation Notes</i> <i>Solaris PowerPC Edition: Installing on the Desktop</i> <i>Solaris PowerPC Edition: Installing Solaris Software</i>	Installing Solaris Software
<ul style="list-style-type: none">• Hardware Compatibility	<i>Solaris 2.5.1 PowerPC Edition: Hardware Compatibility List</i>	Hardware Information

System Administration Differences Between SPARC, x86, and PowerPC Systems

Table 3-2 SPARC, x86, and PowerPC System Administration Differences

Category	SPARC	x86	Power PC
System operation before kernel is loaded	<ul style="list-style-type: none"> A programmable read-only memory (PROM) chip with a monitor program runs diagnostics and displays device information. It is also used to program default boot parameters and test the devices connected to the system. 	<ul style="list-style-type: none"> The basic input/output system (BIOS) runs diagnostics and displays device information. A Solaris boot diskette with the Multiple Device Boot (MDB) program is used to boot from non-default boot partitions, the network, or CD-ROM. 	<ul style="list-style-type: none"> Open Firmware (OF), machine resident, or Virtual Open Firmware (VOF), loaded from a boot floppy, runs diagnostics and prepares the system to run Solaris.
Booting the system	<ul style="list-style-type: none"> Commands and options at the PROM level are used to boot the system. 	<ul style="list-style-type: none"> Commands and options at the MDB, primary, and secondary boot subsystems level are used to boot the system. 	<ul style="list-style-type: none"> Commands and options at the monitor and OF or VOF level are used to boot the system.
Boot programs	<ul style="list-style-type: none"> <code>bootblk</code>, the primary boot program, loads <code>ufsboot</code>. <code>ufsboot</code>, the secondary boot program, loads the kernel. 	<ul style="list-style-type: none"> <code>mboot</code>, the master boot record, loads <code>pboot</code>. <code>pboot</code>, the Solaris partition boot program, loads <code>bootblk</code>. <code>bootblk</code>, the primary boot program, loads <code>ufsboot</code>. <code>ufsboot</code>, the secondary boot program, loads the kernel. 	<ul style="list-style-type: none"> The manufacturer's firmware loads OF or VOF. VOF is loaded from the PowerPC boot <code>fdisk</code> partition. VOF loads the boot block code from the active DOS12 <code>fdisk</code> partition. The boot block code loads the kernel.
System shutdown	<ul style="list-style-type: none"> The shutdown and <code>init</code> commands can be used without additional operation intervention. 	<ul style="list-style-type: none"> The shutdown and <code>init</code> commands are used but require operator intervention at the <code>type any key to continue</code> prompt. 	<ul style="list-style-type: none"> The shutdown and <code>init</code> commands can be used without additional operation intervention.

Table 3-2 SPARC, x86, and PowerPC System Administration Differences (Continued)

Category	SPARC	x86	Power PC
Disk Controllers	SCSI and IPI	SCSI and IDE	SCSI and IDE
Disk slices and partitions	A disk may have a maximum of eight slices, numbered 0-7.	A disk may have a maximum of four <code>fdisk</code> partitions. The Solaris <code>fdisk</code> partition may contain up to ten slices, numbered 0-9, but only 0-7 can be used to store user data.	A disk may have a maximum of four <code>fdisk</code> partitions. The Solaris <code>fdisk</code> partition may contain up to ten slices, numbered 0-9, but only 0-7 can be used to store user data.
Diskette drives	Desktop systems usually contain one 3.5-inch diskette drive.	Systems may contain two diskette drives: a 3.5-inch and a 5.25-inch drive.	Systems may contain two diskette drives: a 3.5-inch and a 5.25-inch drive

Booting a PowerPC System



This chapter describes concepts and procedures for booting a PowerPC system.

This is a list of information in this chapter.

<i>Virtual Open Firmware</i>	<i>page 18</i>
<i>The Boot Process</i>	<i>page 18</i>
<i>The Boot Process Details</i>	<i>page 21</i>
<i>The VOF Interface</i>	<i>page 23</i>
<i>Using the VOF Interface</i>	<i>page 25</i>
<i>PowerPC: How to Change the auto-boot Setting</i>	<i>page 26</i>
<i>PowerPC: How to Change the Default Boot Device</i>	<i>page 28</i>
<i>PowerPC: How to Reset the Default VOF Settings</i>	<i>page 30</i>
<i>PowerPC: How to Boot a System to Run Level 3 (Multiuser State)</i>	<i>page 35</i>
<i>PowerPC: How to Boot a System to Run Level S (Single-User State)</i>	<i>page 37</i>
<i>PowerPC: How to Boot a System Interactively</i>	<i>page 41</i>
<i>PowerPC: How to Boot a System for Recovery Purposes</i>	<i>page 41</i>

PowerPC: Virtual Open Firmware

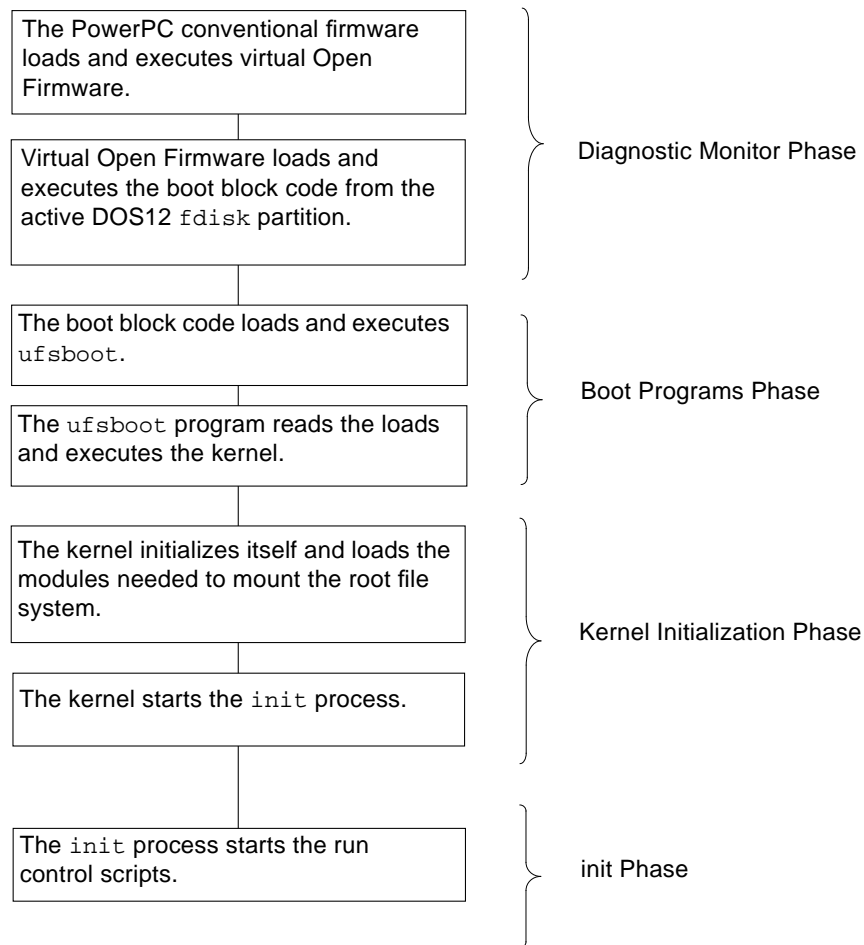
Before the kernel is started, PowerPC systems are controlled by one of two types of read-only-memory firmware:

- Conventional Open Firmware (OF) – built into the PowerPC system.
- Virtual Open Firmware (VOF) – an implementation provided by SunSoft for PowerPC systems without built-in firmware. VOF is loaded onto `fdisk` partition `0x41` during installation.

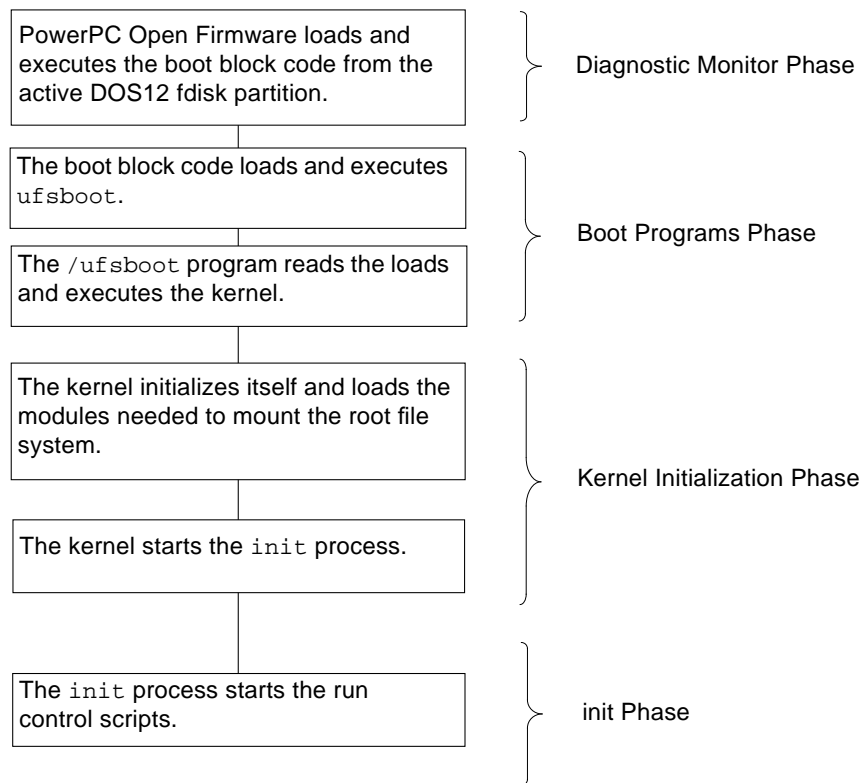
PowerPC: The Boot Process

This section describes the details of the boot process for PowerPC systems with conventional Open Firmware and Virtual Open Firmware.

PowerPC: Conventional Firmware



PowerPC: Open Firmware



PowerPC: The Boot Process Details

The following boot process information describes the illustrations on the previous pages.

PowerPC: The Diagnostic Monitor Phase

When the system is powered on, a PowerPC system runs self-test diagnostics to verify that the system's hardware and memory are operational.

On systems with OF ...

- Control is transferred to the resident OF.
- The OF builds a device tree consisting of both permanently installed devices and plug-in devices.
- The OF loads and executes the contents of the active DOS12 `fdisk` partition, which is `bootblk`, the primary boot program.

On systems with VOF ...

- VOF, which is loaded in `fdisk` partition `0x41`, is executed.
- VOF builds a device tree consisting of both permanently installed devices and plug-in devices.
- VOF loads and executes boot block code from the active DOS12 `fdisk` partition.

PowerPC: Boot Programs Phase

During the boot programs phase, the primary boot program loads and executes `ufsboot`, the secondary boot program. The `ufsboot` program loads and executes the kernel.

PowerPC: Kernel Initialization Phase

During the kernel initialization phase, the kernel initializes itself and begins loading modules, using `ufsboot` to read the files. When the kernel has loaded enough modules to mount the root file system, it unmaps the `ufsboot` program and continues, using its own resources.

The kernel creates a user process and starts the `/sbin/init` process, which starts other processes by reading the `/etc/inittab` file.

PowerPC: The `init` Phase

During the `init` phase, the `/sbin/init` process starts the run control (`rc`) scripts, which execute a series of other scripts. These scripts (`sbin/rc*`) check and mount file systems, start various processes, and perform system maintenance tasks.

PowerPC: The VOF Interface

The VOF has commands and configuration variables—similar to a SPARC system’s PROM monitor—that are used to either display or reset the way the system behaves before the operating system is loaded.

PowerPC: VOF Terminology

VOF terminology includes:

- Packages—Represent various support components, such as the `obp-tftp` package, that provide the protocols used by network device drivers.

Packages can be activated to display their properties using the `dev` command.

- Properties—Describe hardware and software characteristics that users may display and modify.
- Device Aliases—Represent user-friendly names for the fully-qualified names for buses, manufacturer names, and unit addresses.

Table 4-1 describes some basic keys for using the VOF interface.

Table 4-1 VOF Interface Keys

Use ...	To ...
Enter	Execute VOF commands
Backspace	Erase previous characters
Control-U	Erase the current line

Use the following syntax to issue VOF commands:

```
ok command argument
```

Table 4-2 describes some helpful VOF commands.

Table 4-2 VOF Commands

Command	Function
dev	Makes the specified device the active package.
.properties	Lists the properties of the active package.
help	Displays a list of VOF commands.
reset-all	Resets and reboots the system. This has the same effect as turning system power off and on.
show-devs	Prints the device tree of attached devices. Use this command to verify that devices are connected properly.
printenv	Displays configuration variables. See Table 4-3 for a description of configuration variables.
setenv <i>config-variable value</i>	Sets a configuration variable. See Table 4-3 for a description of configuration variables.
set-default <i>config-variable</i>	Resets a configuration variable back to the default setting.
set-defaults	Resets all configuration variables back to their default settings.

Table 4-3 describes some helpful configuration parameters.

Table 4-3 VOF Configuration Parameters

Configuration Parameter	Description
auto-boot?	If true, boot after turning power on or reset; otherwise, displays ok prompt.
boot-device	Sets default boot device.
boot-file	Sets default boot file.
input-device	Sets console input device.
output-device	Sets console output device.

PowerPC: Using the VOF Interface

The VOF interface is used to:

- Display information about default VOF settings.

This is helpful when you want to determine how a system is set up—such as what is the default boot file or device. This information also helps you verify changed VOF settings.

- Change the default boot device.

This is necessary when converting a standalone system to a diskless or Solstice™ AutoClient™ system that now needs to boot from the network rather than a local disk.

- Display a list of attached devices.

After connecting devices it is a good idea to see if the system recognizes the new device before loading the operating system.

- List properties of attached devices.

Automatic Booting

The VOF interface is set up so a PowerPC system boots automatically by default. This means that if you use the `init 0` or `shutdown` command to bring the system to the VOF prompt, the system will start booting within five seconds.

If more convenient, you can change the `auto-boot?` setting to `false` to have the system stop at the `ok` prompt after halting the system.

This section assumes that the `auto-boot?` setting is set to `true`, so you will have to press a key to stop the automatic boot process after you see the following message:

```
Automatically booting in 5 seconds. Hit any key to abort.
```

▼ **PowerPC: How to Change the auto-boot Setting**

1. **Become root.**
2. **Halt the system by using the `init 0` command.**

```
# init 0
.
.
.
Automatically booting in 5 seconds. Hit any key to abort.
```

3. **Press any key to stop the automatic boot process after the `Hit any key to abort` prompt.**
The `ok` prompt is displayed.
4. **Change the auto-boot setting to `false` by using the `setenv` command.**

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

In this command:

<code>auto-boot?</code>	Identifies the parameter for modifying the automatic boot process.
<code>false</code>	Identifies the value for disabling the automatic boot process.

5. **Verify that the auto-boot setting has been changed.**

```
ok printenv auto-boot?
```

Example—Changing the auto-boot Setting

In the following example, the auto-boot feature is disabled.

```
ok setenv auto-boot? false
ok printenv auto-boot?
auto-boot?="false" (default value = "true")
ok
```

▼ PowerPC: How to Change the Default Boot Device

1. **Become root.**
2. **Halt the system by using the `init 0` command.**

```
# init 0
.
.
.
Automatically booting in 5 seconds. Hit any key to abort.
```

3. **Press any key to stop the automatic boot process after the Hit any key to abort prompt.**
The `ok` prompt is displayed.
4. **Change the `boot-device` setting by using the `setenv` command.**

```
ok setenv boot-device value
```

In this command:

<code>boot-device</code>	Identifies the parameter for setting the device from which to boot.
<code>value</code>	Identifies the <code>boot-device</code> value. These are <code>boot net</code> for booting over the network, <code>boot disk<i>n</i></code> for booting from a local disk.

Use the `show-devs` command if you need help identifying the disk number.

5. **Verify the change by using the `printenv` command.**

```
ok printenv boot-device
```

Example—Changing the Default Boot Device

In the following example, the default boot device is changed to boot net for booting over the network.

```
ok setenv boot-device boot net
ok printenv boot-device
boot-device="boot net" (default value
"/pci/pci1000,1@1/disk@6,0:\solaris.elf")
ok
```

▼ PowerPC: How to Reset the Default VOF Settings

- 1. Become root.**
- 2. Halt the system by using the `init 0` command.**

```
# init 0
.
.
.
Automatically booting in 5 seconds. Hit any key to abort.
```

- 3. Press any key to stop the automatic boot process after the `Hit any key to abort` prompt is displayed.**
The `ok` prompt is displayed.
- 4. Reset the default VOF settings by using the `set-defaults` command.**

```
ok set-defaults
```

- 5. Verify the default VOF settings.**

```
ok printenv
```


Example—Resetting Default VOF Settings

In the following example, the default VOF settings are reset.

```
ok set-defaults
ok printenv
auto-boot?="true" (default value = "true")
boot-device="boot net" (default value =
"/pci/pci1000,1@1/disk@6,0:\solaris.elf")
boot-file="" (default value = "")
fdc-debug="00000000" (default value = 00000000)
display-mode="" (default value = "")
input-device="" (default value = "keyboard")
little-endian?="true" (default value = "true")
load-base="00000000" (default value = 00100000)
output-device="" (default value = "screen")
real-base="00007000" (default value = 00000000)
real-mode?="false" (default value = "false")
real-size="000f9000" (default value = 00100000)
virt-base="fe000000" (default value = fe000000)
virt-size="01f00000" (default value = 01f00000)
```

PowerPC: Booting a System

Table 4-4 describes the boot types covered in this chapter.

Table 4-4 Boot Type Descriptions

Booting the System ...	Is Usually Done ...	See an Example On ...
To run level 3 (multiuser state)	After shutting down the system or performing some system hardware maintenance task. This is the default boot level where all resources are available and users can log into the system.	page 36
From the network to run level 3 (multiuser state)	After shutting down a diskless or AutoClient system to perform some system maintenance task.	page 40
To run level S (single-user state)	After performing some system maintenance task such as backing up a file system. At this level only some file systems are mounted and users cannot log into the system.	page 38
Interactively	After making temporary changes to the system file or the kernel for testing. This type of boot allows you to recover easily if there are problems with the system file or kernel by supplying an alternative path name to these files when prompted. Use the default settings for the other system prompts.	page 42
From local CD-ROM or the network for recovery purposes	To repair an important system file that is preventing the system from booting successfully. This type of boot is also used for installing (or upgrading) a new release of the operating system.	page 45
Reboot the system to run level 3 (multiuser state)	After changing kernel parameters in the <code>/etc/system</code> file.	page 34

▼ PowerPC: How to Reboot the System

1. **Become root.**
2. **Reboot the system by using the `init 6` command.**

```
# init 6
```

3. **Verify the system boots to run level 3.**

The login prompt is displayed when the boot process has finished successfully.

```
hostname console login:
```

Example—Rebooting a PowerPC System

In the following example, the system `pluto` rebooted to run level 3.

```
# init 6
#
INIT: New run level: 6
The system is coming down. Please wait.
System services are now being stopped.
Print services stopped.
Stopping BOOTP/DHCP Service.
Stopping the syslog service.
The system is down.
syncing file systems... [8] [5] done
Automatically booting in 5 seconds. Hit any key to abort.

Boot device: /pci/pci1000,1@1/disk@6,0:,\solaris.elf
Boot args:
SunOS Release 5.5.1 [UNIX(R) System V Release 4.0]
Copyright (c) 1983-1996, Sun Microsystems, Inc.
NOTICE: The serial number of this system must be set.
configuring network interfaces: elx0.
Hostname: pluto
The system is coming up. Please wait.
checking ufs filesystems
/dev/rdisk/c0t6d0s7: is clean.
NIS domainname is solar.com
starting router discovery.
starting rpc services: rpcbind keyserv ypbind kerbd done.
Setting netmask of elx0 to 255.255.255.0
Setting default interface for multicast: add net 224.0.0.0:
gateway pluto
syslog service starting.
Print services started.
volume management starting.
The system is ready.

pluto console login:
```

▼ **PowerPC: How to Boot a System to Run Level 3 (Multiuser State)**

- 1. Boot to run level 3 by using the `boot` command.**

```
ok boot
```

The automatic boot procedure displays a series of startup messages and brings the system to run level 3.

- 2. Verify the system boots to run level 3.**

The login prompt is displayed when the boot process has finished successfully.

```
hostname console login:
```

Example—Booting a PowerPC System to Run Level 3

In the following example, the system `pluto` is booted to run level 3.

```
ok boot

Boot device: /pci/pci1000,1@1/disk@6,0:,\solaris.elf
Boot args:
SunOS Release 5.5.1 [UNIX(R) System V Release 4.0]
Copyright (c) 1983-1996, Sun Microsystems, Inc.
NOTICE: The serial number of this system must be set.
configuring network interfaces: elx0.
Hostname: pluto
The system is coming up. Please wait.
checking ufs filesystems
/dev/rdisk/c0t6d0s7: is clean.
NIS domainname is solar.com
starting router discovery.
starting rpc services: rpcbind keyserv ypbind kerbd done.
Setting netmask of elx0 to 255.255.255.0
Setting default interface for multicast: add net 224.0.0.0:
gateway pluto
syslog service starting.
Print services started.
volume management starting.
The system is ready.

pluto console login:
```

▼ PowerPC: How to Boot a System to Run Level S (Single-User State)

1. Boot the system to run level S by using the `boot -s` command.

```
ok boot -s
```

2. Enter the root password when the following message is displayed.

```
INIT: SINGLE USER MODE
Type Ctrl-d to proceed with normal startup,
(or give root password for system maintenance):  xxx
```

3. To bring the system up to the multiuser state after the system maintenance task is performed, press Control-d.
4. Verify the system is at run level S by using the `who -r` command.

```
# who -r
.          run-level S  Nov 10 13:59      S    0  ?
```

Example—Booting a PowerPC System to Run Level S

In the following example, the system `pluto` is booted to run level S.

```
ok boot -s

Boot device: /pci/pci1000,1@1/disk@6,0:,\solaris.elf
Boot args: -s
SunOS Release 5.5.1 [UNIX(R) System V Release 4.0]
Copyright (c) 1983-1996, Sun Microsystems, Inc.
DEBUG enabled
NOTICE: The serial number of this system must be set.
configuring network interfaces: elx0.
Hostname: pluto

INIT: SINGLE USER MODE

Type Ctrl-d to proceed with normal startup,
(or give root password for system maintenance):
Entering System Maintenance Mode

Sun Microsystems Inc.   SunOS 5.5.1           May 1996
Perform some maintenance task
# Press Control-d to bring the system to run level 3
INIT: New run level: 3
The system is coming up. Please wait.
checking ufs filesystems
/dev/rdisk/c0t6d0s7: is clean.
NIS domainname is solar.com
starting router discovery.
starting rpc services: rpcbind keyserver ypbind kerbd done.
Setting netmask of elx0 to 255.255.255.0
Setting default interface for multicast: add net 224.0.0.0:
gateway pluto
syslog service starting.
Print services started.
volume management starting.
The system is ready.

pluto console login:
```

▼ PowerPC: How to Boot a System From the Network

To boot a diskless or AutoClient system:

1. Use the `boot net` command to boot a system to run level 3 from the network.

```
ok boot net
```

2. Verify the system boots to run level 3.

The login prompt is displayed when the boot process has finished successfully.

```
hostname console login:
```

Example—Booting a PowerPC System From the Network

In the following example, the system `neptune` is booted from the network to run level 3.

```
ok boot net
Booting "81986F1B.PREP" from server 129.152.111.47 (venus)
Read 156 kbytes
Boot device: /pci/pci8086,484@0/COMS,3C509@i300
Boot args:
hostname: neptune
domainname: solar.com
root server: venus
SunOS Release 5.5.1 [UNIX(R) System V Release 4.0]
Copyright (c) 1983-1996, Sun Microsystems, Inc.
DEBUG enabled
NOTICE: The serial number of this system must be set.
configuring network interfaces: elx0.
The system is coming up. Please wait.
starting rpc services: rpcbind keyserv ypbind kerbd done.
Setting netmask of elx0 to 255.255.255.0
Setting default interface for multicast: add net 224.0.0.0:
syslog service starting.
Print services started.
volume management starting.
The system is ready.

neptune console login:
```

▼ PowerPC: How to Boot a System Interactively

1. Boot the system interactively by using the `boot -a` command.

```
ok boot -a
```

2. Answer the system prompts as described in Table 4-5.

Table 4-5 Interactive Boot Procedure Steps

If the System Displays ...	Do the Following ...
Enter filename [kernel/unix]:	Provide the name of another kernel to use for booting. Or, press Return to use the default kernel (/platform/'uname -m'/kernel/unix).
Name of default directory for modules [/platform/'uname -m'/kernel /platform/prep/kernel /kernel /usr/kernel]:	Provide an alternate path for the modules directory and press Return. Or, press Return to use the default modules directory path.
Name of system file [etc/system]:	Provide the name of an alternate system file and press Return. Or, press Return to use the default /etc/system file.
root filesystem type [ufs]:	Specify <code>ufs</code> for local disk booting or <code>nfs</code> for diskless clients. Or, press Return to use the default root file system type, UFS.
Enter physical name of root device [<i>physical_device_name</i>]:	Provide an alternate device name and press Return. Or, press Return to use the default physical name of the root device.

3. Verify the system boots to run level 3.

The login prompt is displayed when the boot process has finished successfully.

```
hostname console login:
```

Example—Booting a PowerPC System Interactively

In the following example, system `pluto` is booted interactively.

```
ok boot -a

Boot device: /pci/pci1000,1@1/disk@6,0:,\solaris.elf
Boot args: -a
Enter filename [kernel/unix]:
Enter default directory for modules
[/platform/IBM,PPS_Model_6015/kernel /platform/prep/kernel
/kernel /usr/kernel]:
SunOS Release 5.5.1 [UNIX(R) System V Release 4.0]
Copyright (c) 1983-1996, Sun Microsystems, Inc.
NOTICE: The serial number of this system must be set.
Name of system file [etc/system]:
root filesystem type [ufs]:
Enter physical name of root device
[/pci/pci1000,1@1/disk@6,0:a]:
configuring network interfaces: elx0.
Hostname: pluto
The system is coming up. Please wait.
checking ufs filesystems
/dev/rdisk/c0t6d0s7: is clean.
NIS domainname is rmtc.Central.Sun.COM
starting router discovery.
starting rpc services: rpcbind keyserv ypbind kerbd done.
Setting netmask of elx0 to 255.255.255.0
Setting default interface for multicast: add net 224.0.0.0:
gateway pluto
syslog service starting.
Print services started.
volume management starting.
The system is ready.

pluto console login:
```

▼ PowerPC: How to Boot a System for Recovery Purposes

This procedure is needed when an important file, such as `/etc/passwd`, has an invalid entry and is causing the boot process to fail.

If you need help identifying a system's device names, see "Accessing Devices" in *System Administration Guide, Volume I*.

1. Follow the instructions below depending on whether you are booting from the Solaris 2.5.1 installation CD or the network.

If You are Booting From ...	Then ...
Solaris 2.5.1 installation CD	<ol style="list-style-type: none">1. Insert the Solaris 2.5.1 installation CD into the CD caddy.2. Insert the CD caddy into the CD-ROM drive.3. Boot from the installation CD in single-user mode: <code>ok boot cdrom -s</code>
The network, and an installation server or remote CD drive is available	<ol style="list-style-type: none">1. Use the following command: <code>ok boot net -s</code>

2. Mount the file system that has the file with an invalid entry.

```
# mount /dev/dsk/device-name /a
```

3. Change to the newly mounted directory.

```
# cd /a/directory
```

4. Set the terminal type.

```
# TERM=sun  
# export TERM
```

5. Remove the invalid entry from the file using an editor.

```
# vi filename
```

6. Change to the root (/) directory.

```
# cd /
```

7. Unmount the /a directory.

```
# umount /a
```

8. Reboot the system.

```
# init 6
```

9. Verify the system boots to run level 3.

The login prompt is displayed when the boot process has finished successfully.

```
hostname console login:
```

Example—Booting a PowerPC System for Recovery Purposes

The following example uses the `/etc/passwd`, after booting from the network, as an example of repairing an important system file.

```
ok boot net -s
# mount /dev/dsk/c0t3d0s0 /a
# cd /a/etc
# TERM=ppc_type
# export TERM
# vi passwd
(The invalid entry is removed.)
# cd /
# umount /a
# init 6
```

▼ **PowerPC: How to Stop a System for Recovery Purposes**

The specific stop key sequence depends on your system type. For example, press the reset button to stop the system. If your system doesn't have a reset button, turn the power off and back on again.

PowerPC: Adding a Disk



This chapter provides the procedures for adding a disk on a PowerPC system. This is a list of the step-by-step instructions in this chapter.

<i>PowerPC: How to Connect a System Disk and Boot</i>	<i>page 51</i>
<i>PowerPC: How to Connect a Secondary Disk and Boot</i>	<i>page 52</i>
<i>PowerPC: How to Create a Solaris fdisk Partition for a Secondary Disk</i>	<i>page 54</i>
<i>PowerPC: How to Create fdisk Partitions for a System Disk</i>	<i>page 58</i>
<i>PowerPC: How to Create Disk Slices and Label a Disk</i>	<i>page 66</i>
<i>PowerPC: How to Create a File System</i>	<i>page 72</i>
<i>PowerPC: How to Install a Boot Block on a System Disk</i>	<i>page 74</i>

For overview information about disk management, see "Managing Disks" in *System Administration Guide, Volume I*.

PowerPC: About System and Secondary Disks

A system disk contains the root (/) or /usr file systems, or both. If the disk containing either of these file systems becomes damaged, you have two ways to recover:

- You can reinstall the entire Solaris environment.
- You can replace the system disk and restore your file systems from a backup medium.

A secondary disk usually contains space for user files. If you replace a secondary disk on a system, you can restore the old disk's data on the new disk.

PowerPC: Adding a System or Secondary Disk

Table 5-1 PowerPC: Adding a System or Secondary Disk

Activity	Description	For Instructions, Go To
Connect the Disk and Boot	System Disk Connect the new disk and boot from a local or remote Solaris 2.x CD.	▼ "PowerPC: How to Connect a System Disk and Boot" page 51
	Secondary Disk Connect the new disk and perform a reconfiguration boot, so the system will recognize the new disk.	▼ "PowerPC: How to Connect a Secondary Disk and Boot" page 52
Create <code>fdisk</code> Partitions	System Disk Create the <code>fdisk</code> partitions required for booting and for holding the Solaris operating environment.	▼ "PowerPC: How to Create a Solaris <code>fdisk</code> Partition for a Secondary Disk" page 54
	Secondary Disk Create the <code>fdisk</code> partition for holding the Solaris operating environment.	▼ "PowerPC: How to Create a Solaris <code>fdisk</code> Partition for a Secondary Disk" page 54
Create Slices and Label the Disk	Create disk slices and label the disk if it has not already been done by the disk manufacturer.	▼ "PowerPC: How to Create Disk Slices and Label a Disk" page 66
Create File Systems	Create UFS file systems on the disk slices with the <code>newfs</code> command. You must create the root (<code>/</code>) or <code>/usr</code> file system (or both) for a system disk.	▼ "PowerPC: How to Create a File System" page 72
Restore File Systems	Restore the root (<code>/</code>) or <code>/usr</code> file system (or both) on the system disk. If necessary, restore file systems on the secondary disk.	▼ " <i>System Administration Guide, Volume I</i> "
Install Boot Block	System Disk Only Install the boot block on the <code>root (/)</code> file system, so the system can boot.	▼ "PowerPC: How to Install a Boot Block on a System Disk" page 74

PowerPC: Guidelines for Creating an fdisk Partition

Follow these guidelines when setting up the `fdisk` partition:

- The disk can be divided into a maximum of four `fdisk` partitions. The Solaris installation utility automatically sets up three of the four available `fdisk` partitions. These `fdisk` partitions are:
 - PowerPC Boot – a small three-cylinder partition that contains PowerPC boot code.
 - DOS12 – a small partition that is used to boot PowerPC systems.
 - Solaris – the partition that contains the Solaris release.
- The DOS12 partition must be the active partition on the system disk. The Solaris installation process sets this up automatically.
- If you add a new system disk after installation, you will have to create three `fdisk` partitions:
 - The PowerPC boot, required for booting the system
 - The DOS12 `fdisk` partitions, required for booting the system
 - A Solaris `fdisk` partition, required for the Solaris *PowerPC Edition* release.
- Solaris `fdisk` partitions must begin on cylinder boundaries.
- Solaris `fdisk` partitions must begin at cylinder 1, not cylinder 0, on the first disk because additional boot information, including the master boot record, is written in sector 0.
- The Solaris `fdisk` partition can be the entire disk or you can make it smaller to allow room for a DOS12 partition, (if it will be used for booting). You can also make a new `fdisk` partition on a disk without disturbing existing partitions (if there is enough room to create a new one).
- Unlike x86 systems, the Solaris 2.5.1 *PowerPC Edition* release does not allow multiple operating systems on the same disk.

For PowerPC systems – In some Solaris documentation, Solaris slices are referred to as *partitions*. The Solaris 2.x documentation distinguishes between `fdisk partitions` (for x86 and PowerPC systems) and the divisions within an `fdisk` partition; which are referred to interchangeably as *slices* or *partitions*.

▼ PowerPC: How to Connect a System Disk and Boot

This procedure assumes that the system is down.

1. **Disconnect the damaged system disk from the system.**
2. **Make sure the disk you are adding has a different target number than the other devices on the system.**
You will often find a small switch located at the back of the disk for setting the target number.
3. **Connect the replacement system disk to the system and check the physical connections.**
Refer to the disk's hardware installation guide for installation details. Also, refer to the *Solaris 2.5.1 PowerPC Edition: Hardware Compatibility List* for hardware configuration requirements specific to the disk.
4. **Follow the instructions in the table below depending on whether you are booting from a local or remote Solaris 2.5.1 CD.**

If You Are Booting From ...	Then ...
A Solaris 2.5.1 CD from a local CD-ROM drive	1. Make sure the CD is in the CD-ROM drive. 2. Boot from the CD to single-user mode: <code>ok boot cdrom -s</code>
A Solaris 2.5.1 CD from a CD-ROM drive over the network	1. Boot from the net to single-user mode: <code>ok boot net -s</code>

After a few minutes, the root prompt (#) is displayed.

Where to Go From Here

After you boot the system, you can create the `fdisk` partitions required for booting a system disk. See “PowerPC: How to Create `fdisk` Partitions for a System Disk” on page 58.

▼ **PowerPC: How to Connect a Secondary Disk and Boot**

1. **Become root.**
2. **If the disk is unsupported by the Solaris software, add the device driver for the disk by following the instructions included with the hardware.**
3. **Create the `/reconfigure` file that will be read when the system is booted.**

```
# touch /reconfigure
```

The `/reconfigure` file causes the SunOS software to check for newly installed peripheral devices when you power on or boot your system later.

4. **Shut down the system.**

```
# shutdown -i0 -g30 -y
```

In this command:

- | | |
|------|---|
| -i0 | Brings the system down to init state 0 (zero), the power-down state. |
| -g30 | Notifies logged-in users that they have <i>n</i> seconds before the system begins to shut down. |
| -y | Specifies the command should run without user intervention. |

5. **If you see the automatic boot prompt, press any key to stop the automatic boot process.**
The `ok` prompt is displayed.
6. **Turn off the power to the system and all external peripheral devices.**
7. **Make sure the disk you are adding has a different target number than the other devices on the system.**
You will often find a small switch located at the back of the disk for setting the target number.

-
- 8. Connect the disk to the system and check the physical connections.**
Refer to the disk's hardware installation guide for installation details. Also, refer to the *Solaris 2.5.1 PowerPC Edition: Hardware Compatibility List* for hardware configuration requirements specific to the disk.
 - 9. Turn on the power to all external peripherals.**
 - 10. Turn on the power to the system.**
The system boots and display the login prompt.

Where to Go From Here

After you boot the system, you can create a Solaris `fdisk` partition. See “PowerPC: How to Create a Solaris `fdisk` Partition for a Secondary Disk” on page 54.

▼ **PowerPC: How to Create a Solaris `fdisk` Partition for a Secondary Disk**

Use this procedure to create a Solaris `fdisk` partition on a disk that is added to the system after installation. The `format` utility automatically sets up the entire disk as a Solaris `fdisk` partition.

- 1. Make sure you have read “Guidelines for Creating an `fdisk` Partition” on page 50.**
- 2. Become root.**
- 3. Start the `format` utility.**

```
# format
```

- 4. Enter the number of the disk on which to create a Solaris `fdisk` partition from the list displayed on your screen.**

```
Specify disk (enter its number): disk-number
```

At this prompt:

disk-number Is the number of the disk on which to create a Solaris `fdisk` partition.

5. Go into the fdisk menu.

```
format> fdisk
```

In most cases, the output will look like the following. The `format` utility automatically sets up the entire disk as the Solaris `fdisk` partition.

```
format> fdisk
      Total disk size is 2694 cylinders
      Cylinder size is 765 (512 byte) blocks
      Cylinders
Partition  Status  Type           Start  End  Length  %
=====  =====  =====
      1      Active  Solaris        1    2693  2693   100

SELECT ONE OF THE FOLLOWING:

1.  Create a partition
2.  Change Active (Boot from) partition
3.  Delete a partition
4.  Exit (Update disk configuration and exit)
5.  Cancel (Exit without updating disk configuration)

Enter Selection:
```

6. Select option 4 to make the entire disk the Solaris fdisk partition. Then go to step 13.

```
Selection: 4
```

7. Remove any existing fdisk partitions by selecting option 3. Delete a partition, if necessary.

```
Enter the number of the partition you want to delete
(or enter 0 to exit ): 1
Do you want to delete partition 1? This will make all files and
programs in this partition inaccessible (type "y" or "n"). y
Partition 1 has been deleted.
```

8. Create an fdisk partition by selecting option 1. Create a partition.

9. Select 1=Solaris to create a Solaris fdisk partition.

```
Indicate the type of partition you want to create
(1=SOLARIS, 2=UNIX, 3=PCIXOS, 4=Other, 8=DOSBIG)
(5=DOS12, 6=DOS16, 7=DOSEXT, 9=PowerPC Boot, 0=Exit) ? 1
```

10. Indicate the percentage of the disk to be used for the fdisk partition.

```
Indicate the percentage of the disk you want this partition
to use (or enter "c" to specify in cylinders). 100
```

11. Indicate whether the fdisk partition should be activated.

Enter n if the fdisk partition will not be used for booting.

```
Do you want this to become the Active partition? If so, it will
be activated each time you reset your computer or when you turn
it on again.
Please type "y" or "n". n
```

12. Update the disk configuration and exit the fdisk menu from the selection menu.

```
Selection: 4
```

13. Quit the format menu.

```
format> quit
```

Example—Creating an fdisk Partition for a Secondary Disk on a PowerPC System

In the following example, the entire disk is used as the Solaris `fdisk` partition.

```
# format
Searching for disks...done
AVAILABLE DISK SELECTIONS:
    0. c0t2d0 <SUN1.05 cyl 2691 alt 2 hd 9 sec 85>
       /pci/pci1000,1@1/cmdk@2,0
    1. c0t6d0 <DEFAULT cyl 1728 alt 2 hd 7 sec 87>
       /pci/pci1000,1@1/cmdk@6,0
Specify disk (enter its number): 0
selecting c0t2d0
[disk formatted]
FORMAT MENU:
.
.
.
format> fdisk
                Total disk size is 2694 cylinders
                Cylinder size is 765 (512 byte) blocks
                Cylinders
Partition  Status  Type           Start  End  Length  %
=====  =====  =====
    1      Active  Solaris        1    2693  2693   100
SELECT ONE OF THE FOLLOWING:
    1.  Create a partition
    2.  Change Active (Boot from) partition
    3.  Delete a partition
    4.  Exit (Update disk configuration and exit)
    5.  Cancel (Exit without updating disk configuration)
Enter Selection: 4
format> quit
#
```

Where to Go From Here

After you create a Solaris `fdisk` partition on the disk, you can create slices on the disk. Go to “PowerPC: How to Create Disk Slices and Label a Disk” on page 66.

▼ **PowerPC: How to Create `fdisk` Partitions for a System Disk**

By default, the `format` utility sets up a disk added to the system after installation as a Solaris `fdisk` partition spanning the entire disk. Use this procedure to first remove any existing partitions and then create the `fdisk` partitions required for booting a system disk.

- 1. Make sure you have read “Guidelines for Creating an `fdisk` Partition” on page 50.**
- 2. Become root.**
- 3. Start the `format` utility.**

```
# format
```

- 4. Enter the number of the disk on which to create a Solaris `fdisk` partition from the list displayed on your screen.**

```
Specify disk (enter its number): disk-number
```

At this prompt:

disk-number Is the number of the disk on which to create a Solaris `fdisk` partition.

5. Go into the fdisk menu.

```
format> fdisk
```

In most cases, the output will look like the following. The `format` utility automatically sets up the entire disk as the Solaris `fdisk` partition.

```
format> fdisk
      Total disk size is 2694 cylinders
      Cylinder size is 765 (512 byte) blocks
      Cylinders
Partition  Status  Type           Start  End  Length  %
=====  =====  =====
      1      Active  Solaris        1    2693  2693   100

SELECT ONE OF THE FOLLOWING:

1.  Create a partition
2.  Change Active (Boot from) partition
3.  Delete a partition
4.  Exit (Update disk configuration and exit)
5.  Cancel (Exit without updating disk configuration)

Enter Selection:
```

6. Remove any existing fdisk partitions by selecting option 3, Delete a partition.

```
Enter the number of the partition you want to delete
(or enter 0 to exit ): 1
Do you want to delete partition 1? This will make all files and
programs in this partition inaccessible (type "y" or "n"). y
Partition 1 has been deleted.
```

7. Create an fdisk partition by selecting option 1. Create a partition.

Use the following table to create the required fdisk partitions for booting the system disk.

fdisk Partition	Recommended Size	Activate for Booting?
PowerPC Boot	50 cylinders	No
DOS12	80 cylinders	Yes
Solaris	Rest of disk	No

8. Select the type of fdisk partition to be created.

```
Indicate the type of partition you want to create
(1=SOLARIS, 2=UNIX, 3=PCIXOS, 4=Other, 8=DOSBIG)
(5=DOS12, 6=DOS16, 7=DOSEXT, 9=PowerPC Boot, 0=Exit) ?
```

9. Indicate the percentage of the disk to be used for the fdisk partition.

```
Indicate the percentage of the disk you want this partition
to use (or enter "c" to specify in cylinders).
```

10. Indicate whether the fdisk partition should be activated.

Answer yes if the fdisk partition will be used for booting.

```
Do you want this to become the Active partition? If so, it will
be activated each time you reset your computer or when you turn
it on again.
Please type "y" or "n".
```

11. Repeat steps 8-10 for each fdisk partition to be created.

12. Update the disk configuration and exit the fdisk menu from the selection menu.

```
Selection: 4
```

13. Quit the format menu.

```
format> quit
```

Example—Creating fdisk Partitions for a System Disk on a PowerPC System (1 of 3)

```
# format
Searching for disks...done
AVAILABLE DISK SELECTIONS:
    0. c0t2d0 <SUN1.05 cyl 2691 alt 2 hd 9 sec 85>
       /pci/pci1000,1@1/cmdk@2,0
    1. c0t6d0 <DEFAULT cyl 1728 alt 2 hd 7 sec 87>
       /pci/pci1000,1@1/cmdk@6,0
Specify disk (enter its number): 0
selecting c0t2d0
FORMAT MENU:
.
.
.
format> fdisk

          Partition  Status  Type           Start  End  Length  %
          =====  =====  =====
          1          Active  Solaris        1    2693  2693   100
SELECT ONE OF THE FOLLOWING:
    1.  Create a partition
    2.  Change Active (Boot from) partition
    3.  Delete a partition
    4.  Exit (Update disk configuration and exit)
    5.  Cancel (Exit without updating disk configuration)
Enter Selection: 3
Enter the number of the partition you want to delete (or enter 0
to exit ): 1
Do you want to delete partition 1? This will make all files and
programs in this partition inaccessible (type "y" or "n"). y
Partition 1 has been deleted.
THERE ARE NO PARTITIONS CURRENTLY DEFINED SELECT ONE OF THE
FOLLOWING:
    1.  Create a partition
    2.  Change Active (Boot from) partition
    3.  Delete a partition
    4.  Exit (Update disk configuration and exit)
    5.  Cancel (Exit without updating disk configuration)
Enter Selection: 1
```


Example—Creating fdisk Partitions for a System Disk on a PowerPC System (2 of 3)

```

Indicate the type of partition you want to create
(1=SOLARIS, 2=UNIX, 3=PCIXOS, 4=Other, 8=DOSBIG)
(5=DOS12, 6=DOS16, 7=DOSEXT, 9=PowerPC Boot, 0=Exit) ?9
Indicate the percentage of the disk you want this partition
to use (or enter "c" to specify in cylinders). 2
Do you want this to become the Active partition? If so, it will
be activated each time you reset your computer or when you turn
it on again.
Please type "y" or "n". n

      Partition  Status  Type           Start  End  Cylinders  %
      =====  =====  =====
      1          Active  PowerPC Boot   1     54     54         2
SELECT ONE OF THE FOLLOWING:
1.  Create a partition
2.  Change Active (Boot from) partition
3.  Delete a partition
4.  Exit (Update disk configuration and exit)
5.  Cancel (Exit without updating disk configuration)
Enter Selection: 1
Indicate the type of partition you want to create
(1=SOLARIS, 2=UNIX, 3=PCIXOS, 4=Other, 8=DOSBIG)
(5=DOS12, 6=DOS16, 7=DOSEXT, 9=PowerPC Boot, 0=Exit) ?5
Indicate the percentage of the disk you want this partition
to use (or enter "c" to specify in cylinders). 3
Do you want this to become the Active partition? If so, it will
be activated each time you reset your computer or when you turn
it on again.
Please type "y" or "n". y
Partition 2 is now the Active partition

      Partition  Status  Type           Start  End  Cylinders  %
      =====  =====  =====
      1          Active  PowerPC Boot   1     54     54         2
      2          Active  DOS12          55    134     80         3

```

Example—Creating fdisk Partitions for a System Disk on a PowerPC System(3 of 3)

```

SELECT ONE OF THE FOLLOWING:
  1. Create a partition
  2. Change Active (Boot from) partition
  3. Delete a partition
  4. Exit (Update disk configuration and exit)
  5. Cancel (Exit without updating disk configuration)
Enter Selection: 1
Indicate the type of partition you want to create
(1=SOLARIS, 2=UNIX, 3=PCIXOS, 4=Other, 8=DOSBIG)
(5=DOS12, 6=DOS16, 7=DOSEXT, 9=PowerPC Boot, 0=Exit) ?1
Indicate the percentage of the disk you want this partition
to use (or enter "c" to specify in cylinders). 95
Do you want this to become the Active partition? If so, it will
be activated each time you reset your computer or when you turn
it on again.
Please type "y" or "n". n

          Cylinders
Partition  Status   Type           Start   End   Length  %
=====  =====  =====
          1           PowerPC Boot    1     54     54     2
          2      Active   DOS12           55    134     80     3
          3           Solaris        135  2693   2559    95

SELECT ONE OF THE FOLLOWING:
  1. Create a partition
  2. Change Active (Boot from) partition
  3. Delete a partition
  4. Exit (Update disk configuration and exit)
  5. Cancel (Exit without updating disk configuration)
Enter Selection: 4
WARNING:Solaris fdisk partition changed - Please relabel the disk
format> label
Ready to label disk, continue? yes
format> quit

```

Where to Go From Here

After you create a Solaris `fdisk` partition on the disk, you can create slices on the disk. Go to “PowerPC: How to Create Disk Slices and Label a Disk” on page 66.

▼ PowerPC: How to Create Disk Slices and Label a Disk

1. **Become root.**
2. **Start the `format` utility.**

```
# format
```

3. **Enter the number of the disk that you want to repartition from the list displayed on your screen.**

```
Specify disk (enter its number): disk-number
```

At this prompt:

disk-number Is the number of the disk that you want to repartition.

4. **Go into the `partition` menu (which lets you set up the slices).**

```
format> partition
```

5. **Display the current partition (slice) table.**

```
partition> print
```

6. **Start the modification process.**

```
partition> modify
```

7. **Set the disk to all free hog.**

```
Choose base (enter number) [0]? 1
```

For more information about the free hog slice, see "Managing Disks" in *System Administration Guide, Volume I*.

8. Create a new partition table by answering `yes` when prompted to continue.

```
Do you wish to continue creating a new partition
table based on above table[yes]? yes
```

9. Identify the free `hog` partition (slice) and the sizes of the slices when prompted.

When adding a system disk, you must set up slices for:

- `root` (slice 0) and `swap` (slice 1) and/or
- `/usr` (slice 6)

After you identify the slices, the new partition table is displayed.

10. Make the displayed partition table the current partition table by answering `yes` when asked.

```
Okay to make this the current partition table[yes]? yes
```

If you don't want the current partition table and you want to change it, answer `no` and go to Step 6.

11. Name the partition table.

```
Enter table name (remember quotes): "partition-name"
```

At this prompt:

partition-name Is the name for the new partition table.

12. Label the disk with the new partition table when you have finished allocating slices on the new disk.

```
Ready to label disk, continue? yes
```

13. Quit the partition menu.

```
partition> quit
```

14. Quit the format menu.

```
format> quit
```

Example—Creating Disk Slices and Labeling a Disk on a PowerPC System (1 of 3)

```
# format
Searching for disks...done
AVAILABLE DISK SELECTIONS:
    0. c0t2d0 <SUN1.05 cyl 2557 alt 2 hd 9 sec 85>
       /pci/pci1000,1@1/cmdk@2,0
    1. c0t6d0 <DEFAULT cyl 1728 alt 2 hd 7 sec 87>
       /pci/pci1000,1@1/cmdk@6,0
Specify disk (enter its number): 0
selecting c0t2d0
[disk formatted]
FORMAT MENU:
.
.
.
format> partition
PARTITION MENU:
    0      - change `0' partition
    1      - change `1' partition
    2      - change `2' partition
    3      - change `3' partition
    4      - change `4' partition
    5      - change `5' partition
    6      - change `6' partition
    7      - change `7' partition
select - select a predefined table
modify - modify a predefined partition table
name   - name the current table
print  - display the current table
label  - write partition map and label to the disk
quit
partition> print
```

Example—Creating Disk Slices and Labeling a Disk on a PowerPC System (2 of 3)

```

Current partition table (original):
Total disk cylinders available: 2557 + 2 (reserved cylinders)
Part      Tag      Flag      Cylinders      Size      Blocks
0         root     wm        0 - 85         32MB     (86/0/0)    65790
1         swap     wu        86 - 257       64MB     (172/0/0)   131580
2         backup   wu        0 - 2693       1006MB   (2694/0/0) 2060910
3         unassigned wm        0              0        (0/0/0)    0
4         unassigned wm        0              0        (0/0/0)    0
5         unassigned wm        0              0        (0/0/0)    0
6         usr      wm        258 - 2691     909MB    (2434/0/0) 1862010
7         unassigned wm        0              0        (0/0/0)    0
8         unassigned wm        0              0        (0/0/0)    0
9         unassigned wm        0              0        (0/0/0)    0
partition> modify
Select partitioning base:
  0. Current partition table (original)
  1. All Free Hog
Choose base (enter number) [0]? 1
Part      Tag      Flag      Cylinders      Size      Blocks
0         root     wm        0              0        (0/0/0)    0
1         swap     wu        0              0        (0/0/0)    0
2         backup   wu        0 - 2556       955MB    (2557/0/0) 1956105
3         unassigned wm        0              0        (0/0/0)    0
4         unassigned wm        0              0        (0/0/0)    0
5         unassigned wm        0              0        (0/0/0)    0
6         usr      wm        0              0        (0/0/0)    0
7         unassigned wm        0              0        (0/0/0)    0
8         unassigned wm        0              0        (0/0/0)    0
9         unassigned wm        0              0        (0/0/0)    0
Do you wish to continue creating a new partition
table based on above table[yes]? Press Return
Free Hog partition[6]? Press Return

```


Example—Creating Disk Slices and Labeling a Disk on a PowerPC System (3 of 3)

```
Enter size of partition '0' [0b, 0c, 0.00mb]: 100m
Enter size of partition '1' [0b, 0c, 0.00mb]: 100m
Enter size of partition '3' [0b, 0c, 0.00mb]:
Enter size of partition '4' [0b, 0c, 0.00mb]:
Enter size of partition '5' [0b, 0c, 0.00mb]: 100m
Enter size of partition '7' [0b, 0c, 0.00mb]:
Part      Tag      Flag      Cylinders      Size      Blocks
 0      root     wm        0 - 267        100MB     (268/0/0)  205020
 1      swap     wu        268 - 535      100MB     (268/0/0)  205020
 2      backup   wu         0 - 2556      955MB     (2557/0/0) 1956105
 3 unassigned wm         0              0          (0/0/0)    0
 4 unassigned wm         0              0          (0/0/0)    0
 5 unassigned wm        536 - 803     100MB     (268/0/0)  205020
 6      usr     wm        804 - 2556     654MB     (1753/0/0) 1341045
 7 unassigned wm         0              0          (0/0/0)    0
 8 unassigned wm         0              0          (0/0/0)    0
 9 unassigned wm         0              0          (0/0/0)    0
Okay to make this the current partition table[yes]? Press Return
Enter table name (remember quotes): "disk2"

Ready to label disk, continue? yes

partition> quit
format> quit
```

Where to Go From Here

After you create disk slices and label the disk, you can create file systems on the disk. Go to “PowerPC: How to Create a File System” on page 72.

▼ PowerPC: How to Create a File System

1. Become root.
2. Create a file system for each slice with the `newfs` command.

```
# newfs /dev/rdisk/cwtxdysz
```

In this command:

`/dev/rdisk/cwtxdysz` Is the raw device for the file system to be created.

For more information about the `newfs` command, see "Managing File Systems" in *System Administration Guide, Volume I*.

Example—Creating a File System on a PowerPC System

```
# newfs /dev/rdisk/c0t2d0s0
newfs: construct a new file system /dev/rdisk/c0t2d0s0: (y/n)? y
/dev/rdisk/c0t2d0s0:205020 sectors in 268 cylinders of 9 tracks,
85 sectors
    100.1MB in 17 cyl groups (16 c/g, 5.98MB/g, 2880 i/g)
super-block backups (for fsck -F ufs -o b=#) at:
    32, 12368, 24704, 37040, 49376, 61712, 74048, 86384, 98720,
    111056, 123392,
    135728, 148064, 160400, 172736, 185072, 195872,
#
```

Where to Go From Here

If You Are Adding A ...	Then ...
System Disk	<p>You need to restore the root (/) and /usr file systems on the disk. Go to "Backing Up and Restoring Data" in <i>System Administration Guide, Volume I</i>.</p> <p>After the root (/) and /usr file systems are restored, install the boot block. Go to "PowerPC: How to Install a Boot Block on a System Disk" on page 74.</p>
Secondary Disk	<p>You may need to restore file systems on the new disk. Go to "Backing Up and Restoring Data" in <i>System Administration Guide, Volume I</i>.</p> <p>If you are not restoring file systems on the new disk, you are finished adding a secondary disk. For information on making the file systems available to users, see "Managing File Systems" in <i>System Administration Guide, Volume I</i>.</p>

▼ **PowerPC: How to Install a Boot Block on a System Disk**

1. **Become root.**
2. **Type the following command:**

```
# /usr/sbin/installboot -f /platform/`uname -i`/openfirmware.x41  
/usr/platform/`uname -i`/lib/fs/ufs/bootblk /dev/rdisk/cwtxdyp0
```

In this command:

- | | |
|---|--|
| -f /platform/`uname -i`/openfirmware.x41 | Identifies the location of the VOF on disk. |
| /usr/platform/`uname -i`/lib/fs/ufs/bootblk | Is the boot block code. |
| /dev/rdisk/cwtxdyp0 | Is the raw device name that represents the whole disk. |

3. **Reboot the system to multiuser mode.**

Example—Installing a Boot Block on a System Disk on a PowerPC System

```
# /usr/sbin/installboot -f /platform/IBM,PPS_Model_6015/openfirmware.x41  
/usr/platform/IBM,PPS_Model_6015/lib/fs/ufs/bootblk /dev/rdisk/c0t2d0p0
```

Verification—Installing a Boot Block on a System Disk on a PowerPC System

If the system boots to multiuser mode, the boot block has been installed correctly.

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