JNI 2 Gb PCI Single and Dual Port Fibre Channel Host Bus Adapters Installation Guide

Sun Microsystems, Inc.
www.sun.com

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Compliance Model Number: **Amber2J**
Product Family Name: **JNI 2Gb PCI Single FC HBA w/SFK (SG-XPCI1FC-JF2)**

EMC
USA - FCC Class B
This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
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2) This equipment must accept any interference that may cause undesired operation.

European Union
This equipment complies with the following requirements of the EMC Directive 89/336/EEC:

EN55022:1998/CISPR22:1997 Class B

EN55024:1998 Required Limits (as applicable):

EN61000-4-2	4 kV (Direct), 8 kV (Air)
EN61000-4-3	3 V/m
EN61000-4-4	1 kV AC Power Lines, 0.5 kV Signal and DC Power Lines
EN61000-4-5	1 kV AC Line-Line and Outdoor Signal Lines, 2 kV AC Line-Gnd, 0.5 kV DC Power Lines
EN61000-4-6	3 V
EN61000-4-8	1 A/m
EN61000-4-11	Pass
EN61000-3-2:1995 + A1, A2, A14	Pass
EN61000-3-3:1995	Pass

Safety
This equipment complies with the following requirements of Low Voltage Directive 73/23/EEC:
EC Type Examination Certificates:

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IEC 60950:2000, 3rd Edition, Evaluated to all CB Countries	CB Scheme Certificate No.		
UL 60950, 3rd Edition, CSA C22.2 No. 60950-00	File:	Vol.	Sec.

Supplementary Information: This product was tested and complies with all the requirements for the CE Mark.

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Declaration of Conformity

Compliance Model Number: **Crystal2J**
Product Family Name: **JNI 2Gb PCI Dual FC HBA w/SFK (SG-XPCI2FC-JF2)**

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EN61000-4-5	1 kV AC Line-Line and Outdoor Signal Lines, 2 kV AC Line-Gnd, 0.5 kV DC Power Lines
EN61000-4-6	3 V
EN61000-4-8	1 A/m
EN61000-4-11	Pass
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Preface

This manual provides instructions for the installation, integration, and use of the JNI 2 Gb PCI Single and Dual Port FC HBAs.

How This Book Is Organized

Chapter 1 provides a product description and an introduction to Fibre Channel network topologies.

Chapter 2 explains how to install, setup, and verify the product.

Chapter 3 describes the installation sequence for the Solaris™ Driver.

Appendix A explains how to create a bootable disk (if desired).

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. See the following for this information:

- Software documentation that you received with your system
- Solaris operating environment documentation, which is at

  `http://docs.sun.com`

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Typographic Conventions

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

* The settings on your browser might differ from these settings.

Related Documentation

Application	Title	Part Number
Important Information	*JNI 2 Gb PCI Single and Dual Port Fibre Channel Host Bus Adapters Release Notes*	817-2260
Reference Documentation	*JNI 2 Gb PCI Single and Dual Port Fibre Channel Host Bus Adapters Guide to Documentation*	817-3543

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JNI 2 Gb PCI Single and Dual Port Fibre Channel Host Bus Adapters Installation Guide, part number 817-2259-10

CHAPTER 1

The Fibre Channel Host Bus Adapter

This chapter contains the following topics:

- "Description" on page 2
- "Fibre Channel Topologies" on page 2
- "Obtaining the Software and Drivers" on page 6

Description

The JNI Corporation single port and dual port Fibre Channel 2 Gb PCI host bus adapters (HBAs) are PCI universal cards that can be used in either the 33 MHz or 66 MHz PCI slots. These HBAs are PCI-X capable. However, at this time, they are qualified only for use on Sun PCI platforms.

Fibre Channel Topologies

There are four common topologies associated with Fibre Channel networks, illustrated in FIGURE 1-1 through FIGURE 1-4. Depending on your needs, you can set up your Fibre Channel network in several ways. This chapter briefly describes the different topologies.

Switched Fabric

In a switched fabric topology, N_Ports (node ports) are connected to F_Ports (Fabric ports) on an FC switch. See FIGURE 1-1. This arrangement enables connection of a large number of devices and provides high throughput, low latency, and high availability. Depending on switch vendor support, fabric switches can be interconnected to support approximately 16 million N_Ports on a single network.

Arbitrated Loop (Private)

The Fibre Channel Arbitrated Loop (FC-AL) topology (see FIGURE 1-2) enables the attachment of up to 127 nodes without hubs and switches. FC-AL is a time-shared, full-bandwidth, distributed topology where each port includes the minimum necessary connection function. Depending on the distance requirements, workstations or servers can be connected to a single disk or a disk loop with either optical fiber or copper media.

Note – Disk drives connected in this configuration must have an FC-AL interface.

Arbitrated Loop (Public)

The public loop topology contains one participating FL_Port and enables a loop to be connected to a fabric device. See FIGURE 1-4.

Point-to-Point

The point-to-point topology (N_Port to N_Port) uses Fibre Channel technology, without the loop overhead, to increase performance and simplify cabling between a RAID storage box and a host. See FIGURE 1-3.

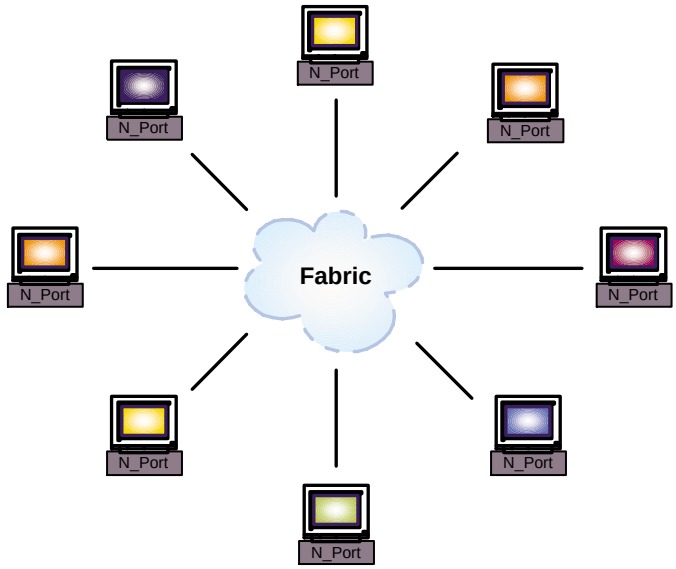

FIGURE 1-1 Switched Fabric Topology

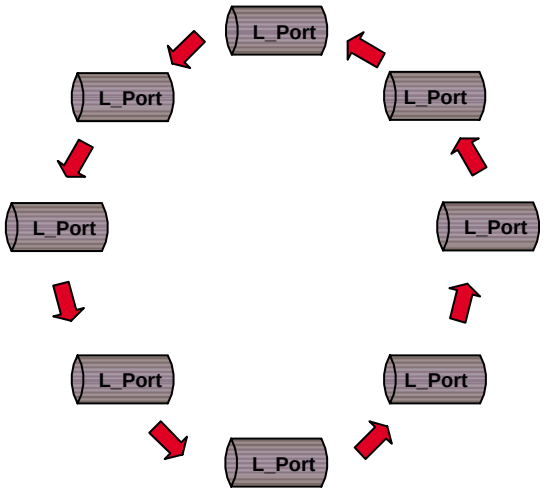

FIGURE 1-2 Arbitrated Loop (Private) Topology

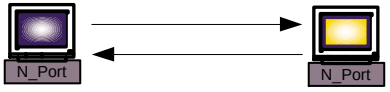

FIGURE 1-3 Point-to-Point Topology

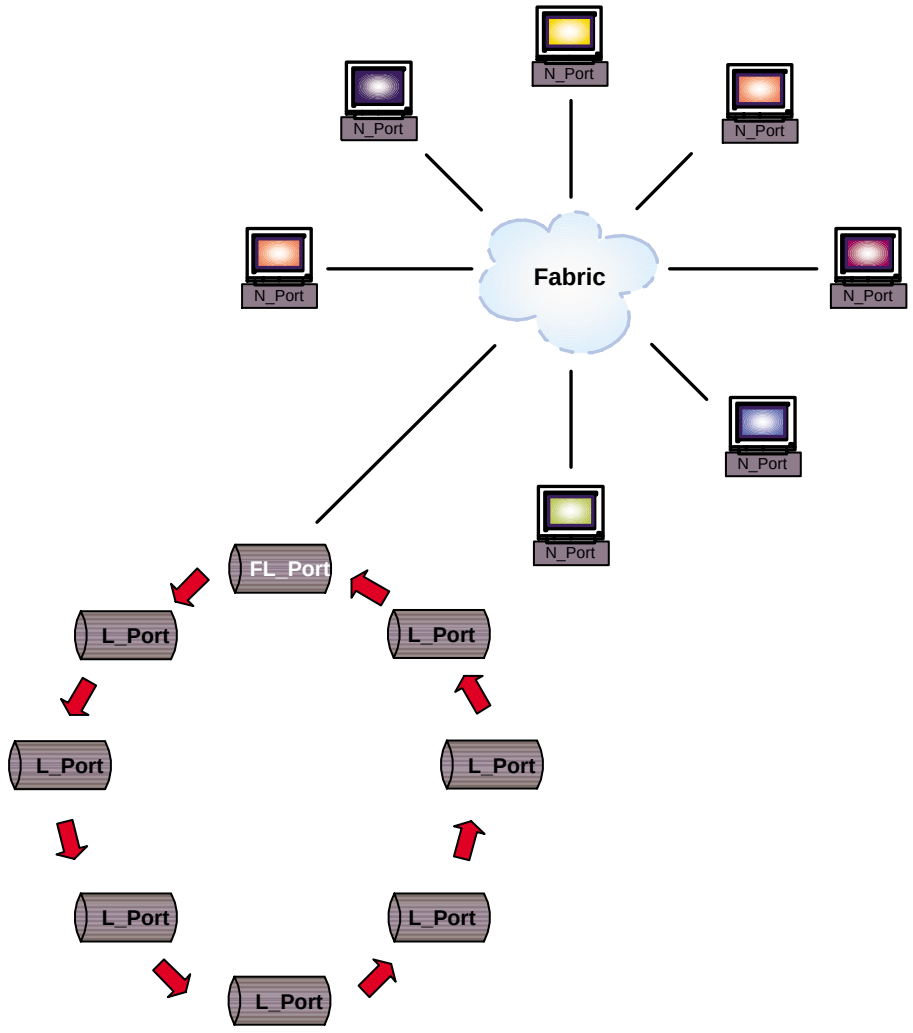

FIGURE 1-4 Arbitrated Loop (Public) Topology

Obtaining the Software and Drivers

To find the necessary software and drivers for the JNI 2 Gb PCI Single and Dual Port HBAs are available on the location referenced in the *JNI 2 Gb PCI Single and Dual HBAs With SAN Foundation Software Release Notes* at

`http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Adapters/index.html`.

CHAPTER 2

Hardware Installation

This chapter contains the following sections:

- "Installation and Setup" on page 8
- "Verifying the Installation in OpenBoot PROM" on page 14

Caution – This procedure involves working with electrostatic discharge (ESD) sensitive material. Only persons trained to avoid static discharge should install this HBA. Be sure that the power cord is disconnected from the machine before removing the cover and installing the HBA. Installation should be performed with precautions to prevent damage to static-sensitive components. Do not force the HBA into the slot.

Installation and Setup

Note – Before installing your HBA, record the serial number. Providing this number facilitates any technical support requests you might have.

Serial # _____

Minimum System Requirements

The HBA requires the Solaris 8 Operating System (OS) or the Solaris 9 OS.

▼ To Install the Adapter

1. **Shut down the system, power down all peripherals, and unplug the power cord.**
2. **Refer to your computer manufacturer's manual for additional instructions and precautions on the installation of new hardware components.**
3. **Locate an unused PCI slot.**

   If a slot bracket is covering the slot opening, unscrew and remove the bracket (keep the screws).
4. **Hold the HBA by the corners and insert it into the available slot.**

   Press the adapter down firmly so the HBA contacts are securely seated.

Caution – Do not use excessive force. If there is resistance, pull the HBA all the way out and check to see if the HBA contacts are correctly aligned with the slot. A gentle back and forth motion might be needed to correctly seat the contacts.

5. **Secure the HBA bracket with any screws removed in Step 3.**
6. **Replace the computer cover per your computer manufacturer's manual.**
7. **Plug in the power cord, cables, and peripherals back into the computer and turn on the power.**

FIGURE 2-1 FCX-6562 HBA (Example Only)

FIGURE 2-2 FCX2-6562 HBA (Example Only)

Connecting Cables and Devices

Connecting devices to your new adapter might require a variety of cables or adapters. The HBA's built-in interface is fiber-optic cabling, as shown in FIGURE 2-3.

Note – LC multimode optical FC cables do not come with the HBA.

FIGURE 2-3 LC Multimode Optical FC Cable

Optical Interface Connector and LED Layout

The interface to your new adapter uses a fiber-optic cable with LC small-form factor fiber-optic connectors. Plug the optical cables into the two-port optical FC connector. See FIGURE 2-4 for the location of the transmitter port (TX) and receiver port (RX) and the LED layout on the optical FC connector.

FIGURE 2-4 Standard Small-Form Factor LC Fiber-Optic Connectors (Single Channel HBA)

FIGURE 2-5 Standard Small-Form Factor LC Fiber-Optic Connector (Dual Channel HBA)

Signal Name Functions

The three LEDs on the HBA show the following functions:

- SD Indicates optical signal detection
- 2G Indicates 2-Gbit transmission rate
- ACT Indicates data transmit activity

Note – Port A is linked to the drive path: `.../SUNW,jfca@i/...`
Port B is linked to the drive path: `.../SUNW,jfca@i,1/...`
where `i` is a number assigned to a partition PCI slot by the PCI controller in the system.

Class 3 Mode

The single channel and dual channel HBAs support the Class 3 mode of operation.

Verifying the Installation in OpenBoot PROM

There are two ways to verify successful installation of the HBA:

- The `show-devs` command. This method is used to show the proper installation of the HBA on the PCI bus of the host system.
- The `apply show-children` command. This method is used to display the storage devices connected to the installed HBAs.

▼ To Verify Installation With the `show-devs` Command

1. **Open a terminal window.**
2. **Use a telnet session to establish communication to your console.**

3. **At the ok prompt, type the** `show-devs` **command.**

   The device paths of the HBA are displayed.

```
3> ok show-devs
/pci@9,600000
/pci@9,700000
/pci@8,600000
/pci@8,700000
/memory-controller@3,400000
/SUNW,UltraSPARC-III@3,0
/memory-controller@2,400000
/SUNW,UltraSPARC-III@2,0
/memory-controller@1,400000
/SUNW,UltraSPARC-III@1,0
/memory-controller@0,400000
/SUNW,UltraSPARC-III@0,0
/virtual-memory
/memory@m0,0
/aliases
/options
/openprom
/chosen
/packages
/pci@9,600000/SUNW,jfca@2,1
/pci@9,600000/SUNW,jfca@2
/pci@9,600000/SUNW,jfca@1,1
/pci@9,600000/SUNW,jfca@1
/pci@9,600000/SUNW,jfca@2,1/fp@0,0
/pci@9,600000/SUNW,jfca@2,1/fp@0,0/disk
/pci@9,600000/SUNW,jfca@2/fp@0,0
/pci@9,600000/SUNW,jfca@2/fp@0,0/disk
/pci@9,600000/SUNW,jfca@1,1/fp@0,0
/pci@9,600000/SUNW,jfca@1,1/fp@0,0/disk
/pci@9,600000/SUNW,jfca@1/fp@0,0
/pci@9,600000/SUNW,jfca@1/fp@0,0/disk
/pci@9,700000/SUNW,jfca@2
/pci@9,700000/usb@1,3
/pci@9,700000/network@1,1
/pci@9,700000/ebus@1
/pci@9,700000/SUNW,jfca@2/fp@0,0
/pci@9,700000/SUNW,jfca@2/fp@0,0/disk
```

In the output of the `show-devs` command of Step 3,

`/pci@9,600000/SUNW,jfca@2` and

`/pci@9,600000/SUNW,jfca@2,1`

indicate the presence of a dual channel JNI HBA in the same session. The

`/pci@9,700000/SUNW,jfca@2`

line indicates the presence of a single channel JNI HBA.

▼ To Verify Installation With the `apply show-children` Command

1. **Open a terminal window.**
2. **Use a telnet session to establish communication to your console.**
3. **Type the `apply show-children` command.**

   The storage devices connected to the HBA are displayed.

```
4> ok apply show-children /pci@9,600000/SUNW,jfca@1
PortID LUN  --- Port WWN ---  --Device Type-  ----- LUN Description ------
 20600   0  50020f23000054ef    Disk          SUN     T300            0201
 20600   1  50020f23000054ef    Disk          SUN     T300            0201
 20600   2  50020f23000054ef    Disk          SUN     T300            0201
 20600  b0  50020f23000054ef    Disk          SUN     T300            0201
 20600  e5  50020f23000054ef    Disk          SUN     T300            0201
 20900   0  50020f2300004667    Disk          SUN     T300            0201
 20900   1  50020f2300004667    Disk          SUN     T300            0201
 20900   2  50020f2300004667    Disk          SUN     T300            0201
 20900   3  50020f2300004667    Disk          SUN     T300            0201
 20900   4  50020f2300004667    Disk          SUN     T300            0201
 20900   5  50020f2300004667    Disk          SUN     T300            0201
 20900   6  50020f2300004667    Disk          SUN     T300            0201
 20900  fb  50020f2300004667    Disk          SUN     T300            0201
5> ok apply show-children /pci@9,600000/SUNW,jfca@1,1
PortID LUN  --- Port WWN ---  --Device Type-  ----- LUN Description ------
 20600   0  50020f23000054ef    Disk          SUN     T300            0201
 20600   1  50020f23000054ef    Disk          SUN     T300            0201
 20600   2  50020f23000054ef    Disk          SUN     T300            0201
 20600  7b  50020f23000054ef    Disk          SUN     T300            0201
 20600  82  50020f23000054ef    Disk          SUN     T300            0201
 20600  ca  50020f23000054ef    Disk          SUN     T300            0201
 20900   0  50020f2300004667    Disk          SUN     T300            0201
 20900   1  50020f2300004667    Disk          SUN     T300            0201
 20900   2  50020f2300004667    Disk          SUN     T300            0201
 20900   3  50020f2300004667    Disk          SUN     T300            0201
 20900   4  50020f2300004667    Disk          SUN     T300            0201
 20900   5  50020f2300004667    Disk          SUN     T300            0201
 20900   6  50020f2300004667    Disk          SUN     T300            0201
 20900  87  50020f2300004667    Disk          SUN     T300            0201
 20900  8a  50020f2300004667    Disk          SUN     T300            0201
```

In the output of the apply `show-children` command, the disk storage attached to the respective HBA ports is displayed. See FIGURE 2-5 for port assignments.

Note – The `probe-scsi-all` command does not function identically on all platforms and does not always probe for Fibre Channel devices. The `probe-fcal-all` command exists only on Sun Enterprise™ systems.

Testing the Installation With SunVTS Software

The JNItest portion of the SunVTS™ software currently has not been released. The HBA can be tested by running the disktest in the SunVTS software.

To determine which version of the SunVTS software to install, and to obtain SunVTS documentation, go to:

`http://www.sun.com/oem/products/vts/`

Download and install the software that is appropriate for your version of the Solaris OS.

▼ To Test the HBA

1. **To run SunVTS software locally on a system running CDE, type the following as** `root`:

```
# cd /opt/SUNvts/bin
# ./sunvts
```

2. **Using the SunVTS menus, do the following tasks:**

   a. **Choose devices None and select “intervention”.**

   b. **Choose the Functional test mode.**

   c. **Choose Disktest.**

   d. **Choose Start to start the test.**

CHAPTER 3

Solaris Driver

The HBAs do not support operating systems earlier than the Solaris 8 Operating System, Update 4.

The Fibre Channel drivers used in these HBA products are unbundled for Solaris 8 and Solaris 9 OS. Install the software in the following sequence:

1. **Download and install Sun StorEdge SAN Foundation software 4.2 packages and patches.**

   See *Sun StorEdge SAN Foundation Software 4.2 Installation Guide*, 817-1244.

2. **Download and install the appropriate JNI 2 Gb PCI Single and Dual Port HBAs packages and patches.**

   See *JNI 2 Gb PCI Single and Dual Port Fibre Channel Host Bus Adapters Release Notes*, 817-2260.

APPENDIX **A**

Booting From the HBA

Booting from the HBA requires special procedures to enable detection of the installation devices so that the Solaris installation program can communicate with these devices and install Solaris on them. There are two ways to enable detection of the installation devices. One is to use a patched install server and use network booting. The second is to boot locally from an existing disk with the appropriate patches. The later method is also known as the dump and restore method. Both procedures should be performed by a knowledgeable UNIX system administrator.

The method explained in this appendix is “Dump and Restore Method” on page 22.

The dump and restore method is more difficult than the net install patching method, and you might experience complications in the loss of the boot. However, the method works with small or large configurations, and it provides a disk image when you have completed the process.

Note – This procedure is necessary if the HBA driver is not bundled with the Solaris operating environment on the boot server on the network. Check your Solaris operating environment to determine whether the driver is bundled with it.

Booting through an HBA is mandatory when the host is an enterprise-level system or a system that does not have its own directly connected disks. It is optional and preferable when a host has a directly connected disk. You might prefer to boot through the adapter because the 2-Gbit connection is faster.

Dump and Restore Method

This example creates a bootable disk on a LUN device in a Sun StorEdge ™ T3 or T3+ array. The original boot disk is an internal drive in a SunFire™ V880. The topics in this appendix include:

- “Dump and Restore Method” on page 22.
- “Partitioning the New Boot Disk the Same As the Temporary Boot Disk” on page 23.
- “To Create File Systems on the New Boot Disk” on page 33
- “Creating the New Boot Files” on page 33.

To enable bootability using a temporary boot disk, a boot disk must be directly connected, at least temporarily, to the host. The boot disk must have the following installed:

- The Solaris operating environment
- The network adapter driver packages and any needed patches

  See *JNI 2 Gb PCI Single and Dual Port HBAs With SAN Foundation Software Release Notes* for how to download and install the driver packages and any needed patches.

Note – You can resolve the initial boot disk if it is not needed after the boot disk is enabled.

Note – The examples in this section show disk 0 as the directly connected boot disk and disk 7 as the designated new boot disk that is connected through the host adapter.

Partitioning the New Boot Disk the Same As the Temporary Boot Disk

There are several subprocedures you must perform to complete the first phase of enabling bootability from a temporarily connected boot disk. These subprocedures include:

- "To Prepare to Partition the New Disk" on page 23.
- "To Record the Partition Layout" on page 23.
- "To Change to the New Boot Disk" on page 28.
- "To Specify Slices on the New Boot Disk" on page 29.
- "To Label the New Boot Disk" on page 32.

▼ To Prepare to Partition the New Disk

1. **Become a superuser on the host with the HBA.**

```
% su
Password:
#
```

2. **If the driver and any needed patches are not already installed, download the driver package from Sun's download center and install it on the host. Following the instructions in the** `README` **file that comes with the driver.**

   To download the driver, follow the instructions in the release notes.

3. **Reboot using the** `reboot`**(1M) command with the** `-r` **option.**

```
# reboot -- -r
```

4. **Log in to the host as root.**

▼ To Record the Partition Layout

After you log back in to the host, you can record the layout of the partitions, or slices, on the system boot disk.

1. **Type the** `format`**(1M) command.**

   If needed, see the `format` man page and the instructions on adding a disk and using the `format` command in the Solaris administration documentation.

Note – These examples use disk 0 as the original boot disk (`c1t0d0`) and disk 7 (`c6t50020F23000054EFd1`) as the new boot disk.

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c1t0d0 <SUN36G cyl 24620 alt 2 hd 27 sec 107>
          /pci@8,600000/SUNW,qlc@2/fp@0,0/ssd@w21000004cf72eec5,0
       1. c1t1d0 <SUN36G cyl 24620 alt 2 hd 27 sec 107>
          /pci@8,600000/SUNW,qlc@2/fp@0,0/ssd@w21000004cf72704e,0
       2. c1t2d0 <SUN36G cyl 24620 alt 2 hd 27 sec 107>
          /pci@8,600000/SUNW,qlc@2/fp@0,0/ssd@w21000004cf6813b7,0
       3. c1t3d0 <SUN36G cyl 24620 alt 2 hd 27 sec 107>
          /pci@8,600000/SUNW,qlc@2/fp@0,0/ssd@w21000004cf8fe2e0,0
       4. c1t4d0 <SUN36G cyl 24620 alt 2 hd 27 sec 107>
          /pci@8,600000/SUNW,qlc@2/fp@0,0/ssd@w21000004cf834579,0
       5. c1t5d0 <SUN36G cyl 24620 alt 2 hd 27 sec 107>
          /pci@8,600000/SUNW,qlc@2/fp@0,0/ssd@w21000004cf7f7b0d,0
       6. c6t50020F23000054EFd0 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f23000054ef,0
       7. c6t50020F23000054EFd1 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f23000054ef,1
       8. c6t50020F23000054EFd2 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f23000054ef,2
       9. c6t50020F2300004667d0 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f2300004667,0
      10. c6t50020F2300004667d1 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f2300004667,1
      11. c6t50020F2300004667d2 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f2300004667,2
      12. c6t50020F2300004667d3 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f2300004667,3
      13. c6t50020F2300004667d4 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f2300004667,4
      14. c6t50020F2300004667d5 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f2300004667,5
      15. c6t50020F2300004667d6 <SUN-T300-0201 cyl 12286 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@w50020f2300004667,6
      16. c7t50020F23000054EFd0 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
          /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f23000054ef,0
```

```
       17. c7t50020F23000054EFd1 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f23000054ef,1
       18. c7t50020F23000054EFd2 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f23000054ef,2
       19. c7t50020F2300004667d0 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f2300004667,0
       20. c7t50020F2300004667d1 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f2300004667,1
       21. c7t50020F2300004667d2 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f2300004667,2
       22. c7t50020F2300004667d3 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f2300004667,3
       23. c7t50020F2300004667d4 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f2300004667,4
       24. c7t50020F2300004667d5 <SUN-T300-0201 cyl 20478 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f2300004667,5
       25. c7t50020F2300004667d6 <SUN-T300-0201 cyl 12286 alt 2 hd 8 sec 128>
           /pci@9,600000/SUNW,jfca@1,1/fp@0,0/ssd@w50020f2300004667,6


Specify disk (enter its number): 7
selecting c6t50020F23000054EFd1
[disk formatted]
```

2. **Make a note of the device path name of the new boot disk.**

   For example, for disk 7, the new boot disk in this example, the device path name shown is:

   `/pci@9,600000/SUNW,jfca@1/fp@0,0/ssd@ws0020t23000054ef,1`.

   You use this information later in Step 4 in "To Specify the New Boot Disk As the Boot Device" on page 37.

Note – The `jfca` number changes, depending on the type of host and slot in use.

---

3. **Specify the disk where the operating system is installed on the temporary boot disk.**

   The following screen example specifies disk `0`.

```
Specify disk (enter its number): 0
```

4. **Type the** `partition` **command to bring up the Partition 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
        !<cmd> - execute <cmd>, then return
        quit
partition>
```

5. **Type the** `print` **command to display the partition table for the specified disk.**

```
partition> print
Current partition table (original):
Total disk cylinders available: 24620 + 2 (reserved cylinders)

Part      Tag    Flag     Cylinders         Size            Blocks
  0       root    wm       0 - 18811       25.92GB    (18812/0/0) 54347868
  1       swap    wu   18812 - 21715        4.00GB    (2904/0/0)   8389656
  2     backup    wm       0 - 24619       33.92GB    (24620/0/0) 71127180
  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 unassigned    wm       0                0         (0/0/0)            0
  7       home    wm   21716 - 24619        4.00GB    (2904/0/0)   8389656
```

As shown in the example, the temporary boot disk has three slices defined: 0 (`root`), 1 (`swap`), and 7 (`home`) with sizes of 25.92 Gbytes, 4.00 Gbytes, and 4.00 Gbytes.

6. **Record the layout (sizes and numbers) assigned to the slices on the temporary boot disk, and type** `quit` **when done.**

```
partition> quit
FORMAT MENU:
        disk       - select a disk
        type       - select (define) a disk type
        partition  - select (define) a partition table
        current    - describe the current disk
        format     - format and analyze the disk
        repair     - repair a defective sector
        label      - write label to the disk
        analyze    - surface analysis
        defect     - defect list management
        backup     - search for backup labels
        verify     - read and display labels
        save       - save new disk/partition definitions
        inquiry    - show vendor, product and revision
        volname    - set 8-character volume name
        !<cmd>     - execute <cmd>, then return
        quit
format>
```

As shown in the previous example, the `quit` command returns you to the Format Menu.

▼ To Change to the New Boot Disk

After you record the partition layout, change to the new boot disk.

1. **Exit the** `format>` **prompt by typing** `quit`**.**
2. **Start a new format session by typing** `format`**.**
3. **After the list of available disks is displayed, type the number of the disk to be formatted.**

   The following screen example uses `disk 7`. The Format Menu appears.

```
Specify disk (enter its number): 7
selecting c6t50020F23000054EFd1
[disk formatted]

FORMAT MENU:
        disk       - select a disk
        type       - select (define) a disk type
        partition  - select (define) a partition table
        current    - describe the current disk
        format     - format and analyze the disk
        repair     - repair a defective sector
        label      - write label to the disk
        analyze    - surface analysis
        defect     - defect list management
        backup     - search for backup labels
        verify     - read and display labels
        save       - save new disk/partition definitions
        inquiry    - show vendor, product and revision
        volname    - set 8-character volume name
        !<cmd>     - execute <cmd>, then return
        quit
format>
```

4. **Make a note of the device name of the disk.**

   The device name of the disk in the previous screen example is `c6t50020F23000054EFd1`.

▼ To Specify Slices on the New Boot Disk

After you change to the new boot disk, specify one slice on the new boot disk for every slice on the temporary boot disk. The following examples specify that the root slice 0 on the new boot disk matches slice 0 on the temporary boot disk.

1. **Type the** `partition` **command to bring up the Partition 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
        !<cmd> - execute <cmd>, then return
        quit
partition>
```

2. **Type the number of the slice to be defined.**

   Slice 0 is specified in the following example. As shown, the partition table for the new boot disk is displayed.

```
partition> 0
Part      Tag    Flag     Cylinders         Size            Blocks
  0       root    wm    1452 - 21715       27.92GB    (20264/0/0) 58542696

Enter partition id tag[root]:
```

3. **Type the partition ID tag.**

   The following example shows a question mark (?) entered after the prompt. The list of accepted partition ID tags is displayed. You can accept the default partition ID tag of `root` by pressing the `Return` key.

```
Enter partition id tag[root]: ?
Expecting one of the following: (abbreviations ok):
        unassigned    boot          root          swap
        usr           backup        stand         var
Enter partition id tag[root]:
Enter partition permission flags[wm]:
```

4. **Type the partition permission flags.**

   You can accept the default permission flags, `wm`, by pressing the `Return` key.

```
Enter partition permission flags[wm]:
Enter new starting cyl[0]:
```

5. **Type the new starting cylinder.**

   You can accept the default new starting cylinder of `0` by pressing the `Return` key.

```
Enter new starting cyl[0]:
Enter partition size[262899b, 91c, 128.37mb, 0.13gb]:
```

6. **Type the partition size.**

   The following example shows a partition size of `2.00gb`.

```
Enter partition size[262899b, 91c, 128.37mb, 0.13gb]: 2.00gb
partition>
```

7. **Type the** `print` **command to display the updated partition table.**

   The following example shows that the root tag, the wm permissions flag, and the partition size of 25.92 Gbytes are assigned to slice 0.

```
partition> print
Current partition table (unnamed):
Total disk cylinders available: 24620 + 2 (reserved cylinders)

Part      Tag    Flag     Cylinders         Size            Blocks
  0       root    wm       0 - 18815       25.92GB    (18816/0/0) 54359424
  1       swap    wu       0 -  1451        2.00GB    (1452/0/0)   4194828
  2     backup    wm       0 - 24619       33.92GB    (24620/0/0) 71127180
  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 unassigned    wm       0                0         (0/0/0)            0
  7       home    wm   21716 - 24619        4.00GB    (2904/0/0)   8389656
```

8. **Repeat Step 2 through Step 7 as needed until all slices are defined as they are in the temporary boot disk.**

9. **Type the** `quit` **command to return to the Format Menu.**

```
partition> quit

FORMAT MENU:
        disk       - select a disk
        type       - select (define) a disk type
        partition  - select (define) a partition table
        current    - describe the current disk
        format     - format and analyze the disk
        repair     - repair a defective sector
        label      - write label to the disk
        analyze    - surface analysis
        defect     - defect list management
        backup     - search for backup labels
        verify     - read and display labels
        save       - save new disk/partition definitions
        inquiry    - show vendor, product and revision
        volname    - set 8-character volume name
        !<cmd>     - execute <cmd>, then return
        quit
format>
```

▼ To Label the New Boot Disk

After you specify the slices on the new boot disk, label the new boot disk with the new partition table.

1. **Type the label command.**

```
format> label
```

2. **Type** `y` **to continue.**

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

3. **When the labeling is complete, type** `q` **to quit the** `format` **program.**

```
format> q
#
```

▼ To Create File Systems on the New Boot Disk

- **Create a file system on each slice on the disk using the** `newfs`**(1M) command.**

  Enter the `newfs` command followed by the device name of the slice. In this example, the device name for slice 0 of disk `c6t50020F23000054EFd1s0` is `/dev/rdsk/c6t50020F23000054EFd1s0`.

```
# newfs /dev/rdsk/c6t50020F23000045EFd1s0
newfs: construct a new file system /dev/rdsk/c6t50020F23000054EFd1s0: (y/n)? y

/dev/rdsk/c6t50020F23000054EFd1s0:    58542696 sectors in 20264 cylinders of
27 tracks, 107 sectors
        28585.3MB in 634 cyl groups (32 c/g, 45.14MB/g, 5632 i/g)
super-block backups (for fsck -F ufs -o b=#) at:
 32, 92592, 185152, 277712, 370272, 462832, 555392, 647952, 740512, 833072,
 925632, 1018192, 1110752, 1203312, 1295872, 1388432, 1480992, 1573552,
 1666112, 1758672, 1851232, 1943792, 2036352, 2128912, 2221472, 2314032,
 2406592, 2499152, 2591712, 2684272, 2776832, 2869392, 2958368, 3050928,
 3143488, 3236048, 3328608, 3421168, 3513728, 3606288, 3698848, 3791408,
 3883968, 3976528, 4069088, 4161648, 4254208, 4346768, 4439328, 4531888,
 4624448, 4717008, 4809568, 4902128, 4994688, 5087248, 5179808, 5272368,
 5364928, 5457488, 5550048, 5642608, 5735168, 5827728, 5916704, 6009264,
 6101824, 6194384, 6286944, 6379504, 6472064, 6564624, 6657184, 6749744,
....
```

For more information, see the section on how to create file systems in the Solaris system administration documentation.

Do this step to create a file system on the new boot disk for each slice on the temporary boot disk. When you are finished, go to "To Copy the Contents of Non-Root File Systems Onto the New Boot Disk" on page 36.

Creating the New Boot Files

This section has several subprocedures, including:

- "To Copy the Boot Block and Root File System Contents to the New Boot Disk" on page 34.
- "To Update the `vfstab` File" on page 35.
- "To Copy the Contents of Non-Root File Systems Onto the New Boot Disk" on page 36.
- "To Specify the New Boot Disk As the Boot Device" on page 37.

▼ To Copy the Boot Block and Root File System Contents to the New Boot Disk

1. **Install the boot block on the** `root` **(/) file system of the new disk.**

   The following example uses the `installboot`(1M) command to install the boot block. The boot block resides in this directory:

   `/usr/platform/`*platform-name*`/lib/fs/ufs/bootblk`

   The example shows use of the `uname` command with the `-i` option (between left single quotes) on the command line to specify the platform name.

```
# /usr/sbin/installboot /usr/platform/‘uname -i‘/lib/fs/ufs/bootblk \
/dev/rdsk/c7t16d0s0
```

   For more information, see the instructions on how to install a boot block in the Solaris system administration documentation.

2. **Mount the** `root` **file system from slice 0 of the new boot disk onto the** `/mnt` **mount point.**

```
# mount /dev/dsk/c6t50020F23000054EFd1s0 /mnt
```

3. **Use the** `ufsdump`**(1M) and** `ufsrestore`**(1M) commands to copy the contents of the** `root` **file system from the temporary boot disk to the root slice of the new boot disk (on the** `/mnt` **mount point).**

```
# ufsdump 0f - /dev/rdsk/c6t50020F23000054EFd1s0 | ( cd /mnt;
ufsrestore rf -)
#
```

4. **Unmount the** `root` **file system on slice 0 from the** `/mnt` **mount point.**

```
# umount /mnt
```

▼ To Update the `vfstab` File

After you copy the boot block and root files, update the `vfstab` file.

1. **Mount the `root` file system from slice 0 of the new boot disk onto the `/mnt` mount point.**

```
# mount /dev/dsk/c6t50020F23000054EFd1s0 /mnt
```

2. **Change directories to `/mnt/etc` and open the `vfstab`(4) file for editing.**

   The following example shows the file systems defined.

```
# cd /mnt/etc
# vi vfstab
...
/dev/dsk/c1t0d0s1       -       -       swap    -       no      -
/dev/dsk/c1t0d0s0       /dev/rdsk/c1t0d0s0      /       ufs     1       no -
/dev/dsk/c1t0d0s7       /dev/rdsk/c1t0d0s7      /home   ufs     2       yes -
```

3. **Replace the name of the temporary boot disk with the name of the new boot disk, and then save and quit the file.**

   The following example shows the disk name `c1t0` changed to `c6t50020F23000054EFd1` in the mount table entries for slices 0, 1, and 7.

```
/dev/dsk/c6t50020F23000054EFd1s1       -       -       swap    -       no      -
/dev/dsk/c6t50020F23000054EFd1s0      /dev/rdsk/c6t50020F23000054EFd1s0     /
ufs     1 no      -
/dev/dsk/c6t50020F23000054EFd1s7      /dev/rdsk/c6t50020F23000054EFd1s7     /home
ufs     2 yes -
:wq
#
```

▼ To Copy the Contents of Non-Root File Systems Onto the New Boot Disk

1. **Mount the file system onto the** `/mnt` **mount point.**

   This example shows the copying of the `/home` file system from slice 7 to the new boot disk.

```
# mount /dev/dsk/c6t50020F23000054EFd1 /mnt
```

2. **Use the** `ufsdump`**(1M) and** `ufsrestore`**(1M) commands to copy the contents of the file system from the temporary boot disk to the new boot disk.**

```
# ufsdump 0f - /dev/rdsk/c1t0d0s0 | ( cd /mnt; ufsrestore rf -)
#
```

3. **Unmount the file system from the** `/mnt` **mount point.**

```
# umount /mnt
```

4. **Repeat Step 1 through Step 3 as needed until you have copied all the file systems' contents to the new boot disk.**

   When finished, go to "To Update the `vfstab` File" on page 35.

▼ To Specify the New Boot Disk As the Boot Device

1. **Bring the host with the host adapter down to the** `ok` **prompt at run level 0.**

   See the Solaris system administration documentation on shutting down a host for the commands that can be used with different configurations. The following screen example uses the `shutdown`(1M) command.

```
# shutdown
...
ok
```

2. **Use the** `nvalias` **command to create a short alias for the device name of the disk to a short name for the disk.**

   The following example uses

   `/pci@8,600000/SUNW,qlc@1/fp@0,0/disk@10,0`

   which was the device path name for disk 2 in "To Record the Partition Layout" on page 23.

```
ok nvalias disk2 /pci@9,600000/SUNW,jfca@1/fp@0,0/disk@w50020f23000054ef,1:a
```

3. **Use the** `nvstore` **command to store the new alias.**

   Type the `reset all` command.

```
ok nvstore
ok reset-all
```

4. **Define the new boot disk as the default** `boot-device`**.**

   Use the data gathered in Step 2 on page 25.

   a. **Type the** `setenv` **command, followed by the** `boot-device` **parameter, followed by the name of the new disk.**

```
ok setenv boot-device disk2
```

   b. **Type the** `reset` **command.**

```
ok reset
```

5. **Type the `boot` command with the `-r` option so that the Solaris operating environment can recognize the adapter.**

```
ok boot -r
```