



**Hitachi Freedom Storage™
Thunder 9500™ V Series**

Sun™ Solaris™ Host Installation Guide

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Document Revision Level

| Revision | Date | Description |
|--------------|----------------|--|
| MK-92DF621-P | September 2002 | Preliminary Release |
| MK-92DF621-0 | March 2003 | Initial Release |
| MK-92DF621-1 | June 2003 | Revision 1, supersedes and replaces MK-92DF621-0 |

Source Documents use for this Revision

The following source documents were used to produce this document revision:

- *Hitachi Freedom Storage™ Thunder 9200™ Sun™ Solaris™ Configuration Guide, MK-90DF514*
- HDS review of this document

Changes for this Revision

- Updated Solaris setting information (Table 2.1 and Table 2.2)
- Updated Host-specific parameter information (section 2.3.1)

Preface

The *Hitachi Thunder 9500™ V Series Sun™ Solaris™ Host Installation Guide* describes and provides instructions for configuring the devices on the Hitachi Thunder 9500™ V Series array subsystem for operation with the Sun™ Solaris™ operating system. This document assumes that:

- the user has a background in data processing and understands direct-access storage device subsystems and their basic functions,
- the user is familiar with the Hitachi Thunder 9500™ V Series array subsystem,
- the user is familiar with the Sun™ Solaris™ operating system and the Sun™ SPARCstation™, SPARCserver™, SPARCcenter™, and/or Ultra™ Series systems, and
- the user is familiar with the UNIX® file system, system commands, and utilities.

Note: The term “9500V” refers to the entire Hitachi Freedom Storage™ Thunder 9500™ V Series subsystem family, unless otherwise noted. Please refer to the *Hitachi Thunder 9500™ V Series User and Reference Guide* (MK-92DF601) for further information on the 9500V disk array subsystems.

Note: For further information on the Sun™ Solaris™ operating system, please consult the Sun™ Solaris™ online help and/or user documentation, or contact Sun™ technical support.

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Make sure to include the document title, number, and revision.

Please refer to specific page(s) and paragraph(s) whenever possible.

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Thank you!

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Chapter 1 Overview of 9500V Solaris™ Configuration

1.1 9500V Solaris™ Configuration

This document describes the requirements and procedures for connecting the 9500V subsystem to a Sun™ Solaris™ system and configuring the new 9500V devices for operation with the Solaris™ operating system.

Configuration of the 9500V disk devices for Solaris™ operations includes:

- Setting the disk and device parameters (see section 2.5),
- Setting and recognizing the LUs (see section 2.6),
- Configuring the host fibre-channel adapters (see section 2.7),
- Partitioning and labeling the new devices (see section 3.1), and
- Creating and mounting the file systems (see section 3.2).

Note on the term “SCSI disk”: The 9500V logical devices are defined to the host as SCSI disk devices, whether the interface is SCSI or fibre-channel.

1.2 9500V Subsystem

The Hitachi Thunder 9500™ V RAID subsystem supports concurrent attachment to multiple UNIX®-based and PC-server platforms. Please contact your Hitachi Data Systems account team for the latest information on platform support. The 9500V subsystem provides continuous data availability, high-speed response, scaleable connectivity, and expandable capacity for PC server and open-system storage. The 9500V subsystem can operate with multihost applications and host clusters, and is designed to handle very large databases as well as data warehousing and data mining applications that store and retrieve terabytes of data.

For further information on the 9500V subsystem, please refer to the *Hitachi Thunder 9500™ V Series User and Reference Guide*, or contact your Hitachi Data Systems account team.

Chapter 2 Preparing for New Device Configuration

2.1 Configuration Requirements

The requirements for 9500V Sun™ Solaris™ configuration are:

- **9500V subsystem**

- The Resource Manager **9500V** software is required to configure the fibre-channel (FC) ports.

Note: The availability of 9500V features and functions depends on the level of microcode installed on the 9500V subsystem.

- **Sun™ system:** Sun™ SPARCstation series, Sun™ SPARCserver series, Sun™ SPARCcenter series, or Sun™ Ultra series. Please contact your Hitachi Data Systems account team for the latest information on supported hardware.

- **Sun™ Solaris™ OS**, version 2.6, 7, or 8. **Root** login access to the Sun™ system is required.

Important: Please contact Sun™ to make sure that the most current OS patches are installed on the Sun™ system(s).

Note: For further information on supported Solaris™ versions, please contact Hitachi Data Systems.

- **High-availability (HA) software.** The 9500V currently supports the following software products. Please contact your Hitachi Data Systems account team for the latest information on supported software products.

- VERITAS® Cluster Server™ and Sun™ Cluster for host/application failover
- Hitachi Dynamic Link Manager and VERITAS® Volume Manager™ for path failover and logical volume management

- **Fibre-channel adapters.** Make sure to install all utilities, tools, and drivers that come with the adapter(s).

- The 9500V subsystem supports full-speed (1 and 2 GB/s), shortwave, non-OFC (open fibre control) optical fibre-channel interface and multimode optical cables with SC and/or LC connectors. Do not connect any OFC-type fibre-channel interface to the 9500V subsystem.

2.2 Installing the 9500V Subsystem

The 9500V subsystem comes with all hardware and cabling required for installation. Installation of the 9500V subsystem involves the following activities:

Hardware installation. Perform hardware installation as specified in Hitachi Data Systems' documentation and Hitachi, Ltd. source documentation. Follow all precautions and procedures in this documentation. Check all specifications to ensure proper installation and configuration. Hardware installation includes:

- Assembling all hardware and cabling
- Upgrading to the latest microcode level
- Creating RAID groups and LUNs and formatting LUNs using the Resource Manager 9500V software. For information and instructions on using Resource Manager, please refer to the *Hitachi Thunder 9500™ V Series Resource Manager User's Guide*.
- Installing the fibre-channel adapters and cabling

9500V FC Port: The fibre topology parameters for each 9500V fibre-channel port depend on the type of device to which the 9500V port is connected. Determine the topology parameters supported by the device, and set your topology accordingly (see section 2.7).

2.3 Preparing to Connect the 9500V Subsystem to the Host

Before connecting the 9500V subsystem, you must perform the following tasks:

- Set the host-specific parameters for the 9500V fibre-channel port(s) (see section 0), and
- Verify host bus adapter installation (see section 2.3.2).

You will use the Resource Manager 9500V software to configure the 9500V fibre ports. For instructions on using Resource Manager, please refer to the *Hitachi Thunder 9500™ V Series Resource Manager User's Guide*.

For additional information on Solaris settings, please see Table 2.1 and Table 2.2.

Table 2.1 Solaris Settings (Basic) (continued on the next page)

| Parameter | Setting | Comments |
|---|---------------------------------|---|
| Subsystem | | |
| System startup attribute | Depends on system configuration | See Note 1. |
| Data share mode | Depends on system configuration | Recommend ON in all cases; see Note 2. |
| Data striping size | 64 kbytes | Default |
| Cache mode | ALL OFF | Default |
| Operation if a processor failure occurs | Reset a fault | Default |
| Drive detach mode enable | Disabled | Default |
| Turbo LU warning | Disabled | Default |
| Report status (normal/warning) | Enabled | Default |
| RS232C Error Information Outflow Mode | OFF | Default |
| Host Interface | | |
| Command Queuing Mode | ON | Default |
| ROM micro program version | — | N/A |
| RAM micro program version | — | N/A |
| Write & verify executing mode | ON | Default |
| LU mapping mode | User defined | See Note 3. |
| Host Port | | |
| Host connection mode | — | N/A |
| Host connection mode1 | Standard | Default; see Note 4. |
| Host connection mode2 | ALL OFF | Default; see Note 4. |
| LIP reset mode | Target authentication | Default |
| Reset/LIP mode (process) | Reset within the port | Default |
| Reset/LIP mode (signal) | Reset within the port | Default |
| Target reset (bus device reset) mode | Reset within the port | Default |
| Logical unit reset mode | Reset within the port | Default |
| Third party process logout mode | Reset within the port | Default |

Table 2.1 Solaris Settings (Basic) (continued)

| Parameter | Setting | Comments |
|-----------------------|--------------|------------------------------|
| Reserve mode | Within a CTL | Default; see <i>Note 5</i> . |
| Network | | |
| DHCP | OFF | Default |
| IP address | User defined | — |
| Subnet mask | User defined | — |
| Default gateway | User defined | — |
| Name | | |
| Vendor ID | HITACHI | Default |
| Product ID | DF600F | Default |
| Serial number | — | Default |
| Controller identifier | Disabled | Default |
| Controller id | DF600-00 | See <i>Note 6</i> . |

Note 1: Hot-Standby mode is used only when one of the two Controllers is desired to be active.

Note 2: Data Share mode is used to prevent performance deterioration caused by LU ownership switching. This occurs when a host computer issues commands frequently to a Controller that does not own the target LU (often due to a path or host failure in failover mode). Data Share mode is recommended where LU ownership switching may occur.

Note 3: This is needed for defining which LUs will be accessible through a port.

Note 4: Please see Table 2.2.

Note 5: When **Data Share** mode is set, the 9500V operates in the **Within a Subsystem** mode even when the **Within a CTL** mode is set.

Note 6: Make the controller ID's of the CTL-00 and CTL-01 of the 9500V identical. When two or more 9500Vs are connected to the same host, the Controller ID's of each 9500V must be unique per 9500V subsystem.

Table 2.2 Solaris Parameter Settings (Advanced)

| Parameter | Options | Path Failover | | Clusters | | HDS Solutions | |
|-----------------------|------------------|----------------------------|------|----------|----------------|-------------------|----------------|
| | | VxVM-DMP | HDLM | VCS | SCS | ShadowImage 9500V | TrueCopy 9500V |
| HCM1 | Standard | X ³ | X | | | — | — |
| | Trespass | X ¹ | | | | — | — |
| HCM2 | Sun Cluster Mode | | | | X ⁴ | | |
| Product ID | | DF400 ² /DF600F | | | DF600FSUN | — | — |
| Controller Identifier | | ENABLED | | | | | |
| | | DF600-00 | | | | | |

Note 1: Set to Trespass mode for VxVM DMP 3.11 or below.

Note 2: Set product ID to DF400 if using VxVM DMP 3.1 or below.

Note 3: Set product ID to DF600F when using VxVM DMP 3.2 and 3.5 with ASL (see Techfile ID 252140 on the Veritas support website).

Note 4: Sun Cluster 3.0 I/O path switch function is not supported but ASL is required for the VxVM environment.

For host and software specific settings, please refer to the appropriate 9500V maintenance documentation.

2.3.1 Setting the Host-Specific Parameters for the 9500V Ports

The 9500V ports must be configured for the connected operating system.

Fibre Topology. You need to configure the 9500V FC ports to define the fibre topology parameters and port addresses (see Table 2.3). The 9500V subsystem supports up to 512 LUs. You will select the appropriate settings for each 9500V FC port based on the device to which the port is connected. Determine the topology parameters supported by the device, and set your topology accordingly.

Note: If you plan to connect different types of servers to the 9500V via the same fabric switch, you should use Hitachi LUN Management™ Host Storage Domain (HSD) on the Thunder 9500™ V.

Port address. In fabric environments, the port addresses are assigned automatically by fabric switch port number and are not controlled by the 9500V port settings. In FC arbitrated-loop (FCAL) environments, the port addresses are set by entering an AL-PA (arbitrated-loop physical address, or loop ID, or port address). The host communicates with the devices comprising the loop with 8-bit AL-PA. See Table 2.3.

Table 2.3 shows the available AL-PA values and the corresponding SCSI TID address. The number of available port addresses is 126. (There are 127 port addresses, but address 00H is reserved for fibre connection.) Fibre-channel protocol uses the AL-PAs to communicate on the fibre-channel link, but the software driver of the platform host adapter translates the AL-PA value assigned to the 9500V port to a SCSI TID.

Devices communicate with hosts using individual port addresses. However, hosts map SCSI protocol to fibre channel devices. The hosts access the device's LUs using the device files `/dev/dsk/c*t*d*` and `/dev/rdisk/c*t*d*`. SCSI and fibre-channel devices are accessed the same way; however, the device files for SCSI and fibre-channel devices are configured differently.

Table 2.3 Fibre Port Addressing

| AL-PA | TID | AL-PA | TID | AL-PA | TID | AL-PA | TID | AL-PA | TID | AL-PA | TID | AL-PA | TID | AL-PA | TID |
|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| EF | 0 | CD | 16 | B2 | 32 | 98 | 48 | 72 | 64 | 55 | 80 | 3A | 96 | 23 | 112 |
| E8 | 1 | CC | 17 | B1 | 33 | 97 | 49 | 71 | 65 | 54 | 81 | 39 | 97 | 23 | 113 |
| E4 | 2 | CB | 18 | AE | 34 | 90 | 50 | 6E | 66 | 53 | 82 | 36 | 98 | 1F | 114 |
| E2 | 3 | CA | 19 | AD | 35 | 8F | 51 | 6D | 67 | 52 | 83 | 35 | 99 | 1E | 115 |
| E1 | 4 | C9 | 20 | AC | 36 | 88 | 52 | 6C | 68 | 51 | 84 | 34 | 100 | 1D | 116 |
| E0 | 5 | C7 | 21 | AB | 37 | 84 | 53 | 6B | 69 | 4E | 85 | 33 | 101 | 1B | 117 |
| DC | 6 | C6 | 22 | AA | 38 | 82 | 54 | 6A | 70 | 4D | 86 | 32 | 102 | 18 | 118 |
| DA | 7 | C5 | 23 | A9 | 39 | 81 | 55 | 69 | 71 | 4C | 87 | 31 | 103 | 17 | 119 |
| D9 | 8 | C3 | 24 | A7 | 40 | 80 | 56 | 67 | 72 | 4B | 88 | 2E | 104 | 10 | 120 |
| D6 | 9 | BC | 25 | A6 | 41 | 7C | 57 | 66 | 73 | 4A | 89 | 2D | 105 | 0F | 121 |
| D5 | 10 | BA | 26 | A5 | 42 | 7A | 58 | 65 | 74 | 49 | 90 | 2C | 106 | 08 | 122 |
| D4 | 11 | B9 | 27 | A3 | 43 | 79 | 59 | 63 | 75 | 47 | 91 | 2B | 107 | 04 | 123 |
| D3 | 12 | B6 | 28 | 9F | 44 | 76 | 60 | 5C | 76 | 46 | 92 | 2A | 108 | 02 | 124 |
| D2 | 13 | B5 | 29 | 9E | 45 | 75 | 61 | 5A | 77 | 45 | 93 | 29 | 109 | 01 | 125 |
| D1 | 14 | B4 | 30 | 9D | 46 | 74 | 62 | 59 | 78 | 43 | 94 | 27 | 110 | | |
| CE | 15 | B3 | 31 | 9B | 47 | 73 | 63 | 56 | 79 | 3C | 95 | 26 | 111 | | |

2.3.2 Verifying the Host Fibre-Channel Adapter Installation

Before the 9500V is connected to the Sun™ system, you must verify the FC adapter installation. To ensure that the host fibre configuration is correct, you will verify recognition of the FCA and the FCA driver.

To verify the fibre-channel host configuration:

1. Log in to the Sun™ system as **root**, and make sure that all existing devices are powered on and properly connected to the Sun™ system.
2. Display the host configuration using the `/usr/platform/[platform:sun4u]/sbin/prtdiag` command (see example in Figure 2.1). Make sure that the host recognizes the following four classes of fibre information (underlined in the following example): **fibre channel adapter**, **SCSI bus characteristics**, **world wide name**, and **FCA driver**. If this information is not displayed or if error messages are displayed, the host environment may not be configured properly.

Note: For information on the HBA-specific text displayed on screen, please refer to the MAN pages and/or user documentation for the HBA.

```
# /usr/platform/sun4u/sbin/prtdiag -v pkginfo -l
:
:
:
fca0: JNI Fibre Channel Adapter (1062 MB/sec), model FC
fca0: SBus 1: IRQ 4: FCODE Version 11.0.9 [1a6384]: SCSI ID 125: AL PA 01
fca0: Fibre Channel WWN: 100000e0690000d5
fca0: FCA Driver Version 2.2.HIT.03, Oct 09, 1999 Solaris 2.5, 2.6
:
Brd  Type  MHz  Slot  Name                                     Model
-----
0    PCI    33   0     SUNW,qfe-pci108e,1001                   SUNW,pci-qfe
0    PCI    33   1     network-SUNW,hme                         SUNW,pci-qfe
0    PCI    33   1     SUNW,qfe-pci108e,1001                   SUNW,pci-qfe
0    PCI    33   2     SUNW,qfe-pci108e,1001                   SUNW,pci-qfe
0    PCI    33   3     scsi-glm/disk (block)                   Symbios,53C875
0    PCI    33   3     scsi-glm/disk (block)                   Symbios,53C875
0    PCI    33   3     SUNW,qfe-pci108e,1001                   SUNW,pci-qfe
0    PCI    33   5     fibre-channel-pci1242,4642              SUNW,pci-qfe
```

JNIfcaw ← For FC64-1063 (64-bit Sbus)
 JNIfca ← For FC32-1063 (32-bit Sbus)
 JNIfcaPCI ← For FCI-1063 (32/64-bit PCI)
 JNIC ← For FCE-6410 (64-bit PCI)

← Verify that
 ← these items
 ← are listed.
 ←

Figure 2.1 Displaying the Fibre Device Information (JNI FC-1063 shown)

2.4 Connecting the 9500V Subsystem to the Sun™ System

The 9500V subsystem comes with all the hardware and cabling required for connection to the host system(s). Connection of the 9500V subsystem involves the following activities:

1. Verify subsystem installation. Verify that the status of the fibre/SCSI adapters and LUNs is NORMAL.
2. Connect the 9500V to the Sun™ system. Install the fibre-channel cables between the 9500V subsystem and the Sun™ system.

After connecting the 9500V subsystem to the Solaris™ host, you need to perform the following tasks before rebooting the host:

- Modify `/etc/system` with appropriate time-out and max throttle values (see section 2.5),
- Modify `/kernel/drv.sd.conf` so LUs can be recognized (see section 2.6), and
- Configure the host fibre-channel adapters (see section 2.7).

2.5 Setting the Disk and Device Parameters

Once the 9500V is installed and connected, you must set the queue depth parameter (`sd_max_throttle`) and I/O time-out value (`sd_io_time`) for the 9500V devices. The required I/O time-out value (TOV) for 9500V devices is 60 seconds (0x3C), which is also the default TOV value. If the I/O TOV has been changed from the default, you must change it back to 60 seconds by editing the `sd_io_time` parameter in the `/etc/system` file.

To set the I/O TOV and queue depth for the 9500V devices:

1. Make a backup of `/etc/system`: `cp /etc/system /etc/system.bak`
2. Edit `/etc/system`
3. Add the following to `/etc/system`: `set sd:sd_io_time=0x3c`
4. Add the following to `/etc/system`: `set sd:sd_max_throttle = x` (for `x`, refer to Figure 2.2)

Note: `sd_max_throttle = 512 / (number of LUNs on the 9500V port) [up to 32, or up to 8 if using VxVM DMP]. Round the result down (for example, 7.82 = 7).`

5. Save your changes and exit the text editor. You will reboot the system later to apply the above I/O TOV setting.

```
*ident "@(#)system      1.15      92/11/14 SMI" /* SVR4 1.5 */
*
* SYSTEM SPECIFICATION FILE
*
:
*      To set a variable named 'debug' in the module named 'test_module'
*
*      set test_module:debug = 0x13
*      set sd:sd_io_time = 0x3c      ← For setting I/O TOV, add this line to /etc/system
*
*      set sd:sd_max_throttle = 8      ← For setting max throttle,
*                                     add this line to /etc/system
```

Figure 2.2 Setting I/O TOV and Max Throttle (Queue Depth)

2.6 Setting and Recognizing the LUs

You must set and recognize the new LUs by adding the 9500V logical devices to the `sd.conf` file (`/kernel/drv/sd.conf`). The `sd.conf` file includes the SCSI TID and LUN for all LUs connected to the Sun™ system.

To set and recognize the new LUs:

1. Log in as root, and make a backup copy of the `/kernel/drv/sd.conf` file:
`cp -ip /kernel/drv/sd.conf /kernel/drv/sd.conf.bak`
2. Edit the `/kernel/drv/sd.conf` file as shown in Figure 2.3. Make sure to make an entry (SCSI TID and LUN) for each new device being added to the Sun™ system.
Note: If the LUs have already been added to the `sd.conf` file, please verify each new LU.
Note: The setup in the `sd.conf` file is different for some adapters (for example, Emulex LP8000). Please refer to the MAN pages or user documentation for the adapter.
3. Exit the vi editor, and save your changes. You will reboot the system later to apply the new settings.

```
# cp -ip /kernel/drv/sd.conf /kernel/drv/sd/conf/standard      ← Make backup of file.
#
# vi /kernel/drv/sd.conf                                     ← Edit the file (vi shown).
#ident "@(#)sd.conf      1.8      93/05/03 SMI"
name="sd" class="scsi"
        target=0 lun=0;

name="sd" class="scsi"
        target=1 lun=0;

name="sd" class="scsi"
        target=2 lun=0;

name="sd" class="scsi"                                     ← Add this information for
        target=2 lun=1;                                   ← all new target IDs
                                                    and LUNs. (*See note.)

name="sd" class="scsi"
        target=3 lun=0;

name="sd" class="scsi"
        target=4 lun=0;
#
#
```

Note: The SCSI class type name is used because the SCSI driver is used for fibre channel.

Figure 2.3 Setting and Recognizing LUs

2.7 Configuring the Host Fibre-Channel Adapters

After setting the disk and device parameters and setting and recognizing the LUs, you are ready to configure the FC adapter(s) connected to the 9500V. The host bus adapters (HBAs) have many configuration options. This section provides minimum requirements for configuring FC adapters for operation with the 9500V subsystem.

Please make sure that you have read the MAN pages and user documentation for the adapter.

The following sample instructions apply to JNI™, JNI™ Emerald-based, and Emulex FC adapters.

2.7.1 Sample Instructions for JNI FC Adapters

You will edit the `fca*.conf` file to configure the FC adapters.

For 32-bit SBus adapters, configure the `/kernel/drv/fca.conf` file.
For 64-bit SBus adapters, configure the `/kernel/drv/fcaw.conf` file.
For PCI adapters, configure the `/kernel/drv/fca-pci.conf` file.

To configure an HBA by editing the `fca*.conf` file (`fca-pci.conf` is shown in this example):

1. Log in as `root`.
2. Make a backup of `fca-pci.conf`: `cp /kernel/drv/fca-pci.conf /kernel/drv/fca-pci.bak`
3. Edit the `fca-pci.conf` file: `vi /kernel/drv/fca-pci.conf`
4. Enter: `timeout_reset_enable = 1`; (see Figure 2.4)
5. Enter: `link_recovery_delay = 500`; (see Figure 2.5)
6. Enter: `recovery_attempts = 5`; (see Figure 2.6)
7. When using VERITAS® VxVM, enter: `scsi_probe_delay = 5000`;
(minimum value = 5000, can be set higher as needed)
8. Enter: `failover = 180`; (see Figure 2.7)
When using VERITAS® VxVM Dynamic Multi Pathing (DMP), enter: `failover = 60`;
9. Enter: `ip_disable = 1`; (This parameter is only for driver v2.5.) (see Figure 2.8)
10. Enter: `def_wwpn_binding = "xxxxxxxxxxxxxxxxxx"`; (see Figure 2.9)
Enter: `def_wwnn_binding = "xxxxxxxxxxxxxxxxxx"`; (see Figure 2.9)
Note: Before driver v2.5, enter: `def_wwn_binding = "xxxxxxxxxxxxxxxxxx"`;
Note: If binding is being performed, use `$xxxxxxxxxxxxxxxxxx` for the `wwpn` setting.
11. Enter: `def_port_binding = "$xxxxxx"`; (see Figure 2.10)
12. Enter: `fca_verbose = 1`; (see Figure 2.11)
13. When connecting to AL, enter: `fca_nport = 0`;
When connecting to fibre switch, enter: `fca_nport = 1`;

14. If there are multiple workstations/servers on same loop and two or more of the host's ports have the same AL_PA, change the AL_PA as follows:

For FCI-1064, set `scsi-initiator-id = 0xZZ`; (0xZZ:0-7d hex) (see Figure 2.12)

For FC-1063, FC64-1063:

- a) For Openboot mode, enter `init 0`.
- b) To disable autoboot, enter the following command at the `ok` prompt
`setenv auto-boot? False`
- c) Set the `fcode-debug?` attribute to `true`. To view the OpenBoot environment variables, enter `printenv`. If the value of `fcode-debug?` is false, enter `setenv fcode-debug? true`
- d) Enter the following command to show a list of all SCSI devices: `probe-scsi-all`
- e) Select the device for which you want to change the SCSI-ID, and issue the following command (note there must be a space after the first “”):
`"/sbus@1f,0/fca@1,0" select-dev`
- f) If this fails, reset the system using the `reset` command, and issue the `select-dev` command again.
- g) To reconfigure the workstation to autoboot, enter: `setenv auto-boot? true`
- h) Reset the system by entering the `reset` command.

Note: There must be a storage device or loopback plug attached to the adapter. Enter the Openboot command to change the SCSI-ID, and enter `y` and the new SCSI ID (see Figure 2.13): `set-scsi-id`

15. Save your changes, and exit the text editor.

```
# Configuration flag timeout_reset_enable
# Type: boolean; default: 0
# When a command times out to a target, the driver can attempt to clear the problem in
# two ways:
# 1. (timeout_reset_enable = 1) Reset the target.
# 2. (timeout_reset_enable = 0) Send an abort exchange (ABTS_LS) request to the target.
timeout_reset_enable = 1;
```

Figure 2.4 Example of set `timeout_reset_enable = 1`

```
# Configuration flag link_recovery_delay
# Type: unsigned int; default: 100
# Set delay between link up state and login recovery.
# This delay helps ensure link stability before recovery of communications to ports.
# The delay is in milliseconds with a 10 millisecond resolution.
link_recovery_delay = 500;
```

Figure 2.5 Example of set `link_recovery_delay = 500`

```
# Configuration variable recovery_attempts
# Type: integer; count; default: 5
# Defines the number of times login_recovery is attempted before failed
recovery_attempts = 5;
```

Figure 2.6 Example of set recovery_attempts = 5

```
# Configuration variable failover
# Type: integer; seconds; default: 180
# Defines the number of seconds after link failure before
# failing all pending commands on targets.
failover = 180;
```

Figure 2.7 Example of failover = 180

```
# Configuration flag ip_disable
# Type: boolean; default; 0 (false)
# if false (0), then the IP side of the driver is enabled
# if true (1), the IP side of the driver is completely disabled
ip_disable = 1;
```

Figure 2.8 Example of ip_disable=1

```
# Configuration flag def_wwXn_binding where X is either n for node or p for port.
# Type: string; default: "$xxxxxxxxxxxxxxxx" (means WWXN is "static don't care")
# Sets the 16 digit hexadecimal default wwXn binding for every target/lun instance which
# does not explicitly define one.
# - A "$" preceding the string indicates static binding enabled
# - A "x" in place of a digit indicates "don't care" for that digit
# *See technote for details on wwn bindings
def_wwpn_binding = "xxxxxxxxxxxxxxxx";
def_wwnn_binding = "xxxxxxxxxxxxxxxx";
```

Figure 2.9 Example of def_wwn_binding, def_wwpn_binding and def_wwnn_binding

```

# Configuration flag def_port_binding
# Type: string; default: "xxxxxx" (means PORT is "non-static don't care")
# Sets the 6 digit hexadecimal default port binding for every target/lun instance which
# does not explicitly define one.
#   - A "$" preceding the string indicates static binding enabled
#   - A "x" in place of a digit indicates "don't care" for that digit
# *See technote for details on port bindings
def_port_binding = "$xxxxxx";

```

Figure 2.10 Example of def_port_binding

```

# Configuration flag fca_verbose
# Type: boolean; default: 1
# Determines how many messages are displayed directly to the console.
#   - A "0" will quiet the driver messages to the console, but still print them to the
#     system message log.
#     (NOTE: a "boot -v" will override this setting and make the driver verbose again)
#   - A "1" will make the driver print all messages to the console and to the system
#     message log.
fca_verbose = 1;

```

Figure 2.11 Example of fca_verbose=1

```

## fca-pci.conf - JNI FCA-PCI DRIVER (Solaris SCSI HBA) CONFIGURATION FILE

# Configuration variable scsi-initiator-id
# Type: integer, 0-125; default: none (must be explicitly set for PCI driver)
# Defines the adapters SCSI ID (and hence FC AL_PA) on the loop
scsi-initiator-id = 0x7d;

```

Figure 2.12 Example of /kernel/drv/fca-pci.conf

```

Sure you want to change it? (y/n) ...Enter `y'
Se ok set-scsi-id
SCSI Initiator ID set = 7D
t SCSI Initiator ID, 1 to 125(7d), enter 2 hex digits: xx ...Enter new ID
SCSI ID set to xx
ok

```

Figure 2.13 Example of SCSI ID Change

2.7.2 Sample Instructions for JNI™ Emerald™-based FC Adapters

You will edit the `jnic.conf` file to configure the JNI™ Emerald™-based FC adapters.

The following requirements apply when connecting the 9500V to a JNI™ Emerald™-based FC host bus adapter:

- The Solaris™ version must be version 8. **Note:** This functionality is currently supported for Solaris™ 8 only.
- The JNI™ adapter must be model FCE-6410 or FCE2-6410.
- The driver version must be 4.0.2 or later.

To configure a JNI™ Emerald™-based HBA by editing the `/kernel/drv/jnic.conf` file:

1. Log in as `root`.
2. Make a backup of `jnic.conf`: `cp /kernel/drv/jnic.conf /kernel/drv/jnic.conf.bak`
3. Make a backup of `sd.conf`: `cp /kernel/drv/sd.conf /kernel/drv/sd.conf.bak`
4. Edit the `jnic.conf` file: `vi /kernel/drv/jnic.conf`
5. Set the driver parameters: `Topology = Private Loop`, or `Topology = Fabric`;
`Failover Delay (sec) = 180`
`Reset on Timeout = Disabled`
6. Enter or edit the following settings (one line for each LUN mapped on each target/path) where:
Name=`sd` class=`scsi` target=`(x)` lun=`(y)`
Example:
`name=sd class=scsi target=1 lun=0`
`name=sd class=scsi target=1 lun=1`
`name=sd class=scsi target=1 lun=2`
`name=sd class=scsi target=1 lun=3`
`name="sd" class="scsi" target=2 lun=0`
`name="sd" class="scsi" target=2 lun=1`
`name="sd" class="scsi" target=2 lun=2`
`name="sd" class="scsi" target=2 lun=3`
7. Bind the necessary target LUNs.
8. Save your changes, and exit the text editor.

Note: For 4 LUNs (0 through 3) mapped on 2 separate paths on the 9500V.

2.7.3 Emulex LP8000S/LP9000S lpfs package: /kernel/drv/lpfs.conf

For configuring and FC-AL setup with direct connect or through a hub, do the following:

1. Edit the /kernel/drv/lpfs.conf file as follows:

```
topology=4
automap=1
```

All other settings should be left at their default settings specified in the lpfs.conf file.

2.7.4 Emulex LP8000/LP9000: lpfc package: /kernel/drv/lpfc.conf

For configuring and FC-AL setup with direct connect or through a hub, do the following:

1. Edit the /kernel/drv/lpfc.conf file as follows:

```
topology=4;
automap=1;
```

All other settings should be left at their default settings specified in the lpfc.conf file.

2.7.5 Emulex LP8000S/LP9000S: lpfs: /kernel/drv/lpfs.conf

For configuring and point-to-point setup connected through a switch, do the following:

1. Edit /kernel/drv/lpfs.conf file as follows:

```
topology=2
automap=0
```

2. Add the following settings:

```
fcplib-bind-WWPN="(wwpn):lpfs(Z)t(X)";
```

There should be one entry per path with a different target and wwpn.

Note: (X) is the target you desire on this path (one per path), (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in DAMP/Resource Manager, and Z is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) are the same targets entered in the /kernel/drv/sd.conf file in the previous steps.

Example: fcplib-bind-WWPN ="50002000AE001142:lpfc0t1";
fcplib-bind-WWPN ="50002000AE001144:lpfc1t2";

All other settings should be left at their default settings specified in the lpfs.conf file.

2.7.6 Emulex LP8000/LP9000: lpfc package: /kernel/drv/lpfc.conf

For configuring and point-to-point setup connected through a switch, do the following:

1. Edit /kernel/drv/lpfc.conf file as follows:

```
topology=2
automap=0
```

2. Add the following settings:

```
fcplib-bind-WWPN="(wwpn):lpfs(Z)t(X)";
```

There should be one entry per path with a different target and wwpn.

Note: (X) is the target you desire on this path (one per path), (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in DAMP/Resource Manager, and (Z) is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) are the same targets entered in the /kernel/drv/sd.conf file in the previous steps.

Example:

```
fcplib-bind-WWPN ="50002000AE001142:lpfc0t1";
fcplib-bind-WWPN ="50002000AE001144:lpfc1t2";
```

All other settings should be left at their default settings specified in the lpfs.conf file.

2.7.7 JNI FC-1063 (32bit sbus HBA): JNIfca package: /kernel/drv/fca.conf

For configuring an FC-AL setup with direct connect or through a hub, do the following

1. Edit the /kernel/drv/fca.conf file as follows:

```
fca_nport = 0
public_loop = 0
failover = 60
def_wwpn_binding = "xxxxxxxxxxxxxxxxxx"
def_wwnn_binding = "xxxxxxxxxxxxxxxxxx"
def_hba_binding = "fcaw*"
def_port_binding = "$xxxxxx"
```

All other settings should be left at their default settings specified in the fcaw.conf file.

For configuring a Point-to-Point setup connected through a switch

1. Edit /kernel/drv/fca.conf file as follows:

```
fca_nport = 1
public_loop = 0
failover = 60
def_wwpn_binding = "$xxxxxxxxxxxxxxxxxx"
def_wwnn_binding = "xxxxxxxxxxxxxxxxxx"
def_hba_binding = "Non-jni*"
def_port_binding = "xxxxxx"
```

2. Add the following settings:

```
target(X)_wwpn = "(wwpn)"
```

Note: There should be one entry per path with a different target and wwpn.

```
target(X)_lun(Y)_hba="fcaw(Z)"
```

Note: There should be one entry for each LUN on this path, designated by target (X) from step 1.

Note: X is the target you desire on this path (one per path), and (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in Resource Manager 9500V. Y is the Host LUN number as mapped in Resource Manager 9500V, and Z is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) and (Y) are the same targets and LUNs entered in the /kernel/drv/sd.conf file in the steps above.

Example:

```
target1_wwpn = "50002000AE001142"  
target1_lun0_hba = "fcaw0"  
target1_lun1_hba = "fcaw0"  
target1_lun2_hba = "fcaw0"  
target1_lun3_hba = "fcaw0"
```

```
target2_wwpn="50002000AE001144"  
target2_lun0_hba="fcaw1"  
target2_lun1_hba="fcaw1"  
target2_lun2_hba="fcaw1"  
target2_lun3_hba="fcaw1"
```

All other settings should be left at their default settings specified in the fcaw.conf file.

2.7.8 JNI FC64-1063: JNIfcaw package: /kernel/drv/fcaw.conf

For configuring FC-AL setup with Direct Connect or through a Hub

1. Edit /kernel/drv/fcaw.conf file as follows:

```
fca_nport = 0  
public_loop = 0  
failover = 60  
def_wwpn_binding = "xxxxxxxxxxxxxxxx"  
def_wwnn_binding = "xxxxxxxxxxxxxxxx"  
def_hba_binding = "fcaw*"  
def_port_binding = "$xxxxxx"
```

All other settings should be left at their default settings specified in the fcaw.conf file.

For configuring Point-to-Point setup connected through a switch do the following:

1. Edit /kernel/drv/fcaw.conf file as follows:

```
fca_nport=1
public_loop=0
failover=60
def_wwpn_binding="$xxxxxxxxxxxxxxxx"
def_wwnn_binding="xxxxxxxxxxxxxxxx"
def_hba_binding="Non-jni*"
def_port_binding="xxxxxx"
```

2. Add the following settings:

```
target(X)_wwpn="(wwpn)" # There should be one entry per path with a different target and
wwpn.
```

```
target(X)_lun(Y)_hba="fcaw(Z)" # There should be one entry for each LUN on this path,
designated by target (X) from step 1.
```

Note: (X) is the target you desire on this path (one per path), and (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in Resource Manager 9500V. (Y) is the Host LUN number as mapped in Resource Manager 9500V, and (Z) is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) and (Y) are the same targets and LUNs entered in the /kernel/drv/sd.conf file in the previous steps.

Example:

```
target1_wwpn="50002000AE001142"
```

```
target1_lun0_hba="fcaw0"
target1_lun1_hba="fcaw0"
target1_lun2_hba="fcaw0"
target1_lun3_hba="fcaw0"
```

```
target2_wwpn="50002000AE001144";
```

```
target2_lun0_hba="fcaw1"
target2_lun1_hba="fcaw1"
target2_lun2_hba="fcaw1"
target2_lun3_hba="fcaw1"
```

All other settings should be left at their default settings specified in the fcaw.conf file.

2.7.9 JNI FCI-1063: JNIfcaPCI package: /kernel/drv/fca-pci.conf

For configuring an FC-AL setup with direct connect or through a hub

1. Edit /kernel/drv/fca-pci.conf file as follows:

```
fca_nport = 0
public_loop = 0
failover = 60
def_wwpn_binding = "xxxxxxxxxxxxxxxx"
def_wwnn_binding = "xxxxxxxxxxxxxxxx"
def_hba_binding = "fca-pci*"
def_port_binding = "$xxxxx"
```

All other settings should be left at their default settings specified in the fcaw.conf file.

For configuring a point-to-point setup connected through a switch

1. Edit /kernel/drv/fca-pci.conf file as follows:

```
fca_nport = 1
public_loop = 0
failover = 60
def_wwpn_binding = "$xxxxxxxxxxxxxxxx"
def_wwnn_binding = "xxxxxxxxxxxxxxxx"
def_hba_binding = "Non-jni*"
def_port_binding = "xxxxx"
```

2. Add the following settings:

```
target(X)_wwpn="(wwpn)";
```

Note: There should be one entry per path with a different target and wwpn.

```
target(X)_lun(Y)_hba="fcaw(Z)";
```

Note: There should be one entry for each LUN on this path, designated by target (X) from step 1.

Note: (X) is the target you desire on this path (one per path), (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in Resource Manager 9500V. (Y) is the Host LUN number as mapped in Resource manager 9500V, and (Z) is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) and (Y) are the same targets and LUNs entered in the /kernel/drv/sd.conf file in the steps above.

Example:

```
target1_wwpn="50002000AE001142"  
  
target1_lun0_hba="fcaw0"  
target1_lun1_hba="fcaw0"  
target1_lun2_hba="fcaw0"  
target1_lun3_hba="fcaw0"
```

Example:

```
target2_wwpn="50002000AE001144"  
  
target2_lun0_hba="fcaw1"  
target2_lun1_hba="fcaw1"  
target2_lun2_hba="fcaw1"  
target2_lun3_hba="fcaw1"
```

All other settings should be left at their default settings specified in the fcaw.conf file.

2.7.10 JNI FCE-6410: JNIC package: /kernel/drv/jnic.conf

For configuring an FC-AL setup with direct connect or through a hub

1. Edit the /kernel/drv/jnic.conf file as follows:

```
FcLoopEnabled = 1  
FcFabricEnabled = 0  
FcPortCfgEnable = 1
```

Note: Since this is for private loop, you will need to set this first, than reboot (#reboot -- -r), and then set to 0.

```
failover=60
```

Note: For more than one HBA, set failover to 0.

```
def_wwpn_binding = "xxxxxxxxxxxxxxxxxx"  
def_wwnn_binding = "xxxxxxxxxxxxxxxxxx"  
def_hba_binding = "jnic*"  
def_port_binding = "$xxxxxx"
```

All other settings should be left at their default settings specified in the fcaw.conf file.

Configuring a point-to-point setup connected through a switch

1. Edit /kernel/drv/jnic.conf file as follows:

```
FcLoopEnabled = 0
FcFabricEnabled = 1
FcPortCfgEnable = 1
```

Note: This is for private loop, so you will need to set this first, and then reboot (#reboot -- -r), then set to 0.

```
Failover = 60
```

Note: This is for private loop, so you will need to set this first, then reboot (#reboot -- -r), then set to 0.

```
def_wwpn_binding = "$xxxxxxxxxxxxxxxx"
def_wwnn_binding = "xxxxxxxxxxxxxxxx"
def_hba_binding = "Non-jni*"
def_port_binding = "xxxxxx"
```

2. Add the following settings:

```
target(X)_wwpn="(wwpn)"
```

Note: There should be one entry per path with a different target and wwpn.

```
target(X)_lun(Y)_hba="jnic(Z)"
```

Note: There should be one entry for each LUN on this path, designated by target (X) from step 1.

Note: (X) is the target you desire on this path (one per path), (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in Resource Manager 9500V. (Y) is the Host LUN number as mapped in Resource Manager 9500V, and (Z) is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) and (Y) are the same targets and LUNs entered in the /kernel/drv/sd.conf file in the steps above.

Example:

```
target1_wwpn="50002000AE001142"  
target1_lun0_hba="jnic0"  
target1_lun1_hba=" jnic0"  
target1_lun2_hba=" jnic0"  
target1_lun3_hba=" jnic0"
```

Example:

```
target2_wwpn="50002000AE001144"  
target2_lun0_hba=" jnic1"  
target2_lun1_hba=" jnic1"  
target2_lun1_hba=" jnic1"  
  
target2_lun1_hba=" jnic1"  
target2_lun1_hba=" jnic1"  
target2_lun2_hba="jnic1"  
target2_lun3_hba="jnic1";
```

All other settings should be left at their default settings specified in the jnic.conf file.

2.7.11 Emulex LP8000S/LP9000S: lpfs package: /kernel/drv/lpfs.conf

Configuring and FC-AL setup with direct connect or through a hub

1. Edit /kernel/drv/lpfs.conf file as follows:

```
Topology = 4  
automap = 1
```

All other settings should be left at their default settings specified in the lpfs.conf file.

Configuring a Point-to-Point setup connected through a switch

1. Edit /kernel/drv/lpfs.conf file as follows:

```
topology = 2  
automap = 0
```

2. Add the following settings:

```
fcp-bind-WWPN="(wwpn):lpfs(Z)t(X)";
```

Note: There should be one entry per path with a different target and wwpn.

Note: (X) is the target you desire on this path (one per path), (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in Resource Manager 9500V, and (Z) is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) are the same targets entered in the /kernel/drv/sd.conf file in the steps above.

Example:

```
fcp-bind-WWPN = "50002000AE001142:lpfs0t1";  
fcp-bind-WWPN = "50002000AE001144:lpfs1t2";
```

All other settings should be left at their default settings specified in the lpfs.conf file.

2.7.12 Emulex LP8000/LP9000: lpfc package: /kernel/drv/lpfc.conf

Configuring an FC-AL setup with Direct Connect or through a Hub

1. Edit /kernel/drv/lpfc.conf file as follows:

```
Topology = 4  
automap = 1
```

All other settings should be left at their default settings specified in the lpfc.conf file.

Point-to-Point setup: connected through a switch

1. Edit /kernel/drv/lpfc.conf file as follows:

```
Topology = 2  
Automap = 0
```

2. Add the following settings:

```
fcp-bind-WWPN="(wwpn):lpfs(Z)t(X)";
```

Note: There should be one entry per path with a different target and wwpn.

Note: (X) is the target you desire on this path (one per path), (wwpn) is the World Wide Port Name as read from the System Parameter:Fibre Channel display in Resource Manager 9500V, and (Z) is the HBA instance number, incrementing by consecutive numbers, starting from 0 and continuing, one for each path/target.

Note: Where (X) are the same targets entered in the /kernel/drv/sd.conf file in the steps above.

Example:

```
fcp-bind-WWPN = "50002000AE001142:lpfc0t1"  
fcp-bind-WWPN = "50002000AE001144:lpfc1t2";
```

All other settings should be left at their default settings specified in the lpfs.conf file.

2.8 Q-Logic and Sun™ HBAs

For Q-Logic and Sun™ HBAs, accept all default settings. The exception is setting up `sd.conf` with the applicable number of LUNs.

2.9 Rebooting the Sun™ System

After setting the disk and device parameters, setting and recognizing the LUs, and configuring the HBAs, you are ready to reboot the Sun™ System.

To reboot the Sun™ System, go to the command prompt, and enter: **reboot -- -r**
The **-r** option tells the system to rebuild the devices. Using **reboot** by itself will not build the devices on the newly installed 9500V subsystem.

After rebooting, you are now ready to configure the new LUs as described in Chapter 3.

Chapter 3 Configuring the 9500V Devices

After 9500V installation and connection are complete, the devices on the 9500V subsystem are ready to be configured for use. Configuration of the 9500V devices is performed by the user and requires root access to the Sun™ system. The activities involved in device configuration are:

- Partitioning and labeling the new devices (see section 3.1), and
- Creating and mounting the file system (see section 3.2).

Troubleshooting: Chapter 4 provides troubleshooting information.

3.1 Partitioning and Labeling the New Devices

After completing all activities in Chapter 2, you can begin partitioning and labeling the new devices. All new devices must be partitioned and labeled using the Sun™ **format** utility (see **WARNING** below), except raw devices. Each SCSI disk device can have more than one partition. The disk partitioning and labeling procedure involves the following tasks: setting the partition(s), labeling the disk, and verifying the disk label.

Note: Do not use partition 2. Partition 2 is reserved for system use.

WARNING: Be extremely careful when using the Sun™ **format** utility. Do not use any **format** commands not described in this document. The Sun™ **format** utility is designed for Sun™ disks. Some **format** commands are not compatible with the 9500V and can overwrite the data on the disk. The 9500V will not respond to the **format** command, and will not report any defect data in response to the **defect** command.

To partition and label the LUs on the newly installed 9500V:

1. Enter **format** at the root prompt to start the **format** utility (see Figure 3.1).
 - a) Verify that all new devices are displayed. If not, exit the **format** utility (**quit** or **Ctrl-d**), and then make sure that the SCSI/fibre-to-LUN paths were defined for all devices and that all new devices were added to the driver configuration file. See Chapter 4 for troubleshooting information.
 - b) Write down the character-type device file names (for example, c1t2d0) for all of the new 9500V devices. You will need this information later to create the file systems.
2. When you are asked to specify the disk, enter the number (from the list) for the device to be partitioned and labeled.
3. When you are asked if you want to label the disk, enter **n** for “no”.
4. After the format menu is displayed, enter **type** to display the disk types. The disk type for the 9500V LUs is DF600F.
5. If the disk type for the selected device is already defined, enter the number for that disk type, and go to step (7). If the disk type for the selected device is not already defined, enter the number for **other** to define a new disk type.

6. Enter the disk type for the selected device. Make sure to enter the parameters exactly as shown in Figure 3.2 and as explained in Appendix B.
7. When you are asked if you want to label the disk, enter **n** for “no”.
8. After the format menu is displayed, enter **partition** to display the partition menu.
9. Enter the desired partition number, and then enter the partition parameters as shown in Figure 3.3.
Note: Do not use partition 2. Partition 2 is reserved for system use.
10. Enter **print** at the **partition>** prompt to display the current partition table.
11. Repeat steps (9) and (10) as needed to set the desired partitions for the selected device.
Note: This step does not apply to raw devices (for example, Oracle), because these devices can only have one partition of fixed size.
12. When you are finished setting the partitions for the selected device, enter **label** at the **partition>** prompt, and then enter **y** to label the device (see Figure 3.3).
Note: The Sun™ system displays the following warnings when a raw device is labeled. You can ignore these warnings.

```
Warning: error warning VTOC.  
Warning: no backup labels.  
Label failed.
```
13. Enter **quit** to exit the **partition** utility and return to the **format** utility.
14. At the **format>** prompt, enter **disk** to display the available disks. Make sure that the disk you just labeled is displayed with the proper disk type name and parameters.
15. Repeat steps (2) through (14) for each new device to be partitioned and labeled.
16. When you are finished partitioning and labeling the disks and verifying the disk labels, exit the **format** utility (**quit** or **Ctrl-d**).

```

# format                                     ← Start format utility.
Searching for disks...done

c1t2d0: configured with capacity of 2.29GB (DF500F-) ← These devices are not yet labeled.
c1t2d1: configured with capacity of 2.29GB (DF500F-) ←
c2t4d0: configured with capacity of 6.88GB (DF500F-) ←
c2t5d0: configured with capacity of 2.77GB (DF500F-) ←
c2t6d0: configured with capacity of 2.78GB (DF500F-) ←
c2t8d0: configured with capacity of 1.82GB (DF500F-) ←
c2t9d0: configured with capacity of 1.83GB (DF500F-) ←
  ⚡ These character-type device file names are used later to create the file systems.

AVAILABLE DISK SELECTIONS:

  0. c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>                                     ← Already labeled.
     /iommu@f,e0000000/sbus@f,e0001000/espdma@f,400000/esp@f,800000/sd@1,0
  1. c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>                                     ← Already labeled.
     /iommu@f,e0000000/sbus@f,e0001000/espdma@f,400000/esp@f,800000/sd@3,0
  2. c1t2d0 <HITACHI-DF500F-                                                         ←Not yet labeled:
     ⚡LUN ⚡Vendor ⚡Product
     /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@2,0                       DF500F-, TID=2, LUN=0
  3. c1t2d1 <HITACHI-DF500F-                                                         ← Not yet labeled:
     /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@2,1                       DF500F-, TID=2, LUN=1
  4. c1t4d0 <HITACHI-DF500F-                                                         ← Not yet labeled:
     /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@4,0                       DF500F-, TID=4, LUN=0

Specify disk (enter its number): 2                                                 ← Select device.
selecting c1t2d0
[disk formatted]
Disk not labeled. Label it now ? n                                               ← Enter "n" for no.
:
#

```

Figure 3.1 Verifying New Devices for Disk Partitioning

```

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
    volume    - set 8-character volume name
    quit

# format> type                                ← Enter type.
:
AVAILABLE DRIVE TYPES
    0. Auto configure
      :
    14. SUN2.1G
    15. DF500F                                  ← Do not select this disk type.
    16. other
Specify disk type (enter its number):16      ← Enter number for "other" to define.
Enter number of data cylinders:3336          ← Enter value from Table 3.1
Enter number of alternate cylinders[2]:2     ← Enter value from Table 3.1
Enter number of physical cylinders[3338]:
Enter number of heads:15                    ← Enter value from Table 3.2-3.6
Enter number of physical heads[defaults]:
Enter number of data sectors/track:96       ← Enter value from Table 3.2-3.6
Enter number of physical sectors/track[defaults]:
Enter rpm of drive [3600]:10000             ← Enter value from Table 3.1 (*Note)
Enter format time[defaults]:
Enter cylinder skew[defaults]:
Enter track skew[defaults]:
Enter track per zone[defaults]:
Enter alternate tracks[defaults]:
Enter alternate sectors[defaults]:
Enter cache control[defaults]:
Enter prefetch threshold[defaults]:
Enter minimum prefetch[defaults]:
Enter maximum prefetch[defaults]:
Enter disk type name(remember quotes):"HITACHI-DF500F,"
selecting clt2d0
[disk formatted]
No defined partition tables.
Disk not labeled. Label it now ? n           ← Enter "n" for no.
format>

```

Note: The 9500V reports the RPM of the physical disk drive in response to the type subcommand parameter.

Figure 3.2 Defining and Setting the Disk Type

```

format> disk

AVAILABLE DISK SELECTIONS
  0. c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>
    /iommu@f,e0000000/sbus@f,e0001000/espdma@f,400000/esp@f,800000/sd@1,0
  1. c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>
    /iommu@f,e0000000/sbus@f,e0001000/espdma@f,400000/esp@f,800000/sd@3,0
  2. c1t2d0 <HITACHI-DF500F-> ...already labeled
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@0,10000/sd@2,0
  3. c1t2d1 <HITACHI-DF500F-> ...not yet labeled
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@0,10000/sd@2,1
  4. c1t4d0 < HITACHI-DF500F-.....> ...not yet labeled
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@4,0
  5. c1t5d0 < HITACHI-DF500F-....> ...not yet labeled
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@5,0
  6. c1t6d0 < HITACHI-DF500F-....> ...not yet labeled
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@6,0
  7. c1t8d0 < HITACHI-DF500-F....> ...not yet labeled
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@8,0
  8. c1t9d0 < HITACHI-DF500-F ....> ...not yet labeled
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@9,0

Specify disk (enter its number): 3

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
  volume    - set 8-character volume name
  quit

format> type                                     ← Enter type.

AVAILABLE DRIVE TYPES
  0.Auto configure
  :
  13. SUN1.3G
  14. SUN2.1G
  15. HITACHI-DF500F-
  16. HITACHI-DF500F-
  17. other

Specify disk type (enter its number):16          ← Enter the number for
:                                                the desired drive type.
selecting c0t2d0
[disk formatted]
No defined partition tables.
Disk not labeled. Label it now ? n             ← Enter n for no.
format>

```

Figure 3.3 Setting the Partition(s) (continues on the next page)

```

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> partition                                ← Display partition menu.

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> 0                                       ← Select partition number.
Part      Tag      Flag      Cylinders      Size      Blocks
  0 unassigned  wm          0 -              0          (0/0/0)

Enter partition id tag [root]:                       ← Press enter for default.
Enter partition permission flags [wm]:               ← Press enter for default.
Enter new starting cyl [0]:                          ← Press enter for default.
Enter partition size [0b, 0c, 0.00mb]:3336c         ← Enter size (Table 3.1).
partition> print                                     ← Display partition table.
:                                                    (*See note.)
Current partition table (unnamed)
Part      Tag      Flag      Cylinders      Size      Blocks
  0      root     wm          0 -              0          (0/0/0)      0
  1      swap     wm          0 -              0          (0/0/0)      0
  2      backup   wu          0 - 3335       2.29 GB    (3336/0/0)   4803840
  3      unassigned wu          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          336 - 3335     204 GB    (2970/0/0)   4276800
  7      unassigned wm          0 -              0          (0/0/0)      0

```

Note: In Solaris™ version 2.6, make sure that partitions 1 and 6 are set to a partition size of 0.

Figure 3.3 Setting the Partition(s) (continued)

```

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> label                                     ← Label the disk.
Ready to label disk, continue? Y                    ← Enter Y for yes.
  * (see note at bottom)
partition> quit                                     ← Return to format.
format> disk                                        ← Display disks.

AVAILABLE DISK SELECTIONS
  0. c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>
    /iommu@f,e0000000/sbus@f,e0001000/esp@f,400000/esp@f,800000/sd@1,0
  1. c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>
    /iommu@f,e0000000/sbus@f,e0001000/esp@f,400000/esp@f,800000/sd@3,0
  2. c1t2d0 <HITACHI-DF500F- cyl 3336 alt 2 hd 15 sec 96> ← Verify disk label.
    ↵ Track size.
    ↵ Number of heads.
    ↵ Number of alternate cylinders.
    ↵ Number of data cylinders.
    ↵ Disk type name.
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@0,10000/sd@2,0
  3. c1t2d1 <HITACHI-DF500F- ..... > ← Not yet labeled.
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@0,10000/sd@2,1
  4. c1t4d0 <HITACHI-DF500F- ..... > ← Not yet labeled.
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@4,0
  5. c1t5d0 <HITACHI-DF500F- ..... > ← Not yet labeled.
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@5,0
  6. c1t6d0 <HITACHI-DF500F- ..... > ← Not yet labeled.
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@6,0
  7. c1t8d0 <HITACHI-DF500F- ..... > ← Not yet labeled.
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@8,0
  8. c1t9d0 <HITACHI-DF500F- ..... > ← Not yet labeled.
    /iommu@f,e0000000/sbus@f,e0001000/....,isp@1,10000/sd@9,0

Specify disk (enter its number): 3                  ← Enter number for next disk to label,
                                                    or press Ctrl-d to quit.

```

Note: The Sun™ Solaris™ system displays the following warnings when a raw device is labeled. You may ignore these warnings: **Warning: error warning VTOC. Warning: no backup labels. Label failed.**

Figure 3.4 Labeling the Disk and Verifying the Disk Label

3.2 Creating and Mounting the File Systems

After you have partitioned and labeled all new disks, you can create and mount the file systems for the SCSI disk devices. Creating and mounting the file systems for the new SCSI disk devices involves:

- Creating the file systems (see section 3.2.1),
- Creating and verifying the mount directories (see section 3.2.2),
- Mounting and verifying the file systems (see section 3.2.3),
- Setting the auto-mount parameters (optional) (see section 3.2.4).

Note: Do not create file systems or mount directories for the raw devices. Raw devices do not require any further configuration after being partitioned and labeled.

3.2.1 Creating the File Systems

To create the file systems for the newly installed SCSI disk devices:

1. Create the file system using the **newfs -C <maxcontig>** command (see Figure 3.5).
 - a) Use 6 or one of the following multiples of 6 as the **maxcontig** value for all 9500V SCSI disk devices: 12, 18, 24, or 30. If 6 is used, Solaris™ will access 48 kB as a unit (6×8 kB), which matches the track size of the 9500V devices. These **maxcontig** values (6, 12, 18, 24, 30) optimize the 9500V's I/O performance by keeping the I/O data range on one track. The **maxcontig** value that you choose depends on your applications, and you can always change the **maxcontig** parameter to a different value at any time.
 - b) Use the character-type device file as the argument (for example, **/dev/rdisk/c1t2d0s0**).
2. When the confirmation appears, verify that the device file name is correct. If so, enter **y** for yes. If not, enter **n** for no, and then repeat step (1) using the correct device file name.
3. Repeat steps (1) and (2) for each new SCSI disk device on the 9500V subsystem. Make sure to use the same **maxcontig** value for all 9500V devices.

```
# newfs -C 6 /dev/rdisk/c1t2d0s0          ← Create file system.
newfs:construct a new file system /dev/rdisk/c1t2d0s0: (y/n) y      ← Verify correct device.
/dev/rdisk/c1t2d0s0: 4803840 sectors in 3336 cylinders of 15 tracks, 96 sectors
      2345.6MB in 209 cyl groups (16 c/g, 11.25MB/g, 5440 i/g)
super-block backups (for fsck -F ufs -o b=#) at:
   32, 23168, 46304, 69440, 92576, 115712, 138848, 161984, 185120, 208256,
   :
4747616, 4770752, 4792352,
# newfs -C 6 /dev/rdisk/c1t2d1s0          ← Create file system on
                                          next disk using same
                                          maxcontig value.
```

Figure 3.5 Creating the File Systems

3.2.2 Creating and Verifying the Mount Directories

After you have created the file systems, you can create and verify the mount directories for the new SCSI disk devices. Each logical partition requires a unique mount directory, and the mount directory name should identify the logical volume and the partition.

To create the mount directories for the newly installed SCSI disk devices:

1. Go to the root directory (see Figure 3.6).
2. Create the mount directory using the **mkdir** command. Choose a name for the mount directory which identifies both the logical volume and the partition. For example, to create a mount directory named 9500_LU00, enter: **mkdir /9500_LU00**

Note: If you need to delete a mount directory, use **rmdir** (for example, **rmdir /9500_LU00**).

3. Verify the new mount directory using the **ls -x** command.
4. Repeat steps (2) and (3) for each logical partition on each new SCSI disk device.

```
# cd                                     ← Go to the root directory.
# pwd                                     ← Display current directory.
/
# mkdir /9500_LU00                       ← Create new mount directory.
# ls -x                                   ← Verify new mount directory.
9500_LU00 bin dev device etc export correctly
floppy home hstsboof kadb kernel lib
#
```

Figure 3.6 Creating and Verifying a Mount Directory

3.2.3 Mounting and Verifying the File Systems

After you have created the mount directories, you can mount and verify the file systems for the new SCSI disk devices. The file system for each logical partition should be mounted and verified to ensure that all new logical units are fully operational.

To mount and verify the file systems for the newly installed 9500V devices (see Figure 3.7).

1. Mount the file system using the **mount** command. Make sure to use the correct block-type device file name and mount directory for the device/partition. For example, to mount the file `/dev/dsk/c1t2d0s0` with the mount directory `/9500_LU00` enter:
mount /dev/dsk/c1t2d0s0 /9500_LU00

If you need to unmount a file system, use **umount** command (for example., **umount /9500_LU00**).

Note: If you have already set the auto-mount parameters (see section 3.2.4), you do not need to specify the block-type device file, only the mount directory.

2. Repeat step (1) for each partition of each newly installed SCSI disk device.
3. Display the mounted devices using the **df -k** command, and verify that all new SCSI disk devices are displayed correctly.
4. As a final verification, perform some basic UNIX[®] operations (for example, file creation, copying, and deletion) on each LU to make sure that the new file systems are fully operational.

```

# mount /dev/dsk/c1t2d0s0 /9500_LU00                               ← Mount file system.
      ↖ Block-type device file name
# mount /dev/dsk/c1t2d1s0 /9500_LU01                             ← Mount next file system.
      ↖ Mount directory name
# mount /dev/dsk/c1t2d2s0 /9500_LU02                             ← Mount next file system.
:
:
#
# df -k                                                           ← Display file systems.
File system      Kbytes    used    avail  capacity  Mounted on
/dev/dsk/c0t3d0s0  28775    27706     0     100%     /
/dev/dsk/c0t3d0s6 269191   234897   7384    97%     /usr
/proc              0         0         0         0%     /proc
fd                 0         0         0         0%     /dev/fd
/dev/dsk/c0t3d0s4s 57567    29515   22302    57%     /var
swap              142204    20     142184    0%     /tmp
/dev/dsk/c0t3d0s7 462119   206000  209909    50%     /export/home
/dev/dsk/c0t3d0s5  47975    42059    1126    97%     /opt
/dev/dsk/c1t2d0s0 2256436     9   2030787    0%     /9500_LU00 ← Verify file systems.
/dev/dsk/c1t2d1s0 2256436     9   2030787    0%     /9500_LU01
/dev/dsk/c1t2d2s0 6774358     9   6548709    0%     /9500_LU02
:
# mount /dev/dsk/c1t2d0s0 /9500_LU00                             ← Mount file system.
# cd /9500_LU00                                                  ← Go to mount directory.
# cp /bin/vi /9500_LU00/vi.back1                                 ← Copy a file.
# ls -l                                                         ← Verify the file copy.
drwxr-xr-t  2 root    root      8192 Mar 15 11:35  lost+found
-rwxr-xr-x  1 root    sys      2617344 Mar 15 11:41  vi.back1
# cp vi.back1 vi.back2                                         ← Copy file again.
# ls -l                                                         ← Verify file copy again.
drwxr-xr-t  2 root    root      8192 Mar 15 11:35  lost+found
-rwxr-xr-x  1 root    sys      2617344 Mar 15 11:41  vi.back1
-rwxr-xr-t  1 root    sys      2617344 Mar 15 11:52  vi.back2
# rm vi.back1                                                  ← Remove test files.
# rm vi.back2                                                  ←

```

Figure 3.7 Mounting and Verifying the File System

3.2.4 Setting and Verifying the Auto-Mount Parameters

You can add any or all of the new SCSI disk devices to the `/etc/vfstab` file to specify the auto-mount parameters for each device. Once a device is added to this file, you can mount the device without having to specify its block-type device file name (for example, mount `/9500_LU00`), since the `/etc/vfstab` file associates the device with its mount directory.

To set the auto-mount parameters for the desired devices (see Figure 3.8).

1. Make a backup copy of the `/etc/vfstab` file: `cp /etc/vfstab /etc/vfstab.bak`
2. Edit the `/etc/vfstab` file to add one line for each device to be auto-mounted. Table 3.1 shows the auto-mount parameters. If you make a mistake while editing, exit the `vi` editor without saving the file, and then begin editing again.
3. Reboot the Sun™ system after you are finished editing the `/etc/vfstab` file.
4. Display the mounted devices using the `df -k` command, and verify that the desired devices were auto-mounted.

| #to mount | device to fsck | mount point | FS type | fsck pass | mount at boot | mount options |
|--------------------------------|----------------------------------|-------------------------|---------------------|----------------|------------------|-------------------------------|
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ ← Table 3.1. |
| <code>/proc</code> | <code>-</code> | <code>/proc</code> | <code>procfs</code> | <code>-</code> | <code>no</code> | <code>-</code> |
| <code>fd</code> | <code>-</code> | <code>/dev/fd</code> | <code>fd</code> | <code>-</code> | <code>no</code> | <code>-</code> |
| <code>swap</code> | <code>-</code> | <code>/tmp</code> | <code>tmpfs</code> | <code>-</code> | <code>yes</code> | <code>-</code> |
| <code>/dev/dsk/c0t3d0s0</code> | <code>/dev/rdisk/c0t3d0s0</code> | <code>/</code> | <code>ufs</code> | <code>1</code> | <code>no</code> | <code>-</code> |
| <code>/dev/dsk/c0t3d0s6</code> | <code>/dev/rdisk/c0t3d0s6</code> | <code>/usr</code> | <code>ufs</code> | <code>2</code> | <code>no</code> | <code>-</code> |
| <code>/dev/dsk/c0t3d0s7</code> | <code>/dev/rdisk/c0t3d0s7</code> | <code>/export</code> | <code>ufs</code> | <code>3</code> | <code>yes</code> | <code>-</code> |
| <code>/dev/dsk/c0t3d0s5</code> | <code>/dev/rdisk/c0t3d0s5</code> | <code>/opt</code> | <code>ufs</code> | <code>4</code> | <code>yes</code> | <code>-</code> |
| <code>/dev/dsk/c0t3d0s1</code> | <code>-</code> | <code>-</code> | <code>swapfs</code> | <code>-</code> | <code>no</code> | <code>-</code> |
| <code>/dev/dsk/c1t2d0s0</code> | <code>/dev/rdisk/c1t2d0s0</code> | <code>/9500_LU00</code> | <code>ufs</code> | <code>5</code> | <code>yes</code> | <code>-</code> ← Add one line |
| <code>/dev/dsk/c1t2d1s0</code> | <code>/dev/rdisk/c1t2d1s0</code> | <code>/9500_LU01</code> | <code>ufs</code> | <code>5</code> | <code>yes</code> | <code>-</code> for each LUN. |

Figure 3.8 Setting the Auto-Mount Parameters

Table 3.1 Auto-Mount Parameters

| Parameter # | Name | Enter: |
|-------------|-----------------|---|
| ① | Device to mount | Block-type device file name |
| ② | Device to fsck | Character-type device file name |
| ③ | Mount point | Mount directory name |
| ④ | FS type | File system type (for example, ufs) |
| ⑤ | Fsck pass | Order for performing file system checks |
| ⑥ | Mount at boot | Yes = auto-mounted at boot/mountall No = not auto-mounted at boot/mountall |
| ⑦ | Mount options | Desired mount options: - no options (typical) -ro read-only access |

Chapter 4 Troubleshooting

4.1 Troubleshooting

The 9500V disk array subsystems provide continuous data availability.

Table 4.1 lists potential error conditions during 9500V Sun™ Solaris™ configuration and provides instructions for resolving each condition. If you are unable to resolve an error condition, please contact your Hitachi Data Systems representative or VAR for help, or call the Hitachi Data Systems Support Center for assistance.

Table 4.1 Troubleshooting

| Error Condition | Recommended Action |
|--|---|
| The logical devices are not recognized by the system. | Make sure that the READY indicator lights on the 9500V subsystem are ON. Make sure that the fibre cables are correctly installed and firmly connected. Recheck the fibre buses for new devices (using diag command, see section 2.6). Verify the contents of /kernel/drv/sd.conf file. |
| File system cannot be created (newfs command) | Check that character-type device file is specified for newfs command. Verify that logical unit is correctly labeled by UNIX® format command. |
| The file system is not mounted after rebooting. | Make sure that the system was restarted properly. Make sure that the file system attributes are correct. Verify that /etc/vfstab is correctly edited. |
| The 9500V red alarm light is on. | Please contact the Hitachi Data Systems Support Center. |
| System hangs, or devices are declared and then system hangs. | Make sure that the target IDs are set 0 through 6 and 8 through 15, and target ID 7 has been reserved for the SCSI controller card. |
| File system/superblock error | Run fsck . |
| Wrong magic number. | Label the disk using the format utility. |

4.2 Calling the Hitachi Data Systems Support Center

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible, including the circumstances surrounding the error or failure and the exact content of any error messages displayed on the host system (s).

Run the `getconfig` script and send its resulting output file to Hitachi Data Systems when placing a support request call. Instructions are provided in Appendix E.

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
San Diego, California, USA
1-800-348-4357
1-619-537-3000
- Hitachi Data Systems Europe
Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
North Ryde, Australia
011-61-2-9325-3300

Appendix A Acronyms and Abbreviations

| | |
|-------|-----------------------------------|
| AL-PA | arbitrated loop-physical address |
| DMP | Dynamic Multi Pathing |
| FC | fibre-channel |
| FC-AL | fibre-channel arbitrated loop |
| FCP | fibre-channel protocol |
| Gb | gigabit |
| GB | gigabyte |
| HBA | host bus adapter |
| I/O | input/output |
| LU | logical unit |
| LUN | logical unit number, logical unit |
| PC | personal computer system |
| PCI | peripheral component interconnect |
| SCSI | small computer system interface |
| TID | target ID |
| TOV | time-out value |
| WWN | worldwide name |
| VAR | value added reseller |
| VxVM | VERITAS® Volume Manager |

Appendix B 9500V Disk Type Configuration

This appendix provides instructions for determining the parameter values used when formatting a device on a Sun™ host (data cylinders, heads, sectors per track). The Solaris™ OS has a maximum value of **32767** for the number of data cylinders in a device.

Use the following formula to calculate the number of data cylinders for a device:

$$\text{data_cylinders} = [\text{lun_capacity} / (\text{heads} \times \text{sectors_per_track})] - 2$$

where,

lun_capacity = capacity that you entered when you set the LU
heads = (16, 32, 48, 64) depending on lun_capacity. (See Table B.1).
sectors_per_track = 96

Table B.1 Determining the Number of Heads

| Case # | If the LUN size is (in blocks): | Use a 'Heads' value of: |
|--------|--|-------------------------|
| 1 | $LU \leq 50,330,112$ | 16 |
| 2 | $50,330,113 \leq LU \leq 100,660,224$ | 32 |
| 3 | $100,660,225 \leq LU \leq 150,990,336$ | 48 |
| 4 | $150,990,337 \leq LU \leq 201,320,448$ | 64 |

Example 1:

A device with lun_capacity = 68,068,452 is in the "Case #2" category:

$$\begin{aligned} \text{data_cylinders} &= [\text{LUN capacity} / (\text{heads} * \text{sectors_per_track})] - 2 \\ 22155 &= [68,068,452 / (32 \times 96)] - 2 \end{aligned}$$

Note: Use the integer value without the remainder. Do not round up to the next integer.

Example 2:

A device with lun_capacity = 34,034,226 is in the "Case 1" category:

$$\begin{aligned} \text{data_cylinders} &= [\text{lun_capacity} / (\text{heads} * \text{sectors_per_track})] - 2 \\ 22155 &= [34,034,226 / (16 \times 96)] - 2 \end{aligned}$$

Appendix C Online Device Installation

This appendix provides instructions for online installation of new devices. After initial installation and configuration of the 9500V subsystem, additional devices can be installed or de-installed online without having to restart the Solaris™ system. After online installation, the device parameters for new volumes must be changed to match the LUs defined under the same fibre-channel port (see section 3.1). This procedure should be performed by the system administrator (i.e., super-user).

When the TOV for 9500V volumes needs to be changed, you must edit the `/etc/system` file and reboot to make the file change effective. Please use the normal disruptive installation procedure for this case. Solaris™ must be booted once by the `boot -r` command with the TIDs and LUNs for new volumes defined in `/kernel/drv/sd.conf` file for non-disruptive volume installation. It is one way to prepare future online volume installation that whole TIDs and LUNs, i.e. TID=0~15 and LUN=0~7 are defined in the Solaris™ `kernel/drv/sd.conf` file and the system is once booted with `boot -r` command. In case of fibre channel, you should define LUN=0~119 in `/kernel/drv/sd.conf` file for the path (TID) which you will install additional LUNs.

Note: Online installation is not available with the Sun™ X6729A FC adapter and JNI™ Emerald™-based FC host bus adapter.

1. The Solaris™ system must be booted once by `boot -r` command with the TIDs and LUNs for new volumes defined in `/kernel/drv/sd.conf` file for non-disruptive volume installation. If not, the Solaris™ system must be rebooted to recognize new volumes.
2. Check existing SCSI TIDs.
3. 9500V setup:
 - a) Ensure the latest microcode is loaded. Non-disruptive version up requires alternate path.
 - b) Install CHF and LUN, and connect fibre cable if necessary.
 - c) Execute online LU installation from the Resource Manager software, or Remote Console PC.
 - d) Verify 9500V SCSI path configuration.
4. Execute the following commands (as super-user) to recognize the new devices.

```
# /usr/sbin/drvconfig
# /usr/sbin/devlinks
# /usr/sbin/disks
# /usr/ucb/ucblinks
```
5. After online installation, the device parameters (for example, TOV, queue depth) for the new volumes must be changed to match the LUs defined under the same fibre-channel port.
6. Configure the new devices (partition, label, file system, auto-mount) as described in Chapter 3.

Appendix D Configuring the Boot Disk on the 9500V

D.1 Introduction

The 9500V can be set up as the boot disk instead of the built-in SCSI disk, if the following conditions are satisfied:

- HBA (host bus adapter) must be a JNI™ 64-bit S-Bus FC adapter.
- FCODE (firmware) version of HBA must be 13.3.5 for Solaris™ 2.6/7 and 13.3.7 for Solaris™ 8.
- FCA driver version must be 2.2.1.HIT.06.01 for Solaris™ 2.6/7 and 2.5.8.HIT.07 for Solaris™ 8.
- Fibre-channel topology must be FC-AL. The EPL mode of FC switching hub is not available. Connecting to fabric switch is not available.
- Open Boot version must be 3.1 or later.

Install the JNI™ adapter card and the 9500V array on a Sun™ server/ workstation running the desired OS. Install the JNI™ software, and verify that the OS sees the fibre channel drives. Identify the controller and target for the installation of the Solaris™ OS. The target ID must be in the range 0-9.

Note: The Solaris™ system sometimes changes the adapter and controller instance number during a boot -r. If the target for the root file system is set to c2t0d0s0 in `/etc/vfstab`, but the reconfiguration boot changes the controller number to c3, the boot will fail. Before installing Solaris™ on the fibre-channel driver, start with a clean system. Make sure the adapter is the first instance (fca0 or fcaw0). This may require a `boot -ar` to initialize the `/etc/path_to_inst` file.

Note the worldwide name (wwn) of the target. The wwn is printed by the driver during the attach phase. It can be seen in the console window, or by viewing the `/var/adm/messages` file. You may use the target to world wide name binding feature for the driver to set the wwn in the `/kernel/drv/sd.conf` file. This is strongly recommended if the topology includes a switch or hub where configuration is subject to change. See the technotes accompanying the Solaris™ device driver for details.

Note: When the subsystem is set up as boot disk for the Solaris™ system, it is necessary to stop I/O operation for hosts connected to the subsystem. It is recommended that Solaris™ boot be performed during low host load periods.

D.2 Partition Check

To configure the 9500V as the Solaris™ boot disk, use the **format** command to verify that the target will accommodate the Sun™ OS partitions. Verify that the sizes of the partitions on the target chosen for the Solaris™ installation are large enough to copy the current OS partitions. Use the **format** command to examine the partitions of the system drives where the current OS resides (see Figure D.1).

```
# format
  (choose disk 0)
format> partition
partition> print
  (sample output:)
  Current partition table (original):
  Total disk cylinders available: 2733 + 2 (reserved cylinders)

  Part      Tag      Flag      Cylinders      Size      Blocks
  0         root      wm         0 - 133        99.45MB   (134/0/0) 203680
  1         swap      wu        134 - 241      80.16MB   (108/0/0) 164160
  2         backup    wm         0 - 2732      1.98GB    (2733/0/0) 4154160
  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        242 - 761     385.94MB   (520/0/0) 790400
  7         home      wm        762 - 2732    1.43GB    (1971/0/0) 2995920

quit partition, and choose the fibre channel disk on which you wish to install the OS.

partition> quit
format> disk
  AVAILABLE SELECTIONS ---
  specify disk:
  (Enter number of disk)
  1 (example)
format> partition
partition> print

  Repartition the drive (if necessary).
partition> modify

  (exit format)
```

Figure D.1 OS System Drive Partitions

D.3 File System Creation

Creating file systems on the required partitions. In this example the OS is being copied to target 3 of the fibre channel drives on controller 1. To use a different target, change t3 to t(target id). To use a different controller, change c1 to c(controller number). Both the root partition (slice 0) and the /usr partition (slice 6) must be created. Other partitions (/export/home, /var, /opt) should also be created to mirror the current layout. Use the **newfs** command to create the filesystems (see Figure D.2).

```
# newfs /dev/rdisk/c1t3d0s0
# newfs /dev/rdisk/c1t3d0s6
# newfs /dev/rdisk/c1t3d0s7
```

Figure D.2 Creating a New File System

D.4 Boot Block Installation

Install a bootblk on the root partition of the fibre channel drive. Use the **uname -a** command to determine the architecture of the workstation. This will determine the directory in /usr/platform where the bootblk will be found. The example below (see Figure D.3) gives sun4u as the architecture and subdirectory for /usr/platform. Then install a bootblk on the fibre channel target with the **installboot** command (see Figure D.4).

```
# uname -a
(RESPONSE:)
SunOS patriot 5.6 Generic sun4u Sparc SUNW,Ultra -1
```

Figure D.3 Installing a Boot Block

```
# /usr/sbin/installboot /usr/platform/sun4u/lib/fs/ufs/bootblk /dev/rdisk/c1t3d0s0
```

Figure D.4 Installing a Boot Block

D.5 Required Files Directories Copy

Use the `ufsdump` and `ufsrestore` command to copy the required files and directories from the current system to the fibre channel target. First mount the root directory of the fibre channel target. The example below (see Figure D.5) will create the required directory structure on the new target and copy the files. In this example the current OS is located on `/dev/dsk/c0t0d0`.

Note: There must be a space before and after '0f', '-' and 'rf'.

```
# mount /dev/dsk/c1t3d0s0 /mnt
# ufsdump 0f - /dev/dsk/c0t0d0s0 | ( cd /mnt; ufsrestore rf -)
```

Figure D.5 Creating the Directory Structure for Root Directory

When the command completes, the target (c1t3d0s0) will have the complete image of the root partition. In the `/mnt/etc` directory, update the `vfstab` file to indicate the fibre channel target to be mounted during boot. Modify all partitions which will be located on the fibre channel target.

```
# cd /mnt/etc
# vi vfstab

Before Modification:
#device      device      mount      FS  fsck  mount  mount
#to mount    to fsck     point      type pass  at boot  options
#
/dev/dsk/c0t0d0s1 -          -          -      swap -    no    -
/dev/dsk/c0t0d0s0 /dev/rdisk/c0t0d0s0 /          ufs  1    no    -
/dev/dsk/c0t0d0s6 /dev/rdisk/c0t0d0s6 /usr      ufs  1    no    -
swap         -          -          /tmp   tmpfs -    yes   -

After Modification:
#device      device      mount      FS  fsck  mount  mount
#to mount    to fsck     point      type pass  at boot  options
#
/dev/dsk/c1t3d0s1 -          -          -      swap -    no    -
/dev/dsk/c1t3d0s0 /dev/rdisk/c1t3d0s0 /          ufs  1    no    -
/dev/dsk/c1t3d0s6 /dev/rdisk/c1t3d0s6 /usr      ufs  1    no    -
swap         -          -          /tmp   tmpfs -    yes   -
```

Figure D.6 Updating the vfstab File

Unmount the root partition, and repeat the procedure for the `/usr` partition in the current root directory (see Figure D.7). **Note:** There must be a space before and after '0f', '-' and 'rf'. Repeat the procedure for any other partitions to be mounted from the fibre channel target.

```
# umount /mnt

# mount /dev/dsk/c1t3d0s6 /mnt
# ufsdump 0f - /dev/dsk/c0t0d0s6 | ( cd /mnt; ufsrestore rf -)
# umount /mnt
```

Figure D.7 Creating the Directory Structure for /usr Partition

D.6 OpenBoot Modification

Halt the system to get to the OpenBoot environment. Create an OpenBoot alias to boot from the fibre-channel drive. Issue the **printenv** command to see the default boot device in the environment variables:

```
# halt          # halt the system #
ok             # now in the OpenBoot environment #
Ok printenv
(RESPONSE:)
(You can see the following line.)
      boot-device  disk      disk
```

Issue the **devalias** command to see the device associated with the alias for the default boot device:

```
Ok devalias          # get a list of aliases #
(RESPONSE:)
      disk  /sbus/SUNW,fas@e,8800000/sd@0,0
```

Issue the **show-devs** command to see the device name for the fibre channel drive:

```
Ok show-devs        # get a list of devices #
(RESPONSE:)
      /sbus@1f,0/SUNW,fas@e,8800000/sd
      /sbus@1f,0/fca@1,0/sd
```

Create a similar alias for the fibre channel drive with the **nvalias** command:

```
Ok nvalias  fcdisk  /sbus@1f,0/fca@1/sd@3,0
```

Save the alias with the **nvstore** command. Power cycle the workstation so that the alias is saved.

```
Ok nvstore          # save changes to nvram #
```

Now boot from the fibre channel drive using the alias:

```
Ok boot fcdisk -r          # boot from fibrechannel #
(RESPONSE:)
      The normal boot process begins.
```

If you want to set the fibre channel drive as the permanent boot drive, type the following command to check the default value:

```
Ok printenv
(RESPONSE:)
(You can see the following line.)
      boot-device    disk      disk
```

After checking the default value, type the following command to change the boot-device from the default SCSI drive to the fibre channel drive:

```
Ok setenv boot-device fcadisk
```

Appendix E Running the getconfig Script

For troubleshooting purposes, you may need to run the getconfig script and send the results to Hitachi Data Systems Technical Support.

To do this, complete the following steps:

1. Load a CD in the cdrom drive of your Solaris host.
2. Copy the getconfig104.tar.Z file to /tmp
3. type command: # uncompress /tmp/getconfig104.tar.Z
4. type command: # tar xvf /tmp/getconfig104.tar
5. Follow directions in the README file.

