Sun StorEdge™ PCI/PCI-X Dual Ultra320 SCSI Host Adapter Installation Guide

Sun Microsystems, Inc.
www.sun.com

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Contents

Preface

This *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Installation Guide* is intended for experienced system administrators.

Before You Read This Book

Before you install and use the Sun StorEdge™ PCI/PCI-X Dual Ultra320 SCSI host adapter as described in this manual, you must read and understand the documents listed in the following table.

Topic	Title	Part Number
Release Notes	*Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes*	817-5828-10 The release notes list supported cables, platforms, and storage devices along with other essential information. See "To Access the Release Notes" on page viii.
Diagnostics	*SunVTS 5.x User Guide* *SunVTS 5.x Reference Manual*	Varies according to the SunVTS software version being used. A different version of the SunVTS software is released with each release of the Solaris operating system

How This Book Is Organized

- Chapter 1 describes the Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter and explains how to install it on your system, connect it to a storage device, and test it. It also includes instructions on booting from a hard disk connected to the host adapter.
- Appendix A provides general information and configuration rules about the host adapter.
- Appendix B contains the specifications for the low-voltage differential (LVD) host adapter.
- Appendix C contains the Declaration of Conformity, regulatory, and essential safety information.

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`

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
Installation	*Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes*	817-5828-10
	Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Guide to Documentation	817-6237-10

Accessing Sun Documentation

You can view, print, or purchase a broad selection of Sun documentation, including localized versions, at:

`http://www.sun.com/documentation`

To access Solaris OS usage documents listed under "Using UNIX Commands" on page vi and the SunVTS™ software documents listed in "Before You Read This Book" on page v, go to `docs.sun.com`. To access the *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes* at Sun's Network Storage documentation web site, follow the steps on the next page.

▼ To Access the Release Notes

1. **Access the release notes at Sun's web site by using one of the following methods.**
   - Go to `www.sun.com` and follow these links:

   a. Click `Products & Services`**.**

   b. Under `Browse Products`**, click** `Storage`**.**

   c. In the right frame, under `Use`**, click** `Documentation`**.**

   d. Under `Hardware/Storage`**, click** `StorEdge`**.**
   - Alternately, you can go directly to this address:

   `http://docs.sun.com/db/prod/storedge#hic`
2. **From the product list, click** `Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter`**.**
3. **In the documentation list, click the row listing the** *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes.*

Note – Viewing and printing documents in Adobe® Portable Document Format (PDF) requires Adobe Acrobat Reader, which is downloadable for free from: `www.adobe.com/products/acrobat/readstep.html`.

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Please include the title and part number of your document with your feedback:

Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Installation Guide, part number 817-5827-10

CHAPTER 1

Installing, Connecting, and Testing the Host Adapter

This chapter describes the Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter and explains how to install it into a host, connect it to SCSI storage devices, test the installation, and boot from a disk drive connected to the host adapter.

Note – If you are unfamiliar with Ultra320 SCSI configuration guidelines, read "Ultra320 SCSI Configuration" on page 11 before performing the procedures in this chapter.

This chapter discusses the following topics:

Features

The Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter is a dual-channel Ultra320 SCSI to PCI/PCI-X host adapter that provides two Ultra320 SCSI channels.

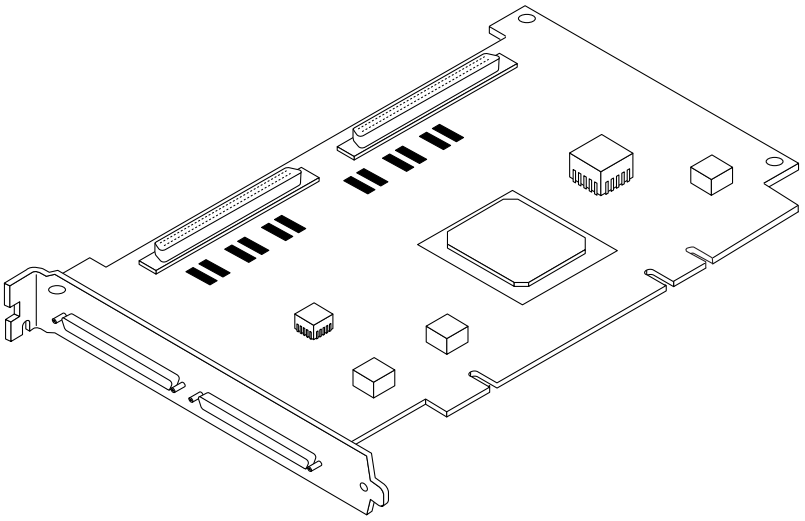

FIGURE 1-1 Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter

The host adapter includes the following features:

- Two independent Ultra320 SCSI channels with support for SCSI speeds of up to 320 Mbyte/sec with 16-bit data transfer
- Four SCSI connectors:
  - Two external 68-pin very high density cable interconnect (VHDCI) right-angle connectors
  - Two internal 68-pin high density right-angle connectors. .
- LVD SCSI support for disk arrays, tape libraries, and tape drives:
  - Two 16-bit LVD interfaces with support for up to 15 targets on each SCSI bus
  - Active LVD termination
- 32K bytes of NVSRAM (reserved feature)
- Backward-compatible with SCSI-2 and SCSI-3 (Ultra1, Ultra2, and Ultra3) devices. For Sun StorEdge systems qualified and supported with this host adapter, see *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes*, 817-5828-*xx*.

- 512K bytes of Flash ROM for booting in a Sun SPARC or a Sun Solaris x86 OS processor-based host system
- A 64-bit universal type board edge connector that provides:
  - 64-bit, 133-MHz PCI-X interface compatibility
  - 32-bit/64-bit PCI interface backwards compatibility

Installing the Host Adapter

Before you start, read these instructions, and also read the installation instructions in the documentation that applies to the storage device(s) to be connected to the host adapter. Also, before installing the host adapter, read the *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes* for required information, including lists of supported cables and storage devices. Downloading the release notes is described in "To Access the Release Notes" on page viii

Caution – This host adapter is only for connection to a single-ended (SE) or low-voltage differential (LVD) device, and it does not work if connected to a high-voltage differential (HVD) device.

▼ To Prepare for Hardware Installation

1. **Read and observe the safety information at the back of this book.**

   See"Safety Agency Compliance Statements" on page 25.

2. **Install the Solaris 8 2/04 (minimum required version) operating system on the host.**

3. **Install the Solaris 8 2/04 (minimum required version) recommended patch cluster on the host.**

   See the *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes* for how to download and install the Solaris OS recommended patch cluster.

4. **Install any required driver patches on the host.**

   See the release notes to find the applicable patches for the version of the Solaris OS that is installed on the host. Also see the release notes for how to download the driver and any required patches. If needed, see "To Access the Release Notes" on page viii.

Caution – If the driver and any required patches described in the release notes are not installed, you cannot use the host adapter.

5. **Install the SunVTS software on the host.**

   The SunVTS software is shipped on the Supplemental Software CD-ROM along with the Solaris operating system CD-ROM. Read the user's guide listed in "Before You Read This Book" on page v for how to install the SunVTS software.

6. **Exit the operating environment.**

Note – If your system supports the PCI hot-plug capability, refer to the service documentation that came with your system. Then continue with Step 8 below.

To inform any mounted users that the system will be going down, use the `shutdown` command. Otherwise, use the `init 0` command. See the Man Pages for these commans or the Solaris AnswerBook documentation.

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

7. **Power off the system. Refer to the service documentation that came with your system.**

Caution – Do not disconnect the power cord from the system or from the wall outlet. This connection provides the ground path necessary to safely remove and install the printed circuit boards and components without damaging them.

8. **Choose a PCI-X (or PCI) slot for installing the host adapter.**

   To maximize performance, use the host system's 64-bit, 66/133-MHz PCI/PCI-X slot slot for installing the host adapter.

Note – You can insert the host adapter into a 32-bit PCI slot if no 64-bit PCI-X slots are available. However, if you do this, the data transmission rate is limited to standard PCI speed.

9. **Unpack the host adapter.**

   You should have the following items:

   - Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter (Figure 1-1)
   - Antistatic wrist strap

Note – Leave the host adapter in the protective bag until you are ready to install it.

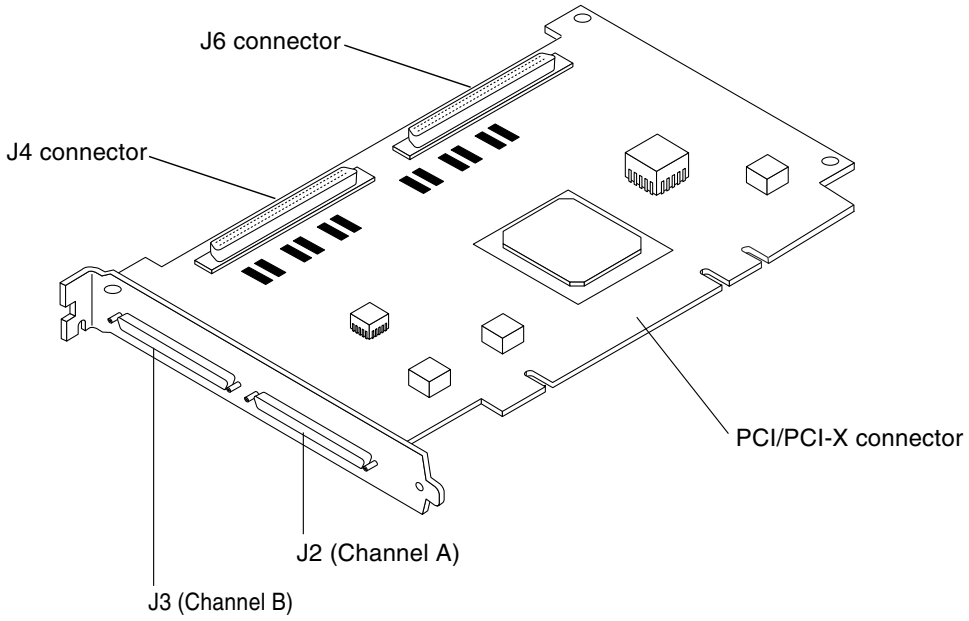

FIGURE 1-2 Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter VHDCI Connectors

The host adapter is shown in Figure 1-2. The Very High Density Cable Interconnect (VHDCI) connectors are for the VHDCI cables that are used to connect the host adapter to the storage device.

The next section provides instructions on how to install the host adapter in your system.

▼ To Install the Host Adapter

1. **Open the system.**

   Refer to your system documentation for information about how to open the system.

2. **Attach the wrist strap between your wrist and a metal part of the system chassis.**

3. **For systems with a standby-type power switch, disconnect the power cord.**

   Standby-type power switches have a ⏻ icon.

   The wrist strap between you and the chassis provides the ground path necessary to safely remove and install the printed circuit boards and components without damaging them.

4. **Remove the filler panel for the desired slot.**

   Refer to the system documentation for information about removing filler panels.

5. **Remove the host adapter from its protective bag.**

6. **Install the host adapter in the selected PCI/PCI-X slot in your system.**

   See Step 8 of the section "To Prepare for Hardware Installation" on page 3 for how to choose a slot. Also, refer to the system's hardware documentation for information about mounting details (mounting holes, standoff locking/unlocking, and screws to secure the card).

Caution – Using excessive force can bend or damage the host adapter edge connector. Make sure that the edge connector is properly aligned before pressing the adapter into place. The bracket around the two external connectors should fit into the empty space where the filler panel was removed in Step 4.

7. **Remove the wrist strap.**

8. **Close the system.**

The next two sections describe how to connect the host adapter to one or more storage devices and how to test the host adapter.

Connecting the Host Adapter

Before you connect the host adapter to the storage device(s), do the following:

- Refer to the release notes for the lists of supported cables and storage devices. Downloading the release notes is described in "To Access the Release Notes" on page viii.
- Refer to Appendix A, "Ultra320 SCSI Configuration" on page 11 for general information on configuration for Ultra320 SCSI devices.
- Refer to your system documentation and the storage device installation manual for specific cabling instructions.

▼ To Connect SCSI Cable(s) From the Host Adapter to the Storage Device(s)

1. **Connect the host adapter to the storage device(s) using the appropriate cable(s). Refer to Table 1-1 for SCSI interface connection information.**

TABLE 1-1 Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Interfaces

SCSI Interface	External Connector	Internal Connector
Channel A	J2	J6
Channel B	J3	J4

Testing the Host Adapter

You should test the host adapter installation using the `probe-scsi-all` command and, if the newly attached device is a disk array, with the SunVTS software.

▼ To Test the Installation Using the `probe-scsi-all` Command

1. **If you have disconnected the power cable, reconnect it.**
2. **Power on the connected storage device(s) and then power on the host.**
3. **Bring the system down to the `ok` prompt at run level 0.**

Note – If the host starts to reboot, interrupt the reboot process by pressing the Stop and A keys simultaneously.

---

4. **At the `ok` prompt, enter the `probe-scsi-all` command to verify that the system recognizes the host adapter.**

   The `probe-scsi-all` command displays the SCSI devices connected to the host, as shown in the following screen example.

```
ok probe-scsi-all
/pci@4,2000/pci@1/scsi@2
Target 0
Unit 0 DISK SEAGATE ST336605LSUN36G 0238
/pci@4,2000/pci@1/scsi@2,1
Target 0
Unit 0 DISK SEAGATE ST336605LSUN36G 0238
```

   In this example, the first SCSI port (`scsi@2`) has one disk drive connected (`Target 0`). The second SCSI port (`scsi@2,1`) also has one disk drive connected (`Target 0`). In the illustration of the host adapter in Figure 1-1, the first SCSI port is labeled as Channel A; the second SCSI port as Channel B.

▼ To Test the Installation With the SunVTS Software

Use the the SunVTS software to test a disk on a newly-attached disk array, to verify that the host adapter is properly installed.

For details about running the the SunVTS software, refer to the *SunVTS 5.X User's Guide* and the *SunVTS 5.X Test Reference Manual.*

1. **As superuser, open the SunVTS window.**

```
# /opt/SUNWvts/bin/sunvts
```

2. **From the System Map, select a disk drive that is in an array connected to the host adapter.**
3. **Start the disk test.**
4. **Verify that no errors have occurred by checking the SunVTS status window.**
5. **If no problems occur, stop the SunVTS software.**

   Your host adapter is now ready to run applications.

Note – If problems occur, please contact your service provider for assistance.

Booting the Host Adapter

The Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter uses the `mpt` driver, which is included with the Solaris operating system beginning with the Solaris 8 2/04 OS release and the Solaris 9 4/04 OS release. This enables you to "warm" boot directly from a hard disk connected to the host adapter if that disk has at least the Solaris 8 2/04 OS release or the Solaris 9 4/04 OS release installed.

Note – A "warm" boot requires that the hard disk attached to the host adapter be powered on and available at the time the server is powered up. A "cold" boot, where both the server and hard disk are powered up at the same time, is not supported by the `mpt` driver.

After booting, you should install any required patches for the `mpt` driver. Refer to the *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes* for instructions on dowloading and installing `mpt` driver patches. To view the Release Notes, see "To Access the Release Notes" on page viii.

Note – The Sun StorEdge 3310 standalone SCSI array is presently limited to Ultra160 SCSI bus speeds only. Normally, the host adapter automatically lowers the transfer speed for attached storage devices that are not Ultra320 capable. However, for the Sun StorEdge 3310 standalone SCSI array, you must create an `mpt.conf` file to limit the Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter to Ultra160 SCSI bus speeds.
For instructions on creating the `mpt.conf` file, refer to the *Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter Release Notes*. To view the Release Notes, see "To Access the Release Notes" on page viii.

APPENDIX **A**

Ultra320 SCSI Configuration

This appendix provides general information about Ultra320 SCSI configuration rules. The following topics are discussed:

Target Devices

For Ultra320 SCSI performance of up to 320 Mbytes/sec, there can be a maximum of 15 devices connected to each port on the host adapter.

The available target addresses (SCSI IDs) for each port on the host adapter are 0 through F.

Note – The SCSI ID of 7 is reserved for the host adapter.

Bus Length

The maximum SCSI bus length is determined by the SCSI bus type (that is, the number of devices connected).

Table A-1 shows the maximum SCSI bus lengths for Ultra320 SCSI with a 8/16-bit bus width.

TABLE A-1 Bus Restrictions

SCSI Type	Peak MBytes /sec	Single-Ended		LVD	
		Max Length[a]	No. of Devices	Max Length[a]	No. of Devices
SCSI-2					
Narrow	10	3	8	25	2
				12	8
Wide	20	3	16	25	2
				12	16
SCSI-3 Ultra1					
Narrow	20	1.5	8	25	2
		3	4	12	8
Wide	40	1.5	8	25	2
		3	4	12	16
SCSI-3 Ultra2					
Narrow	40	N/S[b]	N/S	25	2
				12	8
Wide	80	N/S	N/S	25	2
				12	16
SCSI-3 Ultra3					
Narrow	80	N/S	N/S	25	2
				12	8
Wide	160	N/S	N/S	25	2
				12	16
SCSI-3 Ultra320					
Narrow	160	N/S	N/S	25	2
				12	8
Wide	320	N/S	N/S	25	2
				12	16

a This maximum length (shown in meters) must include the internal bus length of your system. Sun qualifies cable lengths of only up to 10 meters (22.8 feet).

b N/S = not supported

Cabling and Termination

Use the following cabling guidelines to ensure proper device cabling and termination.

Cabling

In order to maintain Ultra320 SCSI performance, all cables used must be Ultra320 SCSI compliant.

Termination

- The SCSI bus must be correctly terminated at the end of the bus. Most Sun devices use auto-termination. See the documentation that came with the device.
- This host adapter has active terminators with an automatic means of enabling and disabling the termination. All the termination circuit derives its power from the PCI or SCSI bus. When the PCI bus power is removed, active SCSI termination is maintained if the other SCSI device supplies power to the Term Pwr pins of the SCSI bus.

SCSI Symbols

One of the four following symbols is placed near a SCSI port to indicate which type of SCSI the port is using. The icon may appear alone or with descriptive text.

Acronym	Meaning
SE	single-ended
LVD	low-voltage differential
MSE	multi-mode single ended
HVD	high-voltage differential

APPENDIX **B**

Specifications

The chapter contains the specifications for the low-voltage differential (LVD) Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter.

The following topics are discussed:

Physical Dimensions

TABLE B-1 Physical Dimensions

Dimension	Measurement	
	Board With Bracket	**Board Without Bracket**
Length	7.3 inches (185 meters)	6.9 inches (175 millimeters)
Width	5.0 inches (127 millimeters)	4.2 inches (107 millimeters)
Height	.85 inches (21.6 millimeters)	.5 inches (12.7 millimeters)
Weight	6.0 oz (43.42 g)	N/A

Power Requirements

TABLE B-2 Power Requirements

Voltage	Maximum Current
5V ±5%	3A
3.3V ±9%	0.0A
12V ±5%	0.0A

Performance Specifications

TABLE B-3 Performance Specifications

Feature	Specification
PCI/PCI-X bus clock frequency	33 MHz, 66 MHz, and 133 MHz
PCI data burst rate	264 MBps* @33 MHz, 528 MBps @66 MHz, 1064 MBps @133 MHz
SCSI synchronous max imum transfer rate	320 MBps (wide)
PCI data/address lines	AD63-0
PCI modes	Master/slave
SCSI interface	Low-voltage differential
SCSI bus parity	Yes
SCSI cyclic redundancy check (CRC)	Yes
SCSI 8-bit bus devices	Yes
SCSI 16-bit bus devices	Yes

* MBps = megabytes per second

PCI Edge Connector Pin Definitions

TABLE B-4 PCI Edge Connector Pin Definitions J1B (Top)

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	-12V	25	+3.3V	49	GND	73	GND
2	TCK	26	C_BE3	50	KEYWAY	74	AD[55]
3	GND	27	AD23	51	KEYWAY	75	AD[53]
4	TDO	28	GND	52	AD08	76	GND
5	+5V	29	AD21	53	AD07	77	AD[51]
6	+5V	30	AD19	54	+3.3V	78	AD[49]
7	INTB	31	+3.3V	55	AD05	79	+5V/+3.3V
8	INTD	32	AD17	56	AD03	80	AD[47]
9	GND (PRSNT1)	33	C_BE2	57	GND	81	AD[45]
10	RESERVED	34	GND	58	AD01	82	GND
11	GND (PRSNT2)	35	IRDY	59	3V/5V	83	AD[43]
12	KEYWAY	36	+3.3V	60	ACK64	84	AD[41]
13	KEYWAY	37	DEVSEL	61	+5V	85	GND
14	RESERVED	38	GND	62	+5V	86	AD[39]
15	GND	39	LOCK	63	RESERVED	87	AD[37]
16	CLK	40	PERR	64	GND	88	+5V/+3.3V
17	GND	41	+3.3V	65	C/BE[6]#	89	AD[35]
18	REQ	42	SERR	66	C/BE[4]#	90	AD[33]
19	3V/5V	43	+3.3V	67	GND	91	GND
20	AD31	44	C_BE1	68	AD[63]	92	RESERVED
21	AD29	45	AD14	69	AD[61]	93	RESERVED
22	GND	46	GND	70	+5V/+3.3V	94	GND
23	AD27	47	AD12	71	AD[59]		
24	AD25	48	AD10	72	AD[57]		

TABLE B-5 PCI Edge Connector Pin Definitions J1A (Bottom)

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	TRST	25	AD24	49	AD09	73	AD[56]
2	+12V	26	IDSEL	50	KEYWAY	74	AD[54]
3	TMS	27	+3.3V	51	KEYWAY	75	+5V/+3.3V
4	TDI	28	AD22	52	C_BE0	76	AD[52]
5	+5V	29	AD20	53	+3.3V	77	AD[50]
6	INTA	30	GND	54	AD06	78	GND
7	INTC	31	AD18	55	AD04	79	AD[48]
8	+5V	32	AD16	56	GND	80	AD[46]
9	RESERVED	33	+3.3V	57	AD02	81	GND
10	3V/5V	34	FRAME	58	AD00	82	AD[44]
11	RESERVED	35	GND	59	3V/5V	83	AD[42]
12	KEYWAY	36	TRDY	60	REQ64	84	+5V/+3.3V
13	KEYWAY	37	GND	61	+5V	85	AD[40]
14	RESERVED	38	STOP	62	+5V	86	AD[38]
15	RST	39	+3.3V	63	GND	87	GND
16	3V/5V	40	SDONE	64	C/BE[7]#	88	AD[36]
17	GNT	41	SBO	65	C/BE[5]#	89	AD[34]
18	GND	42	GND	66	+5V/+3.3V	90	GND
19	RESERVED	43	PAR	67	PAR64	91	AD[32]
20	AD30	44	AD15	68	AD[62]	92	RESERVED
21	+3.3V	45	+3.3V	69	GND	93	GND
22	AD28	46	AD13	70	AD[60]	94	RESERVED
23	AD26	47	AD11	71	AD[58]		
24	GND	48	GND	72	GND		

SCSI Connector Pin Definitions

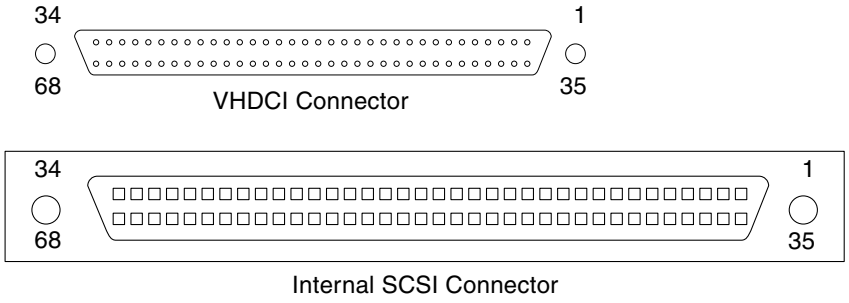

FIGURE B-1 VHDCI and Internal SCSI Connectors

TABLE B-6 SCSI Connector Pin Definitions

Pin	Description	Pin	Description	Pin	Description
1	+SD(12)	24	+RST	47	SD(6)-
2	+SD(13)	25	+MSG	48	SD(7)-
3	+SD(14)	26	+SEL	49	SDP-
4	+SD(15)	27	+C/D	50	Cable Sense (GND)
5	+SDP(1)	28	+REQ	51	TERMPWR
6	GND	29	+I/O	52	TERMPWR
7	+SD(0)	30	GND	53	OPEN
8	+SD(1)	31	+SD(8)	54	ATN-
9	+SD(2)	32	+SD(9)	55	GND
10	+SD(3)	33	+SD(10)	56	BSY-
11	+SD(4)	34	+SD(11)	57	ACK-
12	+SD(5)	35	SD(12)-	58	RST-
13	+SD(6)	36	SD(13)-	59	MSG-
14	+SD(7)	37	SD(14)-	60	SEL-
15	+SDP	38	SP(15)-	61	C/D-
16	DIFFSENS	39	SDP(1)-	62	REQ-
17	TERMPWR	40	GND	63	I/O-

TABLE B-6 SCSI Connector Pin Definitions *(Continued)*

Pin	Description	Pin	Description	Pin	Description
18	TERMPWR	41	SD(0)-	64	GND
19	OPEN	42	SD(1)-	65	SD(8)-
20	+ATN	43	SD(2)-	66	SD(9)-
21	GND	44	SD(3)-	67	SD(10)-
22	+BSY	45	SD(4)-	68	SD(11)-
23	+ACK	46	SD(5)-		

APPENDIX **C**

Declaration of Conformity, Regulatory Compliance, and Safety Statements

This appendix contains the following information that applies to the Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI host adapter:

Declaration of Conformity

Compliance Model Number: **LSI22320-SR**
Product Family Name: **Sun StorEdge PCI/PCI-X Dual Ultra320 SCSI Host Adapter (SG-XPCI2SCSI-LM320)**

EMC

USA - FCC Class B
This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
1) This equipment may not cause harmful interference.
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:

As Telecommunication Network Equipment (TNE) in both Telecom Centers and Other Than Telecom Centers per (as applicable):
EN300-386 V.1.3.1 (09-2001) Required Limits:

EN55022/CISPR22	Class B
EN61000-3-2	Pass
EN61000-3-3	Pass
EN61000-4-2	6 kV (Direct), 8 kV (Air)
EN61000-4-3	3 V/m 80-1000MHz, 10 V/m 800-960 MHz and 1400-2000 MHz
EN61000-4-4	1 kV AC and DC Power Lines, 0.5 kV Signal Lines,
EN61000-4-5	2 kV AC Line-Gnd, 1 kV AC Line-Line and Outdoor Signal Lines, 0.5 kV Indoor Signal Lines > 10m.
EN61000-4-6	3 V
EN61000-4-11	Pass

As Information Technology Equipment (ITE) Class B per (as applicable):
EN55022:1998/CISPR22:1997 Class B
EN55024:1998 Required Limits:

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	Pass
EN61000-3-3	Pass

Safety

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

EN 60950:2000, 3rd Edition	TÜV Rheinland Certificate No.
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.

22 NOV 04
Dennis P. Symanski DATE
Manager, Compliance Engineering
Sun Microsystems, Inc.
4150 Network Circle, MPK15-102
Santa Clara, CA 95054, USA
Tel: 650-786-3255
Fax: 650-786-3723

25 NOV 04
Donald Cameron DATE
Program Manager
Sun Microsystems Scotland, Limited
Blackness Road, Phase I, Main Bldg
Springfield, EH49 7LR
Scotland, United Kingdom
Tel: +44 1 506 672 539
Fax: +44 1 506 670 011

Regulatory Compliance Statements

Your Sun product is marked to indicate its compliance class:

- Federal Communications Commission (FCC) — USA
- Department of Communications (DOC) — Canada
- Voluntary Control Council for Interference (VCCI) — Japan

Please read the appropriate section that corresponds to the marking on your Sun product before attempting to install the product.

FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted-pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

FCC Class B Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

Safety Agency Compliance Statements

Read this section before beginning any procedure. The following text provides safety precautions to follow when installing a Sun Microsystems product.

Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols may appear in this book:

Caution – There is a risk of personal injury and equipment damage. Follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Attention – Depending on the type of power switch your device has, one of the following symbols may be used:

Caution – Applies AC power to the system.

Caution – Removes AC power from the system.

Caution – The On/Standby switch is in the standby position.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems is not responsible for regulatory compliance of a modified Sun product.

Placement of a Sun Product

Caution – Do not block or cover the openings of your Sun product. Never place a Sun product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your Sun product.

Caution – The workplace-dependent noise level defined in DIN 45 635 Part 1000 must be 70Db(A) or less.

SELV Compliance

Safety status of I/O connections comply to SELV requirements.

Power Cord Connection

Caution – Sun products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Caution – Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Sun product.

Caution – Your Sun product is shipped with a grounding type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet

The following caution applies only to devices with a Standby power switch:

Caution – The power switch of this product functions as a standby type device only. The power cord serves as the primary disconnect device for the system. Be sure to plug the power cord into a grounded power outlet that is nearby the system and is readily accessible. Do not connect the power cord when the power supply has been removed from the system chassis.

Lithium Battery

Caution – On Sun CPU boards, there is a lithium battery molded into the real-time clock, SGS No. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, or MK48T08. Batteries are not customer replaceable parts. They may explode if mishandled. Do not dispose of the battery in fire. Do not disassemble it or attempt to recharge it.

System Unit Cover

You must remove the cover of your Sun computer system unit to add cards, memory, or internal storage devices. Be sure to replace the top cover before powering on your computer system.

Caution – Do not operate Sun products without the top cover in place. Failure to take this precaution may result in personal injury and system damage.

Laser Compliance Notice

Sun products that use laser technology comply with Class 1 laser requirements.

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Laser KLasse 1

CD-ROM

Caution – Use of controls, adjustments, or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Einhaltung sicherheitsbehördlicher Vorschriften

Auf dieser Seite werden Sicherheitsrichtlinien beschrieben, die bei der Installation von Sun-Produkten zu beachten sind.

Sicherheitsvorkehrungen

Treffen Sie zu Ihrem eigenen Schutz die folgenden Sicherheitsvorkehrungen, wenn Sie Ihr Gerät installieren:

- Beachten Sie alle auf den Geräten angebrachten Warnhinweise und Anweisungen.
- Vergewissern Sie sich, daß Spannung und Frequenz Ihrer Stromquelle mit der Spannung und Frequenz übereinstimmen, die auf dem Etikett mit den elektrischen Nennwerten des Geräts angegeben sind.
- Stecken Sie auf keinen Fall irgendwelche Gegenstände in Öffnungen in den Geräten. Leitfähige Gegenstände könnten aufgrund der möglicherweise vorliegenden gefährlichen Spannungen einen Kurzschluß verursachen, der einen Brand, Stromschlag oder Geräteschaden herbeiführen kann.

Symbole

Die Symbole in diesem Handbuch haben folgende Bedeutung:

Achtung – Gefahr von Verletzung und Geräteschaden. Befolgen Sie die Anweisungen

Achtung – Hohe Temperatur. Nicht berühren, da Verletzungsgefahr durch heiße Oberfläche besteht.

Achtung – Gefährliche Spannungen. Anweisungen befolgen, um Stromschläge und Verletzungen zu vermeiden

Je nach Netzschaltertyp an Ihrem Gerät kann eines der folgenden Symbole benutzt werden:

Achtung – Setzt das System unter Wechselstrom

Achtung – Unterbricht die Wechselstromzufuhr zum Gerät.

Achtung – (Stand-by-Position) - Der Ein-/Wartezustand-Schalter steht auf Wartezustand. Änderungen an Sun-Geräten.

Nehmen Sie keine mechanischen oder elektrischen Änderungen an den Geräten vor. Sun Microsystems, übernimmt bei einem Sun-Produkt, das geändert wurde, keine Verantwortung für die Einhaltung behördlicher Vorschriften

Aufstellung von Sun-Geräten

Achtung – Um den zuverlässigen Betrieb Ihres Sun-Geräts zu gewährleisten und es vor Überhitzung zu schützen, dürfen die Öffnungen im Gerät nicht blockiert oder verdeckt werden. Sun-Produkte sollten niemals in der Nähe von Heizkörpern oder Heizluftklappen aufgestellt werden

Achtung – Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70Db(A) oder weniger.

Einhaltung der SELV-Richtlinien

Die Sicherung der I/O-Verbindungen entspricht den Anforderungen der SELV-Spezifikation.

Anschluß des Netzkabels

Achtung – Sun-Produkte sind für den Betrieb an Einphasen-Stromnetzen mit geerdetem Nulleiter vorgesehen. Um die Stromschlaggefahr zu reduzieren, schließen Sie Sun-Produkte nicht an andere Stromquellen an. Ihr Betriebsleiter oder ein qualifizierter Elektriker kann Ihnen die Daten zur Stromversorgung in Ihrem Gebäude geben.

Achtung – Nicht alle Netzkabel haben die gleichen Nennwerte. Herkömmliche, im Haushalt verwendete Verlängerungskabel besitzen keinen Überlastungsschutz und sind daher für Computersysteme nicht geeignet.

Achtung – Ihr Sun-Gerät wird mit einem dreiadrigen Netzkabel für geerdete Netzsteckdosen geliefert. Um die Gefahr eines Stromschlags zu reduzieren, schließen Sie das Kabel nur an eine fachgerecht verlegte, geerdete Steckdose an.

Die folgende Warnung gilt nur für Geräte mit Wartezustand-Netzschalter:

Achtung – Der Ein/Aus-Schalter dieses Geräts schaltet nur auf Wartezustand (Stand-By-Modus). Um die Stromzufuhr zum Gerät vollständig zu unterbrechen, müssen Sie das Netzkabel von der Steckdose abziehen. Schließen Sie den Stecker des Netzkabels an eine in der Nähe befindliche, frei zugängliche, geerdete Netzsteckdose an. Schließen Sie das Netzkabel nicht an, wenn das Netzteil aus der Systemeinheit entfernt wurde.

Lithiumbatterie

Achtung – CPU-Karten von Sun verfügen über eine Echtzeituhr mit integrierter Lithiumbatterie (Teile-Nr. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, oder MK48T08). Diese Batterie darf nur von einem qualifizierten Servicetechniker ausgewechselt werden, da sie bei falscher Handhabung explodieren kann. Werfen Sie die Batterie nicht ins Feuer. Versuchen Sie auf keinen Fall, die Batterie auszubauen oder wiederaufzuladen.

Gehäuseabdeckung

Sie müssen die obere Abdeckung Ihres Sun-Systems entfernen, um interne Komponenten wie Karten, Speicherchips oder Massenspeicher hinzuzufügen. Bringen Sie die obere Gehäuseabdeckung wieder an, bevor Sie Ihr System einschalten.

Achtung – Bei Betrieb des Systems ohne obere Abdeckung besteht die Gefahr von Stromschlag und Systemschäden.

Einhaltung der Richtlinien für Laser

Sun-Produkte, die mit Laser-Technologie arbeiten, entsprechen den Anforderungen der Laser Klasse 1.

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Achtung – Die Verwendung von anderen Steuerungen und Einstellungen oder die Durchfhrung von Prozeduren, die von den hier beschriebenen abweichen, knnen gefhrliche Strahlungen zur Folge haben.

Conformité aux normes de sécurité

Ce texte traite des mesures de sécurité qu'il convient de prendre pour l'installation d'un produit Sun Microsystems.

Mesures de sécurité

Pour votre protection, veuillez prendre les précautions suivantes pendant l'installation du matériel :

- Suivre tous les avertissements et toutes les instructions inscrites sur le matériel.
- Vérifier que la tension et la fréquence de la source d'alimentation électrique correspondent à la tension et à la fréquence indiquées sur l'étiquette de classification de l'appareil.
- Ne jamais introduire d'objets quels qu'ils soient dans une des ouvertures de l'appareil. Vous pourriez vous trouver en présence de hautes tensions dangereuses. Tout objet conducteur introduit de la sorte pourrait produire un court-circuit qui entraînerait des flammes, des risques d'électrocution ou des dégâts matériels.

Symboles

Vous trouverez ci-dessous la signification des différents symboles utilisés :

Attention – risques de blessures corporelles et de dégâts matériels. Veuillez suivre les instructions.

Attention – surface à température élevée. Evitez le contact. La température des surfaces est élevée et leur contact peut provoquer des blessures corporelles.

Attention – présence de tensions dangereuses. Pour éviter les risques d'électrocution et de danger pour la santé physique, veuillez suivre les instructions.

Un des symboles suivants sera peut-être utilisé en fonction du type d'interrupteur de votre système:

Attention – Votre système est sous tension (courant alternatif).

Attention – Votre système est hors tension (courant alternatif).

Attention – L'interrupteur Marche/Veilleuse est en position « Veilleuse ».

Modification du matériel

Ne pas apporter de modification mécanique ou électrique au matériel. Sun Microsystems n'est pas responsable de la conformité réglementaire d'un produit Sun qui a été modifié.

Positionnement d'un produit Sun

Attention – pour assurer le bon fonctionnement de votre produit Sun et pour l'empêcher de surchauffer, il convient de ne pas obstruer ni recouvrir les ouvertures prévues dans l'appareil. Un produit Sun ne doit jamais être placé à proximité d'un radiateur ou d'une source de chaleur.

Attention – Le niveau de pression acoustique au poste de travail s'élève selon la norme DIN 45 635 section 1000, à 70 dB (A) ou moins.

Conformité SELV

Sécurité : les raccordements E/S sont conformes aux normes SELV.

Connexion du cordon d'alimentation

Attention – les produits Sun sont conçus pour fonctionner avec des alimentations monophasées munies d'un conducteur neutre mis à la terre. Pour écarter les risques d'électrocution, ne pas brancher de produit Sun dans un autre type d'alimentation secteur. En cas de doute quant au type d'alimentation électrique du local, veuillez vous adresser au directeur de l'exploitation ou à un électricien qualifié.

Attention – tous les cordons d'alimentation n'ont pas forcément la même puissance nominale en matière de courant. Les rallonges d'usage domestique n'offrent pas de protection contre les surcharges et ne sont pas prévues pour les systèmes d'ordinateurs. Ne pas utiliser de rallonge d'usage domestique avec votre produit Sun.

Attention – votre produit Sun a été livré équipé d'un cordon d'alimentation à trois fils (avec prise de terre). Pour écarter tout risque d'électrocution, branchez toujours ce cordon dans une prise mise à la terre.

L'avertissement suivant s'applique uniquement aux systèmes équipés d'un interrupteur VEILLEUSE:

Attention – Le commutateur d'alimentation de ce produit fonctionne comme un dispositif de mise en veille uniquement. C'est la prise d'alimentation qui sert à mettre le produit hors tension. Veillez donc à installer le produit à proximité d'une prise murale facilement accessible. Ne connectez pas la prise d'alimentation lorsque le châssis du système n'est plus alimenté.

Batterie au lithium

Attention – sur les cartes CPU Sun, une batterie au lithium (référence MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, ou MK48T08.) a été moulée dans l'horloge temps réel SGS. Les batteries ne sont pas des pièces remplaçables par le client. Elles risquent d'exploser en cas de mauvais traitement. Ne pas jeter la batterie au feu. Ne pas la démonter ni tenter de la recharger.

Couvercle

Pour ajouter des cartes, de la mémoire, ou des unités de stockage internes, vous devrez démonter le couvercle de l'unité système Sun. Ne pas oublier de remettre ce couvercle en place avant de mettre le système sous tension.

Attention – il est dangereux de faire fonctionner un produit Sun sans le couvercle en place. Si l'on néglige cette précaution, on encourt des risques de blessures corporelles et de dégâts matériels.

Conformité aux certifications Laser

Les produits Sun qui font appel aux technologies lasers sont conformes aux normes de la classe 1 en la matière.

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Attention – L'utilisation de contrôles, de réglages ou de performances de procédures autre que celle spécifiée dans le présent document peut provoquer une exposition à des radiations dangereuses.

Normativas de seguridad

El siguiente texto incluye las medidas de seguridad que se deben seguir cuando se instale algún producto de Sun Microsystems.

Precauciones de seguridad

Para su protección observe las siguientes medidas de seguridad cuando manipule su equipo:

- Siga todas los avisos e instrucciones marcados en el equipo.
- Asegúrese de que el voltaje y la frecuencia de la red eléctrica concuerdan con las descritas en las etiquetas de especificaciones eléctricas del equipo.
- No introduzca nunca objetos de ningún tipo a través de los orificios del equipo. Pueden haber voltajes peligrosos. Los objetos extraños conductores de la electricidad pueden producir cortocircuitos que provoquen un incendio, descargas eléctricas o daños en el equipo.

Símbolos

En este libro aparecen los siguientes símbolos:

Precaución – Existe el riesgo de lesiones personales y daños al equipo. Siga las instrucciones.

Precaución – Superficie caliente. Evite el contacto. Las superficies están calientes y pueden causar daños personales si se tocan.

Precaución – Voltaje peligroso presente. Para reducir el riesgo de descarga y daños para la salud siga las instrucciones.

Según el tipo de interruptor de encendido que su equipo tenga, es posible que se utilice uno de los siguientes símbolos:

Precaución – Aplica la alimentación de CA al sistema.

Precaución – Elimina la alimentación de CA del sistema.

Precaución – El interruptor de Encendido/En espera se ha colocado en la posición de En espera.

Modificaciones en el equipo

No realice modificaciones de tipo mecánico o eléctrico en el equipo. Sun Microsystems no se hace responsable del cumplimiento de las normativas de seguridad en los equipos Sun modificados.

Ubicación de un producto Sun

Precaución – Para asegurar la fiabilidad de funcionamiento de su producto Sun y para protegerlo de sobrecalentamien-tos no deben obstruirse o taparse las rejillas del equipo. Los productos Sun nunca deben situarse cerca de radiadores o de fuentes de calor.

Precaución – De acuerdo con la norma DIN 45 635, Parte 1000, se admite un nivel de presión acústica para puestos de trabajo máximo de 70Db(A).

Cumplimiento de la normativa SELV

El estado de la seguridad de las conexiones de entrada/salida cumple los requisitos de la normativa SELV.

Conexión del cable de alimentación eléctrica

Precaución – Los productos Sun están diseñados para trabajar en una red eléctrica monofásica con toma de tierra. Para reducir el riesgo de descarga eléctrica, no conecte los productos Sun a otro tipo de sistema de alimentación eléctrica. Póngase en contacto con el responsable de mantenimiento o con un electricista cualificado si no está seguro del sistema de alimentación eléctrica del que se dispone en su edificio.

Precaución – No todos los cables de alimentación eléctrica tienen la misma capacidad. Los cables de tipo doméstico no están provistos de protecciones contra sobrecargas y por tanto no son apropiados para su uso con computadores. No utilice alargadores de tipo doméstico para conectar sus productos Sun.

Precaución – Con el producto Sun se proporciona un cable de alimentación con toma de tierra. Para reducir el riesgo de descargas eléctricas conéctelo siempre a un enchufe con toma de tierra.

La siguiente advertencia se aplica solamente a equipos con un interruptor de encendido que tenga una posición "En espera":

Precaución – El interruptor de encendido de este producto funciona exclusivamente como un dispositivo de puesta en espera. El enchufe de la fuente de alimentación está diseñado para ser el elemento primario de desconexión del equipo. El equipo debe instalarse cerca del enchufe de forma que este último pueda ser fácil y rápidamente accesible. No conecte el cable de alimentación cuando se ha retirado la fuente de alimentación del chasis del sistema.

Batería de litio

Precaución – En las placas de CPU Sun hay una batería de litio insertada en el reloj de tiempo real, tipo SGS Núm. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, o MK48T08. Las baterías no son elementos reemplazables por el propio cliente. Pueden explotar si se manipulan de forma errónea. No arroje las baterías al fuego. No las abra o intente recargarlas.

Tapa de la unidad del sistema

Debe quitar la tapa del sistema cuando sea necesario añadir tarjetas, memoria o dispositivos de almacenamiento internos. Asegúrese de cerrar la tapa superior antes de volver a encender el equipo.

Precaución – Es peligroso hacer funcionar los productos Sun sin la tapa superior colocada. El hecho de no tener en cuenta esta precaución puede ocasionar daños personales o perjudicar el funcionamiento del equipo.

Aviso de cumplimiento con requisitos de láser

Los productos Sun que utilizan la tecnología de láser cumplen con los requisitos de láser de Clase 1.

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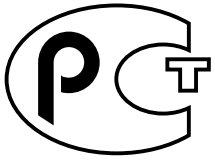
Precaución – El manejo de los controles, los ajustes o la ejecución de procedimientos distintos a los aquí especificados pueden exponer al usuario a radiaciones peligrosas.

GOST-R Certification Mark



Nordic Lithium Battery Cautions

Norge

Caution – Litiumbatteri — Eksplosjonsfare.Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

Sverige

Caution – Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

Danmark

Caution – Litiumbatteri — Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

Suomi

Caution – Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.