Netra™ X1 Server User's Guide

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Contents

Figures

Tables

Preface

The *Netra X1 Server User's Guide* describes how to install, manage, and maintain the Netra™ X1 server. The manual is intended for system administrators who have experience in setting up networked Solaris™ servers.

How This Book Is Organized

Part I Installation and Configuration

Chapter 1 introduces the Netra X1 server, gives an overview of its specifications, lists the optional components available and includes an installation quick start guide.

Chapter 2 provides information about installing the Netra X1 server into a rack and describes how to connect the cables.

Chapter 3 provides instructions on setting up console connections to the server via its serial A/LOM port.

Chapter 4 explains how to perform the initial power-on and configuration of the server.

Part II Remote and Local Management

Chapter 5 explains how to use the LOMlite2 shell.

Chapter 6 describes how to use LOMlite2-specific Solaris commands to monitor and manage the system. This chapter also explains how to configure LOMlite2 to restart the server in the event of a system lockup.

Part III Maintenance and Troubleshooting

Chapter 7 provides information about the fault and power indicators and explains how to identify a faulty system in a rack.

Chapter 8 describes how to swap system configuration cards and how to open the Netra X1 server to add memory or a hard disk drive.

Chapter 9 describes how to reinstall the Solaris operating environment.

Chapter 10 describes the diagnostic tools that are available, and provides troubleshooting and frequently asked questions sections.

Part IV Appendixes

Appendix A lists all physical and environmental specifications, and provides information on calculating power consumption and heat dissipation.

Appendix B describes the parameters you can configure in the LOMlite2 driver configuration file.

Appendix C provides information about the dmfe driver.

Using UNIX Commands

This document may not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris software environment
- Other software documentation that you received with your system

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	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#
LOM shell	lom>
OBP	ok

Accessing Sun Documentation Online

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Safety Precautions

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

- Follow all cautions and instructions marked on the equipment.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects can produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols may appear in this manual:

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

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

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems is not responsible for the regulatory compliance of a modified 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 – If your Netra X1 server is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may exceed the room ambient temperature. Ensure that rack environment ambient temperature does not exceed 40 degrees.

Caution – Mounting of the equipment in a rack or cabinet should be such that a hazardous condition is not created due to uneven mechanical loading or weight distribution.

Caution – Ensure that the connection of multiple system units to the circuit does not overload the supply overcurrent protection or supply wiring. Consider the Sun agency label electrical ratings when determining the correct branch circuit rating for your installation.

Caution – All supply connections, wiring, wire protection, and wire routing must be made in accordance with applicable sections and requirements of national electrical code and local electrical authorities.

PART I Installation and Configuration

CHAPTER 1

Introducing the Netra X1 Server

This chapter gives an overview of the NetraX1 server. It lists the features of the server and the contents of the ship kit, and lists the optional components available for it. It also gives you an overview of the installation process and where to look for further details.

The chapter contains the following sections:

Overview of the Netra X1 Server

The Netra X1 server is a single-processor server in a 1U chassis, designed to maximize the density of high-performance Solaris servers in a rack.

FIGURE 1-1 The Netra X1 Server

The server is ideal for:

- Internet service providers
- Telecommunications carriers
- Financial services
- Corporate customer networks
- Anyone who wants to maximize the density of Solaris servers in a rack

The Netra X1 server has the following features:

- A removable system configuration card containing the server's Host ID, MAC address and NVRAM settings
- Rackmounting enclosure with single power supply
- Four DIMM sockets
- Two 10/100 Mbps RJ-45 Ethernet ports
- Console/Lights Out Management RJ-45 serial port
- Second RJ-45 serial port
- Two USB ports
- Support for up to two low-profile, 3.5-inch IDE disks
- Pre-installed with the Solaris operating environment (64 bit)

Contents of the Ship Kit

The Netra X1 server is supplied with the following components:

TABLE 1-1 Contents of the Ship Kit

Item	Part Number	Quantity
RJ-45 to RJ-45 patch cable for Ethernet or serial connection	530-2093-xx	2
RJ-45 to DB-25 adapter	530-2889-xx	1
RJ-45 to DB-9 adapter	530-3100-xx	1
Rackmounting screws, 10-32x1/2	240-1207-xx	8
Antistatic wrist strap	250-1007-xx	1
Netra X1 Server User's Guide	806-5980-xx	1
Netra X1 Server Safety and Compliance Guide	806-6136-xx	1
Netra X1 Server Product Notes	806-6137-xx	1

Preinstalled Software

The Netra X1 server is preinstalled with the Solaris 8 operating environment (64 bit), including LOMlite2. The server will only support a 64 bit kernel, but applications written for a 32 bit environment can also be used (as long as they do not depend upon a 32 bit driver).

For more information on the specific release of Solaris 8 installed on your server, use the command below.

```
# cat /etc/release

Solaris 8 10/00 s28s_u2wos_11b SPARC
Copyright 2000 Sun Microsystems, Inc.  All Rights Reserved.
Assembled 31 August 2000
```

For information about how to configure the Solaris 8 operating environment, see "Powering On and Configuring the Server" on page 30.

Optional Components

Sun offers additional hard disk drives and memory modules for the server. To order them, contact your local Sun sales representative. See TABLE 1-2 for a list of components and part numbers. The server itself was designed as a replaceable unit which means that, if a fault occurs, you should contact your local Sun sales representative for a replacement.

TABLE 1-2 Customer Installable Hardware

Processor*	Optional Components	Part Number
400MHz* / 500MHz**	128-Mbyte DIMM	X7090A
400MHz / 500MHz	256-Mbyte DIMM	X7091A
500MHz only	512-Mbyte DIMM	X7084A
400MHz only	20 Gbyte, 5400 rpm hard disk drive	X7095A
500MHz only	40 GByte, 7200 rpm hard disk drive	X7096A

* Sun part nos: 380-0425-xx, 380-0426-xx, 380-0427-xx

** Sun part nos: 380-0460-xx, 380-0461-xx, 380-0462-xx, 380-0463-xx

Installation Quick Start

Task	See in the *Netra X1 Server User's Guide*
1 Install the Hardware	
Mount in the rack.	"Installing the Server Into a Standard 19-inch Rack" on page 8
Connect the cables.	"Connecting the Cables" on page 11
Set up a console connection.	"Setting Up a Console Connection to the Server" on page 16
2 Configure the Server **Note: The server is preinstalled with the Solaris 8 operating environment.**	
Power on the server.	"Powering On and Configuring the Server" on page 30
Manage the server from the `lom` or Solaris prompt.	"Remote and Local Management" on page 39
3 Further Information	
Reinstalling the Solaris 8 software.	"Re-installing the Solaris 8 Operating Environment" on page 98
Troubleshooting	"Diagnostic Tools" on page 108
Netra X1 documentation	http://www.sun.com/netra
Solaris 8 documentation	http://docs.sun.com

CHAPTER 2

Installing the Netra X1 Server Into a Rack

This chapter explains how to install the Netra X1 server into a standard 19-inch rack and describes the various mounting options available. It also guides you through connecting the cables to the server. This information is given in the following sections:

Choosing Between a Rack and a Cabinet

A Netra X1 server can be installed in either a rack or a cabinet. Factors that might influence your decision include:

- **Security**
  If other people have access to the room in which your servers are located, you can increase security by locking the servers in a cabinet.
- **Thermal issues**
  Cabinets often require additional fans, because the systems installed in them generate heat in an enclosed space. Two-post racks, however, may require no special cooling systems.
- **Flooring**
  Two-post telco relay racks are designed so that cables can be run overhead. Cabinets often require cables to be run under the floor.

Installing the Server Into a Standard 19-inch Rack

The Netra X1 server fits a standard 19-inch rack. There are five mounting points for the brackets on each side of the server, allowing a choice of mounting positions. The standard position uses the forward three mounting points on the server (see FIGURE 2-2).

You can adjust the position of the server in the rack by using a different set of mounting points for the brackets (see FIGURE 2-4).

▼ To Mount the Server in a 19-inch Rack

1. **Position the Netra X1 server in the rack and tighten the screws (see** FIGURE 2-1**).**

2. **Attach the cables (see “Connecting the Cables” on page 11).**

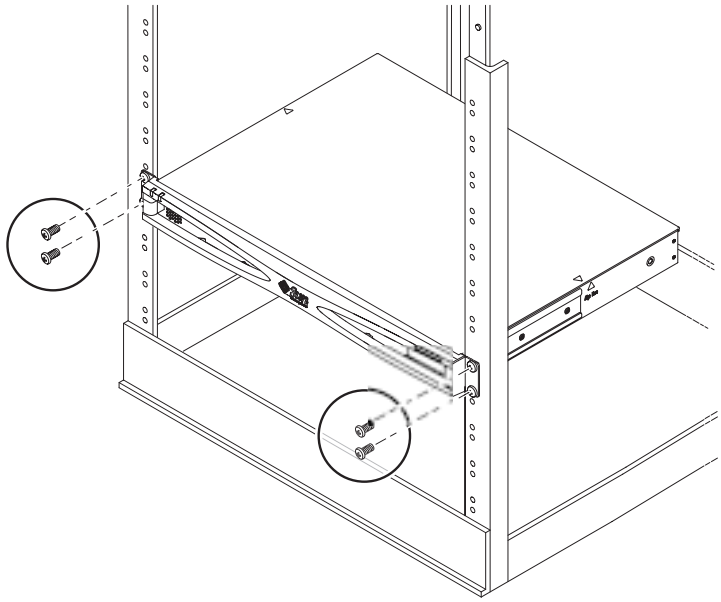

FIGURE 2-1 Mounting the Server in a Standard 19-inch Rack

Using Alternative Bracket Arrangements

You can change the server’s position in a rack, relative to the rack posts, by changing the position of the rackmounting brackets on the server. They can be attached to any group of three from the five mounting points on the side of the server, facing either to the front (see FIGURE 2-2) or to the rear of the server (see FIGURE 2-3). This has the effect of making the server sit further forward, or further back, in relation to the rack mounting posts.

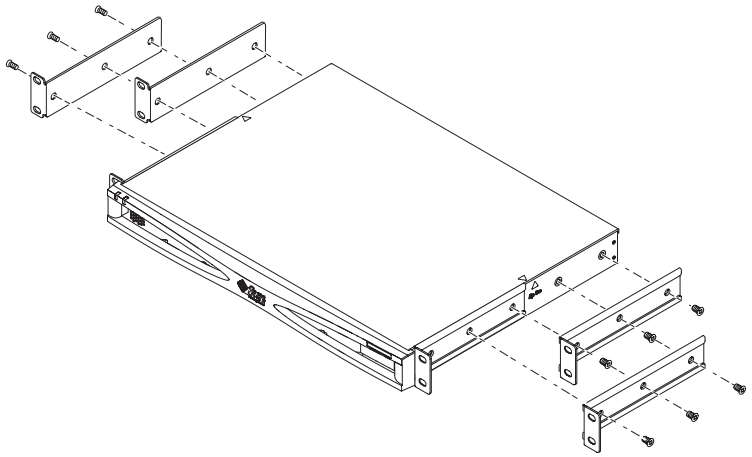

FIGURE 2-2 Forward Facing Rackmounting Brackets

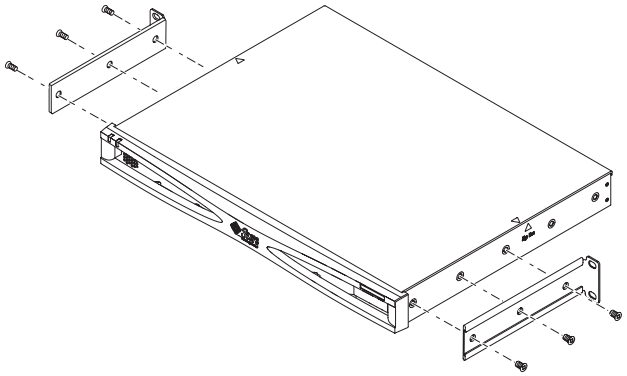

FIGURE 2-3 Rear Facing Rackmounting Brackets

▼ To Use Alternative Bracket Arrangements

1. **Choose the configuration that best suits your installation.**
2. **Reposition the rackmounting brackets on the side of the server.**

3. **Position the server in the rack and tighten the screws.**

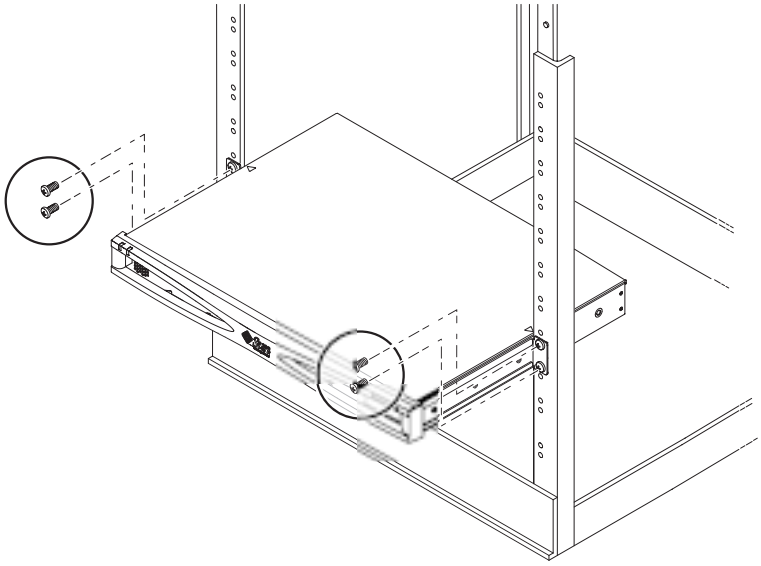

FIGURE 2-4 Alternative Rackmounting Position

4. **Attach the cables (see “Connecting the Cables” on page 11).**

Connecting the Cables

The following section describes the positions of the ports and sockets for the corresponding cables, and the correct procedure for connecting the cables.

The server’s ports are arranged and numbered as in FIGURE 2-5.

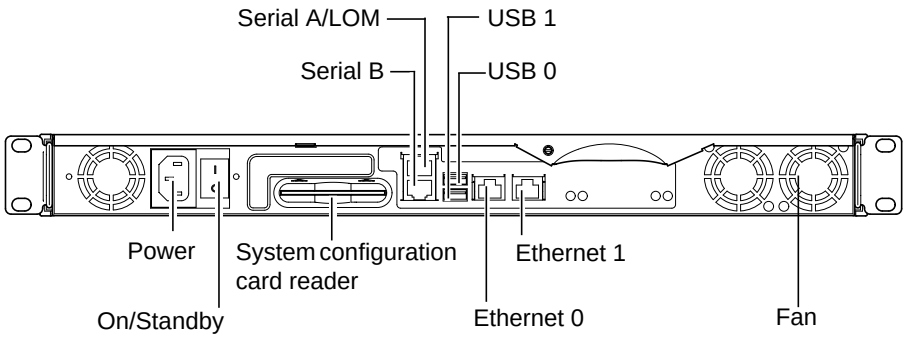

FIGURE 2-5 The Server's Back Panel

▼ To Connect the Cables to the Server

1. **Connect the power cord.**
2. **Connect a serial device.**

   For more information, see "Setting Up a Console Connection to the Server" on page 16.

   If you want to use the server's Lights Out Management (LOM) facilities, use the port labeled Serial A/LOM to make your serial connection to the server.

   Note – The Netra X1 server is supplied with shielded serial cables. Use only these cables when making serial connections to the server.

   ---

3. **Connect the server to a maximum of two Ethernet hubs.**

   You need connect to an Ethernet hub only if you intend to use the server in a network.

4. **Connect the server to a maximum of two USB devices.**

   If required.

5. **If you intend to configure the server directly from a dumb terminal or a Sun workstation, connect the serial cable into the DB-25 serial adapter that was supplied with the server, and connect the adapter to the serial connector on the terminal or on the Sun workstation.**

   Refer to Chapter 4 for information about powering on the system.

Note – The DB-25 serial adapter may not work with all terminals. If you have problems, refer to your terminal manual to check its compatibility with the Sun adapter.

Caution – AC-powered Sun products are designed to work with single-phase power systems that have a grounded neutral conductor. To reduce the risk of electric shock, do not connect Sun products to 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 – Your AC-powered Sun product is packaged with a grounding type (three-wire) power cord. To reduce the risk of electric shock, always connect the cord to a grounded outlet.

CHAPTER 3

Communicating With the Server

This chapter provides information on setting up a console connection to a Netra X1 using a variety of devices. The information is contained in the following sections:

Setting Up a Console Connection to the Server

To perform the initial configuration and to continue to monitor and manage the server, you can connect any of the following devices to the appropriate serial port on the server's back panel:

- Sun workstation or ASCII terminal connected directly to the server
- Sun workstation connected via a terminal server
- Modem
- PC
- Handheld device

Which Is the Appropriate Serial Port?

There are two serial ports on the rear of the Netra X1 server. TABLE 3-1 lists the serial port labels and function.

TABLE 3-1 Netra X1 Server Serial Ports

Serial Port	Purpose	Description
A LOM	Issue LOM commands	This port is dedicated to the Lights Out Management (LOM) device in the server.
B Serial	• Perform binary data transfers • Set up a modem connection	Communication on the A/LOM port is subject to interruption by the LOM device, therefore the A/LOM port does not assert the constant DTR signal required by a modem.

Serial Port Pin Arrangement

When viewed from the back of the server, the pin arrangement of the RJ-45 ports is as shown in FIGURE 3-1.

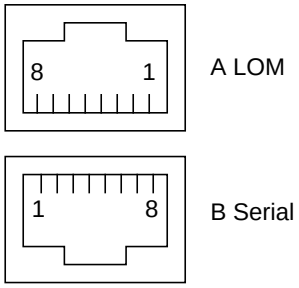

FIGURE 3-1 Serial Port Pins 1 to 8

Serial Connection Settings

The settings you need to use for a serial connection are listed in TABLE 3-2. If you need to perform binary data transfers (that is, transfers of anything more than simple ASCII character streams), use the B Serial port, as communication on the Serial A LOM port is subject to interruption by the Lights Out Management (LOM) device (see “Introduction to Lights-Out Management” on page 41).

TABLE 3-2 Settings for Connecting to the Serial A/LOM or Serial B Port

Parameter	Setting
Connector	Serial A/LOM or Serial B (use Serial B for binary data transfers)
Rate	9600 baud
Parity	No
Stop bits	1
Data bits	8

Serial Adapters

Depending on the type of device you use to connect to the server, you could need to use either a DB-25 or DB-9 serial adapter. TABLE 3-3 describes which type to use, and the following sections describe the crossovers each adapter performs.

TABLE 3-3 Serial Adapters

Terminal Device	Adapter
Sun workstation, ASCII terminal, or terminal server	DB-25
PC or laptop	DB-9 (female, supplied by Sun)
Handheld device	DB-9 (male, not supplied by Sun)

The Sun DB-25 Adapter

To connect to a Solaris `tip` session or to a VT100 terminal, you need to use either the DB-25 (25-Pin DSUB Male to 8-POS RJ-45 Female) adapter that is supplied by Sun (part no. 530-2889) with your system, or an alternative adapter that performs the same pin crossovers. The Sun-supplied DB-25 adapter enables you to connect to any Sun system. The crossovers it performs are listed in TABLE 3-4.

TABLE 3-4 Pin Crossovers in the Sun DB-25 (25-Pin) Adapter

Serial Port (RJ-45 Connector) Pin	25-Pin Connecter
Pin 1 (RTS)	Pin 5 (CTS)
Pin 2 (DTR)	Pin 6 (DSR)
Pin 3 (TXD)	Pin 3 (RXD)
Pin 4 (Signal Ground)	Pin 7 (Signal Ground)
Pin 5 (Signal Ground)	Pin 7 (Signal Ground)
Pin 6 (RXD)	Pin 2 (TXD)
Pin 7 (DSR)	Pin 20 (DTR)
Pin 8 (CTS)	Pin 4 (RTS)

▼ To Use the DB-25 Adapter

1. **Insert one end of the standard RJ-45 patch cable supplied with the Netra X1 server into one of the server's serial ports.**
2. **Insert the other end of the RJ-45 patch cable into the supplied DB-25 adapter.**
3. **Attach the adapter to the appropriate port in your serial device.**

The Sun DB-9 Adapter

Some devices, such as a PC or handheld computer, require you to use either a male or female DB-9 adapter. The Sun DB-9 adaptor (part number 530-3100-xx) is a 9-Pin DSUB female to 8-POS RJ-45 female adapter. To connect to any device that has a 9-pin serial connector, use a DB-9 (9-pin) adapter that performs the pin crossovers listed in TABLE 3-5.

TABLE 3-5 Pin Crossovers for a DB-9 (9-Pin) Adapter

Serial Port (RJ-45 Connector) Pin	9-Pin Connector
Pin 1 (RTS)	Pin 8 (CTS)
Pin 2 (DTR)	Pin 6 (DSR)
Pin 3 (TXD)	Pin 2 (RXD)
Pin 4 (Signal Ground)	Pin 5 (Signal Ground)
Pin 5 (Signal Ground)	Pin 5 (Signal Ground)
Pin 6 (RXD)	Pin 3 (TXD)
Pin 7 (DSR)	Pin 4 (DTR)
Pin 8 (CTS)	Pin 7 (RTS)

Connecting to the Server Using a Sun Workstation or ASCII Terminal

To connect to the server using either a Sun workstation or an ASCII terminal, you need:

- DB-25 adapter

- RJ-45 to RJ-45 patch cable

Both are supplied with the Netra X1 server.

▼ To Connect to the Server Using a Sun Workstation

1. **Connect to the server using the RJ-45 patch cable and DB-25 adapter as described in “To Use the DB-25 Adapter” on page 19.**
2. **From a terminal session, type**:

```
# tip /dev/term/a -9600
```

The `tip` command above is for a console that is using its ttya serial port. If you later configure your console to use ttyb, type the following to set up a `tip` session:

```
# tip /dev/term/b -9600
```

For information about dedicating the console to Serial B, see “Managing the Netra X1 Server From the `lom>` Prompt” on page 41.

For information about how to power on and configure the server, go to “Powering On and Configuring the Server” on page 30.

▼ To Connect to the Server Using an ASCII Terminal

1. **Set up a connection between the terminal and the Netra X1 server.**

   See “To Use the DB-25 Adapter” on page 19.
2. **For the General terminal settings, refer to the terminal operating manual.**

3. **Make the setting changes shown below.**

Property	Setting
Duplex	Full
Bit Rate	9600
Parity	No
Data Bits	8
Stop Bit	1
Flow Control	Xon/Xoff
VT100 Emulation	On (if applicable)

The `lom>` prompt appears.

For information about how to power on and configure the server, go to "Powering On and Configuring the Server" on page 30.

Connecting to the Server Using a Terminal Server

The pinouts for the Netra X1 server's serial ports correspond with the pinouts for the RJ-45 ports on the Asynchronous Serial Interface Breakout Cable supplied by Cisco for use with the Cisco L2511 terminal server. You can also use terminal servers made by other manufacturers, but check the documentation to see if the serial port pinouts of the Netra X1 server match those of the terminal server you plan to use.

Connecting to a Cisco L2511 Terminal Server

The serial ports on the Netra X1 server are DTE ports. If you connect these to other DTE ports, then the cabling between them must perform a crossover.

The pinouts for the server's serial ports correspond with the pinouts for the RJ-45 ports on Cisco terminal servers. This means that if you are using a Cisco L2511 Terminal Server (and you are connecting the Netra X1 server to it using the Cisco Asynchronous Serial Interface Breakout Cable), you have two connection options:

- Connect the breakout cable directly to the Netra X1 server.

- Connect the breakout cable to a patch panel and use the straight-through patch cable (supplied by Sun) to connect the patch panel to the server.

Connecting to Other Terminal Servers

For terminals from other manufacturers, check the documentation to see if the pinouts of the serial ports on the Netra X1 server match those of the serial ports on your terminal server. If they do not, you need to make a crossover (null-modem) cable that takes each pin on the Netra X1 server's serial port to the corresponding pin in the terminal server's serial port.

TABLE 3-6 shows the crossovers that the cable must perform.

TABLE 3-6 Pin Crossovers for Connecting to a Typical Terminal Server

Netra X1 Serial Port (RJ-45 Connector) Pin	Terminal Server Serial Port Pin
Pin 1 (RTS)	Pin 1 (CTS)
Pin 2 (DTR)	Pin 2 (DSR)
Pin 3 (TXD)	Pin 3 (RXD)
Pin 4 (Signal Ground)	Pin 4 (Signal Ground)
Pin 5 (Signal Ground)	Pin 5 (Signal Ground)
Pin 6 (RXD)	Pin 6 (TXD)
Pin 7 (DSR)	Pin 7 (DTR)
Pin 8 (CTS)	Pin 8 (RTS)

▼ To Connect to a Netra X1 Server Using a Terminal Server

1. **Attach the appropriate crossover cables as described in "Connecting to a Cisco L2511 Terminal Server" on page 21 or "Connecting to Other Terminal Servers" on page 22.**
2. **Open a terminal session on the Sun workstation, and type:**

```
# telnet IP-address-of-terminal-server  port-number
```

For example, for a Netra X1 server connected to port 10000 on a terminal server whose IP address is 192.20.30.10, you would type:

```
# telnet 192.20.30.10 10000
```

Connecting to the Server Using a System Running Microsoft Windows

If you want to configure and operate a Netra X1 server from a PC or laptop running Microsoft Windows, you can do so using the Windows Hyperterminal.

Note – The following procedure relates to Windows 98: other variants of Microsoft Windows may differ slightly.

Note – If you use a Palm Pilot or similar device, make sure that Hot Sync Manager is closed. If it is not closed, you will not be able to communicate with the server from your PC or laptop.

---

1. **Connect the RJ-45 patch cable to the port labelled “A LOM” on the rear of the server.**
2. **Connect the other end of the patch cable to the DB-9 adapter.**
3. **Connect the DB-9 serial adapter to the COM1 serial port on your PC or laptop.**
4. **Open a Windows Hyperterminal:**
   a. **Choose Start > Programs > Accessories > Communications > Hyperterminal**
   b. **Run** `Hyperttrm.exe`
5. **In the Set Up New Session window:**
   a. **Name the session.**
   b. **Choose an icon.**
   c. **Click OK.**
6. **In the Connect To window:**
   a. **Click Edit.**

b. Click Connect Using.

c. In the drop-down menu, click Direct to COM1.

Note – If you connected the DB-9 adaptor to a port other than COM1 on your PC or laptop in Step 3, choose the appropriate option from the list in the drop-down menu.

---

d. Click OK.

7. In the COM1 Properties window:

a. Change the Bits Per Second value to 9600.

b. Set Flow Control to Xon/Xoff.

The correct values for all settings in this window are as shown below.

Property	Setting
Bits Per Second	9600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Xon/Xoff

c. Click OK.

The `lom>` prompt now appears in the Windows Hyperterminal. For information about how to power on and configure the server, go to “Powering On and Configuring the Server” on page 30.

Connecting to the Server Using a Handheld Device

The Netra X1 server can be configured from a handheld device that uses PalmOS 2.0 or later, as long as you have VT100 terminal emulation software installed on the device and the correct hardware with which to connect to the server.

▼ To Set Up the Hardware

Note – To connect a handheld device to a Netra X1 server you need a *male* DB-9 adapter which performs the same crossovers as those listed in TABLE 3-5.

1. **Connect the RJ-45 cable supplied with the server to the server's A LOM port.**
2. **Connect the other end of the cable to the DB-9 adapter.**
3. **Connect the DB-9 adapter to the serial cable leading to your PalmOS device's cradle or travel kit.**

▼ To Set Up the Software

Note – To configure the Netra X1 server from a handheld device, you need VT100 emulation software installed. The following procedure was based on a package called "Online" which is available from `http://www.markspace.com/online.html#Getting`. This web address also gives you information on installing and using the software.

Once the program is installed:

1. **Go to the Applications menu.**
2. **Click the Online icon.**
3. **Choose Menu > Options > Communications and make the following settings.**

   This ensures correct communication with the server.

Property	Method
Method	Serial
Port	Serial
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
RTS/CTS	Unchecked
Xon/Xoff	Unchecked

4. **Choose Menu > Options > Terminal and make the following settings:**

Property	Method
Emulate	TTY
Font	Small
Return	LF
Backspace	BS
Add LF	Unchecked
Display follows cursor	Checked
Autowrap to next line	Unchecked
Local echo / Pacing	Unchecked / Off

5. **Click the On button.**

   This starts the software's online mode.

Tip – If the screen prompt does not appear immediately, try pressing the return key. The prompt should appear.

You can now configure the Solaris operating environment and manage the server through the handheld device's terminal emulator. For information on how to power on and configure the server, go to "Powering On and Configuring the Server" on page 30.

The following sections give some additional information that may make using the handheld device's terminal emulator easier.

Using the Arrow Keys

The arrow keys available on the PalmOS device will not work with a Netra X1 server. To work around this problem, specify while you configure Solaris that you are using an Xterm device.

The following keystrokes help you navigate the menus.

Keystroke	Action
Ctrl-F or Tab	Go forward to the next option (down).
Ctrl-B	Go back to the previous option (up).
Space	Select option (X).
Esc-*n*	Go to the next or previous screen, where *n* is indicated at the bottom of the screen. Use this instead of the function (Fn) keys.

▼ To Use Macros

You can manage the server more efficiently by setting macros up in the terminal emulator. To do this:

1. **Choose Menu > Options > Macro.**
2. **Define a name for the macro.**
3. **Specify the text that the macro will execute.**
4. **End the text of each macro with "\n ".**

   This indicates a return signal, and executes the macro.

   The following table gives some example macros.

TABLE 3-7 Example PalmOS Terminal Emulator Macros

Macro Name	Command	Action
backspace	`stty erase ^H\n`	Enables the Graffiti stroke for "delete" to work on the screen without printing the ^H character.
arrow-enable	`csh;setenv TERM dtterm\n`	Switch to `csh` and set the terminal variable to `dtterm`. This enables the on-screen arrows to work on applications such as vi.

CHAPTER 4

Powering On and Configuring the Netra X1 Server

This chapter explains how to use the Power (On/Standby) switch, configure the server, and power it on. The chapter contains the following sections:

Powering On and Configuring the Server

The Netra X1 server comes pre-installed with the Solaris 8 operating environment. When you power on the server for the first time, you will automatically be taken through a configuration procedure during which you will be asked a number of questions. Your answers determine how the server is configured.

Choose the configuration that best suits your requirements from the list below, and follow the instructions in the appropriate section to power on and configure your server.

- "To Power On With the Server's Details Registered at a Name Server" on page 30
- "To Power On Without the Server's Details Registered at a Name Server" on page 31
- "To Power On a Standalone Server for the First Time" on page 33
- "To Clear Your Configuration and Start Again" on page 34

Note – Do not use the power on/standby switch on the back of the server to power on. You power on from the keyboard, and that step is included in these instructions.

Before configuring a Netra X1 server:

- Connect the server to a power source (see "Connecting the Cables" on page 11).
- Set up a serial connection to the server using one of the serial ports on the server's back panel and your choice of workstation (see "Setting Up a Console Connection to the Server" on page 16).

▼ To Power On With the Server's Details Registered at a Name Server

---

Note – Follow the instructions in this section only if you have a name server installed on your network. For instructions on using a name server to automate the process of configuring the Solaris operating environment on multiple servers, refer to the *Solaris 8 Advanced Installation Guide* which accompanies the Solaris 8 operating environment CDs.

---

1. **Connect the server to the power supply but do not power it on.**

2. **Set up a serial connection to the Serial A/LOM port and also a connection to at least one Ethernet hub (as described in Chapter 3).**

3. **At the console** `lom>` **prompt, type the following command to power on the server:**

```
lom> poweron
```

   For more information about the `lom>` prompt and the commands that are available from it, see Chapter 5.

   During booting you will be prompted for certain information. The information you provide determines the configuration of the server.

4. **Specify a language.**

5. **Specify your locale.**

6. **Specify the type of terminal you are using to communicate with the Netra X1 server.**

7. **Specify whether you need IPv6 enabled, and then follow the instructions on the screen.**

8. **Specify whether you want to enable the Kerberos Security mechanism, and then follow the instructions on the screen.**

9. **Confirm the information you have typed.**

10. **Specify time and date information.**

11. **Give a password (if any) for users logging in as root.**

12. **When asked if you want the server to perform Automatic Power Saving Shutdown, answer No.**

Note – If you answer Yes, the server will automatically put itself into Standby mode after a period of idleness.

The system will boot when you have provided it with the information it needs.

▼ To Power On Without the Server's Details Registered at a Name Server

Follow the instructions in this section if you do not have a Name Server configured on your network.

Tip – Read these instructions through before you follow them, to see what information the system will prompt you for when you start it for the first time.

1. **Connect the server to the power supply but do not power it on.**
2. **Set up a serial connection to the Serial A/LOM port and also a connection to at least one Ethernet hub (as described in Chapter 3).**
3. **At the `lom>` prompt, type the following command to power on the server:**

```
lom> poweron
```

   For more information about the `lom>` prompt and the commands that are available from it, see Chapter 5.

   During booting you will be prompted for certain information. The information you provide determines the configuration of the server.

4. **Specify a language.**
5. **Specify your locale.**
6. **Specify the type of terminal you are using to communicate with the Netra X1 server.**
7. **Specify whether the IP address is to be configured manually or by DHCP.**

   If manually, specify an IP address when prompted.

8. **Specify which of the Ethernet ports you intend to use as the primary Ethernet connection.**

   For the port labeled Net0, specify `dmfe0`. For the port labeled Net1, specify `dmfe1`.

9. **Specify a host name for the server.**
10. **Specify whether you need IPv6 enabled, and then follow the instructions on the screen.**
11. **Specify whether you want to enable the Kerberos Security mechanism, and then follow the instructions on the screen.**
12. **Specify the name service you want the server to use.**
13. **Specify the name of the domain of which the server will be a part.**
14. **Specify whether you want the system to search the network for a name server or whether you want it to use a particular name server.**

15. **If you chose to use a particular name server, specify the host name and IP address of the name server.**
16. **Specify whether the Netra X1 server is to be part of a subnet.**
17. **Specify a Netmask for the server.**
18. **Confirm the information you have typed.**
19. **Specify time and date information.**
20. **When prompted, give a password (if any) for users logging in as root.**
21. **When asked if you want the server to perform Automatic Power Saving Shutdown, answer No.**

Note – If you answer Yes, the server will automatically put itself into Standby mode after a period of idleness.

The system will boot when you have provided it with the information it needs.

▼ To Power On a Standalone Server for the First Time

1. **Connect the server to the power supply but do not power it on.**
2. **Set up a serial connection using the Serial A/LOM port (as described in "Setting Up a Console Connection to the Server" on page 16).**
3. **At the `lom>` prompt, type the following command to power on the server:**

```
lom> poweron
```

For more information about the `lom>` prompt and the commands that are available from it, see Chapter 5.

4. **Specify a language.**
5. **Specify your locale.**
6. **Specify the type of terminal you are using to communicate with the Netra X1 server.**
7. **When prompted to indicate whether you want the server to be networked, specify No.**

8. **Specify a Host Name for the server.**
9. **Confirm the information you have given.**
10. **Specify the date and time information.**
11. **When prompted, give a password (if any) for users logging in as root.**
12. **When asked if you want the server to perform Automatic Power Saving Shutdown, answer No.**

Note – If you answer Yes, the server will automatically put itself into Standby mode after a period of idleness.

The system will boot when you have provided it with the information it needs.

▼ To Clear Your Configuration and Start Again

If you want to start the power on process again, as if from a previously unused server, you must clear the configuration of the server.

- **If you are at the** `lom>` **prompt, go to the** `ok` **prompt by typing:**

```
lom> break
```

1. **Boot the server into the Solaris environment by typing:**

```
ok boot
```

2. **At the Solaris prompt, type:**

```
# sys-unconfig
```

3. **When prompted to confirm that you want to create a 'blank' server, type** `y`**.**

4. **When the server has unconfigured itself, type the LOM escape sequence. By default, this is**:

```
# #.
```

When the `lom>` prompt appears, follow the instructions in one of the following sections:

- "To Power On With the Server's Details Registered at a Name Server" on page 30 or
- "To Power On Without the Server's Details Registered at a Name Server" on page 31.
- "To Power On a Standalone Server for the First Time" on page 33

Using the Power (On / Standby) Switch

Caution – The power switch on the back panel of the Netra X1 server is not an On / Off switch, it is an On / Standby switch. It does not isolate the equipment.

The power (On / Standby) switch on the Netra X1 server is a rocker type, momentary action switch. It controls only low-voltage signals; no high-voltage circuits pass through it. This means that the main method of connecting or disconnecting power is by inserting or removing the power supply cord. The server contains no integral circuit breakers: to isolate it, you must break all connections to it. If you do not do this by removing the power supply cord, you must instead open all external circuit breakers.

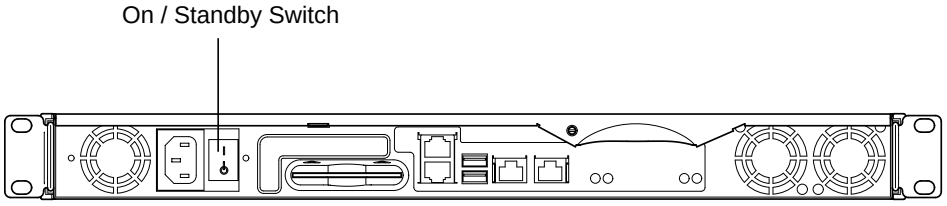

FIGURE 4-1 Netra X1 Server Power (On / Standby) Switch

The symbols on the switch are:

On

- Press to apply power to the server.

Standby

- Press for less than four seconds to initiate an orderly shutdown of the system into Standby mode.
- Press and hold down for more than four seconds to leave only the LOM and certain battery backed functions running.

As long as the power cable is connected to the Netra X1 server, then the server is either powered on or in standby power mode. To power the server on, or return it to standby power mode only, use either of the following methods:

- Commands from the `lom>` prompt.
- The rocker switch.

To completely remove power from the server:

- Disconnect the power cable from the server.

PART II Remote and Local Management

CHAPTER 5

Managing the Netra X1 Server From the lom> Prompt

This chapter introduces the LOMlite2 Lights-Out Management (LOM) facilities available for the Netra X1 server and describes how to use the /usr/sbin/lom utility, which provides a user interface to the device. The chapter contains the following sections:

Note – For information about how to configure the LOMlite2 device-driver, see Appendix B.

Introduction to Lights-Out Management

Lights Out Management (LOM) commands allow you to remotely manage a server that is deployed in a "lights-out" environment. You can also use LOM commands to perform quick onsite management tasks at a locally connected terminal.

LOM commands allow you to:

- Power the server on or to standby mode.
- Monitor the server's temperature and the status of its power supply, fans, internal voltage rails, fault LED, and alarms, even when the server is in standby mode.
- Turn a Fault LED on.
- Configure the server to restart automatically after a lockup.

These LOM facilities are provided by the LOMlite2 device, which in the Netra X1 server is contained on the system board. As long as the server is connected to a power supply, but not powered on, you will see the `lom>` prompt at your terminal. This is because the LOMlite2 device uses standby power and remains active even when the server is not powered on.

There are two ways to interrogate the LOMlite2 device or to send it commands to perform. You can do either of the following:

- Issue LOMlite2 commands from the `lom>` shell prompt. (Explained in this chapter.)
- Issue LOMlite2-specific Solaris commands from the console prompt. (Explained in Chapter 6.)

Using LOMlite2 Commands

To use the LOM facilities either remotely or locally, establish a terminal connection to the Serial A/LOM port on the server. For details on how to do this, see "Setting Up a Console Connection to the Server" on page 16.

With the server connected to a power source but not powered on, and with a terminal connected to the Serial A/LOM port, you will see the `lom>` prompt.

When you power on the server, the prompt will change to the Solaris console prompt. For details on how to get back to the lom> prompt, see "To Display the `lom>` Prompt" on page 43.

Powering On or Resetting the Server From the LOMlite2 Shell

Note – When the Netra X1 server is connected to a power supply, it is always either fully powered on or in standby mode. To remove power entirely from the server you must disconnect its power cables or open all external circuit breakers. The methods referred to in this chapter for powering the server on and off by using `lom>` prompt commands are methods either of powering the server on or returning it to standby power mode. The `poweroff` command does not power the server off completely.

Note – All commands that involve powering on or off, resetting, or specifying the boot mode of the server require you or the named user to have `r`-level LOMlite2 user permission. If you have not set up any named users of the LOMlite2 device, then you have `r`-level permission by default. If you have set up one or more named users, then you must explicitly give them `r`-level permission to use these commands. For more information about user privileges, see “Setting Up LOMlite2 Privileges for Named Users” on page 52.

▼ To Power On the Server or to Power Down to Standby Mode

- **To power on the server, type:**

```
lom> poweron
```

- **To power the server down to standby mode, type:**

```
lom> poweroff
```

▼ To Display the `lom>` Prompt

- **To display the `lom>` prompt, type the following LOMlite2 escape sequence:**

```
# #.
```

When you type the LOMlite2 escape sequence, the LOMlite2 device takes control of the Serial A/LOM port and the `lom>` prompt appears on your terminal screen. You can type the LOMlite2 escape sequence at any time.

Note – If you are at the console and you type the first character of the LOM escape sequence (by default this is #), there is a delay of one second before the character appears on the screen. This is because the server waits to see if you type the dot (.) character next. If you do, the `lom>` prompt is displayed. If you do not, the # character appears on the screen.

For information about changing the first character of the LOMlite2 escape sequence, see “To Change the First Character of the Sequence for Escaping to the `lom>` Prompt (`lom -X`)” on page 76.

▼ To Exit From the `lom>` Prompt

- **To return to the Solaris console prompt from the `lom>` prompt, type:**

```
lom> console
```

Note – If you have the Serial A/LOM port dedicated to the LOMlite2 device (instead of shared between the LOMlite2 and the console), this command will have no effect. For information about dedicating the Serial A/LOM port to the LOMlite2 device, see “Separating LOMlite2 From the Console on the Serial A/LOM Port” on page 59.

Note – If you have set up named users of the LOMlite2 device, the users need `c`-level permission to use the `console` command. Without it, the command will not work. For more information about setting up user permissions, see “Setting Up LOMlite2 Privileges for Named Users” on page 52.

▼ To Reset the Server

- **To reset the server, type:**

```
lom> reset
```

- **To perform a limited reset affecting the processor only, type:**

```
lom> reset -x
```

The `-x` option generates the equivalent of an externally initiated reset (XIR) of the server. You must have `r`-level permission to use this command. (For information about user authorization levels, see “Setting Up LOMlite2 Privileges for Named Users” on page 52.) The `-x` option takes the server into OpenBoot™ PROM mode and causes it to display the `ok` prompt. It is useful for driver or kernel debugging, because most of the contents of the server’s memory and registers are preserved. The server does not automatically return to the Solaris environment when you reset it using the `-x` option. Instead, you must reboot it from the `ok` prompt.

▼ To Display the `ok` or `kadb` Prompt

To display the `ok` or `kadb` prompt, type the following at the `lom>` prompt:

```
lom> break
```

Note – If the Serial A/LOM port is dedicated to the LOMlite2 device, this command will have no effect. For information about dedicating the Serial A/LOM port to the LOMlite2 device, see “Separating LOMlite2 From the Console on the Serial A/LOM Port” on page 59. To use the `break` command, you must have `c`-level LOMlite2 user privileges. For more information, see “Setting Up LOMlite2 Privileges for Named Users” on page 52.

Controlling the Server’s Booting Behavior

The LOMlite2 shell includes a `bootmode` command:

```
bootmode [-u][normal|forth|reset_nvram|diag|skip_diag]
```

This command enables you to dictate the behavior of the server after a reset. Its functionality is identical to that available on Sun keyboards with the L1 key combinations. (However, the `bootmode` command is provided because the L1 key combinations are not available for the Netra X1 server: you cannot use them from a keyboard that is connected to the server with a serial link.)

You must have `r`-level LOMlite2 permission to use the `bootmode` command. For information about user privileges, see “Setting Up LOMlite2 Privileges for Named Users” on page 52.

Boot Modes Available

If you use the `bootmode` command without arguments, the LOMlite2 device reports only the current boot mode. The boot modes available are listed in TABLE 5-1.

TABLE 5-1 Boot Modes

Mode	Description
`-u`	This option does not represent a boot mode. However, if you have previously dedicated the Serial A/LOM port to LOMlite2 and you now want to share the port between the console and LOMlite2, you can use the `-u` option. It is a quick alternative to the procedure described for sharing the Serial A/LOM port in the section “Separating LOMlite2 From the Console on the Serial A/LOM Port” on page 59.
`normal`	In this mode, the server boots using your OpenBoot PROM settings. To cause this parameter to take effect, you must reset the server after using the `bootmode` command at the `lom>` prompt.
`forth`	In this mode, the server does not boot to the Solaris environment but stops the boot cycle at the `ok` prompt. The command is equivalent to the L1-F key combination for Sun keyboards. To cause the parameter to take effect, you must use the `bootmode forth` command at the `lom>` prompt and then reset the server. (It is only when the server resets that it reads the new `forth` parameter from the LOMlite2 device.)

TABLE 5-1 Boot Modes

Mode	Description
`reset_nvram`	In this mode, the server returns all NVRAM data to its default setting. The command is equivalent to the L1-N key combination for Sun keyboards. To cause the parameter to take effect, you must reset the server after using the `bootmode` command at the `lom>` prompt.
`diag`	In this mode, the server performs full self-diagnostics as part of the boot process. The command is equivalent to the L1-D key combination for Sun keyboards. To cause the parameter to take effect, you must power off and then power on the server within 10 minutes of using the `bootmode` command at the `lom>` prompt.
`skip_diag`	In this mode, the server skips the diagnostics part of the boot process. To cause the parameter to take effect, you must power off and then power on the server within 10 minutes of using the `bootmode` command at the `lom>` prompt.

Monitoring the Server From the LOMlite2 Shell

This section describes commands that enable you to check the status of the server and the components monitored by the LOMlite2 device.

It also describes how to view the events stored in the LOMlite2 device's event log.

▼ To Check How Long the Server Has Been Running

- **To find out how much time has elapsed since the last boot, type:**

```
lom> date
Time since last boot: +8d+20h48m2s
```

or:

```
lom> showdate
Time since last boot: +8d+21h49m6s
```

▼ To Check the Current Status of All Components

- **To see the current status of all the components monitored by the LOMlite2 device, type:**

```
lom> environment
```

CODE EXAMPLE 5-1 shows sample output from the `environment` command. In this example, all the components are running normally and none are faulty.

CODE EXAMPLE 5-1 Sample Output From the `environment` Command

```
lom>environment
Fault OFF
Alarm 1 OFF
Alarm 2 OFF
Alarm 3 OFF

Fans:
1 OK speed 99%
2 OK speed 95%

PSUs:
1 OK

Temperature sensors:
1 28degC OK
```

```
Overheat sensors:
1 OK


Supply rails:
1 OK
2 OK
3 OK
4 OK
5 OK

lom>
```

Viewing the LOMlite2 Event Log

The `eventlog` command reports the last 10 events. The `loghistory` command can report up to several hundred events. Note that the first event is the oldest and that each event has a time stamp indicating the hours and minutes (and, if applicable, days) since the following:

- The LOMlite2 device was last powered off (that is, since all power to the server, including standby power, was last removed) or
- If the server has been booted since all power was last removed, then the time stamp indicates the number of days, hours, and minutes since the last reboot.

▼ To View the Last 10 Events in the Event Log

- **Type:**

```
lom> show eventlog
```

▼ To View the Entire Event Log

- **Type:**

```
lom> loghistory [pause x] [level y]
```

where *x* is the number of lines you want to display before pausing, and *y* is the severity level of the events you want to see. By default, the `loghistory` command displays all the events in the log and does not pause the display.

If you specify a severity level, you will see reports for the level you specify and above. For example, if you specify level 2, you will see reports of level 2 and level 1 events. If you specify level 3, you will see reports of level 3, level 2, and level 1 events.

If you do not specify a level, you will see events for all levels.

For more information about severity levels, see "Viewing Event Reports That LOMlite2 Sends to `syslogd`" on page 60.

Each entry in the log includes the time of the event, the server's host name, a unique identifier for the event, and a user-friendly text message describing the event.

Note – The LOMlite2 device's Event Log is never cleared, and it can contain several hundred entries. Events are stored from the very first time the server boots. Eventually the buffer might become full, but when this happens, the LOMlite2 device will start again at the beginning of the buffer, overwriting the earliest events.

▼ To View All Events From the First to the *n*th Event Logged

- **Type:**

```
lom> loghistory index +n [pause x] [level y]
```

where *n* is the number of events you want to see that have been logged since the first event in the current log, *x* is the number of lines you want to display before pausing, and *y* is the severity level of the events you want to see. By default, the `loghistory` command does not pause the display.

▼ To View All Events From the Last One Logged to the *n*th Event Before It

- **Type:**

```
lom> loghistory index -n [pause x] [level y]
```

where *n* is the number of events you want to see listed that were logged before the last event in the current log, *x* is the number of lines you want to display before pausing, and *y* is the severity level of the events you want to see. By default, the `loghistory` command does not pause the display.

- **To see the last five events, type:**

```
lom> loghistory index -5
+0h39m34s Alarm 1 ON
+0h39m40s Alarm 3 ON
+0h39m54s Alarm 3 OFF
+0h40m0s Alarm 1 OFF
+0h40m58s Fault LED ON
```

Verifying That a Component Has Been Fixed

If a monitored component has failed, the LOMlite2 device does not continue to report the failure. You can, however, check the status of a component, for example, after attempting to fix it.

▼ To Check the Status of a Component

- **Type:**

```
lom> check
```

This causes the LOMlite2 device to update the status of all the components it monitors.

Setting Up LOMlite2 Privileges for Named Users

You can specify up to four named users of the LOMlite2 device on a Netra X1 server. By default, no users are set up, and therefore no user login prompt appears when you use the LOM escape sequence.

However, if you set up one or more users, every time you use the LOM escape sequence to display the `lom>` prompt, you will be prompted for a user name and password. Therefore, one of the user accounts you set up must be for yourself.

Permissions Available for LOMlite2 Users

Four areas of authorization are available for named users. When you create a new user, no permissions are assigned until you use the `userperm` command. If you specify any permissions (using the `lom> userperm` command), only those that you specify will be available.

The four areas of authorization available are:

- **Console permission (`c`-level)**
  This enables the named user to select the system console from the `lom>` prompt (if the Serial A/LOM port is shared between the LOMlite2 and the console). The `break` command also requires console permission.
- **User Administration permission (`u`-level)**
  This enables the named user to add and delete users and alter their permissions.
- **Administration permission (`a`-level)**
  This enables the named user to change the LOMlite2 device's configuration variables (see "Introduction to Lights-Out Management" on page 41).
- **Reset permission (`r`-level)**
  This enables the user you have named to reset the server and to power it on and off using the LOMlite2 device.

For information about how to specify one or more of these areas of authorization for a named user, see "To Specify Permissions for a Named User" on page 55.

▼ To Create a LOMlite2 User Account

- **Type:**

```
lom> useradd username
```

where the *username* is up to eight characters long, begins with an alphabetic character, and contains at least one lowercase alphabetic character. You can use any of the following characters in the user name:

- Alphanumeric
- Period (.)
- Underscore (_)
- Hyphen (-)

Note – You must have User Administration (u-level) authorization to add a user (see "Permissions Available for LOMlite2 Users" on page 52). If you have not added any users, you have a-level and all other levels of authorization by default.

▼ To Specify the Password for a LOMlite2 User Account

- **Type:**

```
lom> userpassword username
```

where the *username* is the name of a LOMlite2 user account that already exists.

Note – You must have User Administration (u-level) authorization to set a password for a user (see "Permissions Available for LOMlite2 Users" on page 52).

▼ To View the Details of a LOMlite2 User Account

- **Type:**

```
lom> usershow
```

This command displays the details of all users.

Note – You must have User Administration (u-level) authorization to view the details of a LOMlite2 user account (see “Permissions Available for LOMlite2 Users” on page 52).

▼ To Change Your Own User Password

1. **To change the password for the account you are currently logged into, type:**

```
lom> password
```

2. **When prompted, specify the current password.**
3. **When prompted, specify the new password you want to use.**
4. **Specify the new password again to confirm it.**

▼ To Delete a LOMlite2 User Account

- **Type:**

```
lom> userdel username
```

where the *username* is the name of an existing LOMlite2 user account.

Note – You must have User Administration (a-level) authorization to delete a user account (see “Permissions Available for LOMlite2 Users” on page 52).

If you delete all the users you have set up, you will no longer see the login prompt when you go to the `lom>` prompt.

By default, all four areas of authorization are available to each named user you set up. You can limit users to a particular area or areas of authorization by specifying permissions for a named user.

▼ To Specify Permissions for a Named User

- **Type:**

```
lom> userperm username [c][u][a][r][-]
```

You can specify:

- **All four parameters** (for example, `userperm cuar`)
  This also makes all four areas available to the named user.
- **One, two, or three parameters**
  This makes only the parameter or parameters you specify available.

The parameters are:

- **`c`**
  This stands for “console permission”. It enables the named user to exit from the `lom>` prompt to the Solaris prompt (as long as the Serial A/LOM port is shared between LOMlite2 and the console).
- **`u`**
  This stands for “user administration permission”. It enables the named user to add and delete users and alter their areas of authorization by using the `userperm` command.
- **`a`**
  This stands for “administration permission”. It enables the named user to change the LOMlite2 device’s configuration variables (see “Setting the LOMlite2 Device’s Configurable Variables” on page 56).
- **`r`**
  This stands for “reset permission”. It enables the user you have named to reset the server and to power it on and off using the LOMlite2 device.
- -

  Use this character to specify that no permissions are assigned.

▼ To Quit a LOMlite2 Named User Session

- **Type:**

```
lom> logout
```

This returns you to the LOMlite2 login prompt.

Setting the LOMlite2 Device's Configurable Variables

Note – To be able to run the commands described in this section, a named user must have a-level permission. For more information, see "Setting Up LOMlite2 Privileges for Named Users" on page 52.

▼ To Turn the Fault LED On and Off

- **To turn the Fault LED on by setting the** `faulton` **variable, type:**

```
lom> faulton
```

- **To turn the Fault LED off by setting the** `faultoff` **variable, type:**

```
lom> faultoff
```

▼ To Set an Alarm Flag

- **Turn the alarm on by typing:**

```
lom> alarmon n
```

where *n* is the number of the alarm you want to turn on: 1, 2, or 3.

- **Turn the alarm off by typing:**

```
lom> alarmoff n
```

where *n* is the number of the alarm you want to turn off: 1, 2, or 3.

Alarms 1, 2, and 3 are software flags. They are not associated with any specific conditions, but are available to be set by your own processes or from the command line. For more information, see "To Turn the Alarms On and Off (`lom -A`)" on page 75.

▼ To Stop LOMlite2 Sending Event Reports to the Serial A/LOM Port

- **Enable event reporting by typing:**

```
lom> event-reporting on
```

Note – This is the equivalent of using the `lom -E on` command from the Solaris shell. For more information, see "To View the Event Log (`lom -e`)" on page 70.

- **Disable event reporting by typing:**

```
lom> event-reporting off
```

Note – This is the equivalent of using the `lom -E off` command from the Solaris shell. For more details, see "To Stop LOMlite2 From Sending Reports to the Serial A/LOM Port (`lom -E off`)" on page 76.

Separating LOMlite2 From the Console on the Serial A/LOM Port

By default, the LOMlite2 device shares the Serial A/LOM port with the console, and when it has an event report to send, it takes control of the Serial A/LOM port itself, interrupting any console activity you are performing. To prevent the LOMlite2 device from interrupting the console, either turn serial event reporting off (see Chapter 6), or dedicate the Serial A/LOM port to the LOMlite2 device and use the Serial B port for console activity. The next section, "To Dedicate Serial A/LOM to LOMlite2" on page 59, gives more detail.

The advantages of dedicating the Serial A/LOM port to the LOMlite2 device and using Serial B as your console port include:

- Preserving the ability to power on or reset the server (from the `lom>` prompt on Serial A/LOM) even if for any reason you lose access to Solaris on your console port (Serial B).
- Capturing all LOMlite2 events passively on a terminal connected to the dedicated LOM port (Serial A/LOM). Note, however, that if you dedicate the Serial A/LOM port to the LOMlite2 device, you cannot use the `console` command to quit the LOMlite2 shell. Instead, for access to the Solaris environment, you must connect to the server using the Serial B port.
- Preventing a user with console access from using the LOMlite2 escape sequence to exit the Solaris environment and access the LOMlite2 shell. If you dedicate the Serial B port to the console, users cannot bring up the LOMlite2 shell, which means that they cannot interrogate or reconfigure the LOMlite2 device.
- Performing binary data transfers. To perform any task other than an ASCII transfer, you must use the Serial B port.

▼ To Dedicate Serial A/LOM to LOMlite2

1. **Set up console connections to both the Serial A/LOM port and the Serial B port.**
2. **At the Solaris prompt, type:**

```
# eeprom input-device=ttyb
# eeprom output-device=ttyb
# reboot
```

The Serial B port (ttyb) is now your console port. The Serial A/LOM port remains in the control of the LOMlite2 device.

▼ Sharing Serial A/LOM Between LOMlite2 and the Console

Note – By default, the Serial A/LOM port is shared by the LOMlite2 device and the console. Therefore, you should follow the instructions in this section only if you have configured the server by using the instructions in the previous section ("To Dedicate Serial A/LOM to LOMlite2" on page 59) and you now want to share the Serial A/LOM port between LOMlite2 and the console.

---

1. **Set up console connections to both the Serial A/LOM port and the Serial B port.**
2. **At the Solaris prompt, type:**

```
# eeprom input-device=ttya
# eeprom output-device=ttya
# reboot
```

The Serial A/LOM port (ttya) is now shared between the LOMlite2 device and the console.

Viewing Event Reports That LOMlite2 Sends to `syslogd`

The LOMlite2 device monitors the status of the fans, supply rails, temperature, and power supply even when the server is powered off (the LOMlite2 device operates on standby power). If it detects a fault, it turns on the Fault LED on the server's front and back panels and stores a report in an event log, which resides in memory on the LOMlite2 device. When the Solaris environment is running, the LOMlite2 device also sends event reports to `syslogd`. The `syslogd` handles these in the way it has been configured to handle event reports. This means that by default it sends them to the console and stores them in:

`/var/adm/messages`

In this file, the reports are displayed with a label identifying them as `lom` reports and indicating their severity. Starting with the most severe, the levels of severity are:

1. **Fatal**

   Fatal events can cause the server to shut itself down. Examples of fatal events are:

   - Supply rail failures.
   - Exceeded temperature thresholds.

2. **Warning**

   Warning events do not cause the server to shut down, but they do require immediate attention. Examples of warning events are:

   - Fans turning too slowly.
   - Fault LED has been turned on.
   - System Configuration Card has been removed.

3. **Info**

   Info events are most likely to inform you that a problem is now fixed. For example, if you reinsert the System Configuration Card, the LOMlite2 device will generate an event to say that the System Configuration Card has been restored.

4. **User**

   User level events indicate the activity of named users whom you have authorized to access the LOMlite2 device. For example, an event is generated when a user logs in or out.

LOMlite2 Shell Command List

The commands you can use from the `lom>` prompt are listed in TABLE 5-2.

TABLE 5-2 LOM Commands

Command	Description
`alarmoff` *n*	Sets alarm *n* off, where *n* is 1, 2, or 3. These three alarms are software flags. They are associated with no specific conditions but are available to be set by your own processes.
`alarmon` *n*	Sets alarm *n* on. See the description for the `alarmoff` command.
`break`	Takes the server down to the `ok` prompt.
`bootmode`	Determines the behavior of the server during the boot process.

TABLE 5-2 LOM Commands *(Continued)*

Command	Description
`check`	Resets monitoring to report all failures. If a monitored component has failed, the LOMlite2 device will not continue to report the same failure. To check the status of the component, for example, after attempting to fix it, use the `check` command. This updates the status of all monitored components.
`console`	Takes you out of the LOMlite2 shell and back to the Solaris prompt. It returns control of the serial connection to the console.
`environment`	Displays the temperature of the server and the status of the fans, the power supply, the overtemperature monitors, the supply rails and circuit breakers, the alarms, and the fault LED.
`faulton`	Sets the Fault LED to On.
`faultoff`	Sets the Fault LED to Off.
`help`	Displays the list of LOM commands.
`loghistory`	Displays all the events in the LOMlite2 device's Event Log.
`logout`	Returns named users you have set up with password access to the LOM user login prompt.
`poweron`	Powers the server on.
`poweroff`	Powers the server down to standby power mode.
`reset`	Resets the server.
`show model`	Displays the server model.
`show hostname`	Displays the server name (this command is equivalent to the Solaris `uname -n command`).
`show eventlog`	Displays the LOMlite2 device's event log. The event log is the list of the last 10 events stored in the LOMlite2 device. The most recent event is the one at the bottom of the list.
`show escape`	Displays the current LOMlite2 escape sequence.
`show`	Displays all the information available with the `show` command.
`useradd`	Adds a user to the LOMlite2 device's list of permitted users.
`userdel`	Deletes a user from the LOMlite2 device's list of permitted users.
`usershow`	Displays the details of a named user's LOMlite2 account.
`userpassword`	Sets or changes a user's password.
`userperm`	Sets the permission levels for a named user.
`version`	Displays the version number of the LOMlite2 device.

CHAPTER 6

Managing the Netra X1 Server From the Solaris Prompt

This chapter describes how to monitor and manage the Netra X1 server with LOMlite2-specific commands in the Solaris 8 operating environment. It contains the following sections:

Note – For information about how to configure the LOMlite2 device driver, see Appendix A.

Monitoring the System From the Solaris Prompt

To use the Lights-Out Management (LOM) facilities either remotely or locally, you need a terminal connection to the Serial A/LOM port on the server (see “Setting Up a Console Connection to the Server” on page 16).

There are two ways to interrogate LOMlite2 or to send it commands to perform:

- Use LOMlite2 commands from the `lom>` shell prompt. For information about how to do this, see Chapter 5.
- Use LOMlite2-specific Solaris commands from the Solaris prompt. These commands are described in this chapter.

All Solaris commands described in this section are available from the main Solaris # prompt. They run a utility called `/usr/sbin/lom`.

Where appropriate, the command lines given in this section are accompanied by typical output from the commands.

There are also manual pages for the LOMlite2 utility.

▼ To View the LOMlite2 Online Documentation

- **To view the manual pages for the LOMlite2 utility, type:**

```
# man lom
```

▼ To Check the Power Supply Unit (`lom -p`)

- **To check whether the input lines and the output line for the power supply unit are working normally, type:**

```
# lom -p
PSU:
1 OK

#
```

▼ To Check the Fan Status (`lom -f`)

- **Type:**

```
# lom -f
Fans:
1 OK speed 99%

#
```

Checking the Supply Rail Voltages and Internal Circuit Breakers (`lom -v`)

The supply rails are the Netra X1 server's internal power lines. If the status of any of these is `faulty`, contact your local Sun sales representative. It means that you have either a faulty system board or a faulty PSU.

The `-v` option also displays the status of the server's internal circuit breakers. For any that have been tripped, the status will read `faulty`. The system contains three circuit breakers: one for each of the USB ports and one for the system configuration card reader.

If there is a problem with the circuit breakers or the USB port circuit breakers, remove the device connected to the relevant port and the circuit breakers will automatically recover.

If there is a problem with the circuit breaker for the system configuration card, it means either that the system configuration card is inserted incorrectly, or is broken. Insert a valid one to check.

▼ To Check the Status of the Supply Rails and Internal Circuit Breakers

- **Type:**

```
# lom -v
Supply voltages:
 1 5V status=ok
 2 3V3 status=ok
 3 +12V status=ok
 4 -12V status=ok
 5 VDD-CORE status=ok

System status flags (circuit breakers):
1 USB0 status=ok
2 USB1 status=ok
```

▼ To Check the Internal Temperature

- **Type:**

```
# lom -t
System Temperature Sensors:
1 enclosure 25 degC : warning 67 degC : shutdown 72 degC

System Over-temperature Sensors:
1 cpu status=ok
#
```

This checks the server's internal temperature, and the warning and shutdown threshold temperatures.

▼ To Check Whether the Fault LED and Alarms Are On or Off

- **Type:**

```
# lom -l
LOMlite alarm states:
Alarm1=off
Alarm2=off
Alarm3=off
Fault LED=on
#
```

Alarms 1, 2, and 3 are software flags. They are not associated with any specific conditions, but are available to be set by your own processes or from the command line. For more information, see “To Turn the Alarms On and Off (`lom -A`)” on page 75.

▼ To Change the LOMlite2 Automatic Server Restart Configuration (`lom -w`)

For full information about enabling and using LOMlite2’s Automatic Server Restart (ASR) process, see “To Configure the LOMlite2 ASR” on page 72.

- **To find out how the LOMlite2 watchdog is currently configured, type:**

```
# lom -w
LOMlite watchdog (ASR) settings:
Watchdog=on
Hardware reset=off
Timeout=40 s
#
```

The LOMlite2 watchdog is enabled by default when the Solaris environment boots. This means that, by default, if the watchdog does not receive a “pat” for 40,000 milliseconds, it will turn on the Fault LED on the front and back panels of the system, generate a LOM event report, and, if configured to do so, perform an automatic server restart. However, although the watchdog is enabled by default when Solaris boots, the `Hardware reset` option is not. This means that the LOMlite2 device does not, by default, automatically restart the server after a lockup.

- **To configure the LOMlite2 device to perform an automatic server restart (ASR) after a lockup, you must enable the** `Hardware reset` **option as well as the** `Watchdog` **option.**

  For more information, see “Configuring Automatic Server Restart (ASR)” on page 71.

▼ To View the Configuration of LOMlite2

- **To view the settings of all the configurable variables for the LOMlite2 device, type:**

```
# lom -c
LOMlite configuration settings:
serial escape character=#
serial event reporting=default
Event reporting level=fatal, warning & information
Serial security=enabled
Disable watchdog on break=disabled
Automatic return to console=disabled
alarm3 mode=watchdog
firmware version=3.0
firmware checksum=2983
product revision=0.0
product ID=Netra X1 200
#
```

▼ To View All the Status Data Stored by LOMlite2, Plus Details of the Device's Own Configuration

- **Type:**

```
# lom -a
```

The code example below gives sample output of this command:

CODE EXAMPLE 6-1 Sample `lom -a` output

```
PSUs:
1 OK

Fans:
1 OK speed 68%

LOMlite configuration settings:
serial escape character=#
serial event reporting=default
Event reporting level=fatal, warning & information
Serial security=enabled
Disable watchdog on break=enabled
Automatic return to console=disabled
alarm3 mode=user controlled
firmware version=3.9
firmware checksum=2262
product revision=0.1
product ID=Netra X1

LOMlite Event Log:
 +12d+18h28m30s  fault led state - ON
 +12d+18h28m34s  fault led state - OFF
 +12d+18h28m43s  fault led state - ON
 +12d+18h28m45s  fault led state - OFF
 +12d+18h28m46s  fault led state - ON
 +12d+18h28m47s  fault led state - OFF
 +12d+18h28m48s  fault led state - ON
 +12d+18h28m49s  fault led state - OFF
 4/11/2001 15:23:33 GMT LOM time reference
 4/25/2001 15:30:13 GMT LOM time reference
```

CODE EXAMPLE 6-1 Sample `lom -a` output

```
PSUs:
LOMlite alarm states:
Alarm1=off
Alarm2=off
Alarm3=on
Fault LED=off

LOMlite watchdog (ASR) settings:
Watchdog=off
Hardware reset=off
Timeout=127 s

Supply voltages:
 1               5V status=ok
 2              3V3 status=ok
 3             +12V status=ok
 4             -12V status=ok
 5         VDD core status=ok


System status flags (circuit breakers):
 1             USB0 status=ok
 2             USB1 status=ok
 3              SCC status=ok

System Temperature Sensors:
 1        Enclosure 27 degC : warning 67 degC : shutdown 72 degC
System Over-temperature Sensors:
 1 CPU status=ok

Console output prior to last reset:
```

▼ To View the Event Log (`lom -e`)

- **To see the event log, type:**

```
# lom -e n,[x]
```

where *n* is the number of reports (up to 128) that you want to see and *x* specifies the level of reporting you require. There are four levels of event reporting:

1. Fatal events
2. Warning events
3. Information events
4. User events

If you specify a level, you will see reports for that level and above. For example, if you specify level 2, you will see reports of level 2 and level 1 events. If you specify level 3, you will see reports of level 3, level 2, and level 1 events.

If you do not specify a level, you will see reports of level 3, level 2, and level 1 events.

FIGURE 6-1 shows a sample event log display. Note that the first event is the oldest and that each event has a date stamp indicating the days, hours and minutes since the system was last booted.

```
# lom -e 10
LOMlite Event Log:
+0h0m21s host reset
9/15/2000 17:35:28 GMT LOM time reference
+0h3m20s  fault led state - ON
+0h3m24s  fault led state - OFF
+0h39m34s Alarm 1 ON
+0h39m40s Alarm 3 ON
+0h39m54s Alarm 3 OFF
+0h40m0s Alarm 1 OFF
+0h48m52s fault led state - OFF
+0h49m39s Fan 1 FATAL FAULT: failed
+0h50m58s fault led state - ON

# lom -e 10
```

FIGURE 6-1 Sample LOMlite2 Device Event Log (Oldest Event Reported First)

Configuring Automatic Server Restart (ASR)

You can configure LOMlite2 to restart the server automatically after a lockup. LOMlite2 has a watchdog process that, by default, expects to be patted every 10,000 milliseconds. If it does not receive a pat after 40,000 milliseconds (default), then

LOMlite2 turns the front and back fault LEDs on and generates a LOM event report. However, it does not automatically restart the system unless you have configured it to do so.

▼ To Configure the LOMlite2 ASR

- **Add the** `-R` **option to the** `priocntl` **command in the script file called** `/etc/rc2.d/S25lom`**.**

  This is the script that runs the LOMlite2 watchdog process:

```
# priocntl -e -c RT lom -W on,40000,10000 -R on
```

  When you have done this, LOMlite2 will restart the server whenever the watchdog times out.

  You can turn the option on and off from the Solaris command prompt. For more information, see “To set the `Hardware Reset` Option From a Script or Command (`lom -R on`)” on page 73.

  However, as long as you have the `-R on` option set in `/etc/rc2.d/S25lom`, the `Hardware Reset` option will always be enabled when you start the system.

Enabling the LOMlite2 Watchdog Process From Your Own Script or Command (`lom -W on`)

Note – You do not normally need to do this. If you want to configure LOMlite2 to perform an automatic server restart after a lockup, see “To Configure the LOMlite2 ASR” on page 72. Use the `lom -W on` option on the command line or in another script file only if you have removed the `/etc/rc2.d/S25lom` script.

By default, the LOMlite2 watchdog process is enabled, and if you type `lom -W on` while the watchdog process is already running, the command will have no effect. You can run this command only if you have removed the `/etc/rc2.d/S25lom` script file, or if you have turned the watchdog off manually by using the `lom -W off` command.

The default `priocntl` command is:

```
priocntl -e -c RT lom -W on,40000,10000
```

The number 40,000 on this command line indicates the watchdog's timeout period in milliseconds; you can specify a different number. The number 10,000 indicates its pat interval in milliseconds; again, you can specify a different number.

Note – Do not specify a watchdog timeout period of less than 5000 milliseconds. If you do, the watchdog times out frequently even though the server has not locked up.

If the watchdog process times out (in other words, if it does not receive its expected pat), the LOMlite2 device will turn on the server's front and back Fault LEDs and generate a LOM event report. However, it will not automatically reset the system. To make it reset the system, you must use the `-R` option. For more information, see "To set the `Hardware Reset` Option From a Script or Command (`lom -R on`)" on page 73.

- **If you have no LOMlite2 watchdog process running already and you want the process to run, type the following, or add it to another script file:**

```
# lom -W on,40000,10000
```

- **If you want the LOMlite2 device to perform an automatic server restart after a lockup, you must include the `-R on` option in the command, as follows:**

```
# lom -W on,40000,10000 -R on
```

Note – Unless you include the `lom -W on` and `-R on` options in a script file, you must run the `lom` command every time you reboot the system if you want to use the automatic server restart facility. Otherwise the watchdog will not run, and the server will not reset after a lockup.

▼ To set the `Hardware Reset` Option From a Script or Command (`lom -R on`)

To make the LOMlite2 device's watchdog process trigger an automatic server restart (ASR) after a lockup, add the `-R on` option to the command in your `/etc/rc2.d/S25lom` script file. This is the script that runs the watchdog. For instructions about how to do this, see "To Configure the LOMlite2 ASR" on page 72.

However, if for any reason you are not using the script file provided with your system (`/etc/rc2.d/S25lom`) but have instead enabled the watchdog from the command line or from another script file, you can turn the `Hardware reset` option on.

- **To turn the `Hardware reset` option on, type the following at the command line:**

```
# lom -R on
```

- **To turn the `Hardware reset` option off from the command line, type:**

```
# lom -R off
```

Other LOM Tasks You Can Perform From the Solaris Prompt

This section describes how to:

- Turn the alarms and Fault LEDs on and off with the `lom` command.
- Change the first character of the `lom` escape sequence.
- Stop LOMlite2 sending reports to the Serial A/LOM port.
- Remove driver protection from the device driver.
- Make the LOMlite2 interface backward compatible.
- Upgrade LOMlite2 firmware.

▼ To Turn the Alarms On and Off (`lom -A`)

There are three alarms associated with LOMlite2. They are not associated with specific conditions but are software flags that can be set either by your own processes or from the command line.

- **To turn an alarm on from the command line, type:**

```
# lom -A on,n
```

where *n* is the number of the alarm you want to set: 1, 2, or 3.

- **To turn the alarm off from the command line, type:**

```
# lom -A off,n
```

where *n* is the number of the alarm you want to turn off: 1, 2, or 3.

▼ To Turn the Fault LED On and Off (`lom -F`)

- **To turn the Fault LED on, type:**

```
# lom -F on
```

- **To turn the Fault LED off, type:**

```
# lom -F off
```

▼ To Change the First Character of the Sequence for Escaping to the lom> Prompt (lom -X)

The character sequence #. (hash, dot) enables you to exit the Solaris prompt to the lom> prompt.

- **To change the first character of this default lom escape sequence, type:**

```
# lom -X x
```

where *x* is the alphanumeric character you want to use instead of #.

Note – If you are at the console and you type the first character of the LOM escape sequence (by default this is #), there is a delay of one second before the character appears on the screen. This is because the system waits to see if you type the dot (.) character next. If you do, the lom> prompt appears. If you do not, the # character appears. If you want to change the LOM escape character, use a character that is not included in any console commands; otherwise the delay between your striking the key and the character appearing on the screen may affect your typing at the console.

▼ To Stop LOMlite2 From Sending Reports to the Serial A/LOM Port (lom -E off)

LOMlite2 event reports can interfere with information you are attempting to send or receive on the Serial A/LOM port. By default, the Serial A/LOM port is shared by the console and LOMlite2. LOMlite2 interrupts the console whenever it needs to send an event report. To prevent LOMlite2 from interrupting the console on Serial A/LOM, turn serial event reporting off.

- **To stop LOMlite2 from sending reports to the Serial A/LOM port, type:**

```
# lom -E off
```

- **To turn serial event reporting on again, type:**

```
# lom -E on
```

If you want to dedicate the Serial A/LOM port to the LOMlite2 device and you want to use the Serial B port as your console port, see “To Dedicate Serial A/LOM to LOMlite2” on page 59.

▼ To Remove Driver Protection From the LOMlite2 Driver (`lom -U`)

By default, the LOMlite2 driver cannot be unloaded. This is because the driver is required by the watchdog process. If you unload the driver and you have configured the system to restart when the watchdog times out, the watchdog will time out, causing a system reset. For information about configuring the system to restart automatically after a lockup, see “Configuring Automatic Server Restart (ASR)” on page 71.

To remove driver protection from the LOMlite2 driver so that you can unload the driver:

1. **Turn the watchdog process off by typing:**

```
# lom -W off
```

2. **Unload the driver by typing:**

```
# lom -U
```

▼ To Make the LOMlite2 Interface Backward Compatible (`lom -B`)

If you have scripts written to the LOMlite interface on the Netra T1 Model 100/105 server or the Netra t 1400/1405 server and you want to use these scripts on the Netra X1 server, you can add file system links that make this possible. To do so, type:

```
# lom -B
```

When you have done this, you will be able to use the old scripts on the new system.

▼ To Upgrade LOMlite2 Firmware (`lom -G default`)

To upgrade the firmware for LOMlite2, obtain the new firmware package from the SunSolve[SM] website (http://sunsolve.sun.com) or from your local Sun sales representative, and type the following:

```
# lom -G default
```

Note – LOMlite2 firmware upgrades will be released as patches and will include detailed installation instructions.

PART III Maintenance and Troubleshooting

CHAPTER 7

Interpreting the LEDs

This chapter describes the location, function, and meaning of the Netra X1 server's warning LEDs, and contains the following sections:

Interpreting the Front- and Back-Panel LEDs

The Netra X1 server contains two front panel LEDs (see FIGURE 7-1) and four rear panel LEDs (see FIGURE 7-2). Those on the front panel indicate power and faults only. Those on the back panel indicate the presence of up to two ethernet connections, and replicate the power and fault information of the front LEDs.

Front-Panel LEDs

The front panel LEDs are located at the top left of the server's front bezel.

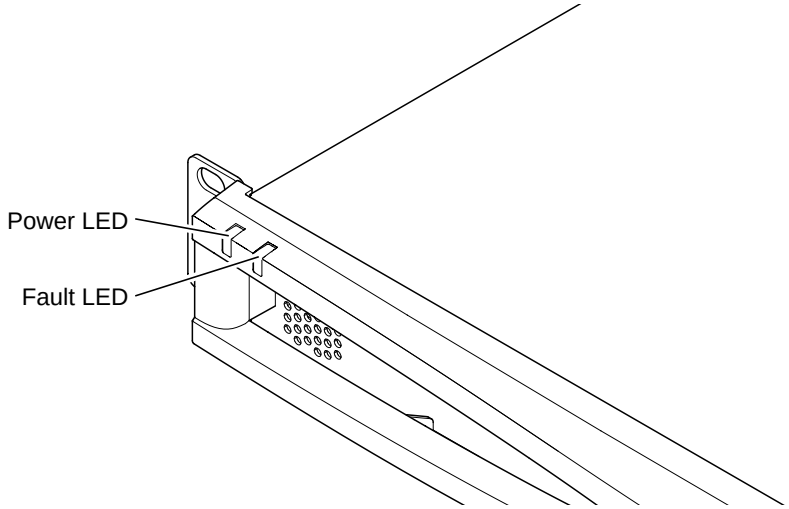

FIGURE 7-1 Front-Panel Power and Fault LEDs

- **Power LED (Green)**
  This LED is lit when the server is powered on. It is unlit when the server is in standby mode.
- **Fault LED (Amber)**
  The Fault LED is *constantly* on when a problem has occurred that is *not fatal* to the server but that you should attend to as soon as possible. Circumstances that could cause this include the following:

- The temperature inside the server's enclosure is higher than normal.
- The voltage on one of the server's output supply rails is unusually high.
- The system configuration card, containing the server's serial number, MAC address, and NVRAM settings, has been removed.
- The LOMlite2 watchdog has timed out, indicating that the server has locked up. You can configure the server to restart automatically after a lockup (see Chapter 6).

The Fault LED *flashes* when a problem has occurred *that is fatal* to the server. Circumstances that cause the Fault LED to flash include the following:

- The speed of the fan inside the server is too low.
- The temperature inside the server's enclosure is too high. By default, this causes the server to shut down. For information about configuring the server not to shut down in this condition, see Appendix B.
- The voltage on one of the server's output supply rails is too high. By default, this causes the server to shut down. For information about configuring the server not to shut down in this condition, see Appendix B.
- The temperature inside the CPU is too high. This causes the server to shut down.

Back-Panel LEDs

The Netra X1 server contains four back panel LEDs (see FIGURE 7-2):

- **Ethernet port 0**

  Lights to indicate link status with dmfe0.

- **Ethernet port 1**

  Lights to indicate link status with dmfe1.

- **Fault LED**
  This mirrors the Fault LED on the front panel.

- **Power LED**
  This mirrors the Power LED on the front panel.

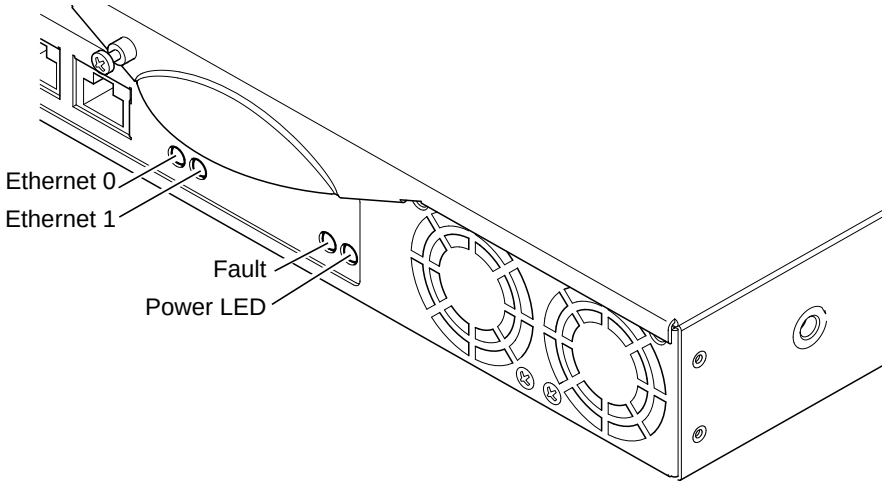

FIGURE 7-2 Back-Panel Power and Fault LEDs

▼ To Turn the Fault LED On or Off

- **To turn the Fault LED on, type:**

```
# lom -F on
```

- **To turn the Fault LED off, type:**

```
# lom -F off
```

For information about turning the Fault LEDs on and off from the LOMlite2 shell, see Chapter 5.

For more information about the `lom` commands included in the Solaris operating environment, see Chapter 6.

CHAPTER 8

Removing and Replacing Components

This chapter details the procedures for moving the system configuration card from one server to another, and for changing replaceable components. It contains the following sections:

Adding Components or Replacing A Server

For a list of components that are available for the Netra X1 server, see “Optional Components” on page 4. If there is a fault with any of the components listed below, replace the whole server. Should you need to do this, contact your Sun sales representative.

- Motherboard
- Processor
- Power Supply Unit
- Fan

The server contains a memory card called the system configuration card. The card contains the following data:

- the only copy of NVRAM
- IDPROM
  - host ID
  - MAC address

Replacing the System Configuration Card

The card is removable so that you can transfer the host ID and configuration data onto a new server, allowing quick and easy server replacement.

▼ To Swap the System Configuration Card (SCC) Between Servers

1. **Make sure that both Netra X1 servers are powered down.**
2. **Remove the zip ties securing the system configuration cards in both servers, and remove the cards.**
3. **Insert the system configuration card from the old server into the new one.**
4. **Replace the zip tie on the new system.**

5. **Power on the new system (see Chapter 4).**

Caution – Never remove the system configuration card when the server is booting or running Solaris. Power the server off or down to standby mode before removing or inserting the system configuration card.

Caution – Do not handle the system configuration card unless you need to transfer it to another system. If you need to handle it for this reason, avoid contact with the gold terminals on the underside of the card.

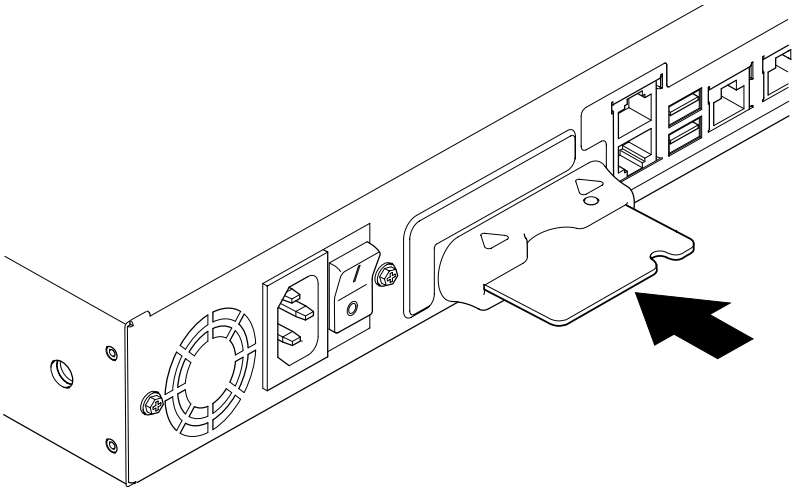

FIGURE 8-1 The System Configuration Card Slot

Adding or Changing Internal Components

The procedures in this section are for the attention of qualified service engineers only. If you need to replace or add a component, contact your local Sun sales representative, who will put you in touch with the Sun Enterprise Service branch for

your area. You can then arrange to return the system to Sun for repair under the terms of your warranty or you can order the components and have them installed by your own qualified service engineers.

Caution – The system contains electronic parts that are extremely sensitive to static electricity. Do not touch any metal parts. Place the system on top of an electrostatic discharge (ESD) pad (see FIGURE 8-2). Use the disposable antistatic wrist strap supplied with the system, and attach it to the metal base of the system before touching any of the internal components.

Caution – Before attempting to remove the cover, make sure that the server is powered off and that the power cord, and all other cables, have been disconnected from it.

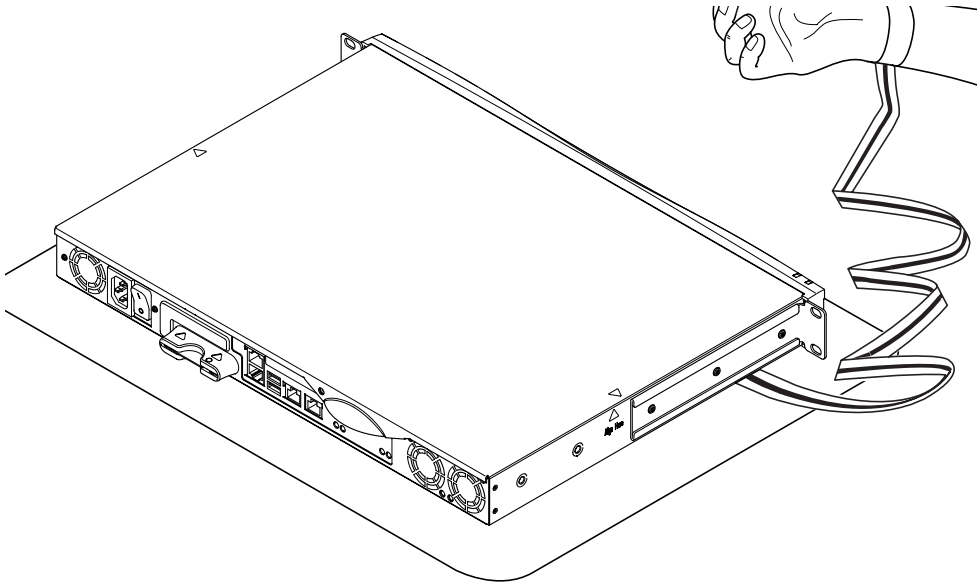

FIGURE 8-2 Using the Disposable Antistatic Wrist Strap Supplied With the System

▼ To Change Components In a Netra X1 Server That Is In Use

If the system is currently in use and you need to open it to install a component:

1. **Shut down the Solaris environment from the console.**

2. **Hold the On/Standby switch in the Standby position for more than four seconds to put the server in standby mode.**
3. **Disconnect the power cord.**
4. **Disconnect all other cables.**
5. **If the system is installed in a rack or cabinet, remove it.**

▼ To Remove the Top Cover

- If the Netra X1 server is not in use, go straight to step 1.
- If the server is already in use, see "To Change Components In a Netra X1 Server That Is In Use" on page 88.

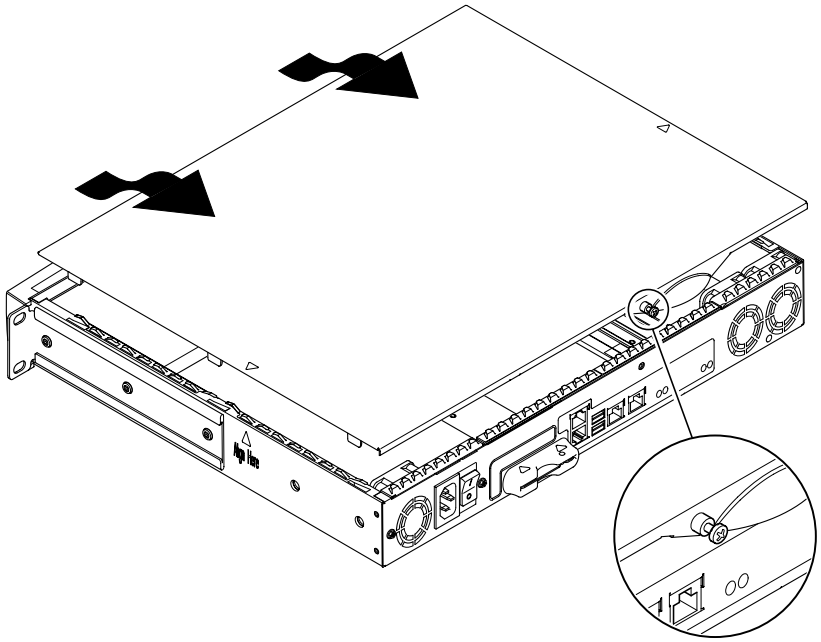

FIGURE 8-3 Removing the Top Cover

1. **Place the unit on an ESD surface and attach an antistatic wrist strap (see** FIGURE 8-2**).**
2. **Unscrew the captive screw from the back of the unit** (see FIGURE 8-3)**.**

3. **Slide the top cover back until the arrow on the cover lines up with the arrow on the server body.**
4. **Lift the cover up and off.**

▼ To Replace the Top Cover

1. **Align the arrow on the cover with the arrow on the server body.**
2. **Press the cover down so that it clips into the server body.**

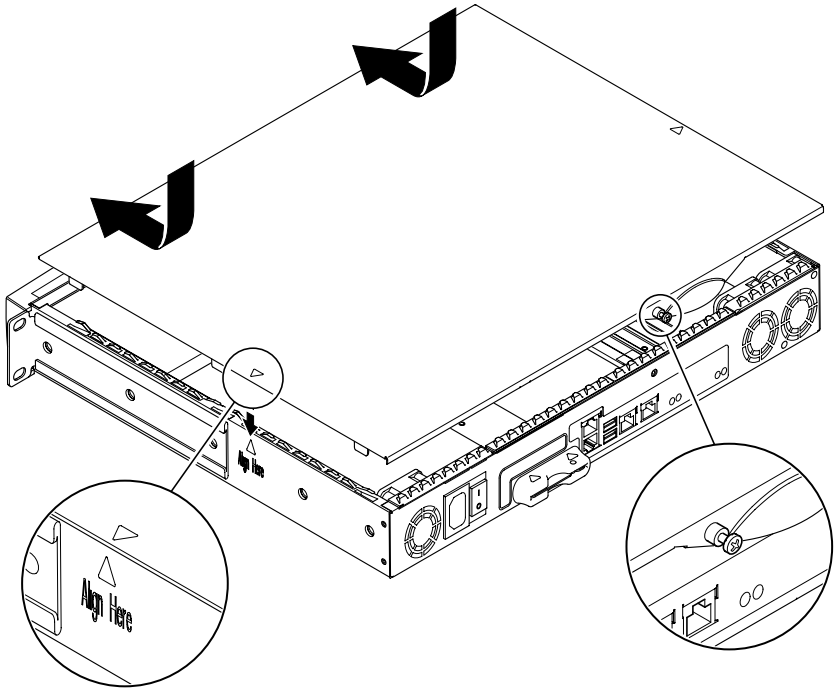

FIGURE 8-4 Replacing the Top Cover

3. **Slide the cover forwards so that its leading edge is flush with the back of the server's front bezel.**

Note – When the cover is in position, the arrows do not line up; the arrow on the cover is further towards the bezel than the arrow on the server body.

---

4. **Tighten the captive screw on the back of the unit.**

Identifying Components

Viewed from the back with the cover removed, the internal components of the Netra X1 server are laid out as in FIGURE 8-5. This image, and a summary of the instructions given in this section, are repeated on the underside of the server's top cover.

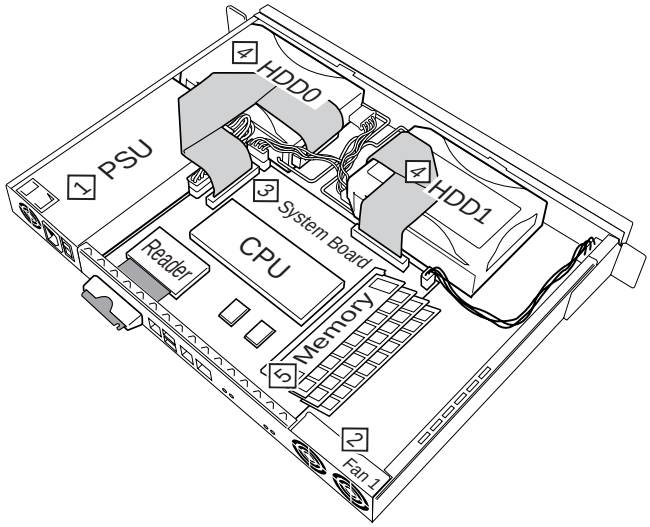

FIGURE 8-5 Layout of Components

The components shown are

1. Power Supply Unit
2. Fan
3. System Board
4. Hard Disk Drive (HDD) 0 and 1
5. Memory

Memory Installation and Removal

There are four industry standard PC133 memory module sockets on the Netra X1 server's system board. To see the location of the memory modules inside the server, see FIGURE 8-5 or the underside of the server's top cover.

▼ To Install and Remove Memory

- If the server is not in use, go straight to Step 1.
- If the server is already in use, see "To Change Components In a Netra X1 Server That Is In Use" on page 88.

1. **Place the unit on an ESD surface and attach an antistatic wrist strap (see** FIGURE 8-2**)**
2. **Remove the server's top cover (see "To Remove the Top Cover" on page 89).**
3. **Insert the memory module in the next vacant DIMM socket.**

   The memory slots are numbered 3, 2, 1, 0. Add DIMMS in that order.

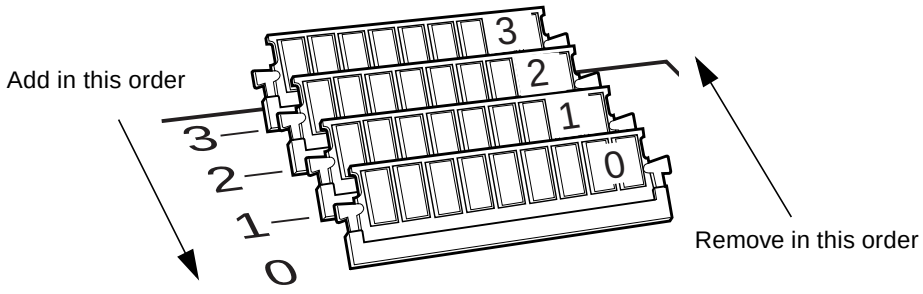

FIGURE 8-6 DIMM Insertion and Removal Sequence

4. **Press the memory module until the latches at the sides of the socket click into place.**

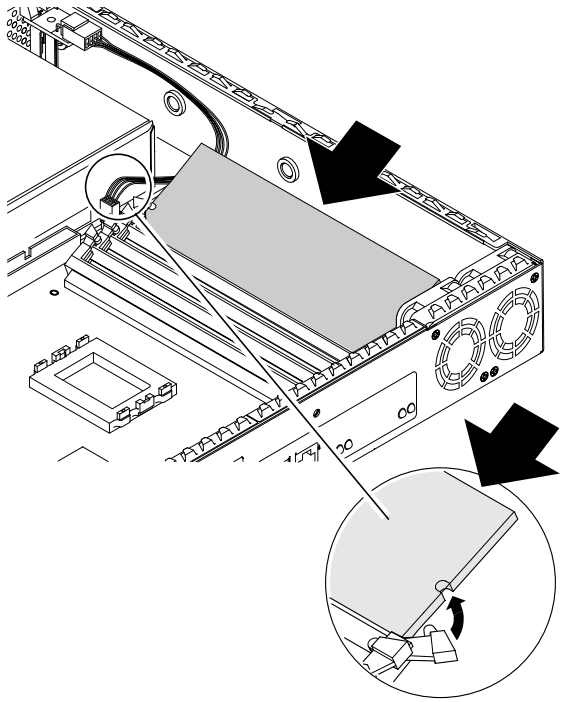

FIGURE 8-7 Installing Memory Into a Socket on the System Board

5. **If you are removing memory, open the latches and remove the module(s) in the order 0, 1, 2, 3.**
6. **Replace the system cover and tighten the captive screw** (see FIGURE 8-4)**.**

Hard Disk Drive (HDD) Installation and Removal

The server can accept two HDDs, which are numbered 0 and 1. To see the position of each HDD, see FIGURE 8-5 or the underside of the server's top cover.

▼ To Install a Hard Disk Drive

- If the Netra X1 server is not in use, go straight to Step 1.

- If the server is already in use, see “To Change Components In a Netra X1 Server That Is In Use” on page 88.

1. **Place the unit on an ESD surface and attach an antistatic wrist strap (see** FIGURE 8-2**).**
2. **Remove the server’s top cover (see “To Remove the Top Cover” on page 89).**
3. **Remove the metal placeholder if your server has one (if it was configured with a single hard disk drive, the second hard disk drive slot will have the placeholder installed).**

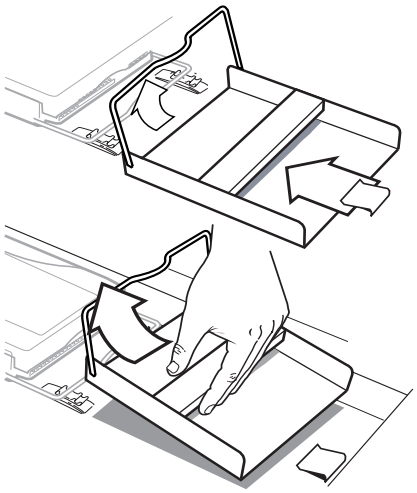

FIGURE 8-8 Removing the HDD Placeholder

4. **Insert and align the new hard disk drive (see** FIGURE 8-9**).**
   a. **Position HDD and slide onto the clips on the base of the server.**
   b. **Press the handle into the two clips on the base of the server.**

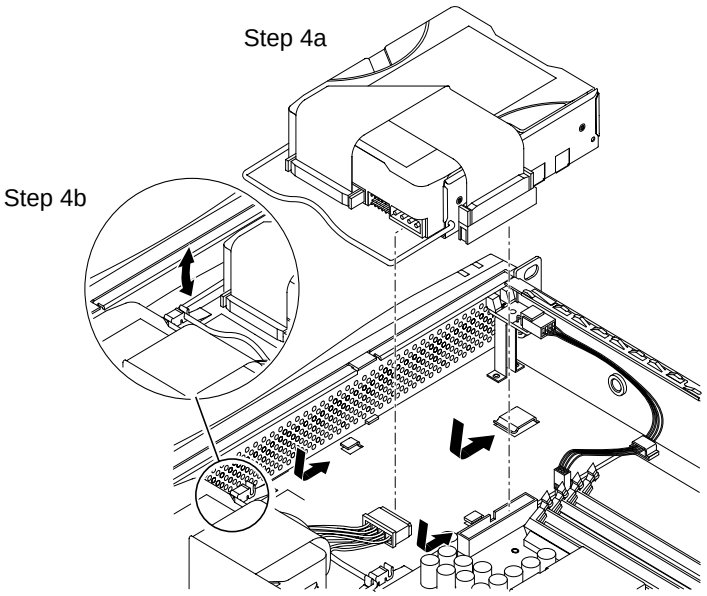

FIGURE 8-9 Installing a Hard Disk Drive

5. Attach the power and data cables.

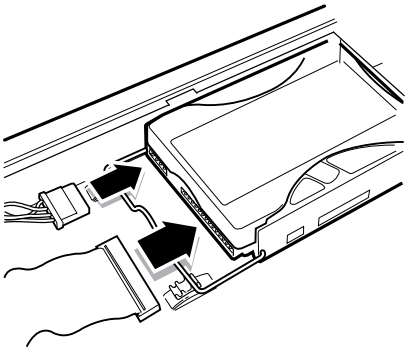

FIGURE 8-10 Attaching the Power and Data Cables

6. Replace the system cover and tighten the captive screw (see FIGURE 8-4**).**

▼ To Remove a Hard Disk Drive

- If the Netra X1 server is not in use, go straight to Step 1.
- If the server is already in use, see “To Change Components In a Netra X1 Server That Is In Use” on page 88.

1. **Place the unit on an ESD surface and attach an antistatic wrist strap (see** FIGURE 8-2**).**
2. **Remove the server’s top cover (see “To Remove the Top Cover” on page 89).**
3. **Disconnect the data and power cables.**
4. **Unfasten the hard disk drive’s handle from the two clips securing it.**
5. **Slide the hard disk drive towards the centre of the server until it is free from the clips on the base of the server.**
6. **Lift the hard disk drive up and out of the server.**

CHAPTER 9

Reinstalling a Netra X1 With the Solaris 8 Operating Environment

This chapter explains how to reinstall the Solaris 8 operating environment from a network install server. It contains the following section:

Re-installing the Solaris 8 Operating Environment

Note – The earliest version of the Solaris 8 operating environment supported on the Netra X1 server is Solaris 8 (10/00).

The Netra X1 server comes pre-installed with:

- The Solaris 8 operating environment (64 bit).
- Lights Out Management (LOM) packages.
- The Netra X1 dmfe Fast Ethernet driver.

Because the Netra X1 server does not contain a CD-ROM drive, if you need to re-install the Solaris 8 operating environment, you must do so from a network install server which does have a CD-ROM drive.

Further information about installing the Solaris 8 operating environment from a network install server is available in the *Solaris 8 Advanced Installation Guide* (806-0957-10), which is supplied with the Solaris 8 operating environment CDs. It can also be downloaded from `http://docs.sun.com`.

Before you create a network install server, there are some software updates, specific to the Netra X1 server, which you must install onto the system you will use as a network install server. The following section tells you how to do this.

▼ To Download the Netra X1 Mandatory Software for the Network Install Server

1. **On the system you are going to use as the network install server, make a directory called** `/var/tmp/netra-x1` **by typing:**

```
# mkdir -m 755 /var/tmp/netra-x1
```

2. **Go to** `http://www.sun.com/netra` **and, in the 'Downloads' section, click on 'Netra X1 Software Drivers'.**

   (If you have not used the download service before, you will be invited to register before proceeding.)

3. **Log into the download service.**

4. **Click "Download Netra X1 Driver Software" and save the packages to the directory** `/var/tmp/netra-x1.`

   The file you download is called `mis.netra-x1.259-3836-03.zip`. This file contains the following Netra X1 specific software:

   - Netra X1 dmfe Fast Ethernet driver.
   - Lights Out Management (LOM) packages.
   - The patches listed in Table 9-1.

   (This is the correct version number at the time of writing. Because this file is likely to be updated, the final two digits in the name of the file you download may be higher than -03. This indicates that you are downloading the most recent version of the software updates for the Netra X1 Server.)

5. **At the Solaris prompt on the system you are going to use as the network install server, unzip the files you have downloaded. To do this, type:**

```
# cd /var/tmp/netra-x1
# unzip mis.netra-x1.259-3836-03.zip
```

Note – The software updates you have downloaded include all the mandatory patches for Solaris and the Netra X1 server: you do not need to download these patches separately. However, you can download and find information about the latest software patches for both the Netra X1 server and the Solaris operating environment at `http://sunsolve.sun.com`.

TABLE 9-1 Patches Included in the Netra X1 Server Software Updates

Patch Number	Patch Title
110383-01 or later	SunOS 5.8: libnvpair patch
108528-07 or later	SunOS 5.8: kernel update patch
108664-06 or later	SunOS 5.8: Support for Network Service
109793-07 or later	SunOS 5.8: su driver patch
108974-09 or later	SunOS 5.8: dada, uata, dad, sd and scsi patch
110208-09 or later	Netra Lights Out Management 2.0 patch
110693-01 or later	Netra X1 dmfe ethernet driver, Link light
111092-02 or later	Netra X1 time of day driver

Creating a Network Install Server

To install the Solaris software over the network, you must create an install server. This section describes how to set up an install server on the same subnet as the system you are about to install, by copying the Solaris 8 CD images to the server's hard disk drive.

The following procedure refers to Chapter 9 ("Preparing to Install Solaris Software Over the Network) on page 209 of the *Solaris 8 Advanced Installation Guide* (806-0957-10). This document is supplied with the Solaris 8 software CDs. The beginning of the chapter provides background information.

▼ To Create an Install Server

1. **On the system that is going to be the install server, log in and become superuser.**

   This system must include a CD-ROM drive and be part of the site's network and name service. The system must also be in the NIS or NIS+ name service. If your site does not use the NIS or NIS+ name service, you must distribute information about this system by following your site's policies.

   Note – This procedure assumes that the system is running Volume Manager. If you are not using Volume Manager to manage diskettes and CDs, refer to the *System Administration Guide, Volume 1* for detailed information about managing removable media without Volume Manager.

   ---

2. **Insert the CD labelled Solaris 8 Software 1 of 2 SPARC Platform Edition into the system's CD-ROM drive.**

3. **If necessary, mount the CD.**

   Volume Manager automatically mounts the CD.

4. **Change to the** `Tools` **directory on the mounted CD. Type:**

```
# cd /cdrom/cdrom0/s0/Solaris_8/Tools
```

5. **Copy the CD in the CD-ROM drive to the install server's hard disk by using the `setup_install_server` command:**

```
# ./setup_install_server install_dir_path
```

where *install_dir_path* specifies the directory where the CD image is to be copied. The directory must be empty.

Note – The `setup_install_server` command indicates whether or not there is enough disk space available for the Solaris 8 software CD images. To determine available disk space, use the `df -kl` command.

---

6. **Eject the Solaris 8 Software 1 of 2 CD:**

```
# cd /
# eject
```

7. **Insert the CD labelled Solaris 8 Software 2 of 2 SPARC Platform Edition into the system's CD-ROM drive.**

8. **If necessary, mount the CD.**

Volume Manager automatically mounts the CD.

9. **Change to the `Tools` directory on the mounted CD:**

```
# cd /cdrom/cdrom0/Solaris_8/Tools
```

10. **Copy the CD in the CD-ROM drive to the install server's hard disk by using the `add_to_install_server` command:**

```
# ./add_to_install_server install_dir_path
```

where *install_dir_path* specifies the directory where the CD image is to be copied.

11. **Eject the Solaris 8 Software 2 of 2 CD:**

```
# cd /
# eject
```

12. **Insert the CD labelled Solaris 8 Languages SPARC Platform Edition.**

13. **If necessary, mount the CD.**

    Volume Manager automatically mounts the CD.

14. **Change to the `Tools` directory on the mounted CD:**

```
# cd /cdrom/cdrom0/Tools
```

15. **Copy the CD in the CD-ROM drive to the install server's hard disk by using the `add_to_install_server` command:**

```
# ./add_to_install_server install_dir_path
```

    where *install_dir_path* specifies the directory where the CD image is to be copied.

16. **Eject the Solaris 8 Languages SPARC Platform Edition CD.**

```
# cd /
# eject
```

17. **Change to the directory in which you placed `mis.netra-x1.259-3836-03.zip` by typing:**

```
# cd /var/tmp/netra-x1
```

18. **Add the patches and packages automatically to the network install server image by typing:**

```
# ./modify_install_server -d install_dir_path
```

    where *install_dir_path* is the path to the install image on your install server.

Setting Up Systems to Be Installed Over the Network With `add_install_client`

- If the details of the system you are installing are held in a name service such as NIS or NIS+, see "To Set Up a System That is In a Name Service" on page 103.

- If the details of the system you are installing are *not* held in a name service such as NIS or NIS+, see "To Set Up a System That is Not In a Name Service" on page 103.

▼ To Set Up a System That is In a Name Service

1. **Become superuser on the install server.**
2. **Ensure that the following information about the system to be installed has been added to the name service:**
   - Host name.
   - IP address
   - Ethernet address
3. **Change to the `Tools` directory within the install image:**

```
# cd install_dir_path/Solaris_8/Tools
```

4. **Use the `add_install_client` command to set up a system to be installed over the network:**

```
# ./add_install_client host_name platform_group
```

Where *host_name* is the name of the machine to be installed and where *platform_group* is `sun4u`.

▼ To Set Up a System That is Not In a Name Service

1. **Become superuser on the install server.**
2. **Use the obp `banner` command to find out the system's Ethernet address of the system you want to install. On that system type:**

```
ok banner
Sun Netra X1 (UltraSPARC-IIe 400MHz), No Keyboard
OpenBoot 4.0, 512 MB memory installed, Serial #16634592.
Ethernet address 8:0:20:fd:d2:e0, Host ID: 80fdd2e0.
```

3. **Change to the** `Tools` **directory within the install image:**

```
# cd install_dir_path/Solaris_8/Tools
```

4. **Obtain the IP address allocated to the machine you are about to install from your system administrator.**

5. **Use the** `add_install_client` **command to set up a system to be installed over the network:**

```
# ./add_install_client -i IP_address -e Ethernet_address host_name
platform_group
```

Where *IP_address* is provided by your system administrator, *Ethernet_address is* from step 2, *host_name* is the name of the machine to be installed, and *platform_group* is `sun4u`.

For example:

```
# ./add_install_client -i 123.123.123.42 -e 08:00:20:fd:d2:e0
myhost sun4u

Adding IP address for myhost to /etc/hosts
Adding Ethernet number for myhost to /etc/ethers
making /tftpboot
enabling tftp in /etc/inetd.conf
updating /etc/bootparams
copying inetboot to /tftpboot

#
```

▼ Installing the New Image From the Network Install Server

When you have finished setting up the install server, you are ready to install the new image on to the client (in this case, the Netra X1 Server).

- **If you are performing a custom jumpstart installation (as described in Chapter 6, 7 and 10 of the** *Solaris 8 Advanced Installation Guide***) then, at the Netra X1 Server you are installing the new image onto, type:**

```
ok boot net - install
```

- **If you are performing an interactive installation (as described in Chapter 5 of the** *Solaris 8 Advanced Installation Guide***) then, at the Netra X1 Server you are installing the new image onto, type:**

```
ok boot net
```

CHAPTER 10

Troubleshooting

This chapter describes the diagnostics tools you can use with the Netra X1 server, lists some of the problems you might encounter when setting up or using a server, and gives information to help fix those problems. The information is contained in the following sections:

Diagnostic Tools

The following troubleshooting tools are available for the Netra X1 server:

- Power On Self Test (POST) Diagnostics
- OpenBoot Diagnostics (OBDiag)
- SunVTS

POST Diagnostics

To view Power On Self Test (POST) diagnostic and error messages you need to have a serial connection set up to the server. For more information, see “Setting Up a Console Connection to the Server” on page 16.

If the OpenBoot PROM (OBP) variable `diag-switch?` is set to `true`, then POST diagnostics will run automatically when you power on the server. However, the default setting for `diag-switch?` is `false`.

To initialize POST diagnostics, you need to set the `diag-switch?` variable to `true` and `diag-level` to `max` or `min`, and then power cycle the server. From the `ok` prompt:

1. **Type:**

```
ok setenv diag-switch? true
```

2. **Type:**

```
ok reset-all
```

The system will now run POST diagnostics and display status and error messages in your console window. If POST detects an error, it displays an error message describing the failure. A sample error message is shown below:

```
Power On Self Test Failed. Cause: DIMM U0702 or System Board
```

OpenBoot Diagnostics (OBDiag)

Like POST diagnostics, OpenBoot Diagnostics can be run if the `diag-switch?` variable is set to `true`.

You can also run OBDiag interactively and select which tests you want it to perform. To do so, follow the steps below from the `ok` prompt.

1. **Type:**

```
ok setenv diag-switch? true
ok setenv auto-boot? false
ok reset-all
```

2. **Type:**

```
ok obdiag
```

This displays the OBDiag menu. Note the number that corresponds to the test you want to perform and use it with the `test` command.

3. **Type:**

```
obdiag> test 2
Hit the spacebar to interrupt testing
Testing /pci@1f,0/ethernet@5 ..........................passed

Hit any key to return to the main menu.
```

When you have finished testing, exit OBDiag and then restore the the value of `auto-boot?` to true.

4. **Type:**

```
obdiag> exit
ok setenv auto-boot? true
auto-boot? = true
ok boot
```

Setting the Diagnostic Level for POST and OBDiag

There are three levels of diagnostic testing available for OBDiag and POST diagnostics:

- *max* (maximum level)
- *min* (minimum level)
- *off* (no testing)

Set the testing level with the OpenBoot PROM variable called `diag-level`. The default setting for `diag-level` is `min`. The test level is set from the `ok` prompt. To set the test level:

- **Type:**

```
ok setenv diag-level value
```

SunVTS

SunVTS, the Sun Validation and Test Suite, is an online diagnostics tool which you can use to verify the configuration and functionality of hardware controllers, devices and platforms. It runs in the Solaris 8 operating environment using any of the following:

- command line interface
- serial (tty) interface
- graphical interface within a windowed desktop environment.

SunVTS software lets you view and control a testing session on a remotely connected server. Below is a list of example tests:

TABLE 10-1 SunVTS Tests

SunVTS Test	Description
disktest	Verifies local disk drives
fputest	Checks the floating-point unit
nettest	Checks all the hardware associated with networking (for example, Ethernet, token ring, quad Ethernet, fiber optic, 100-Mbit per second Ethernet devices)
pmem	Tests the physical memory (read only)
sutest	Tests the server's on-board serial ports
vmem	Tests the virtual memory (a combination of the swap partition and the physical memory)

To Find Out If SunVTS is Installed

To check whether SunVTS is installed:

- **Type**:

```
# pkginfo -l SUNWvts
```

  - If SunVTS software is loaded, information about the package will be displayed.
  - If SunVTS software is not loaded, you will see the following error message:

```
ERROR: information for “SUNWvts” was not found
```

Installing SunVTS

By default, SunVTS is not installed on the Netra X1 server. However, it is available by downloading patch number 110353 from `http://www.sun.com/sunsolve`. The default directory to use when you install SunVTS software is `/opt/SUNWvts`.

Using SunVTS Software

To test a Netra X1 server by running a SunVTS session from a workstation using the SunVTS graphical user interface, follow the procedure below.

1. **Use the** `xhost` **command to give the remote server access to the local display. Type**:

```
# /usr/openwin/bin/xhost + remote_hostname
```

2. **Remotely log in to the server as superuser or root.**

3. **Type**:

```
# cd /opt/SUNWvts/bin
# ./sunvts -display local_hostname:0
```

Where *local_hostname* is the name of the workstation you are using.

Note – The directory `/opt/SUNWvts/bin` is the default directory for SunVTS software. If you have the software installed in a different directory, use that path instead.

When you start SunVTS software, the SunVTS kernel probes the test system devices and displays the results on the Test Selection panel. There is an associated SunVTS test for each hardware device on your system.

You can fine-tune your testing session by selecting the appropriate check boxes for each of the tests you want to run.

Problems You Might Encounter

This section outlines some particular problems you might encounter when setting up and using the Netra X1 server and, where applicable, tells you where to look in the *Netra X1 Server User's Guide* for more information.

Power On Failure

If the system does not power on when you apply power to the server:

- Ensure that the power cord is properly connected to the system and to the wall receptacle. Verify that the wall receptacle is supplying AC power to the system.

If the wall receptacle AC power has been verified, but the system does not power on, the system power supply may be defective.

Cannot Set Up a Console Connection to the Server

The Netra X1 server's serial port pinouts are listed in "Setting Up a Console Connection to the Server" on page 16. Verify that they are correct for the device (that is, the terminal or terminal server) that you are connecting to the Netra X1 server.

No LOM Messages Displayed at the Terminal

You will only see LOM messages displayed at your terminal if you are connected to the server using the A LOM port. If you are connected through the Serial B port, then you need to switch serial ports.

Cannot Display the `lom>` Prompt Using the `#.` Escape Sequence

Check whether the first character of the `#.` escape sequence has been changed (this is a user-configurable value). To check the current value, type the following from the Solaris prompt:

```
# lom -c
```

The information that this command displays includes the serial escape character. If this is not “#”, then type the character that is currently specified and follow it immediately with a dot.

Problems Connecting to the Server Using a Handheld Device

Having Sync Manager turned on causes problems when you try to establish a connection to the server from a handheld device: make sure that Sync Manager is turned off.

Cannot Display the `lom>` or Solaris Prompt, Cannot Access the Server From the Console, or Receiving Corrupted Text at the Console on Serial A/LOM

First, try resetting LOMlite2. To do this, connect remotely (using the `rlogin` *hostname* or `telnet` *hostname* command), and type:

```
# lom -G resetlom
```

If resetting LOMlite2 does not fix the problem, reprogram it by using the firmware supplied in patch 110208-*xx*. First apply the patch, and then download the new firmware by typing:

```
# lom -G default
```

OpenBoot PROM Initialization Aborts and the Server Will Not Boot

If the message “NO IDPROM” is displayed when the operating system attempts to read the serial number and MAC address, the OpenBoot PROM initialization sequence aborts. This could be caused by either of the following:

- Incorrectly fitted System Configuration Card (SCC).
- No valid System Configuration Card inserted.

The SCC contains the serial number, MAC address, and NVRAM settings for the Netra X1 server. Check that the card is correctly inserted by pressing it firmly home. If the server still will not boot, you may need to replace the System Configuration Card. See your Sun sales representative.

IDE Controller Failure

The probe-IDE diagnostic transmits an inquiry command to internal and external IDE devices connected to the system’s on-board IDE interface. If the IDE device is connected and active, the target address, unit number, device type, and manufacturer name are displayed. Initialize the probe-IDE diagnostic by typing the probe-ide command at the ok prompt. The following code example shows the probe-IDE diagnostic:

```
ok probe-ide
Device 0 ( Primary Master )
ATA Model: ST34342A
Device 1 ( Primary Slave )
ATA Model: ST34342A
ok
```

DIMM Failure

At times, the operating environment, diagnostic program, or POST might not display a DIMM location (U number) as part of a memory error message. In this situation, the only available information is a physical memory address and failing byte (or bit). The following table lists physical memory addresses that can be used to locate a defective DIMM.

TABLE 10-2 DIMM Physical Memory Address

DIMM Slot	Physical Address Range	DIMM Starting Address (Hex)
DIMM 0 (U2)	0 to 256MB	0X 00000000
DIMM1 (U3)	256MB to 512MB	0X 20000000
DIMM2 (U4)	512MB to 768MB	0X 40000000
DIMM3 (U5)	768MB to 1024MB	0X 60000000

Jumper Settings

The default settings for the jumpers are shown below. Do not change these settings.

Jumper Name	Jumper Setting*	Jumper Setting**
JP1	1-2	1-2
JP3	Not used.	Not used.
JP7	1-2, 3-4, 5-6.	1-2, 5-6.
JP8	Not used.	Not used.
JP9	1-2	1-2
JP13	Jumper not fitted.	Jumper not fitted.
JP14	Jumper not fitted.	Jumper not fitted.
JP15	1-2	1-2
JP16	Jumper not fitted.	Jumper not fitted.
JP18	Jumper not fitted.	Jumper not fitted.
JP19	Jumper not fitted.	Jumper not fitted.

* 380-0425-xx, 380-0426-xx, 380-0427-xx

** 380-0460-xx, 380-0461-xx, 380-0462-xx, 380-0463-xx

Frequently Asked Questions

Note – FAQ information is also available from `http://www.sun.com/netra/netrax/X1/faq.html`

How Does the Netra X1 Server differ from the Netra T1 AC200 Server?

Differences are shown below, marked in bold text.

TABLE 10-3 Netra T1 AC100 and Netra X1 Comparison

	Netra T1 AC200	Netra X1
Processor	1 x UltraSparc IIe	1 x UltraSparc IIe
Speed	500 MHz	400* or 500** MHz
Cache	256KB on chip	256KB on chip
Disk	2 x 18GB SCSI hotswap CDROM	**1 x 20GB IDE, expandable to 2 (400 MHz)* or 1 x 40GB IDE, expandable to 2 (500 MHz)**: no hotswap, no CDROM**
IO	1 full length PCI slot	**No PCI slot**
Ethernet	2 x 10/100 Ethernet	2 x 10/100 Ethernet
External SCSI	Yes	**No**
USB	2	2
Memory	256MB-2GB standard PC133	**128MB to 1GB (400 MHz)* or 128MB to 2GB (500 MHz)** std. PC133**
Lights Out Management	LOMLite2	LOMLite2
Power	AC/DC (DC to be released after AC release date)	**AC only**
Physical	1U, 19" depth	1U, **13" depth**
NEBS	Expected after release date	**no NEBS**

* Sun part nos: 380-0425-xx, 380-0426-xx, 380-0427-xx

** Sun part nos: 380-0460-xx, 380-0461-xx, 380-0462-xx, 380-0463-xx

What hardware configurations is the Netra X1 available in?

The Netra X1 server is available in the following configurations:

Processor	RAM	Hard Disk Drive	Sun Part Number
400MHz	128MB	1 * 20GB (5400rpm)	380-0425-xx
400MHz	512MB	1 * 20GB (5400rpm)	380-0426-xx
400MHz	1GB (4 * 256MB)	2 * 20GB (5400rpm)	380-0427-xx
500MHz	128MB	1 * 40GB (7200 rpm)	380-0460-xx
500MHz	512MB(2 * 256MB)	1 * 40GB (7200 rpm)	380-0461-xx
500MHz	1GB (4 * 256MB)	2 * 40GB (7200 rpm)	380-0462-xx
500MHz	2GB (4 * 512MB)	2 * 40GB (7200 rpm)	380-0463-xx

What software is preinstalled?

The Netra X1 server comes preinstalled with the Solaris 8 operating environment (64 bit) including LOMlite2. For more information, see “Preinstalled Software” on page 3.

Can I install a 32-bit kernel?

The server will only support a 64 bit kernel. Applications written for 32 bit or 64 bit environments, and which do not rely on 32 bit kernel drivers specifically, should work without modification.

Will my 32 bit application work on the Netra X1 server?

32 bit applications should work without modification, as long as they were written to be dynamically linked. If not, they will not work with Solaris 8 (64 bit).

Where can I get more information on the Solaris operating environment?

All Solaris documentation is available online and can be downloaded in PDF format from `http://docs.sun.com`

What are the Netra X1 server's expandability options?

The Netra X1 provides simplified expansion options, which are outlined below. You cannot upgrade the CPU, and the server does not ship with PCI slots. Optional components and part numbers are listed in "Optional Components" on page 4.

Processor	Expandability options
400 MHz*	Up to 1GB of memory and up to two 20GB IDE drives (5400 rpm).
500 MHz**	Up to 2GB of memory and up to two 40GB IDE drives (7200 rpm).

* Sun part nos: 380-0425-xx, 380-0426-xx, 380-0427-xx

** Sun part nos: 380-0460-xx, 380-0461-xx, 380-0462-xx, 380-0463-xx

Can I install my own PC DIMM memory?

Doing so risks breaking your warranty. Only Sun service personnel should install memory and only Sun certified memory may be used.

Can I boot the server from an external CDROM connected to the USB ports?

No. USB devices are not widely supported by the Solaris 8 operating environment and no device drivers are available.

What peripherals can I connect to the USB ports?

Currently, the Solaris 8 operating environment ships with minimal USB driver support and the only USB peripheral supported is the keyboard used with SunRay systems.

What information does the System Configuration Card hold?

The System Configuration Card contains:

- the only copy of NVRAM
- IDPROM
  - host ID
  - MAC address

Should I put a server into stand-by mode before removing a System Configuration Card?

Yes. The correct procedure for removing cards is described in “To Swap the System Configuration Card (SCC) Between Servers” on page 86.

What if a System Configuration Card is lost?

You can order a new card from your local Sun Customer Solution Centre.

Is there a DC version of the Netra X1 server?

There are no plans to introduce a DC version of the Netra X1 server.

What size racks can I mount the server in?

The Netra X1 server comes prepared for installation into 19-inch racks straight out of the box, and no rack mount kit is required. No other rack sizes are supported.

How many Netra X1 servers can be put in a standard 19-inch rack?

Physically and electrically, you can put up to 40 Netra X1 servers into a standard 19-inch rack with two 20-amp circuits. However, a more practical deployment would be 32 servers in a rack with termservers, network gear, and additional power strips.

Where do I connect my monitor, keyboard, and mouse?

Because the Netra X1 server has been designed as a rack-mount compute element, there is no keyboard, mouse or parallel port on the Netra X1 server. To manage the server, you have to connect to the console (ttya) port and manage via a console connection. Two USB ports are available for adding a keyboard and/or mouse if needed.

What is ASR (Automatic Server Restart)?

Automatic Server Restart is a feature of Lights-Out Management that can automatically restart the Netra X1 server in the event of the operating system locking up. The feature can be turned on or off and is fully configurable.

Why are two Ethernet 10/100 ports included with the Netra X1 server?

The most common deployment for a server in use at a service provider is to have two physical network connections to each server. One is for the production network, the other for the administrative or backup network. Each is a separate physical port, usually connecting to separate network switches. This provides better redundancy, in case of error, and increased isolation, for security.

Why does the Netra X1 server use RJ-45 instead of DB-9 or DB-25 connectors for the serial port?

The Netra X1 server uses RJ-45 connectors for its serial ports because these connectors best suit service providers' systems. With RJ-45 connectors, you can use standard Category 5 network cables without needing any extra adaptors. With DB-9 or DB-25 connectors, you would need to use extra adaptors to use the standard Category 5 network cable.

Do the serial ports support synchronous protocols?

No.

Will the server need a null-modem cable to connect to the console port?

No. Because the Netra X1 requires the use of console port, Sun has designed the server so that a null-modem cable is not needed. A standard Category 5 cable connected between a Netra X1 server and a termserver is all you need.

How can I configure the dmfe driver to operate at different link parameters?

By default, the dmfe drivers (dmfe0 and dmfe1) select the link speed (100 Mbps or 10 Mbps) and operation mode (full-duplex or half-duplex) by auto-negotiation, from the following list of options as described in the 100Base-TX standard:

- 100 Mbps, full-duplex
- 100 Mbps, half-duplex
- 10 Mbps, full-duplex
- 10 Mbps, half-duplex

The auto-negotiation protocol automatically selects the highest-throughput settings supported by both link partners.

However, if you need to set either the speed or duplex setting manually (for example, if the dmfe device is connected to a hub that does not support auto-negotiation), you can change the entries in the dmfe driver configuration file:

`/platform/SUNW,UltraAX-i2/kernel/drv/dmfe.conf`

- Speed

Set to 10 or 100 to force the dmfe device to operate at the specified speed.

- Full-duplex

Set to 0 to disable full-duplex, set to 1 to force full-duplex operation.

Ensure you set *both* parameters to match the requirements of the external device.

Note – By specifying either the speed or full-duplex setting yourself, you disable auto-negotiation. Therefore, if you set only one of the two parameters, the other will not be determined automatically by the driver.

Can I change the dmfe link settings using ndd*?*

Yes, dmfe supports the setting of link parameters using `ndd`.

Specify `/dev/dmfe0` or `/dev/dmfe1` when using `ndd` instead of setting the instance. The `link_speed` value returns 10 or 100 indicating 10 or 100Mbit operation:

```
# ndd /dev/dmfe0 \?
?                               (read only)
link_status                     (read only)
link_speed                      (read only)
link_mode                       (read only)
adv_autoneg_cap                 (read and write)
adv_100fdx_cap                  (read and write)
adv_100hdx_cap                  (read and write)
adv_10fdx_cap                   (read and write)
adv_10hdx_cap                   (read and write)
```

To force a specific link setting:

1. **Set three of the four variables to 0:**

```
# ndd -set /dev/dmfe1 adv_10hdx_cap 0
# ndd -set /dev/dmfe1 adv_10fdx_cap 0
# ndd -set /dev/dmfe1 adv_100hdx_cap 0
```

2. **Set the variable you want to force to 1:**

```
# ndd -set /dev/dmfe1 adv_100fdx_cap 1
```

3. **Set** `adv_autoneg_cap` **to 0:**

```
# ndd -set /dev/dmfe[01] adv_autoneg_cap 0
```

This command causes the driver to disable auto-negotiation and re-evaluate the settings of the other four variables to determine which transfer speed and mode is required. To re-enable autonegotiation, set `adv_autoneg_cap` to 1; the other variables are not checked when autonegotiation is in effect.

To change the selected mode when not using autonegotiation:

1. **Select the required mode by setting the first four variables.**
2. **Set** `adv_autoneg_cap` **to 0.**

   Setting `adv_autoneg_cap` causes the other values to be re-evaluated.

Note – Use the configuration file `dmfe.conf` to make permanent changes to the dmfe link settings. Refer to the dmfe(7d) man page for more information.

The parameters supported by each driver may change in subsequent releases. Like programs that read `/dev/kmem`, user programs or shell scripts that execute `ndd` should be prepared for parameter names to change. The `ioctl()` command that `ndd` uses to communicate with drivers could change in future releases, so avoid having user programs depend upon it. The meanings of many `ndd` parameters can vary, according to how the dmfe driver is implemented.

Only *total autonegotiation* or *no autonegotiation* (link settings completely determined by software parameters) is supported by dmfe. It does not support *restricted autonegotiation* (where the software parameters select multiple options and autonegotiation determines which of these options to use).

PART IV Appendixes

APPENDIX **A**

Physical and Environmental Specifications

In the following sections, this appendix gives the physical dimensions of the Netra X1 server and describes the conditions in which the server is capable of operating:

Physical Specifications

Dimension	U.S.	Metric
Height	1.72 in.	43.6 mm
Width	17.55 in.	445 mm
Depth	13.21 in.	335 mm
Weight	6 kg (with two hard disk drives and four memory modules installed)	

Environmental Specifications

You can operate and store the system safely in the conditions detailed below.

Specifications	Operating	Storage
Ambient temperature	5˚C to 40˚C 14˚F to 104˚F	–40˚C to 70˚C –8˚F to 158˚F
Temperature variation	30˚C/hr maximum 86˚F/hr maximum	30˚C/hr maximum 86˚F/hr maximum
Relative humidity	5% to 85% (noncondensing)	10% to 95% (noncondensing)
Altitude	–300 m to +3000 m	–300 m to +12000 m

Acoustic Noise Generated

The system generates less than 60 dBA at a distance of 23.67 inches (600 mm) and a height of 59.17 inches (1500 mm) while operating in an ambient temperature of 77˚F (25˚C).

Environmental Compliance Information

- Electromagnetic compatibility
  - Immunity: The server conforms to EN55024.
  - Emissions: The server conforms to EN55022 Class A and FCC Class A.
- Safety
  The system conforms to UL 1950 (3rd edition), EN60950

Operating Power Statistics

TABLE A-1 Operating Power Statistics

Maximum operating current	1.3A @ 100 VAC
Typical operating current	See “Calculating Power Consumption” on page 128
Maximum in-rush current (cold start)*	40A peak at 115V 25˚C
Maximum in-rush current (warm start, or upon a restart 20 to 200 msecs after power has been removed*)	100A peak at 115V 25˚C
Operating input voltage range	90 to 264 Vrms
Voltage frequency range	47 to 63 Hz
Power factor	0.9 to 0.99
Maximum volt-ampere rating	130 VA
BTU / hr	400 MHz processor: 135 (min), 154 (max). 500 MHz processor: 148 (min), 280 (max).

* The in-rush current decays to the normal operating current in less than 200 msecs.

Caution – The power supply continues to regulate all outputs for at least 17 ms after AC power is removed.

Note – Logic ground and chassis ground are connected internally.

Note – Power from the standby output is available whenever input power is connected.

Calculating Power Consumption

A Netra X1 server containing two disk drives has an estimated current requirement of approximately 1 amp.

TABLE A-2 shows the estimated power consumed by the individual components in a fully powered system. However, when you are calculating the power requirements for your system, you must allow for 63 percent PSU efficiency. To perform this calculation, add the figures for each component installed in the system, then divide the result by 0.63.

TABLE A-2 Estimated Power Consumption of Netra X1 Server Components

Component	400 MHz	500 MHz
Base system	15.0W	20.0W
Memory (per DIMM)	4.59W (256 Mbytes, burst mode)	4.59W (256 Mbytes, burst mode)
Hard disk drive	6.0W (20 Gbyte/5400 rpm, idle)	6.5W (40 Gbyte/7200 rpm, idle)

Note – To calculate the total power requirement for several servers installed in a single rack or cabinet, add the individual power requirement figure for each server installed.

Calculating Heat Dissipation

To calculate the heat generated by a server so that you can estimate the heat your cooling system must dissipate, convert the figure for the system's power requirement from watts to BTU/hr. A general formula for doing this is to multiply the figure for the power requirement by 3.415.

APPENDIX **B**

Configuring the Driver for LOMlite2

This appendix describes the parameters that you can use to configure the LOMlite2 driver, and contains the following sections:

The LOMlite2 Device Driver and Script Files

The LOMlite2 driver software included in the Solaris 8 (10/00) operating environment is as follows:

- `/platform/sun4u/kernel/drv/lom` (the `lom` driver [32-bit])
- `/platform/sun4u/kernel/drv/sparcv9/lom` (the `lom` driver [64-bit])
- `/platform/sun4u/kernel/drv/lom.conf` (the driver configuration file)

The driver is started by the following three scripts in the Solaris 8 (10/00) environment:

- `/etc/init.d/lom`
- `/etc/rc2.d/S25lom`
- `/etc/rc0.d/K80lom`

This appendix describes the driver parameters you can set in the `lom.conf` configuration file. Some of these parameters are configurable by means of the LOMlite2-specific Solaris commands described in Chapter 6.

Configuring the LOMlite2 Device Driver

The full list of parameters you can set in this file is given in TABLE B-1.

TABLE B-1 LOM Configuration File Parameters

Field	Format	Default	Effect
`wdog_reset=`	Boolean 0=FALSE 1=TRUE	0	Causes LOMlite2 to reset the server after a watchdog timeout. Setting this to 1 is equivalent to using the `lom -R on` command described in Chapter 6.
`wdog_alarm3=`	Boolean 0=FALSE 1=TRUE	0	Turns on software alarm 3 when the LOMlite2 watchdog times out. Setting this to 1 is equivalent to using the `lom -A on,3` command described in Chapter 6.
`serial_events=`	0=OFF 1=ON 2=ON WHEN DRIVER NOT LOADED	2	Causes LOMlite2 to report events over the serial connection. Setting this parameter to 0 means that no events will be reported over the serial connection. Setting it to 1 means that events will be reported over the serial connection as well as to `syslogd`; this is equivalent to `lom -E on`. If you have dedicated the Serial A/LOM port to LOMlite2, you need to set this parameter to 1. It ensures that you receive all event reports at the terminal you have connected to Serial A/LOM. Finally, setting the parameter to 2 means that events will be reported over the serial connection but only when the driver is not running (when it is running they will be reported to `syslogd`, although Fatal and Warning messages will still go to Serial A/LOM).

TABLE B-1 LOM Configuration File Parameters *(Continued)*

Field	Format	Default	Effect
`disable_wdog_on_break=`	Boolean 0=FALSE 1=TRUE	1	Causes LOMlite2 to disable its watchdog if it detects a break signal on the Serial A/LOM port.
`disable_wdog_on_panic=`	Boolean 0=FALSE 1=TRUE	1	Causes LOMlite2 to try to disable its watchdog after a system “panic”.
`faulty_voltage_shutdown=`	Boolean 0=FALSE 1=TRUE	1	Causes LOMlite2 to attempt first to shut down the system and, if that fails, to power off the system in the event of a problem with the supply rails.
`enclosure_warning_temp=`	^{o}C	67	Specifies the temperature at which LOMlite2 generates an overtemperature event.
`over_temperature_shutdown=`	Boolean 0=FALSE 1=TRUE	1	Causes LOMlite2 to attempt to shut down the system, or to power it off, if the enclosure temperature exceeds the level specified for the enclosure_shutdown_temp parameter.
`enclosure_shutdown_temp=`	^{o}C	72	Specifies the enclosure temperature above which LOMlite2 attempts to shut the system down or, if this fails, to power the system off. (LOMlite2 will attempt to do either of these if over_temperature_shutdown is set to 1.)
`serial_security=`	Boolean 0=FALSE 1=TRUE	1	Enables and disables the user security facilities even if user security has been configured. You can use this parameter to set up users again if your users have forgotten their passwords. Cannot be turned on if no users are configured in the LOM.

TABLE B-1 LOM Configuration File Parameters *(Continued)*

Field	Format	Default	Effect
`serial_timeout=`	Multiples of 4 secs	0	Specifies the period after which LOMlite2 gives control of the Serial A/LOM port back to the console when it has finished sending a report (or when the user has issued a LOMlite2 shell command, if you have enabled the serial_return= option). By default, there is no delay at all.
`serial_return=`	Boolean 0=FALSE 1=TRUE	0	Causes LOMlite2 to return the user to the console from the `lom>` prompt after each LOMlite2 shell command. You can use this option in conjunction with the serial_timeout= option.
`reporting_level=`	Number between 0 and 4	3	Indicates the severity level down to which you want to see LOMlite2 event reports. 0 means no reports. 1 means fatal event reports only. 2 means fatal and warning event reports. 3 means fatal, warning and information event reports. 4 means fatal, warning, information and user event reports. (User event reports concern the user security facility; you will not see any unless you have enabled the security facility and set up users.) If power is removed then the setting is lost and not reinstated until the next Solaris boot.

Each parameter must be on a separate line and must be followed by an equals sign (=) and a value, without spaces. Where the format is Boolean, 1 means true and 0 means false.

APPENDIX **C**

dmfe - Davicom Fast Ethernet Driver for Davicom DM9102A

This appendix describes the dmfe driver and gives more information about its configuration and Application Programming Interface. The appendix contains the following section:

- “dmfe - Davicom Fast Ethernet Driver” on page 136.

dmfe - Davicom Fast Ethernet Driver

The dmfe device provides 100Base-TX networking interfaces using the Davicom DM9102A chip, which incorporates its own internal transceiver.

The dmfe Ethernet driver is a multithreaded, loadable, clonable, GLD-based STREAMS driver. It supports multiple controllers installed within the system. The dmfe driver functions are listed below.

- Controller initialization.
- Frame transmit and receive.
- Promiscuous and multicast support.
- Error recovery and reporting.

The 100Base-TX standard specifies an auto-negotiation protocol to automatically select the mode and speed of operation. The internal transceiver is capable of performing auto-negotiation with the remote-end of the link (link partner) and receives the capabilities of the remote end. It selects the highest common denominator mode of operation based on the priorities. It also supports a forced-mode of operation, under which the driver selects the mode of operation.

Application Programming Interface

The cloning character special device, `/dev/dmfe`, is used to access all Davicom DM9102A devices installed in the system.

The dmfe driver depends on `/kernel/misc/gld`, a loadable kernel module that provides the dmfe driver with the DLPI and STREAMS functionality required of a LAN driver. See gld(7D) for more details on the primitives supported by the driver.

Use an explicit `DL_ATTACH_REQ` message to associate the opened stream with a particular device (ppa). The ppa ID is interpreted as an unsigned integer data type and indicates the corresponding device instance (unit) number. The driver returns an error (`DL_ERROR_ACK`) if the ppa field value does not correspond to a valid device instance number for this system. The device is initialized on first attach and de-initialized (stopped) at last detach.

The values returned by the driver in the `DL_INFO_ACK` primitive in response to `DL_INFO_REQ` are shown below.

- The maximum SDU is 1500 (ETHERMTU, defined in `<sys/ethernet.h>`).
- The minimum SDU is 0.
- The DLSAP address length is 8.
- The MAC type is DL_ETHER.

- The sap length value is -2, meaning the physical address component is followed immediately by a 2-byte sap component within the DLSAP address.
- The broadcast address value is the Ethernet/IEEE broadcast address (FF:FF:FF:FF:FF:FF).

Once in the DL_ATTACHED state, send a DL_BIND_REQ to associate a particular Service Access Point (SAP) with the stream.

Configuration

By default, the dmfe driver performs auto-negotiation to select the speed and mode of the link, which can be any of the following, as described in the 100Base-TX standard:

- 100 Mbps, full-duplex
- 100 Mbps, half-duplex
- 10 Mbps, full-duplex
- 10 Mbps, half-duplex

The auto-negotiation protocol automatically selects:

- Speed (100 Mbps or 10 Mbps)
- Operation mode (full-duplex or half-duplex)

The auto-negotiation protocol automatically selects the highest-throughput settings supported by both link partners.

However, if you need to set either the speed or duplex setting manually (for example, if the dmfe device is connected to a hub that does not support auto-negotiation), you can change the entries in the dmfe driver configuration file:

`/platform/SUNW,UltraAX-i2/kernel/drv/dmfe.conf`

- Speed

  Set to 10 or 100 to force the dmfe device to operate at the specified speed.

- Full-duplex

  Set to 0 to disable full-duplex, set to 1 to force full-duplex operation.

Ensure you set *both* parameters to match the requirements of the external device.

Note – By specifying either the speed or full-duplex setting yourself, you disable auto-negotiation. Therefore, if you set only one of the two parameters, the other will not be determined automatically by the driver.

Index

I

L

M

N

O

P

Q

R

S

T

V

W