VoyagerIIi

Mobile Computer System

User Guide

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FCC Class B Notice

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

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from your supplier. Tadpole-RDI is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications to the equipment could void the authority granted by the FCC to operate the equipment.

Declaration of Conformity

We, Tadpole-RDI,
2300 Faraday Avenue
Carlsbad, California USA 92008
(760) 929-0992

Declare under our sole responsibility that the product

Voyager IIi Portable Workstation

complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

Electrical Safety Notice

WARNING!

Electrical current from power, telephone and communications cables is hazardous. To avoid shock hazard, connect and disconnect cables as described below when installing, moving or opening the covers of this device or attached devices.

Attention

Le courant électrique provenant des câbles électriques, téléphoniques ou de télécommunications est dangereux. Pour éviter tout danger de choc électrique, suivez la procédure décrite ci-dessous pour brancher et débrancher les câbles lors de l'installation, du déplacement ou de l'ouverture du couvercle de cet appareil et des périphériques qui y sont connectés.

To connect your computer

1. Turn your computer and peripherals OFF.
2. Connect all cables between your computer and any peripherals.
3. Connect all cables; for example, display cable or network cable.
4. Connect the power cord to the outlet.
5. Turn the peripherals ON and then turn your computer ON.

To disconnect your computer

1. Turn everything OFF.
2. Disconnect the power cord.

3. Disconnect all cables.
4. Disconnect all cables between your computer and peripherals.

WARNING!

The unit contains hazardous voltages and must not be opened by anyone.

Attention

Cet appareil présente un danger d'électrocution et ne doit jamais être ouvert.

Fuses

The unit is fitted with two fuses located and accessed at the bottom of the mains inlet socket. The fuses are user changeable but must be replaced with parts suitable for the purpose.

Caution

For the continued protection against risk of fire, replace only with the same rating of fuse.

Attention

Pour ne pas compromettre la protection contre les risques d'incendie, remplacer par un fusible de meme type et de memes caracteristiques nominales.

Either obtain a replacement fuse from an approved supplier or obtain a 2 Amp anti-surge 20*5 fuse with the following approvals:

In the USA: UL recognised fuse: Bussman S505/2A Anti-surge.

In Europe: Compliant with IEC EN60127.

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Overview

1

Welcome to your new computer from Tadpole-RDI. The Tadpole-RDI VoyagerIIi is designed to meet the demands of high-end mobile computer users. It integrates UltraSPARC processing, the Solaris Operating System, large memory and disk capacities, I/O interfaces and a wide range of configuration options within a compact and robust package.

The VoyagerIIi can be used for software applications which run on Sun SPARC/Solaris computer systems where the additional benefit of mobility is required. It is a practical alternative to conventional products not suited to mobile applications because of their larger size and weight, and their lack of robustness. Examples of such uses are:

- Sales professionals visiting clients to perform product demonstrations
- Permanent/temporary deployment in vehicles such as a mobile training facility or an environmental monitoring unit
- Construction sites for running, displaying and processing Geographical Information Systems, survey data and plans

The VoyagerIIi has the mobility of a notebook computer together with the facilities and processing power required for heavyweight applications.

The VoyagerIIi can be used as a server system and operated from a local console terminal or over a network. Alternatively, by attaching a keyboard, mouse and display the VoyagerIIi can be used as a desktop computer, and can be connected to a network and other

external devices. The VoyagerIIi's operations can be easily suspended and resumed whenever you need, thus minimizing set-up and shut-down time. It is a truly mobile high-end computer system.

Features

The VoyagerIIi has been designed as an alternative to Sun Server and Sun Desktop computers in mobile application areas. The Sun SPARC/Solaris environment has the following features:

- Powerful - fast processing of high-end applications.
- Scalable - can be expanded to meet increasing demands.
- Network Ready - easy interchange of data between multiple systems.
- Reliability - high availability and integrity.

The two main types of system are described as Server and Desktop products. Both systems have the above features but the essential differences are:

- Servers handle high capacity, remote storage, processing and communications needs of one or many users typically running large, centralized applications. Servers are tailored to specific applications by configuring the amount of processing, storage and I/O.
- Desktops handle local processing and the graphics needs of a single user typically running a dedicated application. Desktops are tailored to specific applications by configuring the amount of processing, graphics capability and memory.

The VoyagerIIi can be configured to meet all these requirements. In order to support mobile applications, the VoyagerIIi also has the following additional features:

- Compact/lightweight - for easy transportation, even as hand luggage on flights.
- Robust - ability to cope with demanding environmental conditions such as shock, vibration, temperature extremes and fluctuations.
- Ease of deployment - for rapid set-up and shut-down between different operating locations.
- Removable disks - allowing the software environment to be easily changed and consequently providing high levels of security.

Applications

Table 1.1 shows some further application areas in which the VoyagerIIi could be used because of its compact size, ruggedness, reliability, processing capability and ease of set-up and shut-down:

Potential Application Areas	Example Industry Sectors
Demonstrations and Presentations	Software Sales, Education, Exhibitions
Geological Survey, Exploration	Mining, Oil
Mapping and Analysis	GIS, BioMedical, Astronomical Research
Field Technical Support	Technical, Commercial
Mobile Command Posts	Communication, Command and Control Centres
Engineering	Integrated Circuit Design, Automotive
Software Development	Client-Server Applications
Disaster Support and Recovery	Banking, Call Centre, Natural Disasters

Table 1-1 Potential Applications

Expanding the VoyagerIIi's capabilities

The VoyagerIIi can be expanded by adding more memory and further disk drives. Its capability can also be increased using devices such as a tape unit, CD drive, high capacity floppy disk and PCMCIA modem and network cards.

Summary

This chapter has provided a high level overview of the VoyagerIIi and some of its potential applications areas. The next chapter will help you familiarize yourself with the VoyagerIIi's controls, interfaces and indicators.

Familiarization

2

The Tadpole-RDI VoyagerIIi is designed to meet the demands of high-end mobile computing needs. You can use your VoyagerIIi as a desktop computer by attaching a keyboard, mouse and display. It can also be connected to a network and other external devices. Alternatively, your VoyagerIIi can be used as a server system and operated over a network. The VoyagerIIi's operations can be easily suspended and resumed whenever needed, minimizing set up and shut down time. It is a truly mobile high-end computer system lending itself to client-server applications.

This chapter explains the purpose of your VoyagerIIi indicators, switches and connectors.

It provides the following sections:

Familiarizing yourself with the system

The VoyagerIIi combines Sun Microsystem's UltraSPARC processing, Solaris operating system,

large memory and disk capacities, I/O interfaces and a wide range of configuration and upgrade options within a compact and robust package.

The front panel contains system status indicator lamps, a recessed reset switch and access to the disk drive packs. The rear panel contains switches, interfaces and power connectors. The side panels are vented to provide an air inlet and air exhaust for system cooling. The VoyagerIIi is designed to be operated horizontally. With a suitable stand (to enable venting) it may also be operated vertically.

The dimensions of the VoyagerIIi are:

- WxDxH = 335 x 266 x 116mm (13.2 x 10.5 x 4.5in) plus rubber feet and disk packs.

Weight:

- 4.5kg (10lb)

Figure 2-1 The VoyagerIIi Mobile Computer

The Front Panel

The front panel contains a row of indicators, a recessed reset switch and the removable disk packs.

Figure 2-2 The Front Panel

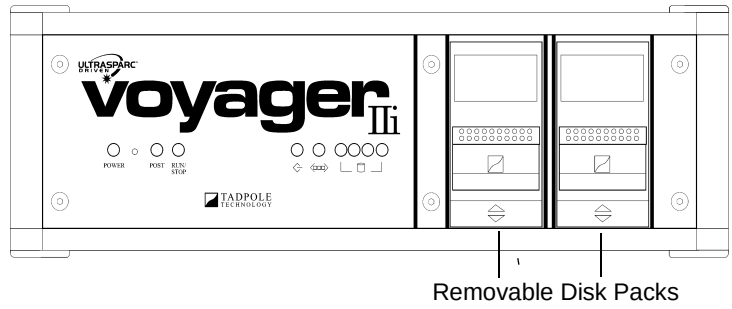
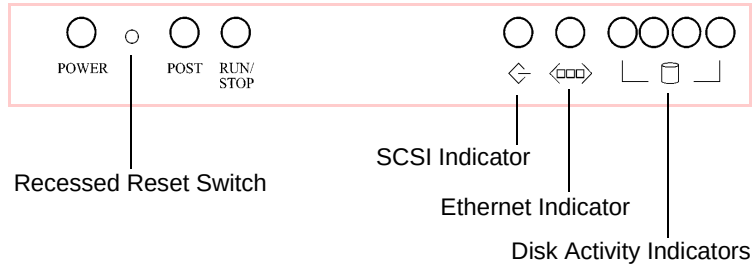


Figure 2-3 Front Panel Indicators



Power Indicator:

This is illuminated when the system is connected to the mains power supply and the Power On/Off Switch on the rear panel is in the ON position.

The POST Indicator

When the system is turned on the Power On indicator illuminates, then the POST (Power On Self Test) indicator illuminates while an internal system test and diagnostic program runs. The lamp is turned off at the end of the system test. If the lamp stays on or flashes, this indicates the presence

of a potential fault. The duration of the test will depend on your system configuration. If the lamp remains on, refer to Chapter 16, Problem Solving and Support.

The Run/Stop Indicator

This lamp is illuminated when the system is running the Solaris operating system.

When the Power On Self Test program has completed, the system will prepare itself for running the Solaris operating system.

If the Run/Stop switch on the rear of the unit (see later) is in the Run position the Solaris operating system will automatically be started or resumed. The indicator will be illuminated.

If the Run/Stop Switch is in the Stop position the system boot will be delayed, and the indicator will remain off. If the Run/Stop Indicator is illuminated then the operating system is running and system shutdown can be attempted in an orderly manner. When the Run/Stop Indicator is extinguished, it is safe to turn off the main power switch.

The SCSI Indicator

This lamp illuminates when there is a data transfer in progress on the SCSI expansion bus.

The Ethernet Indicator

This lamp flashes when the system detects activity on the Ethernet.

Note

The activity detected may have nothing to do with your system. Depending upon the network topology, the lamp may indicate other activity on the network. The lamp always flashes when your system is active on the network.

Disk Drive Indicators

The cluster of four lamps indicate disk drive activity. Each lamp is illuminated when the corresponding disk drive is accessed.

Reset Switch

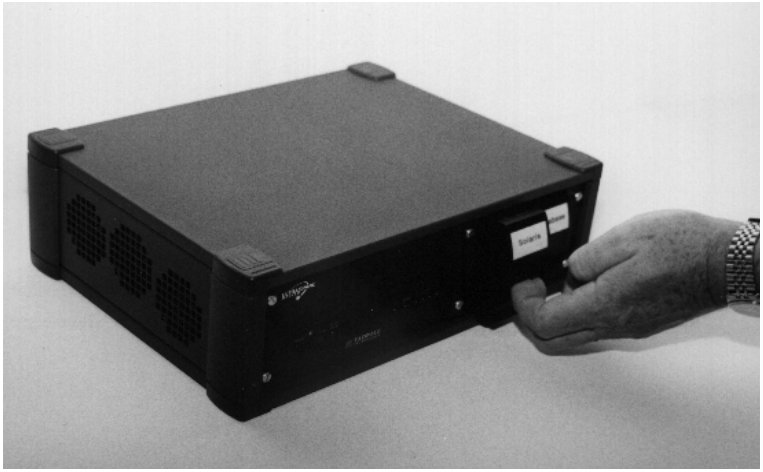
A recessed Reset Switch is fitted between the Power Indicator and the POST Indicator. The switch is accessed through a small hole and is operated by pressing a narrow implement, such as the tip of a ball-point pen, against it. The Reset Switch is not used during normal operation but may be useful for software developers. Pressing the switch causes the operating system and all applications which are running to stop. The system will then restart OpenBoot. Any applications' data not saved to disk will be lost.

Removable Disk Packs

Disk Packs simply plug into the system and are secured using an integral latch mechanism. Disk Packs are removed by pressing the latch and gently pulling the units forward.

Disk Packs should be looked after—take care not to abuse them. Disk Packs may contain valuable data.

Figure 2-4 Removing a Disk Pack

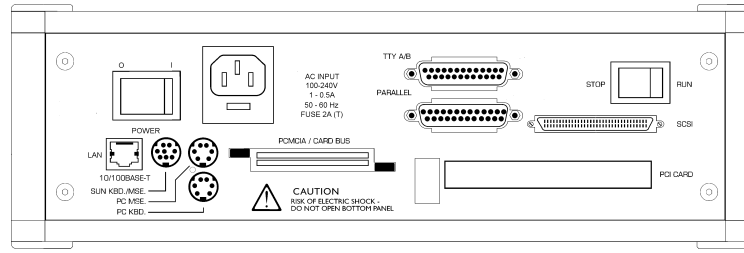


WARNING!

Disk packs should not be inserted or removed while the power on indicator is illuminated.

The Rear Panel

Figure 2-5 The Rear Panel - Switches and Connectors



The Power On/Off Switch

This switches power to the system. The rocker switch is designed so that in the **on** position the exposed rocker end is red. In the **off** position only black is showing.

WARNING!

The system should not be powered off unless the operating system has been properly shutdown or suspended. Switching the system off while the operating system and applications are running is likely to cause irretrievable loss of data. So, if the run/stop indicator is illuminated or flashing do not turn the power off. It is only safe to turn the power off when the run/stop indicator on the front panel is not illuminated.

The AC Supply Inlet Socket

The AC supply inlet is a standard IEC 950-compliant three pin earthed socket. The socket has a 'plug-in' fuse rated at 2A. See "Fuses" on page v at beginning of this User Guide.

The system should be operated from an earthed, or grounded, AC supply of between:

100 - 240 V AC 50 - 60 Hz.

The power supply will automatically adjust to the AC voltage.

Current consumption is 1A max at 100 Volts AC and less than 0.5A at 240 Volts AC.

A suitable power cord fitted with a fused AC plug (appropriate to the country where the system was purchased) is provided.

The Run/Stop Switch

The Run/Stop Switch can provide easy manual control of whether the operating system should be run or stopped. This can be useful when the system is operated as a server and there is no console connection to the unit.

It can also save time at airport security checks by speeding the run up time and proving unit functions, without going through lengthy operating system boots.

When the switch is set to the **Run** position then the operating system will be run when the system is powered up.

If the switch is set to the **Stop** position, then the operating system will not be allowed to run when the system is powered up.

Changing this switch setting while the unit is powered up is a simple way to manually request start-up or shut-down of the operating system. The Run/Stop Indicator, described earlier, indicates whether the operating system is running or stopped.

Interfaces

This section provides a brief description of the connectors provided on the rear panel of the system. In-depth information for connecting external peripherals and details on the interfaces appears elsewhere in this User Guide.

Ethernet Connector

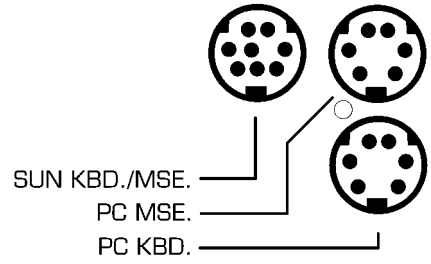
An RJ45 socket is provided for connecting to a 10/100Base TX interface. The interface speed is auto-sensing.

Keyboard and Mouse Connectors

A 'Sun standard' keyboard or a mouse may be connected to the 'SUN KBD./MSE'. socket. A 'Sun standard' keyboard and mouse can be connected simultaneously by connecting the mouse to the keyboard (as in other Sun systems).

A PC style keyboard and PS/2 mouse may also be connected to the system via the sockets shown in the figure.

Figure 2-6 Keyboard and Mouse Connectors



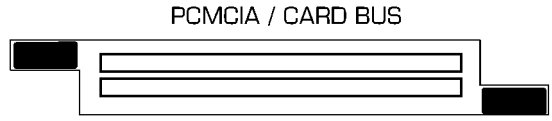
PCI Card interface

The connector/s which appear in this slot are appropriate to the PCI option fitted to the system.

PCMCIA Card Slots

Two Personal Computer Memory Card Interface Association (PCMCIA) expansion slots are provided. See Chapter 13, PCMCIA Interface.

Figure 2-7



SCSI Connector

Typically, this connector is used to connect backup devices to the system. A number of SCSI devices can be daisy chained from this connector. See Chapter 12, Using SCSI Devices.

Serial Ports

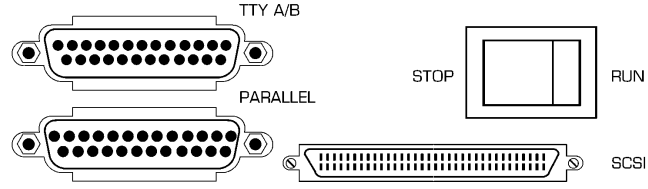
Two RS232 serial ports are supported via the TTY A/B socket. A UNIX supported character based console terminal can be attached to the system via this port.

Serial Ports are connected using the same standard cables as Sun's Ultra workstations.

Parallel Port

The parallel port is the standard IEEE P1284 Centronics interface, thus enabling the connection of a printer.

Figure 2-8 Serial, Parallel and SCSI Connectors



Cooling

The left-hand side panel (looking from the front of the unit) is vented in order that air may be drawn into the system. Similarly, the right-hand side panel is vented so that warm air can be blown out. The system should be positioned so that the vents are not blocked. This will ensure adequate cooling of unit.

WARNING!

Restricting the unit's ability to draw air in and blow warm air out will cause the system to become hot. Temperature sensors MAY then close the system down.

The system may be operated on its side provided that a suitable stand-off unit is used to ensure airflow clearance.

Sounder

A sounder inside the unit provides various audible alerts

Getting Started

3

This chapter describes how to operate your VoyagerIIi. It describes how to connect your system to an AC supply, how to start the system, how to properly shut it down and how to save and resume. This chapter contains the following sections:

Caring for your VoyagerIIi

Your VoyagerIIi is a robust mobile computer system but does require careful handling. To prevent any damage and ensure prolonged reliability, please observe the following precautions:

- Do not place heavy objects, such as a monitor, on top of your VoyagerIIi.
- Keep your VoyagerIIi away from electrical appliances that generate strong magnetic fields, such as motors, televisions, refrigerators or unshielded audio speakers.
- Do not dismantle your VoyagerIIi.
- Do not move your VoyagerIIi while it is operating.
- Do not obstruct the air flow through the VoyagerIIi.

Cleaning

Clean your VoyagerIIi as follows:

- On the exterior surface, wipe with a soft cloth moistened with mild detergent and water.

Connecting to an AC supply

Your VoyagerIIi operates at any AC voltage in the range of 100 to 240 Volts at 50 or 60Hz. This means that you can use the unit anywhere in the world where there is a suitable mains supply. You may need to use different AC power cords, however.

Connect the AC power cord to your VoyagerIIi as follows:

- Connect the molded socket of the AC power cord into the mains power inlet on the rear panel of your VoyagerIIi and connect the molded plug of the power cord into a suitable mains supply.

Powering On for the First Time

Before powering up the system, connect either

- a Sun or PC compatible keyboard and mouse, and
- a suitable display to the PCI graphics card option

or

- an ASCII terminal to the serial port.

Note

The PC keyboard and mouse cannot be used for installing the operating system.

To power your VoyagerIIi on, press the Power On switch. When the system is turned on the Power On indicator illuminates, then the POST (Power On Self Test) indicator illuminates and an internal system test and diagnostic program runs. This is to determine that the system is able to operate. The lamp is turned off at the end of the system test. If the lamp stays on or flashes, this indicates the presence of potential fault. The duration of this test will depend on your system configuration.

If the lamp remains on refer to Chapter 16, Problem Solving and Support. If all is well, the POST lamp goes out. Ensure that the Run/Stop switch is set in the 'Run' position. Once the POST lamp has extinguished, the system will start to run the operating system. After several seconds the operating system will have booted, the Run/Stop indicator will become illuminated and operating system messages will appear on the console. You will then need to configure the system. Configuring your system is described in Chapter 4, Initial System Configuration.

Note

POST may take up to 5 minutes. The more DRAM installed the longer it will take.

Powering Off

Your VoyagerIIi provides you with two methods of shutting down and powering off:

- Conventional system shutdown
- Save or Suspend

Powering off using a system shutdown

To shut your VoyagerIIi down, log in as root and enter the command:

```
# init 0
```

This takes the system down to the OpenBoot prompt and a safe state for power-off.

You may then power off by switching the Power On/Off Switch to the Off position. The next time you power on, your VoyagerIIi carries out a full system startup.

Alternatively, log in as root and enter the command

```
# shutdown now
```

A message is displayed indicating that it is safe to switch the power off

The Run/Stop lamp will go out when it is safe to power off the unit.

Powering off using Save

The Save or Suspend facility allows you to power off quickly without having to perform lengthy shutdown procedures. To power off with Save, press the STOP switch on the rear panel. Depending upon which applications are running, it should take about 15 seconds for the Save operation to complete and a message indicating that is safe to switch the power off to be

displayed. During the power off sequence the Run/Stop lamp will flash and eventually go out, indicating that it is safe to turn off the unit.

Suspend and Resume

The Suspend and Resume feature makes it easy to start and stop your VoyagerIIi without having to perform the lengthy Solaris shutdown and startup procedures of a conventional UNIX system. The system's complete operational state is saved onto a specially assigned file on the hard disk and is completely restored when you next power on. You do not have to close applications before performing a Suspend because they are completely unaffected by Suspend and Resume, allowing you to take up exactly where you left off.

Use Suspend and Resume only if your VoyagerIIi is going to be used in the same way when you next power-on. Use a full system shutdown and reboot if you intend to change or remove disks, change displays or change the system's network environment while it is powered off. Your VoyagerIIi provides several ways to initiate a Suspend operation. These are described in the Chapter 10, Suspend and Resume.

Using Full System Startup

Your VoyagerIIi can be booted in the same way as any conventional desktop ULTRA workstation running Solaris.

- Use a full system startup if you have reconfigured your system's hardware in any way while it has been powered off (Suspend and Resume may fail in cases where the system hardware has been reconfigured).
- Use a full system restart if, for any reason, you do not wish to use the Suspend and Resume facility.

In cases where you have previously used Suspend in conjunction with power off or if Resume fails, a full system startup can be carried out as follows:

1. Press the Power On switch or, if your system already has power but is failing to Resume, press the recessed Reset switch.
2. When the OpenBoot start-up screen is displayed, press **Stop-A** on a Sun keyboard or **Break** on a PC keyboard or serial console.
3. At the OpenBoot prompt, type in the following commands:

```
ok create no-resume?
ok boot
```

If you need further help refer to your Solaris Documentation.

Using Different Screen Environments

Different types of screen may be connected:

- a PC graphics terminal may be connected to the PCI card
- an ASCII terminal console may be connected to the serial port
- an XWindows terminal may be connected via the network.

When your system starts up, the Solaris login window allows you to select the display mode from the **Option** menu.

Session Allows you to select between the CDE or the OpenWindows desktop environments, both of which operate in XWindows mode.

Command Line Login

Allows you to select the terminal mode. In this mode, your display operates as a simple ASCII terminal and displays the Solaris command line.

Note

If your VoyagerIIi starts at the command prompt, you can enter OpenWindows by typing the command `/usr/openwin/bin/openwin`.

Using a Keyboard and Mouse

If you wish to use your VoyagerIIi as a desktop machine then you may use either a Sun-compatible keyboard and mouse, or a PC compatible keyboard and mouse.

The external keyboard and mouse interface is combined, and can be used to connect a type 4 or 5 Sun keyboard and mouse.

Note

Your VoyagerIIi supports the connection of a Sun-compatible keyboard and Sun-compatible optical or mechanical mouse. Alternatively, a PC-compatible keyboard and mouse may be connected.

Initial System Configuration

4

This chapter describes how to carry out the initial system configuration of your VoyagerIIi system, including how to create your own user account, how to configure an Internet Protocol (IP) address and host name, and how to set the timezone.

Your VoyagerIIi system arrives with the Solaris operating environment already installed for you on the removable hard disk pack. However, before using your system for the first time, configure the operating system following the instructions in this chapter. You may require the assistance of a system administrator to carry out the configuration or to provide you with essential information.

This chapter contains the following sections:

What System Configuration Entails

Basic configuration of your system involves the following basic steps:

- Assigning a host name and Internet Protocol (IP) address to your system
- Setting your time zone
- Setting a password for the super user (root) account
- Setting up user accounts
- The remainder of this chapter provides you with a worked example.

Note

The initial configuration process may differ slightly between Solaris versions so that the order in which steps are carried out may differ from the worked example below. As a general rule, you should carry out any steps following any instructions displayed on the screen.

For full details of how to configure Solaris, refer to the SunSoft Solaris documentation.

Initial Configuration – Worked Example

Collecting the required system information

Before configuring your system, assemble the information you will require by filling in the following table. You may need to consult your system administrator for the correct information for your system.

Category	Worked Example	Your Configuration
Host Name	chianti	
IP Address	195.5.2.15	
Subnet Mask	255.255.255.0	
Name Service	None	
Name Server Hostname	None	
Time Zone	GB	
User Name	Liz Turner	

Table 4-1 Important System Information

Network information

➲ *Host Name*

The host name of your system is the name by which it is known to other computers connected to the network. For example:

```
Host name: chianti
```

The host name must be unique to your system as duplicated names will disrupt the operation of the network.

➲ *Internet Address*

The IP address of your system consists of four groups of decimal numbers separated by periods. For example:

```
Internet (IP) Address: 195.5.2.15
```

The IP address must be unique to your system as duplicated addresses will disrupt the network. If you are any doubt regarding the assignment of an IP address, you are advised to contact your network administrator or system administrator.

If your system is to be connected to other networks, it is possible to change the IP address, at a later time, to match the IP addresses used by the network you are connecting to.

➲ *Name Service*

After you have entered your system's host name and IP address, you are prompted to select the name service you require. Using NIS and NIS+ can cause start-up problems if you later try to use your system without a network connection.

If your system is going to be used as a mobile computer, it may be advisable to select `None` from this screen and configure your system later to use the Domain Name Service (DNS). See the Network Interface chapter.

➲ *Subnets*

The screen prompts you to specify whether or not your system is going to be attached to a subnet. Larger corporate networks are often divided into smaller segments called subnets. If your system is going to be used as a standalone system, enter `No`.

If your system is going to be connected to a large network, you will need to consult your system administrator for the correct choice for this screen.

Time zone

When prompted, enter your time zone information following the on-screen instructions. Once a time zone has been assigned to a system, the system will continue to use that time zone until it is reconfigured or re-installed.

If your time zone does not correspond with any of those listed, you can set a time zone relative to Greenwich Mean Time (GMT), also known as Coordinated Universal Time (CUT), or specify a timezone file to be used.

Setting a super user password

Enter a password for the super user (or root) account. The super user account has special privileges and is used mainly for system administration tasks. Inadvertent or unauthorized use of some of the commands available to super user can damage the operating system and render your system unusable. For this reason you are advised to set a password for the super user account.

Although the super user password can be between zero and eight characters long, the password should consist of a minimum of six characters as a security precaution. Any printable characters can be used including letters, numbers and punctuation marks.

Because the super user has special system privileges, the Solaris Operating System employs a higher degree of security control on this user. You may, therefore, experience problems if you do not set a password for the super user.

After you have entered your root password, Solaris displays the Solaris login prompt. You should create a user account as described in the next section.

Moving Between User and the Root Accounts

Many of the operations described in this guide require you to be logged in as root. The root account gives you the privileges required to carry out system administration tasks such as disk maintenance. However, using the root account for day to day purposes is very risky as you can easily cause damage to the operating system.

As a rule, you should log in to your normal user account for every day purposes. Then, when you need to carry out a particular task as root, enter the `su` command and the root password to log in to the root account:

```
% su -
Password:
#
```

The hash prompt (#) indicates that you have root privileges. When you have completed the task requiring root privilege, close the root session by pressing **Ctrl-D** on the keyboard.

Setting up a user account (OpenWindows Environment)

➲ *Starting the User Account Manager*

For day-to-day use, you should set up a user account by using the Graphical User Interface (GUI) administrative interface, admintool. This provides an easy-to-use way to create a user account. This administrative interface can only be invoked in the Common Desktop Environment (CDE) or OpenWindows graphical environments. To open an admintool window carry out the following steps:

1. At the Solaris prompt, log in as root and then start OpenWindows with the following commands:

   ```
   login: root
   password:
   # /usr/openwin/bin/openwin
   ```

   The OpenWindows desktop is displayed.

2. Move the cursor to a clear area of the desktop background and press and hold the menu (center) mouse button. The OpenWindows desktop menu is displayed.

3. From the menu, select **Programs** and then **Command Tool**. A cmdtool window is displayed.

4. In the command tool window, enter the command:

```
# admintool &
```

The **Admintool** window is displayed. If necessary, select the **User** from the **Browse** menu to display a list of users.

5. The steps to add a user are as shown from step 4 onwards as described in the following CDE Environment information.

Setting up a user account (CDE Graphical Environment)

➲ *Starting the User Account Manager*

For day-to-day use, you should set up a user account by using the Graphical User Interface (GUI) administrative interface, admintool. This provides an easy-to-use way to create a user account. This administrative interface can only be invoked in the Common Desktop Environment (CDE) or OpenWindows graphical environments. To open an admintool window carry out the following steps:

1. At the CDE Login Screen, log in as root and enter the root password when prompted.

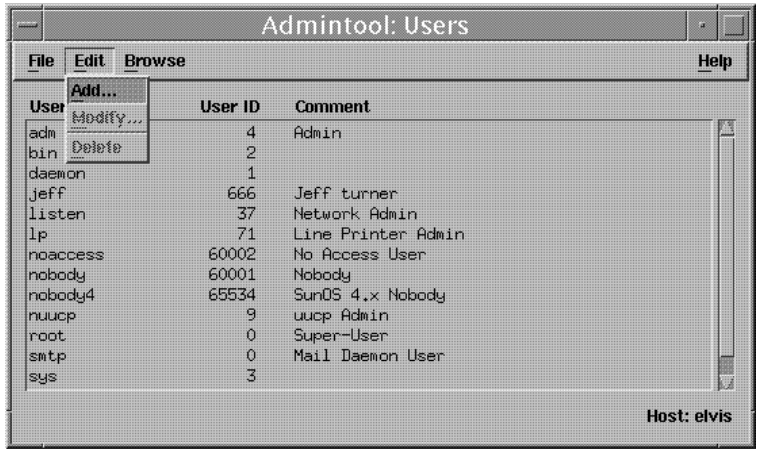
   The CDE workspace screen is displayed.

2. Invoke a Terminal Display Window from the applications pull-up menu. (*This is usually situated on the pull-up menu above the icon which shows 'paper and pencil'*)

3. In the terminal window, enter the command:

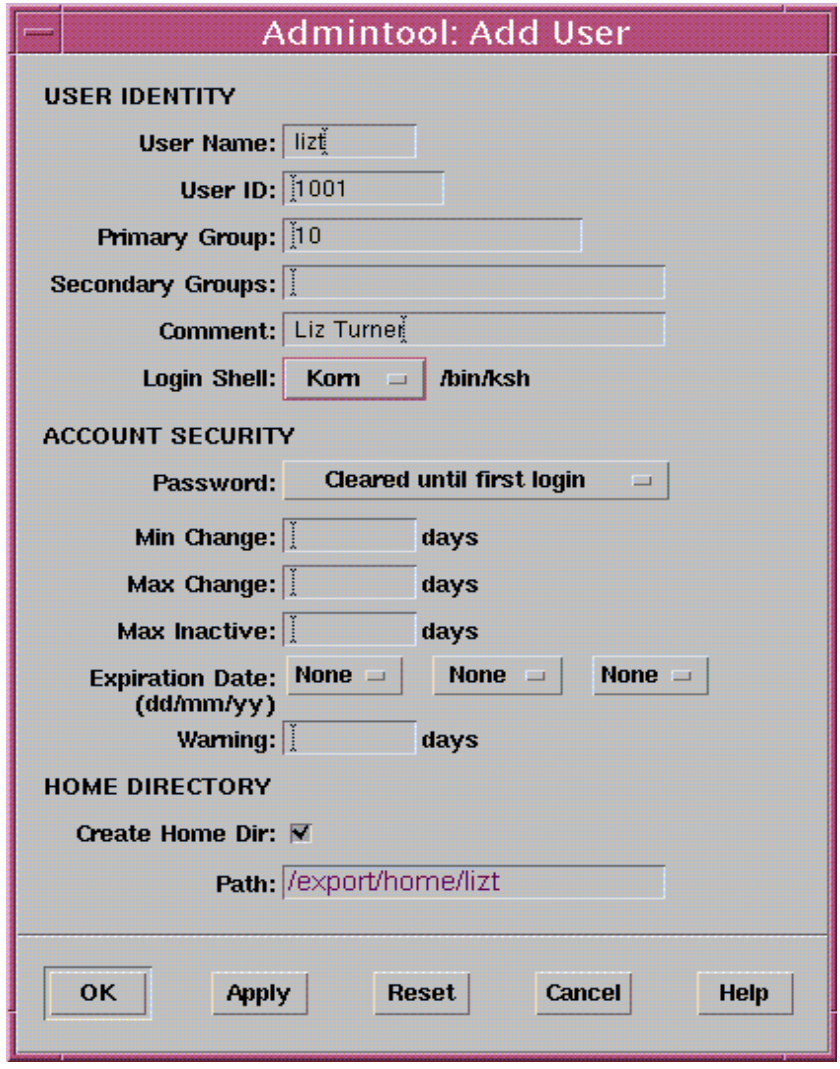
   ```
   # admintool &
   ```

4. The **Admintool** window is displayed. If necessary, select the **User** from the **Browse** menu to display a list of users. The names of the users are always displayed in ascending order.



A scroll bar at the right edge of the window allows you to scroll up and down through the available list of user login IDs.

5. From the Edit menu, select Add. The Add User window is displayed.



➲ *User Name*

This is the login name of the user. This is often an abbreviation or your initials. For example, for the user 'Liz Turner' you might use `lizt`. The comment field is commonly used to describe the user. In this case, the user's full name 'Liz Turner'.

➲ *User ID*

The user ID is a unique number by which the network identifies a user account. Numbers 1 through 99 are reserved. You should consult the network administrator for your site for a valid number. The default user ID number, in the Add User window, will always be displayed as 1001. If you are using your system as a stand-alone unit, use 1001 for the first account, 1002 for the next and so on.

➲ *Group ID or Primary Group*

The group ID is a number which identifies the workgroup to which this user belongs at login time. To create new groups or list available groups, you should select the Browse Groups option in the admintool window. The default group used by Solaris is group ID number 10 (*staff*).

➲ *Account Security*

This section is used to specify how the password for the account is to be administered. Use this section to specify the required change frequency, expiration date and number of days warnings that are issued advising that the password should be changed.

➲ *Home Directory*

This section creates a home directory for your new user account. You must enter a directory path in the text field. User accounts are normally located in `/export/home`. In this example, for the user Liz Turner you would enter the path

`/export/home/lizt`. Note that the name at the lowest level directory of the user's home directory is the same as the login name for that user.

After you have entered your account details, click on OK and Solaris creates a user account based on your specifications.

Setting up a user account (UNIX Command Line)

➲ *Creating Users using a UNIX Command Line*

There may be circumstances when you are unable to set up a user account by using the Graphical User Interface (GUI) administrative interface, admintool. A UNIX utility program is supplied which can be used to create users. This is the useradd utility.

1. At the Solaris prompt, log in as root.

```
login: root
password:
```

The UNIX prompt, #, is displayed.

2. Type the command line, as shown in the example below, with the appropriate login name being supplied in place of the words in *italics*.

```
# useradd -d /export/home/username -m -g 10 -s
/bin/ksh username
6 blocks
#
```

3. Once the login identity has been created, you should apply a password to that login name. Type the command:

```
# passwd username
New password
Re-enter new password:
passwd (SYSTEM): passwd successfully changed for
username
#
```

Note

Steps 2. and 3. could be repeated to create other login identities.

Note: Solaris will ask the user to change their password when they first login. This is done to maintain security on the system, allowing only that user to know their personal password.

Restarting the System

When you have completed system configuration, carry out a complete system reboot by entering the command:

```
# init 0
```

This takes the system down to the OpenBoot prompt and a safe state for power-off without using the Save and Resume feature. When the Run/Stop light is off and has stopped flashing, power off by switching the power switch to the OFF position.

Power on again by turning the power switch to the ON position.

Using the root login ID

The root user is referred to as the super user due to the security access which is allowed for this user.

The Solaris operating system has many automatic security controls. One of these controls is a restriction on the login capability of the root user. The root user is, by default, only allowed to login on the console terminal device. Because your system does not, necessarily, have a console device, you may wish to remove this restriction.

To allow root to login from any terminal:

1. Connect a character terminal device to Serial Port A of your system.

Note

If a keyboard is connected, the system will assume that a screen is also connected. If a video card is installed, this will also result in the system unit not responding on the serial port. If problems are experienced that are related to these two situations, removing the keyboard should resolve the problems.

2. Power on your system. By default, it will use the terminal device on Port A as the console device if no other keyboard is connected.

3. At the Solaris prompt, login as the root user, as shown below:

```
login: root
password:
```

The UNIX prompt, #, is displayed.

4. Edit the `/etc/default/login` file, using an editor such as the *vi* editor:

```
# vi /etc/default/login
#ident"@(#)login.dfl1.896/10/18  SMI"/*  SVr4.0
1.1.1.1*/

......

# If CONSOLE is set,root can only login on that
device.

# Comment this line out to allow remote login by
root.

#

CONSOLE=/dev/console
```

5. Insert a hash (#) character at the start of the line that reads:

```
CONSOLE=/dev/console
```

6. When the line looks like the example, shown below, you should save and exit from the file using the command:

```
# wq!

# If CONSOLE is set, root can only login on that
device

# Comment this line out to allow remote login by
root.

#

# CONSOLE=/dev/console
```

7. Once the file has been saved, the root user will be able to login from any connected terminal or network connected system.

Installing & Using Applications 5

This chapter provides details about running third-party applications, and outlines any limitations that may apply.

This chapter contains the following sections:

Third-party Application Support

Because it uses a standard SPARC processor architecture and the Solaris operating system, the VoyagerIIi provides the same level of support for several thousand software applications as a conventional desktop SPARCstation. Applications that meet the SPARC Compliance Definition (SCD) will run on your VoyagerIIi.

In general, all third-party XWindows or OpenWindows applications written for SPARCstation and compatible workstations will run on the VoyagerIIi with very few limitations as follows:

- Applications use either XWindows as their graphics system or must be written for OpenWindows. The operating system uses Xwindows Release 4 and OpenWindows Version 3, but you can run earlier XWindows, OpenWindows or MOTIF applications directly on the VoyagerIIi. Older SunView applications are not supported.
- Applications that require the existence of Sun specific hardware, such as attached SBus hardware, or that make direct calls into undocumented device driver interfaces in the Sun kernel, will not run on the VoyagerIIi.
- Applications that use Sun or other vendor specific hardware may not run on the VoyagerIIi.

Methods of Installing Applications

Software installation on the VoyagerIIi is carried out in a conventional manner. Programs can be installed to run locally or can be run on a network server. However, due to the mobile nature of the VoyagerIIi, which may mean it is operated

without a network connection from time to time, it is advisable to install applications onto your VoyagerIIi's own hard disk and then run them locally.

You can install applications from a locally connected drive or from a network server. In addition, application vendors are increasingly using the world wide web to distribute their products.

Applications can be installed using one of the following methods:

- From a locally connected CD-ROM, tape or floppy drive
- From a network server
- From a remote website

For specific information about installing SPARC applications onto VoyagerIIi, refer to the documentation supplied with the application and to the SunSoft documentation.

Applications and Graphics Interfaces

The VoyagerIIi does not come supplied with a display monitor.

Graphics monitors can be connected to optional graphics cards in the PCI slot. Certain applications may not work, in a satisfactory manner, depending on the type of graphics monitor that has been attached to the system unit.

Legibility of Text on a Small Screen

When using some display resolutions, you may find that text elements within windows and menus become very small. Both OpenWindows and CDE allow you to increase the size of text used in windows, menus and alert messages.

➲ *Changing Text Size in OpenWindows*

To change the font size used in OpenWindows, select **Workspace Properties** from the Workspace menu and then select Fonts from the Category menu. Within the fonts category window, select the required font style and size.

➲ *Changing Text Size in CDE*

To change the font size used in CDE, select the Style Manager icon from the Front Panel and then select the Font icon from the Style Manager window. In the Font window, select the required font size and then click **OK**.

The change takes effect immediately for applications launched after the change is made. However, to make the change take effect for CDE itself, you must exit and then re-enter CDE.

Customizing the Operating System

The VoyagerIIi preload of Solaris 2.6 or above is a standard Sun Developer installation with additional packages that are specific to the VoyagerIIi system. Many of the facilities available on the complete Solaris operating system CD-ROM are not required by every user or are only occasionally needed.

This section explains how to add facilities to your system by installing packages from the Tadpole-RDI distribution CD supplied with your VoyagerIIi or from the SunSoft Solaris CD. The instructions should be read in conjunction with your SunSoft Solaris documentation.

Installing Packages

The basic procedure for adding packages is as follows:

- Connect a CD-ROM drive, either directly to your VoyagerIIi or to a server, containing the Tadpole-RDI or SunSoft distribution CD. Consult the system administrator, if required, for advice on using the CD-ROM with a server.
- Create the necessary device file (`/dev/dsk/c1t6d0s0`), if it does not already exist, to read the CD-ROM. The device file can be created at boot time or without powering down, as described below.

Note

The device name of c1t6d0s0 is used as an example. The first two characters denote the disk controller number (*in this instance, controller 1*). The number of the SCSI disk controller may vary from this example dependent on the number of IDE disk controllers that have been installed in your system. All examples in this chapter use controller 1 to represent the SCSI disk controller.

- Mount the CD-ROM onto your file system.
- Use the `pkgadd` command to install the required packages.

Connecting the CD-ROM

Connect the CD-ROM to your VoyagerIIi's SCSI port with a target SCSI ID of 6, see Chapter 12 "Using SCSI Devices".

Creating the Device Files – Boot Time

To create the special device files during boot time, use the following procedure:

1. Ensure that the system had previously been fully shutdown, not saved, then power on all peripherals and the system unit.

2. Interrupt the boot process, at an appropriate time, so that you can issue commands at the PROM monitor command line.

```
ok
```

3. Enter the following commands:

```
ok boot -r
```

The `-r` option causes the VoyagerIIi to carry out hardware reconfiguration. In this example, the VoyagerIIi detects the external CD-ROM at target ID 6 and creates the necessary special file `/dev/dsk/c1t6d0s0` to allow the CD-ROM's filesystem(s) to be accessed. You must wait for the system to boot.

➲ *Mount Your CD-ROM*

To do this, login as root and enter the following commands:

Note

The following command lines will only be required if the Volume Manager process (vold) is not running on your system. If `vold` is running, the /cdrom file system will automatically be mounted a few seconds after the CD has been inserted and the three command lines, shown immediately below, will not be required.

```
# cd /
# mkdir /cdrom
# mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /cdrom
```

➲ *Installing the Packages*

The `pkgadd` command is used to install the required packages. For example, to add a package to a Solaris 2.6 release, type:

```
# pkgadd -d /cdrom/cdrom0 packageA
```

Follow the displayed instructions to complete the installation procedure.

You can add several packages at one time by specifying the required package names separated with a space. For example:

```
# pkgadd -d /cdrom/cdrom0 packageA packageB
```

Note

The name of the directory `cdrom0` may differ between versions of the operating system. To ascertain the correct name list the contents of the CD-ROM using the command:
`ls /cdrom`.

Displaying Package Information

To display information about all packages that are already installed on your VoyagerIIi, type:

```
# pkginfo
```

Information about the installed packages is displayed on your screen. Alternatively, to display information about specific packages, you can pipe the output of `pkginfo` into a `grep` command. For example, the following command could be used to display the Tadpole-RDI packages installed on your VoyagerIIi:

```
# pkginfo | grep TAD
```

Removing Packages

To remove packages, use the `pkgrm` command. For example:

```
# pkgrm packageA
```

You can remove several packages at one time, by specifying the package names separated with spaces. For example:

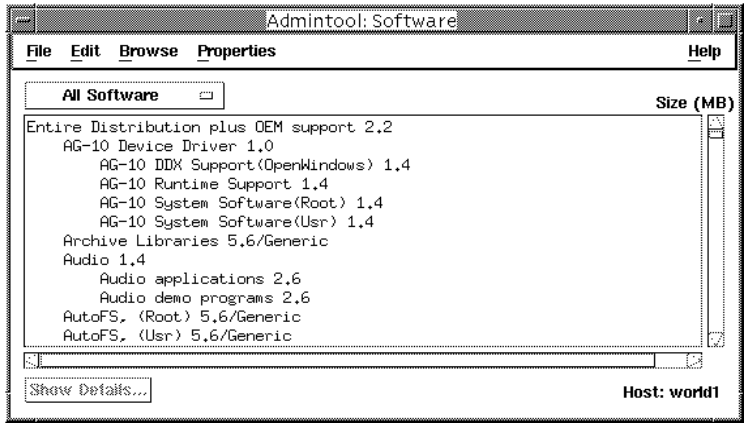
```
# pkgrm packageA packageB packageC
```

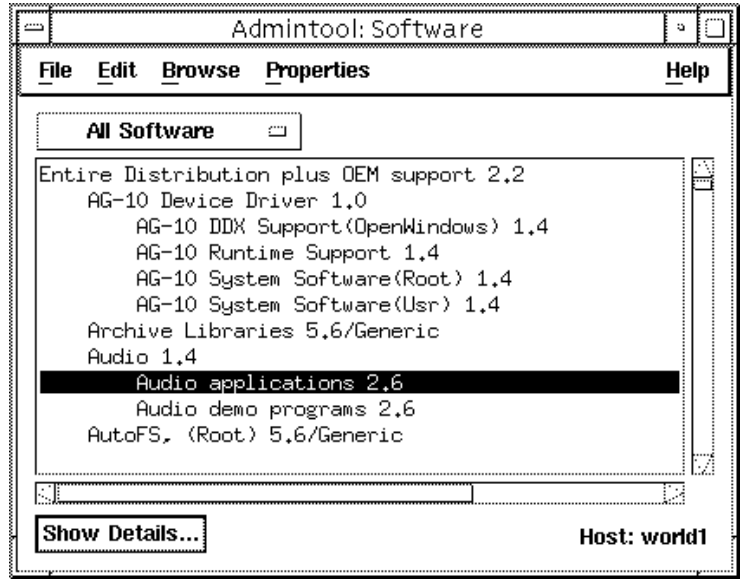
Admintool Software

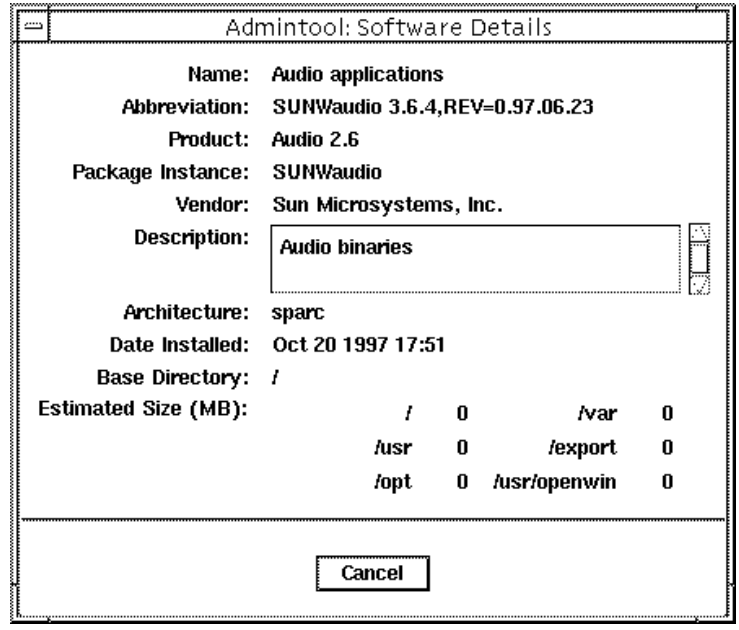
The Admintool administrative GUI provides a set of Software management facilities.

Software can be added, have details listed or be removed using the Admintool Graphical User Interface.

Examples of the Admintool Software windows are provided on the following pages:




Admintool: Software
File
Edit
Browse
Properties
Help
All Software
Entire Distribution plus OEM support 2.2
AG-10 Device Driver 1.0
AG-10 DDX Support(OpenWindows) 1.4
AG-10 Runtime Support 1.4
AG-10 System Software(Root) 1.4
AG-10 System Software(Usr) 1.4
Archive Libraries 5.6/Generic
Audio 1.4
Audio applications 2.6
Audio demo programs 2.6
AutoFS, (Root) 5.6/Generic
Show Details...
Host: world1


Admintool: Software Details
Name: Audio applications
Abbreviation: SUNWaudio 3.6.4,REV=0.97.06.23
Product: Audio 2.6
Package Instance: SUNWaudio
Vendor: Sun Microsystems, Inc.
Description:
Audio binaries
Architecture: sparc
Date Installed: Oct 20 1997 17:51
Base Directory: /
Estimated Size (MB):
/ 0
/var 0
/usr 0
/export 0
/opt 0
/usr/openwin 0
Cancel

Memory Usage and Swap Space

The Solaris operating system uses *virtual memory* to allow several applications to run simultaneously when they would otherwise require more memory than is physically present in the system. To support this feature, one of the disk partitions on the boot disk is assigned to provide your VoyagerIIi with 'swap space'. This allows parts of programs that are not running at any given moment to be stored (or *swapped*) temporarily on to the hard disk while active applications are running in main memory. The effect of this is to make your VoyagerIIi's memory appear to be much larger than it really is.

The `swap` partition created by the "factory install" on your VoyagerIIi's removable hard disk drive is large enough to allow a reasonable number of tools and applications to be used simultaneously. Table 5-1 shows the sizes used for the `swap` partition for the different memory capacities.

Memory (MB)	swap size (MB)
128	128
256	256
512	512
1024	1024

Table 5-1 Factory Configured Swap Partition Sizes

Using swap space efficiently

All applications require a certain amount of memory to be available before they will start. Your VoyagerIIi's memory can soon be used up if you start many applications and leave them all running on the OpenWindows or CDE workspace. Typically, if you are running one or two applications together with a Mail

Tool, a clock and a File Manager you would have no problems. However, if you run a large number of complex applications you are likely to run out of memory and swap space.

To minimize your memory and swap usage bear the following points in mind:

- Minimize the number of DeskSet tools in use. The tools use large amounts of memory. For example, if you only use the Calendar Manager occasionally, call it up from the Workspace menu when you need it rather than leaving it as an icon on your workspace.
- Avoid using tools that use memory continuously or often. For example, the performance meter tool runs every second. Similarly, if you enable the second hand on the clock, the clock program must run every second.
- Keep your mail in mailfiles if you have more than a few messages. Each message that appears when you open your mail file takes memory.
- Keep tools iconified if you are not using them, but do not want to quit them. For example, the performance meter and the File Manager tools are suspended when they are iconified, freeing up memory (but not swap space) for other processes.
- Arrange tools on the screen so they do not overlap. This reduces repainting by the Window Manager.
- If you are using the multi-browser in the Calendar Manager, quit it when you are finished rather than iconizing it. It is almost as quick to restart it from the Calendar Manager as it is to open it from the icon.
- Avoid using a background image for the main background, plain backgrounds use less memory.

- Avoid using PostScript applications at the same time as OpenLook applications.
- Do not run too many applications at once. You may have to reduce the number of applications active or on the DeskTop if you want to run a new large application.

Checking swap space usage

You can find out how much swap space you are using at any time by using the following command:

```
% swap -l
```

This prints out the amount of swap space available and in use.

Adding swap space

You can create and add additional swap space without reformatting the disk. For example, the following steps create a 16Mbyte file for use as extra swap space (you will need to be superuser or logged in as root to do this) as follows:

1. Create a swap file using the following commands:

```
# mkdir /swap
# cd /swap
# mkfile 16m SWAPFILE Make a 16Mbyte file
```

2. Add the swap file to the system by editing. You should add lines such as the following to the file `/etc/vfstab:`

```
/swap/SWAPFILE  -  -  swap  -  no  -  no  -
```

3. Restart your VoyagerIIi using a full system startup

Disks & Filesystems

This chapter provides an overview of how the hard disk drives of the VoyagerIIi can be configured, using the Solstice DiskSuite software. Also covered in this chapter is a guide to using the Network File System (NFS) as an extension of the VoyagerIIi's local disk file systems.

It contains the following sections:

Using Disk Devices

The VoyagerIIi is designed to allow up to four internal hard disk drive units to be installed. In addition, external SCSI disk drives can also be attached to extend the disk storage capacity of the system.

The disk storage capacity of an internal disk drive unit in the VoyagerIIi system is 8Gigabytes or more. Four disk drive units can be fitted, in pairs, where storage capacity combinations, using 8GB internal disk drives, can be 16GB or 32GB or higher if larger capacity drives are fitted. The internal disk drive units are selected for their low power consumption, size and resilience.

There are no restrictions regarding the storage capacity of the external SCSI disk drive unit. Disk technology is ever changing and storage capacities are ever increasing.

By combining the internal disk drive units and external SCSI disk units, the VoyagerIIi may have a disk storage capacity in excess of 50GB. This volume of data storage requires special disk management techniques to be applied in order to reduce the risk of data loss.

The Solaris operating system is supplied with a software package called Solstice DiskSuite. This software package provides facilities especially aimed at management of very large disk capacity.

Each disk device will have an associated, logical, device name file. For example, the device name `/dev/dsk/c1t3d0s0` refers to:

- a SCSI disk on controller number 1 (`c1`)
- that has a target address of 3 (`t3`)

- that is a standalone disk drive (`d0`) and not part of a RAID drive and partition, or slice, 0 on the drive (`s0`).

Solstice DiskSuite

Solstice DiskSuite is a graphical administrative tool that provides facilities to manage hard disk drives. DiskSuite enables you to manage large numbers of disks and the data stored on those disks. DiskSuite allows the creation of virtual disks. Each of the virtual disks is called a *metadevice*.

To the system's application software, a metadevice is functionally no different from a disk partition. DiskSuite converts all the Input/Output requests that are targeted at a metadevice and converts them into the appropriate physical disk read/write requests.

A metadevice is a combination of two or more disk slices (partitions). These could be on the same disk drive or be a combination of slices from two or more disk drives.

Metadevices can contain *mirrors* (duplicate copies) of the data areas on disk. Information can also be *striped* over two or more disk drives to help increase disk I/O data throughput.

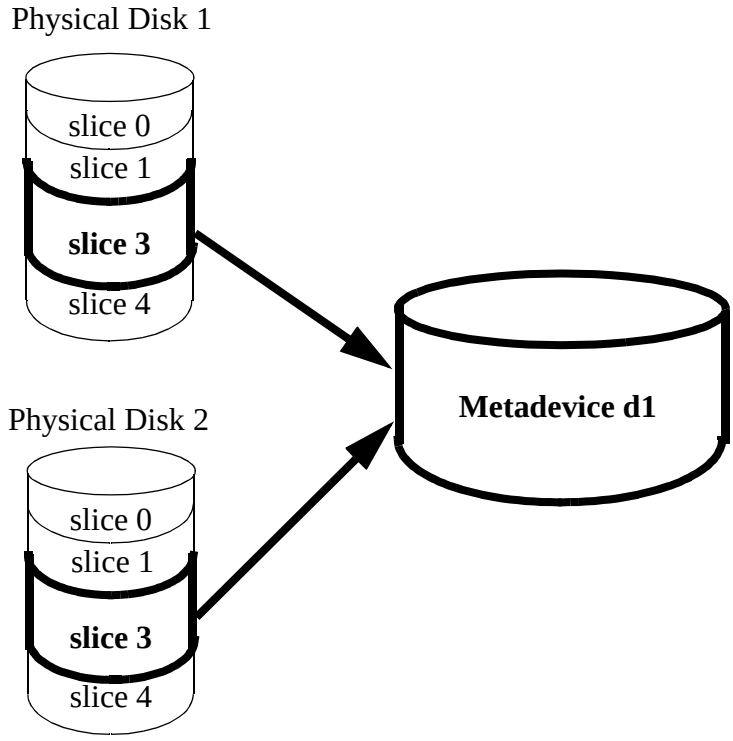
Note

The VoyagerIIi is designed to be a transportable system. Mirroring and striping are, therefore, best applied to the internal disk drives only. If external disk drives are considered to be part of the mirror or stripe area for the metadevice, there is no guarantee that those external disks will be available if the VoyagerIIi is moved to another site.

Metadevice Configuration

The diagram, below, shows how a number of disk slices can be combined to form a *metadevice*

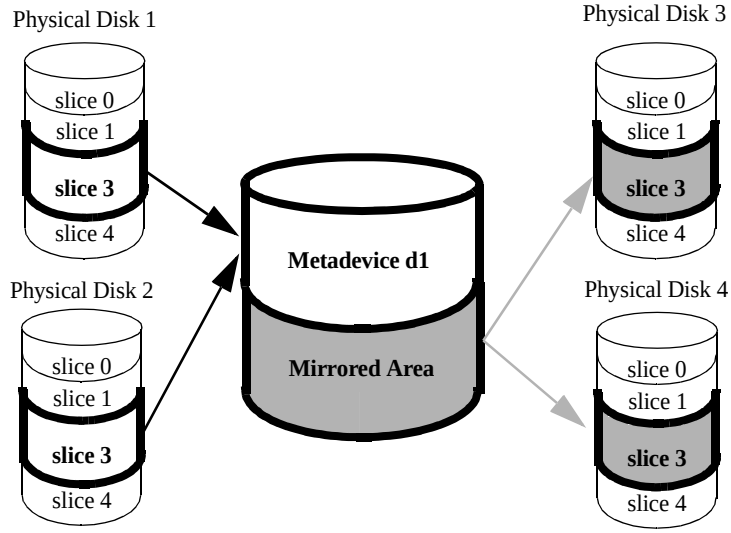
Figure 6-1 :Setting up a Metadevice



Metadevice Mirror Configuration

A disk mirror is a duplicate region of disk space, which must be physically identical to the disk space it is mirroring, that acts as a backup storage region. All data written to a disk will also be written to the mirror of that disk.The diagram below shows how a mirror may be configured:

Figure 6-2 Disk Mirroring



Not only does the mirror provide greater resilience for the storage of data, it also provides an alternative data source for disk read operations. Disk mirroring can, therefore, improve the speed of disk input.

The mirror disk area is still considered to be part of the metadevice. When adding disk space to a mirrored metadevice, you should remember to add an equivalent amount of mirror disk space.

Note

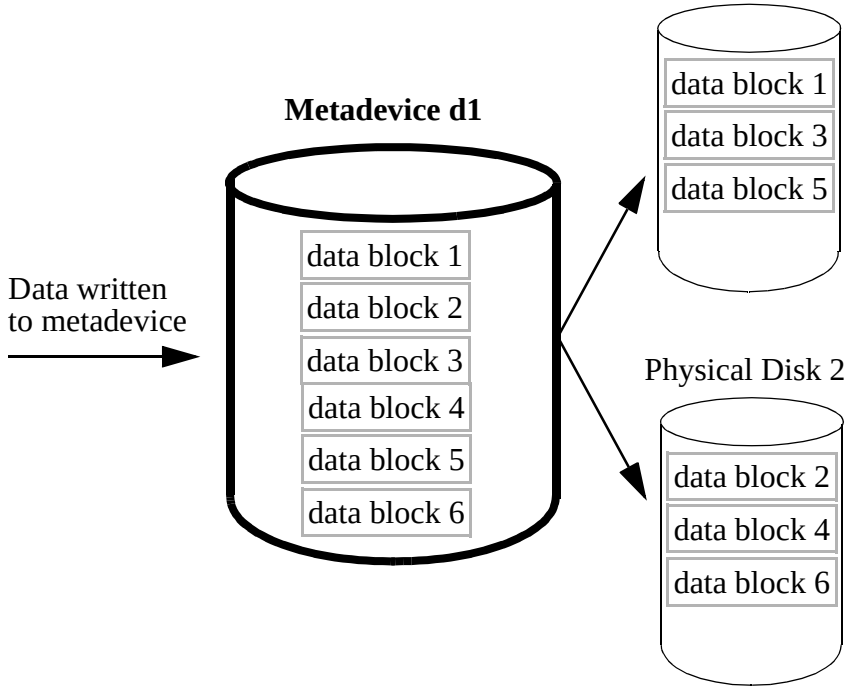
DiskSuite can work with standalone disk drives, such as the internal disk drives or with RAID (*Redundant Array of Inexpensive Disks*) storage units.

Metadevice Data Striping

Data striping is a method of spreading the write operations across two or more slices or disk drives.

When data is written to the *metadevice*, the blocks of data are written, alternately, to each physical disk

Figure 6-3 Data Striping



As shown in the diagram above the first block of data is written to physical disk 1 and the second block of data is written to physical disk 2. Data blocks 3 and 4 are written in the same manner. This operation will continue for all the data blocks being written to the *metadavice*.

The advantage of striping is that two or more disk drives can be written to simultaneously. Striping, therefore, can help increase the speed of data output.

Network File Systems (NFS)

The Network File System, NFS, was developed by Sun Microsystems. NFS allows directories to be shared across the network.

The Solaris operating system is supplied with the NFS software and any Solaris system can act as a NFS client, automatically, when connected to a network. The NFS client daemon processes are started at boot time by a run-time control script called `/etc/init.d/nfs.client`.

A server can make one or more directories available to NFS clients in the network. The server must run appropriate daemon processes. These processes can be started, manually, by running the `/etc/init.d/nfs.server` script. For the script to work, there must be an entry in the `/etc/dfs/dfstab` file. An example is shown below:

```
earth # cat /etc/dfs/dfstab

# Place share(1M) commands here for automatic
execution
# on entering init state 3.
#
# Issue the command '/etc/init.d/nfs.server start'
to ...
# daemon processes and the share commands, after ...
# first entry to this file.
#
# share [-F fstype] [-o options] [-d "<text>"] ...
# .e.g,
# share -F nfs -o rw=engineering -d ...
share -F nfs -o rw=earth -d "man pages" /usr/share/man
earth #
```

The nfs.server script on the host `earth` will read the `/etc/dfs/dfstab` file and share the `/usr/share/man` directory to other hosts in the network. Only the host, `earth`,

will be able to read and write to this directory. All other hosts will have read-only access to files in the `/usr/share/man` directory.

Mounting a NFS shared directory

If the VoyagerIIi system is to be connected to a network on a permanent, or semi-permanent basis then NFS shared directories can be mounted at boot time using entries in the `/etc/vfstab` file or they could be mounted, by the root user, using the `mount` command.

```
# grep earth /etc/vfstab
earth:/usr/share/man - /usr/man nfs - yes -ro,nosuid


# mount -o ro,nosuid earth:/usr/share/man /usr/man
```

If the VoyagerIIi is to be used as a mobile system it would be easier to use the NFS Automounter facility.

The NFS Automounter

A daemon process, called `automountd`, can be used to automatically mount and unmount NFS shared directories. The automounter will mount when a shared directory is required and will unmount that directory after a period of non-use.

➲ *Automounter special directory*

The `automounter` process uses a special directory to allow access to shared directories without having to use the mount command. The special directory is the `/net` directory. Use of this directory is controlled by information found in the `/etc/auto_master` file.

```
# cat /etc/auto_master
# Master map for automounter
#
+auto_master
/net      -hosts   -nosuid,nobrowse
/home     auto_home  -nobrowse
/xfn      -xfn
```

Remote, shared, directories will be automatically mounted, by the automounter whenever a pathname is used that starts with `/net/`*`server_host_name`*.

Before a mount operation is performed, by the autmounter, the `/net` directory will appear as an empty directory. Once an appropriate pathname is used, the automounter will create the necessary sub-directories of `/net` to allow access to the shared directory files.

Shown below is an example of how the /net directory is used:

1. The NFS server host must exist in the hosts database.

   ```
   # grep earth /etc/hosts
   130.1.46.101        earth
   #
   ```

2. The NFS server host must be available on the network. The easiest way to test that a network connection could be made to the server is to use the `ping` command.

   ```
   # ping earth
   earth is alive
   #
   ```

3. The NFS server must be sharing one or more directories to other hosts in the network. The easiest way to test that the server is sharing directories is to use the `dfshares` command.

   ```
   # dfshares earth
   ```

```
RESOURCE                  SERVER ACCESS TRANSPORT
 earth:/usr/share/man      earth    -       -
#
```

4. Initially, the /net directory will appear to be an empty directory.

```
# ls -l /net
total 0
```

5. When a pathname is used which starts with /net/*server_name*, the automounter will automatically mount all shared directories, from that server, to the appropriate sub-directories of /net/*server_name*.

```
# cd /net/earth/usr/share
# ls
man
# pwd
/net/earth/usr/share
#
```

After a default time-period (*usually 5 minutes*) of non-use, the automounter will unmount the sub-directories that were mounted below the /net directory and the /net directory will once again appear to be an empty directory.

If you wish to start or stop the automounter process, you can use the run-control script as shown below:

```
# /etc/init.d/autofs stop  << stop the automounter
# /etc/init.d/autofs start <<start the automounter
```

If directories need to be NFS mounted and applications refer to those directories by pathnames that do not start with `/net`, then the automounter may not be used to mount the NFS shared directories. *Refer to the Mounting a NFS shared directory section, earlier*.

MetaDevices

7

This chapter provides an overview of the Solstice DiskSuite software and the use of MetaDevices.

It contains the following sections:

Overview of MetaDevices

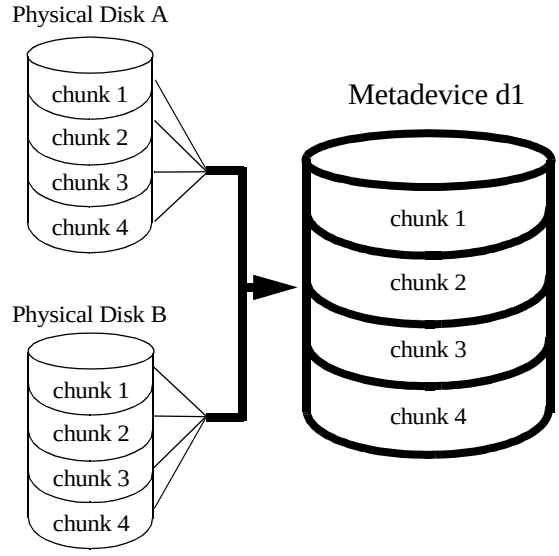
The VoyagerIIi can have up to 4 large-capacity internal disk drives fitted in addition to external SCSI disk drives. Each disk drive can have a maximum of seven partitions.

One physical partition may not have sufficient storage capacity to contain all files required by an application, for example a large database.

The Solaris 2.6 operating system (server version) is supplied with a package called Solstice DiskSuite. (*Consult the appropriate Solaris Licence Agreement regarding the licensing of this package*) This package allows the user to create a number of metadevices.

A MetaDevice is a combination of two or more partitions from one or more, physical, disk drives that are treated as one, logical, disk drive unit. Unlike the physical limitation of seven partitions, up to 1027 metadevices can be created, allowing up to 1027 logical partitions to exist on your system.

Figure 7-1 The Metadevice Concept



A further advantage of the metadevice approach is that logical partitions, or entire physical disk drives, can be mirrored to other drives and data can be "striped" across a series of disk drives to improve read/write performance.

Note

A mirrored partition or disk must have exactly the same characteristics and size as the partition or disk it is mirroring.

Using MetaDevices

As with physical disk drives, the metadevice has special device files associated with each logical drive.

The device names of metadevices are stored in the subdirectories `/dev/md/dsk` (*block metadevices*) and `/dev/md/rdsk` (*raw metadevices*).

Each metadisk can be recognized by its number. For example, in the preceding diagram, partitions (*referred to as chunks*) from the two physical disk drives were being treated as one, logical, metadisk. The metadisk had the name **d1**. The block device name for this metadisk would therefore, be `/dev/md/dsk/d1`.

The information that is used, by the system, to manage the metadevices must be stored in a raw disk partition. This information is called the State Database as it contains details of the state of the metadevice and its contents.

To avoid loss of that data, it is recommended that the State Database be duplicated and stored in a minimum of three raw partitions. These partitions should not be used as swap space and should not be used for filesystems. If an error occurs, which corrupts a State Database, the system will seek out the backup State Databases and rebuild its information using the most up-to-date and correct data from all of he State Databases for the metadevice.

Solstice DiskSuite

Although there are several commands available to create and manage metadevices and State Databases, Solaris provides a Graphical Administration Interface. This interface is called DiskSuite.

The DiskSuite program is one of the “Solstice” products and would be started from the Solstice Launcher window.

For further details, you should refer to the Solstice DiskSuite Reference Guide.

How MetaDevices Can Improve Performance

Each time a disk is accessed, for reading or writing of data, the disk’s Read/Write heads must be positioned over the appropriate track on which the data is stored. Several, simultaneous read/write requests can cause the read/write heads to move over a large number of track areas. While the heads are being moved to the appropriate track, no data is actually being transferred.

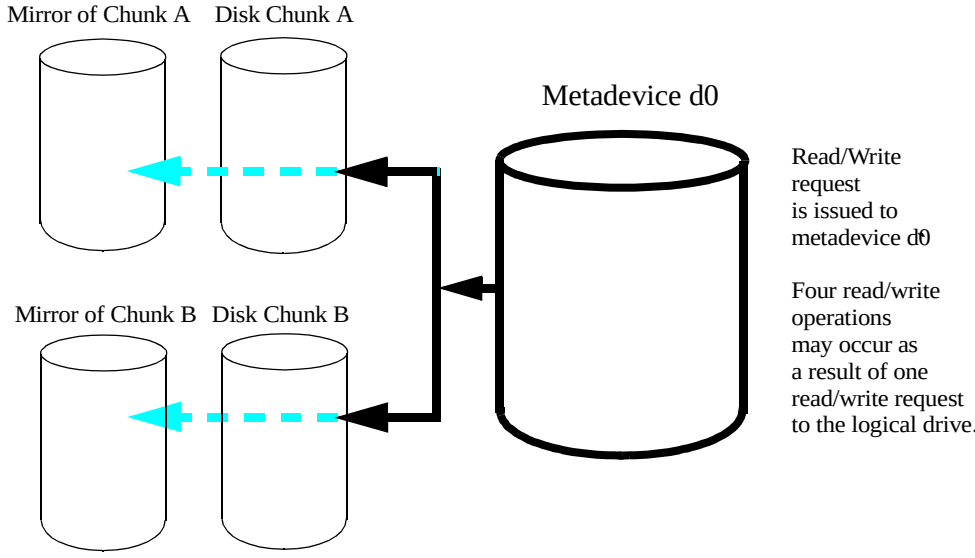
It would, therefore, be better to spread data across a number of disk drives, especially if the data input/output requests are for random data access

Although this would provide some improvement on disk read/write performance, the benefits may not be substantial. The use of metadevices can significantly improve read/write throughput by striping and mirroring.

If data is striped over two or more physical disk drives, the data from the metadevice could be read from all physical drives that are associated with that metadisk. This would mean that two or more sets of read/write heads are accessing the required data, simultaneously.

If metadisks are mirrored, then for each read request, a second source of data is available. The read request could be passed to the normal metadisk or to its mirror, depending on which metadisk is busy.

Figure 7-2 Mirrored Metadisks



Backup and Restore

8

This chapter describes the backup and restore facilities provided as part of the 2.6 implementation of Solaris. In particular it provides an example of how to use `ufsdump` and `ufsrestore` to backup and restore filesystems.

The following topics are covered:

Overview

System hang-ups and hard disk problems are hazards even with the most reliable computer systems. Problems may be caused by operator error or by software or hardware failures. However reliable the software and hardware is, there is always a risk that valuable data may be lost. In the case of your system, the hard disk can be removed very easily giving rise to the additional risks of losing or damaging a disk while it is not fitted in the system. For these reasons, it is vital to maintain regular backups of your work and of essential system configuration files.

Backup strategies

Usage and filesystem structures vary widely from system to system, which means that the backup strategy must be appropriate for your individual needs. You should consult the system administrator for your organization who will be able to advise you on the best strategy for you and the facilities available. The following observations may help in devising your strategy.

- Your system runs the standard Solaris operating system with backup capabilities identical to those of a conventional desktop system, including `tar`, `cpio` and `ufsdump`.
- The preloaded operating system is supplied on a CD-ROM and can be re-installed very easily. The installation process automatically configures the hard disk for you but provides no protection for work or application directories.
- Consider also how cumbersome different media and drives are to carry around with your system and whether you are able to power external drives in different

countries. The Tadpole-RDI removable disk packs provide light-weight options that are powered from system's internal power supplies.

Further information

The Solaris operating system contains many facilities for automated backup in a large networked environment. This guide can only describe very basic backup and restore facilities. For a complete description of the backup and restore capabilities of Solaris you will need to refer to SunSoft's publications.

File Backup Facilities

For most purposes, `tar` and `cpio` are adequate for saving important files to tape or floppy disk. They are sufficient to save small amounts of data and have the advantage of allowing you to back up both local and remote filesystems mounted via NFS.

For example, the `tar` command could be used to make a backup of your `/export/home` directory to tape as follows:

```
$ tar cvf /dev/rmt/0 /export/home
```

As another example, to save the file `mywork` to a formatted floppy disk using a SCSI floppy disk drive, the command would be as follows.

```
$ tar cf /dev/diskette mywork
```

To list the contents of the archive on the floppy in the form displayed by `ls -l`, the command would be:

```
$ tar tvf /dev/diskette
```

To extract the archive from the floppy the command would be:

```
$ tar xvf /dev/rdiskette mywork
```

For further information about `tar` and `cpio`, please consult the SunSoft Solaris documentation.

Backing Up Filesystems

To make backups of a complete filesystem (or single disk partition), the `ufsdump` command provides an alternative. The general syntax for the command is as follows:

```
# ufsdump options arguments filesystem
```

Where `options` is a list of options to be used for this backup and `arguments` is a list of arguments that correspond to the list of options in the *same order*.

Caution

Supply the arguments in the same order as their corresponding options. For example:

```
ufsdump 0sd s-arguments d-arguments filesystems
```

If you do not observe the correct order you could completely destroy the filesystem being backed up.

For example, to create a backup of a disk partition on a 5.0 Gbyte tape unit 0, the following command would be used:

```
# ufsdump 0fu /dev/rmt/0 /dev/dsk/c0t0d0sn
```

`0fu` is a list of options. `0` specifies the backup level, in this case a full backup; `f` specifies that the dump is to be directed to something other than the default device; and `u` specifies that the `/etc/dumpdates` file should be updated with a record of this backup

`/dev/rmt/0` is the device to which the archive is to be directed. This argument corresponds to the `f` option.

`/dev/dsk/c0t0d0sn`
is the block disk device being backed up where n is the disk slice.

Backing up partitions to tape

To make backups of the individual disk partitions on your removable hard disk drive, the following sequence of commands could be used, one for each partition to be backed up:

```
# ufsdump 0cfb /dev/rmt/0n 64 /          (slice 0)
# ufsdump 0cfb /dev/rmt/0n 64 /var       (slice 3)
# ufsdump 0cfb /dev/rmt/0n 64 /opt       (slice 5)
# ufsdump 0cfb /dev/rmt/0n 64 /usr       (slice 6)
```

The options used in these examples specify a level `0` or full backup, using a cartridge tape at `/dev/rmt/0n`, where `n` specifies the "no rewind". The no rewind is most important for this type of backup scenario to prevent each subsequent dump from overwriting the last. In this case, the argument `/dev/rmt/0n` corresponds with the `f` option, and the `64` argument corresponds with the `b` (block size) option.

Caution

Restore the partitions in the same order they were backed up.

Making a complete tape backup – worked example

This example creates a tape backup of the backup `partition` of your removable hard disk drive. This is a special partition that spans the whole drive to make backing up the entire contents of the removable hard disk drive more convenient.

1. Ensure that the system was previously shutdown, not suspended.
2. Connect a tape drive to your system with a SCSI Target ID of 5.
3. Power on the external drives and your system.
4. When the OpenBoot greeting is displayed, press **Stop-A** on the keyboard. The OpenBoot `ok` prompt is displayed.

5. Boot the system with the following command:

   ```
   ok boot -r
   ```

6. Log in as root.

7. At the Solaris command prompt, type the appropriate `ufsdump` command. For example, to create a backup of the root partition `c0t0d0s0` on a 5.0 Gbyte tape unit 0:

   ```
   # ufsdump 0cfb /dev/rmt/0n /dev/dsk/c0t0d0s0
   ```

Backing up onto an external hard disk

Disk partitions can also be backed up to another locally connected disk drive with the `ufsdump` command. For example, to backup each partition in turn to an external hard disk, the commands would have the following form:

```
# ufsdump 0f /external/usr_arch_ddmmyy /usr
```

Where:

`/usr_arch_ddmmyy`
: is the name of the dump file. The `_arch` element used in this example is an arbitrary reminder to the user at a future date that this is an archive, and `ddmmyy` provides an arbitrary date stamp.

Restoring Filesystems

Filesystems can be restored from a `ufsdump` archive using the `ufsrestore` command.

Note

It is important to restore the partitions in the same order they were backed up. See the example in "`/dev/dsk/c0t0d0sn` is the block disk device being backed up where n is the disk slice." on page 8-4.

Carry out the restore procedure as follows:

1. Connect the backup drive to your system. A tape drive should be connected at SCSI ID 5 or an external hard disk drive at SCSI ID 0, 1 or 2.
2. Power on your system and external drive.
3. Connect the CD-ROM drive to your system at SCSI ID 6.
4. If you are using a tape device, ensure that the backup tape is rewound by logging in as root and entering the following command at the Solaris prompt (assuming that the backup device used was `/dev/mnt/0n`):

   ```
   # mt -f /dev/rmt/0n rewind
   ```

5. Reset your system by entering the following commands:

   ```
   # sync
   # init 5
   ```

6. Power up your system and external drive and when the OpenBoot greeting is displayed, press **Stop-A** on the keyboard. The OpenBoot `ok` prompt is displayed.
7. Place the Solaris operating system CD in the CD-ROM drive and boot the system with the following command:

   ```
   ok boot cdrom -s
   ```

8. You will be logged in as root, in a Bourne shell, and at the Solaris prompt, restore each partition in turn with the following sequence of commands:

Note

This example restores the partitions in the order they were backed up in "`/dev/dsk/c0t0d0sn` is the block disk device being backed up where n is the disk slice." on page 8-4.

```
# cd /
# mount /dev/dsk/c0t0d0s0 /a
# cd /a
# ufsrestore -rf /dev/rmt/0n
# rm restoresymtable
```

To restore the `root` filesystem to your hard disk.

Note

Change the directory to the one that is acting as the mount-point directory for the partition that is being restored (*in this instance, the* **/a** *directory*). The ufsrestore command will restore files starting with the current directory. Failure to observe this rule, may cause you to restore files into the wrong partition.

9. After restoring the files into the root partition (disk slice 0) you must re-create the Solaris Operating System Bootblock. (Without this, the disk could not be used as a bootable disk). The command to install the bootblock is provided on the Solaris CD-ROM.

To install the bootblock on the disk, you would give the following commands:

```
# cd /usr/platform/‘uname -i‘/lib/fs/ufs
# installboot bootblk /dev/rdsk/c0t0d0s0
```

10. To restore the remaining partitions, you would give the following commands:

```
# cd /
# umount /a
# mount /dev/dsk/c0td0s3 /a
# cd /a
# ufsrestore -rf /dev/rmt/0n
# rm restoresymtable
```

To restore the `var` filesystem to your hard disk.

```
# cd /
# umount /a
# mount /dev/dsk/c0t0d0s5 /a
# cd /a
# ufsrestore -rf /dev/rmt/0n
# rm restoresymtable
```

To restore the `opt` filesystem to your hard disk.

```
# cd /
# umount /a
# mount /dev/dsk/c0t0d0s6 /a
# cd /a
# ufsrestore -rf /dev/rmt/0n
# rm restoresymtable
```

This restore the `usr` filesystem to your hard disk.

11. At the Solaris prompt, enter the command:

```
# cd /
# umount /a
```

Reboot the system by entering the command:

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

Note

The examples, above, all end with the command "rm restoresymtable". This file should only be removed when a complete restore has been made. The restoresymtable file contains details of the files that have been restored and is not required once the restore operation (of a level 0 backup) has been performed.

Re-installing the Operating System from CD-ROM

The Solaris operating system can be re-installed on your hard disk from the supplied Tadpole-RDI CD-ROM. You might do this to configure a new hard disk drive, to recover from a serious operating system problem or following a memory upgrade.

When you install Solaris from the Tadpole-RDI CD-ROM you can choose to configure the hard disk's partition map to suit your own preference or you can follow the default option. The table below shows an example of a partition map for a hard disk installed from the CD using the default options except for the `var` partition which was selected explicitly. The resulting partition map differs from the factory installed partition map.

system partitions	Tag	Approximate Size (MB)
/dev/dsk/c0t0d0s0	/	25
/dev/dsk/c0t0d0s1	swap	1 - 2 x size of DRAM
/dev/dsk/c0t0d0s2	backup	(Entire) Disk size
/dev/dsk/c0t0d0s3	var **(if selected)**	100
/dev/dsk/c0t0d0s5	/opt	30
/dev/dsk/c0t0d0s6	/usr	120
/dev/dsk/c0t0d0s7	/export/home	Remainder of disk

Table 8-1 Disk Partition Table

Restoring the complete factory installation from CD-ROM involves the following steps:

- Loading a version of the Solaris operating system from the Tadpole-RDI CD-ROM supplied with your system.
- Rebooting your system.

Note

The Solaris install program will destroy all of the data on your hard disk. Before installing Solaris onto a previously used disk, make backups of all filesystems so that you can recover your data afterwards. See "Backing Up Filesystems" on page 8-4.

Loading Solaris

1. Connect the CD-ROM drive to your system at SCSI ID 6.
2. Power up your system and external drive and when the OpenBoot greeting is displayed, press **Stop-A** on the keyboard. The OpenBoot `ok` prompt is displayed.
3. Boot the system with the following command:

   ```
   ok boot cdrom
   ```

4. After a delay, the Solaris installer window is displayed. Follow the displayed instructions to install Solaris.

5. When the Solaris installation is complete, restore your data and configuration files into the newly created filesystems from backups created before starting out the install process. Alternatively, you can configure a new hard disk for your system as described in the earlier chapter on Initial System Configuration.

Using the Network Interface

9

This chapter provides an introduction to networking concepts, with particular regard to mobile computing and describes how to connect your system to a network and configure the network interface.

This chapter contains the following sections:

Network Terminology

Some of the terms used in this chapter are explained below:

Client A network *client* machine is a system that uses the services provided by a server machine for disk storage space, printer access or some other network-wide service.

Domain The name assigned to a group of machines within an organization on a site is called a *domain*.

DNS Domain Name Service (DNS). A service that allows systems on a network to find out the IP Addresses of other systems on a network from a server.

Hostname The name given to a computer so that it can be referred to easily by other users on the network.

Internet The name given to a wide area network that spans the world. Many computers connected to an Ethernet local area network (LAN) or have access to the Internet.

IP Address A unique number assigned to each machine on the network. Each system address has a corresponding system name, or hostname.

NFS The Network File System (NFS) allows you to use directories or files on a remote machine as if they were actually on your own computer.

NIC Network Information Center (NIC). Internet addresses are allocated and administered globally by the DDN/ARPANET Network Information Center.

NIS Network Information Service (NIS). A service that allows systems on a network to find out the Hostnames and IP Addresses of other systems on a network from a server. This is not recommended for systems that are frequently operated away from the network.

RJ45 A connector type, used to connect the system to an Ethernet network cable system.

Server A machine that provides services to other machines on the network, such as providing network-wide disk, backup or printing services.

TCP/IP Transmission Control Protocol/Internet Protocol (TCP/IP) is a family of protocols that determine how data is transferred across a network.

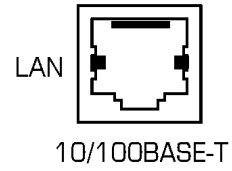
Connecting your system to a Network

Note

Your system can be connected to a network via the built-in network interface or via a suitable PCMCIA adapter card.

There are several different types of physical media to which a system's Ethernet interface can be connected. The VoyagerIIi supports a direct 10/100BaseTX connection to a hub or another network device. Your system provides an RJ45 connector located on the I/O panel, as illustrated below.

Figure 9-1 RJ45 Connector



Before you can operate your system on a network, it must be correctly configured, as described in "Configuring your system for a TCP/IP Network" on page 9-9.

An Overview of TCP/IP Networking and the Internet

All computers connected to an Ethernet network, either directly or via a telephone line, can potentially access computers all over the world via the Internet. For this to be possible, every computer needs a unique identity so that data and messages can be sent and received anywhere in the world.

Although an in-depth study of networking is beyond the scope of this manual, this section provides a useful overview of how the Internet uses a system of network domains and internet protocol (IP) addresses to make data communications possible over the Internet.

Internet addresses

Every device connected to a network must have a unique address and must know the address of every other machine on the network that it is going to communicate with. *Internet Protocol* (IP) addresses are used to uniquely identify each machine on the Internet throughout the world. IP address allocation is normally managed by a single person at a particular site, often called the *system administrator*, who is responsible for the reliable operation and security of an organization's network.

Note

If you do not belong to an organization with its own internal network, you may gain access to the Internet via a modem through a local Internet Service Provider (ISP).

Classes of Address

IP addresses consist of 32 bits and are normally written as four decimal numbers each in the range 0-255 and separated by periods. IP addresses have the following form:

```
a.b.c.d
```

For example, a typical IP address for a computer might be:

```
192.3.4.56
```

Any leading zeros are discarded.

The address functions in two parts: the first is used to identify a particular network; and the second is used to identify an individual computer, normally called a *host*, attached to that network. The proportion of the address used for each function depends upon the class of the network. There are three network classes, as summarized in the table below.

Class	Range	Network Portion	Host Portion	Likely Usage
A	1-126	a	b.c.d	Only the largest networks are assigned Class A addresses. Each Class A network has over 16 million available addresses.
B	128-191	a.b	c.d	Large organizations and groups of subnetworks sometimes have a Class B address. The first and second number are assigned by the NIC, providing over 65000 available addresses for each Class B network.
C	192-224	a.b.c	d	Networks for the majority of companies are Class C networks. The first three numbers are allocated by the NIC, providing up to 254 available hosts for each Class C network.

Table 9-1 ID Address Name Structure

The majority of smaller organizations use class C addresses, which provide 254 possible host addresses on their network. By convention, host address 0 is used to represent the network

itself and 255 is used as a broadcast address. A message sent as a broadcast on a network is received by every other host attached to that network.

In addition, address 127.0.0.1 is used as a *loopback address*; data sent to this address is transmitted back to the same host for testing. This address is usually given the hostname *localhost* in the `/etc/hosts` file (described later in this chapter).

Addresses used by systems not connected to the Internet

By convention, sites that are not connected to the Internet often use 192 or 193 as part a of their network address. However, even if you do not intend to access the Internet immediately, you are advised to obtain an official Internet address for your site. See "Registering Internet addresses" on page 9-9.

Network names

Although IP addresses provide computers with an efficient means of identifying the source and destination of data and messages transmitted across the Internet, it is much more intuitive for humans to use names. TCP/IP provides a flexible naming system which allows this.

The global Internet is organized into a hierarchical structure of *domains* that follow the network's organizational and geographical structure. At the top level, or *root domain,* the Internet is organized into a number of domains which reflect the type of organizations or geographical territories within them. For example,`.com` identifies a *domain* used by commercial organizations most often in the United States. There also exist codes for individual countries such as `.uk` for the United Kingdom or `.fr` for France.

Commercial companies, educational establishments and government departments can access the Internet within these domains either directly or through an access provider. The Internet address for an organization consists of a name which is unique to that organization.

For example, a company attached to the .com domain could have the address:

```
anyco.com
```

The diagram in Figure 9.2 shows three fictitious commercial organizations attached to the `.com` domain. An individual computer called `medoc` attached to a LAN segment within the company called anyco would have the address: `medoc.anyco.com`

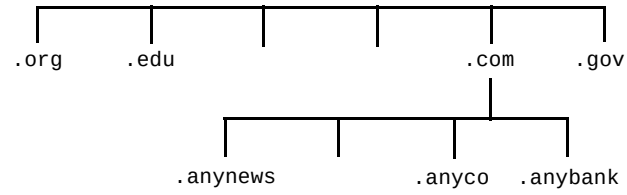


Figure 9-2 Domain Structure

Individual users can be addressed using this scheme. For example, a user called Liz Turner who uses `medoc` at `anyco`, might have the address:

```
liz_turner@medoc.anyco.com
```

Simpler email addresses may be recognized by a mail server which uses database files to recognize the intended destination from Liz Turner's email address of:

```
liz_turner@anyco.com
```

Accessing the Internet

To allow access to computers attached to other networks or to the Internet, a *router* or *gateway* is normally required. The router or gateway functions are performed by computers with

multiple network connections which provide the necessary link between the Internet and an organization's internal LAN segments. They ensure that messages, in the form of data packets, are routed according to destination. A gateway may also be used to provide security against unauthorized intrusion.

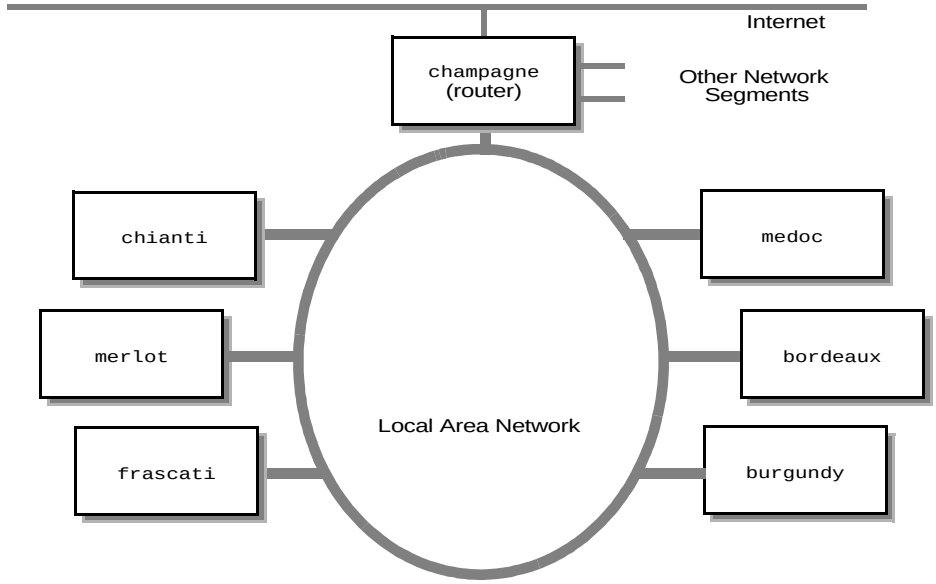


Figure 9-3 Example diagram of a Local Area Network

Figure 9-3 shows a LAN within the organization `anyco`. Each computer has a unique IP address and hostname which allow messages to be routed correctly between them and the outside world. Subject to access privileges, the various computers are able to share applications and files. In this case `champagne` functions as a *router* and controls data movement between this segment and any others within the same organization and provides access to the Internet.

Registering Internet addresses

Internet addresses are allocated and administered globally by the DDN/ARPANET Network Information Center (NIC). An Internet address and domain name can be obtained directly from the NIC or from a network access provider who will register one on your behalf. For further information, contact the NIC at the following address:

WWW:	http://rs.internic.net/
Telephone: ([1]-800-365-DNIC)	[1-](800) 365-3642
Postal mail:	Department of Defense Attn: Network Information Center 7990 Boeing Court M/S CV-50 Vienna, VA 22183 U.S.A.

Due to the high demand for domain registration on the world-wide Internet, it is advisable to ask your preferred internet service provider to register your domain name on your behalf.

Configuring your system for a TCP/IP Network

The steps required to configure your system for a TCP/IP network are as follows:

- Configuring a hostname and IP address
  Many organizations appoint an individual to be responsible for the reliable operation and security of their internal networks. This individual, sometimes known as the *network administrator*, should be consulted before connecting a new machine to the

network. In particular, the network administrator will be able to advise you about the correct hostname and IP address to use for your system.

- Configuring your system to use DNS (optional)
  This may not be necessary for a small network which rarely changes. However, as a network grows, the administrative burden of keeping each host up to date can be considerable. This burden is reduced on many larger networks by designating one host as a *name server*. A name server provides a name-to-address mapping service for individual hosts within its domain allowing them to obtain the address information required for communication.
- Configure your system to use a router (optional)
  If your network is local and has no connection to other networks or to the Internet, this is not required. On some networks, one machine, or several machines on very large networks, will be configured as a *router*. A router controls the passage of messages between network segments and ensures the efficient flow of data.
- Reboot and test the system.

Assigning a hostname and IP address

Although you may have already assigned a hostname and IP address to your system during initial system configuration (see Chapter 4, Initial System Configuration) you may need to change these details from time to time because your system is a mobile system and may be connected to different networks at different locations. If this is the case, you will need to consult the network administrator responsible for all networks you wish to connect to.

➲ *Simple Configuration Using ifconfig*

The `ifconfig` command can be used to set the basic characteristics of the network interface, the most important of which is to associate an IP address with the interface. For example:

```
ifconfig le0 195.5.2.15 netmask 255.255.255.0
broadcast 195.5.2.255
```

➲ *Configuring Your system by Editing the Hosts Files*

The `/etc/inet/hosts` file contains the name-to-address mapping for every host on the network, including the local host itself. On a Solaris system, the `/etc/inet/hosts` filename is symbolically linked to the filename `/etc/hosts`. Either of these file names can be referred to as the `hosts table`.

Whenever a new machine is added to the network, its own `hosts table` and the `hosts table` on each host already connected to the network must be updated to allow them to communicate.

The initial configuration you carried out when you first powered your system on will have created an `/etc/inet/hosts` file similar to the following:

```
#
# Internet host table
#
127.0.0.1     localhost
195.5.2.15    chianti loghost
```

Note

The address and hostname used here are examples only and would be substituted by your system's address and hostname.

You must add an additional line for each machine that you need to communicate with on your network. To edit the `/etc/inet/hosts` file you must be logged in as root. You can edit the file using a text editor or with `vi` at the Solaris command prompt.

Each line contains the following information:

```
ip-number hostname #comments
```

For example, the following might be the host file for the network of machines illustrated in Figure 9-3:

```
#
# Internet host table
#
127.0.0.1 localhost
195.5.2.15   chianti loghost # my system
#
195.5.2.10   champagne    # internet router
195.5.2.54   burgundy
195.5.2.55   bordeaux
195.5.2.57   frascati
195.5.2.58   merlot
```

Configuring your system to use a name server

Note

You are strongly advised not to use NIS or NIS+ with your system if you intend to use your system as a mobile computer. Using NIS or NIS+ may prevent your system from starting up properly if it is not connected to a network and cannot communicate with the NIS name server.

The system can be configured as a *Domain Name Service* (DNS) client by creating the configuration file `/etc/resolv.conf`. This file lists the local domain name and location of name servers for the local network. For example, in the case of the network illustrated in Figure 9-3 where champagne is the name server, `/etc/resolv.conf` would be similar to the following:

```
#
# Name Server Lookup
domain anyco.com
nameserver 195.5.2.10
```

The file could contain a list of several name servers, if required.

The `/etc/inet/hosts` file is much simpler for the DNS client and need only contain the hostname and IP address of your own system and the name server. For example, the `/etc/inet/hosts` file for a machine attached to the network in Figure 9-3 would be similar to the following:

```
#
# Internet host table
#
127.0.0.1 localhost
195.5.2.15 chianti loghost # my system
#
195.5.2.10 champagne  # internet router
```

Setting up a default router

Your system is configured to use a router by creating the file `/etc/defaultrouter` containing the IP address of the router. For example, the `/etc/defaultrouter` file for a machine attached to the network in Figure 9-3 where champagne is the router would be similar to the following:

```
# defaultrouter
192.5.2.10
```

Testing your network connection

When all the necessary configuration files have been created and correctly edited, your system should be rebooted in order for the changes to take effect and the network connection tested.

The simplest way to test connections is with the `ping` command. This is a simple utility that will indicate if the connection is working and whether or not the basic configuration is correct. The command syntax is as follows:

```
# ping hostname
```

To use ping, you must be logged in as root. For example, to test communications with a machine connected to the local network in Figure 9-3, you might use the following command:

```
$ su
password:
# ping burgundy
burgundy is alive
```

You can obtain more detailed output by using the `-s` option with the command.

To test the Internet connection to a company called `otherco`, you might use a command similar to:

```
# ping otherco.com
otherco.com is alive
```

If the use of a hostname does not work, you can use the IP Address as an alternative:

```
# ping 195.5.5.1
195.5.5.1 is alive
```

Note

If you experience problems using the `ping` command, this may be caused by an incorrect setting in the `/etc/nsswitch.conf` file. This file controls access to Naming Service information. Refer to the Solaris manual pages on `nsswitch.conf` for information about the contents of this file.

Sharing Filesystems

The Sun Network File System (NFS) allows you to set up distributed filesystems enabling files and applications on one host to be shared across the network by other hosts. This section provides a brief overview of how to set up a distributed filesystem using NFS.

File Sharing and Suspend and Resume

Many problems associated with Save/Suspend and Resume arise when file sharing is being used. This is particularly true if you are running applications located on a server machine. The scenario is frequently as follows: you power off with a Save; remove your system from the network; and then attempt a Resume with no network connection. The server machine cannot be reached and the Resume cannot complete because your system cannot Resume the same operational state.

To prevent this situation arising you should always observe the following precaution before powering off with a Save and removing your system from the network.

Always unmount shared directories and comment out any lines in the `/etc/vfstab` file that automount an NFS filesystem by placing a # at the start of the line.

For more information refer to Chapter 10, Suspend & Resume.

Sharing local filesystems

To allow others to access parts of the filesystem on your system you *share* the filesystems you wish to make available. To make the whole filesystem available, you would specify the root directory, but normally you would only allow access to specific files or directories.

➲ *Configuring the /etc/dfs/dfstab file*

The `/etc/dfs/dfstab` file controls access by other hosts to the local filesystem and consists of a number of lines containing the mount point followed by one or more hostnames, identifying

the hosts which may access the exported filesystem. This file will not exist if you have not previously used NFS to export files but can be created and edited with a text editor such as `vi`.

Each line has the following syntax:

```
share -F nfs -d "text" pathname -option,option…
```

Where:

`share` is the command used to share directories

`-F nfs` designates that the directory is to be shared using NFS

`-d "text"` is the descriptive text that will be displayed by certain NFS-related commands

`pathname` is the file or directory to be exported

`option` specifies the type of access to be given, such as `ro` for read-only or `rw` for read-write access.

For example, the `/etc/dfs/dfstab` file on merlot attached to the network shown in Figure 9-3 might have the following lines:

```
#Place share(1M) commands here for automatic
execution
#on entering init state 3.
#
#Issue the command '/etc/init.d/nfs.server
start' to ...
#daemon processes and the share commands, after
adding ...
#first entry to this file.
#
#share [-F fstype] [-o options] [-d "<text>"] ...
#.e.g,
#share -F nfs -o rw=engineering -d "home dirs"
...
/usr/anywork  -rw=medoc,
access=chianti:burgundy, \     anon=-1
/usr/anybrowse -ro
```

In this example, `medoc` has read-write access to the directory `/usr/anywork`; `chianti` and `burgundy` have read-only access; and the `anon=-1` entry prevents any anonymous accesses. The second entry allows anonymous read-only access to `/usr/anybrowse`.

➲ *Enabling file sharing*

To allow these directories to be shared, you can either reboot the operating system (but not with Save and Resume) or use the following commands:

```
# /etc/init.d/nfs.server start    start the NFS server daemons
# shareall                        share the specified directories (listed in the dfstab file)
# dfshare                         list the directories that are being shared
```

If you have added directories to an already existing `/etc/dfs/dfstab` file the NFS daemons will already be running and you may need only to enter the `shareall` command.

➲ *Disabling file sharing*

Before disabling file sharing, check to see if any files are being shared with the `dfshares` command without arguments. This produces a list of shared directories. You can unshare directories at any time by using the `unshare` or `unshareall` commands. For example:

```
# unshare /usr/anywork      halt NFS access to /anywork
# unshareall                halt NFS access to all directories
# dfshares                  list the directories that are being shared
                            (the list should be empty)
```

Mounting filesystems

To use a directory that has been made available for sharing you use the `mount` command. This allows you to attach remote filesystems to your own filesystem tree and access them as a normal part of your own filesystem. You may need to create a directory as a mount point and then mount the remote filesystem. For example, Liz Turner on the machine medoc wishes to mount the directory `/usr/anywork`, which resides on the machine `merlot`, and access it within her home directory `/export/home/lizt` in a subdirectory called `mywork`. The steps required would be as follows:

➲ *Create the new directory*

```
$ mkdir /export/home/lizt/mywork
```

This step is only required if the directory does not already exist. However, using an existing directory as a mount point will prevent you from accessing files already in that directory while the remote filesystem is mounted.

➲ *Mount the remote directory*

The `mount` command can only be executed by the super user. The command to mount the directory must, therefore, be executed as the super user.

```
# mount merlot:/usr/anywork /export/home/lizt/mywork
```

Figure 9-4 illustrates the effect of mounting the remote directory on the local directory tree. Note that although this directory has the name `/usr/anywork` on merlot, access to the directory from the local host (medoc) use the name of the mount point `/export/home/lizt/mywork`. For example:

```
$ pwd
/export/home/lizt
$ ls mywork
File_1 File_2 File_3
```

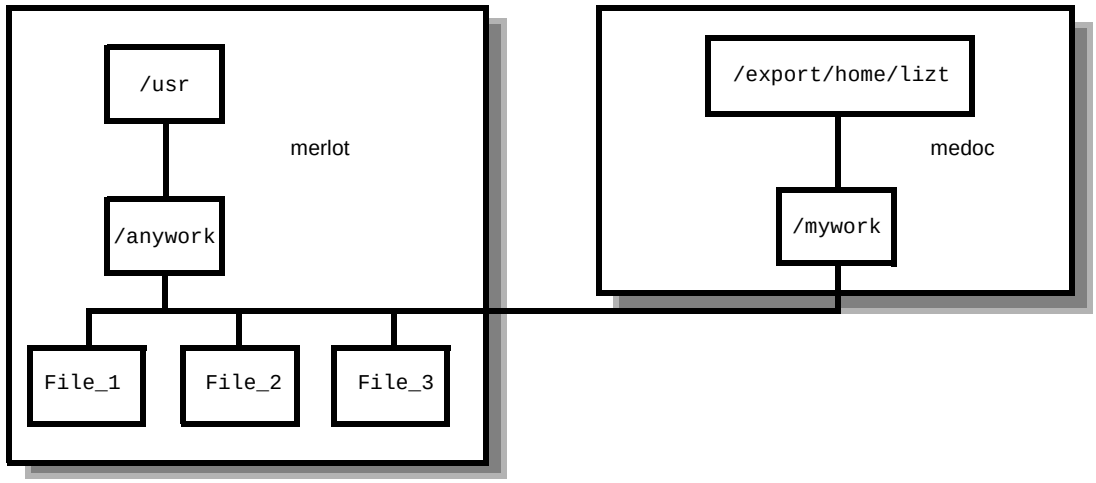


Figure 9-4 Mounting a Remote Directory

Automatic file mounting

You can specify a remote directory to be mounted automatically at boot time. To do this, you need to log in as root and add a line to the `/etc/vfstab` file using a text editor, such as vi.

For example, to mount `/usr/anywork` on a machine called merlot, at boot time, as `/export/home/lizt/mywork` on a machine called medoc (as in the previous example), the following line would be added to the `/etc/vfstab` file on medoc:

```
merlot:/usr/anywork - /export/home/lizt/mywork nfs - yes rw,hard,intr
```

Where the fields are assigned as follows:

`device to mount`
: This is the device name for a local file system or `host:pathname` for a remote directory.

`device to fsck`
: This specifies raw device to `fsck`. In the case of an NFS filesystem, a dash (`-`) should be used.

`mount point`
: This is the directory where the remote filesystem is to be mounted. The directory must exist for the mount to succeed.

`FS type`
: This is the type of filesystem which is normally `ufs` for a local filesystem or `nfs` for a network filesystem.

`fsck pass`
: This is the number of times a filesystem checks to be carried out. In this case a dash (`-`) means none. This is normally 1 for the root filesystem, 2 for all other local filesystems or 0 for remotely mounted filesystems.

`mount at boot`
: This specifies whether or not the filesystem is mounted automatically at boot time.

`mount options`
: This field specifies mount options, such as read-only (`ro`), read-write (`rw`) and no super user privileges (`nosuid`). Other useful options for remotely mounted filesystems are `hard` and `intr` which together enable the local user to interrupt (with **Ctrl-C**) or to kill hung processes which may occur if the network link is disrupted.

Unmounting a remote filesystem

Remote files can only be unmounted by the super user using the `umount` command. For example:

```
# umount /export/home/lizt/mywork
```

Note

Unmounting is recommended whenever you have the intention of using your system away from the current network. Always unmount remote filesystems before a Save if the filesystem is not going to be available when you Resume.

Executing remote commands

A number of commands are provided by TCP/IP which can be executed remotely on other machines on the network, subject to permissions. The most important of these commands are as follows:

`rcp` Lets you copy files over the network between UNIX hosts.

`rlogin` Lets you log in to remote UNIX hosts over the network on which you have an account. You may have to supply a password if the remote system has been set up to test for one.

`rsh` Lets you execute a single command on a remote UNIX host.

`ftp` For file transfer protocol, allows you to copy files over the network between hosts.

`telnet` Allows you to log in to any reachable remote system on which you have an account.

`finger` Allows to find out information about users on remote systems.

Copying files

The syntax for copying files with `rcp` is as follows:

```
$ rcp [-r] [fromsys:]filename [tosys:]filename
```

For example, to copy the file `swdemo` from the current directory on the local machine into the `/tmp` directory on the machine called burgundy, you would use the following command:

```
$ rcp swdemo burgundy:/tmp/swdemo
```

Note that you do not need to specify the name of the local host in the command.

Remote program execution

You can execute a single command on a remote machine without having to log in, provided that you have the necessary privileges. The command syntax is as follows:

```
$ rsh sysname command
```

For example, to list the files in `/home` on the machine called burgundy you would type the following:

```
$ rsh burgundy ls /home
```

SLIP and PPP

When your system is connected to a remote network via a SLIP or PPP connection, most of the commands that can be used when directly attached to the local network can still be used. Care should be taken when disconnecting a SLIP or PPP connection that SLIP or PPP data transfers are complete. Information will be lost if the interface is detached while a transfer is in progress.

NFS Automounter

The NFS software provides a facility called the automounter. This facility allows users to mount and unmount shared directories, from remote systems, without having to be logged in as the super user. By default, the `automountd` daemon is started at boot time.

A special directory, `/net`, is provided, by default, which is used by the autmounter to connect to NFS servers on your network. Automatically, all shared directories, from the specified server, would be mounted as sub-directories of the `/net/server_name` directory. For example:

If the server, `merlot`, is sharing the directory `/usr/anywork`, the user called `lizt` could access files in that directory by typing the following command:

```
$ cd /net/merlot
$ ls
File_1 File_2 File_3
```

Once `lizt` changes directory to another directory, that is not below `/net`, the automounter will automatically unmount the `/net/merlot` directory after 5 minutes.

It is advised that you do not configure the automounter if your system is to be used as a mobile system.

If your system is to be permanently connected to a network, you may wish to configure the automounter. You should refer to the Solaris documentation or the Administrator's Answerbook (*on-line manual*) for further details.

Suspend & Resume

10

This chapter discusses the use of the Suspend and Resume feature. This provides an easy way to start and stop your VoyagerIIi without having to perform lengthy shutdown and startup procedures.

This chapter contains the following sections:

How Suspend and Resume Functions

The operation of Suspend and Resume can be summarized as follows:

➲ *Suspend*

- On suspending, your VoyagerIIi copies the contents of the system's memory and system operating parameters into the `.CPR` file on a specified partition and sets the save state as valid in the `.cpr.default` file.

➲ *Resume*

- When the system attempts to boot, the ufs boot program looks for a valid cpr dump file. Provided the OpenBoot variable 'noresume' does not exists and it finds valid save data, it Resumes to exactly the same state in operation as when the save was initiated for *that disk*. If there is no valid save data available, your VoyagerIIi carries out a conventional Solaris system startup.

WARNING!

Unexpected operations may occur if you try to resume with a disk saved on a Voyager with a different hardware configuration, such as a larger main memory.

Powering Off Using Suspend

You can initiate a Suspend in several ways:

- By selecting **Suspend** from the OpenWindows desktop Utilities menu.
- By typing the appropriate commands at the Solaris root prompt.

You do not have to close applications because they remain completely unaffected by Suspend and Resume, allowing you to take up work exactly where you left off.

How to ensure Suspend and Resume operates successfully

Your VoyagerIIi Resumes most reliably if the hardware facilities are the same before and after the Suspend is performed.

To ensure the Suspend and Resume facility operates correctly, it is important that you avoid making hardware configuration changes while your system is powered off. This applies particularly to hard disks, tape drives, CD-ROMs and PCMCIA memory cards that are mounted as part of your file system, and to network connections that may change.

Your VoyagerIIi cannot Resume successfully to a file tree that is no longer there. To prevent problems, observe the following precautions:

- Always unmount file systems on drives that are likely to be disconnected before you power on again.
- Always unmount network file systems if your VoyagerIIi's network connection is likely to change before you power on again.

In many instances, your VoyagerIIi will recover from these situations but this cannot always be guaranteed.

What to do if Resume Fails

If your system fails to Resume, carry out a full system reboot with the following procedure:

1. Power off again.
2. Wait for a few moments and restore power.
3. When the OpenBoot greeting is displayed, press **Stop-a**. The OpenBoot `ok` prompt is displayed.
4. Enter the following commands:

```
ok create no-resume?
ok boot disk
```

Your VoyagerIIi carries out a full system boot.

Suspend & Resume and Security

If a user was logged on to a machine prior to a suspend operation, the system will Resume and prevent access by requiring the user to re-enter their password. Instant access can be gained if the user does not have a password.

One way to further protect your VoyagerIIi against unauthorized use is to remove the hard disk while it is without power. Refit it again when you next wish to use your VoyagerIIi, before you power on.

If this level of protection is not sufficient, you have the following options:

- Power off using a conventional Solaris system shutdown. To do this, log in as root and enter the **`init 0`** command.

  This takes the system down to the OpenBoot prompt and a safe state for power-off. The next time you power on your VoyagerIIi carries out a full system startup and not a Resume.

- Disable Suspend and Resume altogether, see below.

If either of these issues poses a serious problem, the Suspend and Resume facility can be disabled. Suspend and Resume can be disabled by commenting out the “statefile” entry in the `/etc/power.conf` file removing `/.cpr_default` and `/.cpr_config` files.

Removable Disk Packs

11

This chapter discusses how to use your VoyagerIIi's removable hard disk packs. It describes how to fit and remove the disk packs, how to use additional disk packs and how to ensure a basic level of security.

It contains the following sections:

Overview

Your VoyagerIIi's disk packs can be removed easily when your system is not in use and can be stored or carried separately. Removable hard disks provide you with effective data security for your VoyagerIIi when it is not in use and allows you to upgrade your hard disks very easily as larger capacity disk drives become available.

It is possible for you to have several boot disks for several different projects, or for different people who share a VoyagerIIi system to each have their own boot disk pack.

For example, you may have a disk for a demonstration system and another disk fitted while the system is being used for training purposes. Each could be stored securely when not in use and each could contain the appropriate operating system configuration for its designated location and use. For example, with networking setup when used in a training environment and dial-up client services set up when the system is being used for demonstrations requiring access to remote facilities.

Using the Save and Resume feature, each disk can store a different machine state that your VoyagerIIi 'resumes' when you next power on. This means, for example, that when you power on with your 'Training' disk fitted, your VoyagerIIi Resumes to the state Saved onto your 'Training' disk.

WARNING!

To avoid losing your data, do not swap disk packs while the system is suspended. That is, the Run/Stop switch is in the Off position. Remember, if you do need to remove the disk packs temporarily, you must first perform an orderly shutdown or suspend the system and then turn off the power to the system.

Fitting and Removing the Hard Disk

Your VoyagerIIi is shipped from the factory with a disk pack/s already fitted and ready for you to use. These disk packs can be removed as follows:

WARNING!

Ensure that your VoyagerIIi is powered OFF before removing a disk pack. Removing a disk pack while your VoyagerIIi is running may damage the disk and destroy important data.

1. Place your VoyagerIIi on a firm surface, such as a desk.
2. Lift the disk pack's catch, as shown in Figure 11-1.
3. Pull on the catch to remove the disk from your VoyagerIIi.

Figure 11-1 Removing the Disk Packs

Caring for Removable Disk Packs

The removable hard disk packs are robust but should be handled with care. Follow these precautions:

- **Physical shock and vibration**: Protect the disk pack from knocks and excessive vibration. You should never remove the hard disk while your VoyagerIIi is running; always power off first.
- **Condensation**: If your disk packs are carried separately from your VoyagerIIi and are subjected to much lower temperatures, bringing them into a warm room may cause condensation. This may cause damage, so you should allow your disk packs time to acclimatize before use.
- **Static electricity**: In common with most electronic components, the removable hard disk pack is prone to damage due to static discharge. To prevent such damage, avoid touching the electrical contacts on the disk pack.

Boot Disk Partitions

The hard disk pack supplied with your VoyagerIIi is preloaded to order with the Solaris 2.6 operating system; the version is dependent upon availability and customer order. The removable disk is preconfigured as a boot disk and is “factory” partitioned.

The `swap` partition is used by the operating system to store applications that are running in the background. Its size, therefore, is affected by the size of the main memory of your VoyagerIIi. The main memory is provided by in-line memory modules which are accessible when the top panel of the case is removed. This makes it easy to perform memory upgrades without using special tools or equipment

Using Additional Removable Hard Disks

Additional removable hard disk packs are available from your supplier. These are supplied blank for use as additional data storage. Each new disk pack must be configured for your VoyagerIIi when it is first used.

Removable Hard Disk Security

The disk packs provide your system a basic level of security by allowing you to remove them from your VoyagerIIi when it is not in use and storing them separately. However, it is equally possible for a disk pack to be removed by an unauthorized person. The disk pack can be removed and installed into a similarly configured VoyagerIIi allowing your files and applications to be accessed.

Using SCSI Devices

12

This chapter describes how to connect and use external SCSI devices. It describes how to set the SCSI ID and termination correctly and provides an example of how to connect and configure an external SCSI hard disk.

It provides the following information:

Overview

The system provides a single-ended small computer system interface (SCSI) via the rear panel. An industry-standard 68-pin high density Ultra Wide SCSI connector is provided:

How to Ensure Reliable SCSI Operation

To ensure reliable operation of SCSI devices, always follow these hints:

- Do not connect too many devices to your system.
  You can connect up to fifteen external devices using standard SCSI connections.
- Do not exceed the maximum recommended SCSI cable lengths. Refer to the documentation for the type of SCSI controller that is being used in your system.
- Standard SCSI cable chains can be up to 6 m in length. Fat & Wide SCSI cable chains can be up to 25 m in length. (Note: *Each SCSI device uses up half a meter of cable length on its internal circuit boards*)
- Select a different SCSI Target ID for each device in the chain.
- Ensure that the SCSI chain is correctly terminated. The chain must be terminated at the physical end, but there must be no other terminators in the chain.
- Always connect your SCSI devices to the chain, working outwards from the system's SCSI connector. Your system acts as one, terminated, end of the chain. (*The system is terminated internally.*)
- SCSI devices should be powered on before the system is powered on.

Connecting SCSI Devices

SCSI devices are connected to the system in a *daisy chain* arrangement as illustrated in Figure 12-1.

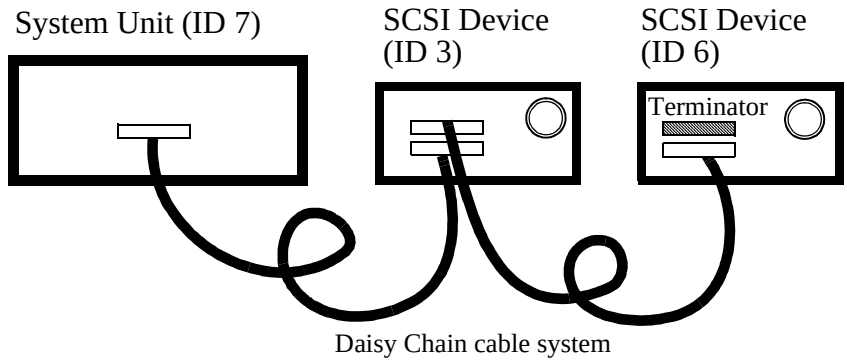


Figure 12-1 A SCSI Daisy Chain

Maximum number of devices supported

A SCSI chain supports up to sixteen devices connected along its length. The SCSI Interface, in the system itself, counts as one device. The SCSI Target ID of the interface is ID 7. This number is set in the eeprom NVRAM settings. The eeprom parameter which holds this number is called the `scsi-initiator-id`.

To verify the eeprom setting, give the following command:

```
# eeprom scsi-initiator-id
scsi-initiator-id=7
#
```

Positioning the system in the daisy-chain

Some SCSI devices provide two connectors so that they can be located in any position along the chain. The system has only one connector because it has to be located at one end of the chain.

SCSI Terminators

To ensure reliable operation of your system and external SCSI devices, you must use an active terminator at the end of the SCSI chain.The system unit contains permanently fixed terminators and should, therefore, be positioned at one end of the SCSI chain while the device at the end of the SCSI chain will need terminators fitted or enabled.

Note

A SCSI terminator is a type of resistor network which prevents interference occurring between conductors within the interconnecting cables, and so improve reliability. However, terminators must not be fitted to other devices in the chain as this will cause unreliable operation.

SCSI IDs

To allow data on individual drives to be accessed, each device connected to the chain must have a unique address, or SCSI target ID. A device's target ID is not related to its physical position within the daisy chain. IDs are usually assigned in keeping to operating system convention to devices according to type. For example, under Solaris 2.6 or above, a CD-ROM is assigned to SCSI ID 6 and the system is assigned to ID 7.

Note

The boot disks in the system are IDE disk drives and, therefore, have different identities.

Every drive has one or more special files associated with it, according to its type function. For example, a hard disk has a block data file and a raw data file associated with each partition in the form:

`/dev/dsk/c1t2d0s`*n*	block special device file
`/dev/rdsk/c1t2d0s`*n*	raw (*character*) special device file

The structure of the file name provides clues to the nature of the disk drive unit.

`c1` Controller 1 (SCSI controller on the internal system bus)
`t2` The target ID number of the device
`d0` The number of the disk in the disk drive unit (*see note below*)
`s0` The **slice** (*partition*) number on that disk device. Partitions are numbered 0 through to 7.

If a RAID disk drive unit is attached to the SCSI daisy chain, that unit may contain more than one, physical, disk unit. The number of the disk device would increment, by a value of 1, for each drive found in the RAID unit. For example, in a RAID drive unit which has a target ID of 2 and contains three disk drives, the device names would be like the following:

`/dev/dsk/c1t2d0s0`
Slice 0 (zero) on the first disk drive in the RAID unit
`/dev/dsk/c1t2d1s0`
Slice 0 (zero) on the second disk drive in the RAID unit
`/dev/dsk/c1t2d2s0`
Slice 0 (zero) on the third disk drive in the RAID unit

Note

On a SCSI disk, slice 2 represents the entire disk. Only slices 0, 1 and 3 through to 7 should be used as partitions in which date may be saved.

The following table shows the convention for SCSI target IDs used by the Solaris 2.6 (or above) operating system. Device filenames are also listed in this table.

SCSI ID	Special (Device) Files	Function
0	`/dev/[r]dsk/c1t0d0s[0-7]`	External Hard Disk Drive
1	`/dev/[r]dsk/c1t1d0s[0-7]`	External Hard Disk Drive
2	`/dev/[r]dsk/c1t2d0s[0-7]`	External Hard Disk Drive
3	`/dev/[r]dsk/c1t3d0s[0-7]`	External Hard Disk Drive
4	`/dev/rmt/0[bchlmn]`	External Tape Drive
5	`/dev/rmt/1[bchlmn]`	External Tape Drive
6	`/dev/dsk/c1t6d0s[0-7]`	First CD-ROM Drive
7	-	System Unit
F	/dev/dsk/c0t15d0s[0-7]	Wide Hard Disk Drive

Table 12-1 SCSI Device Assignments & Device file names

Note

The disk controller number can be a number between 0 and 5, making a total of six possible controllers. These example device pathnames may, therefore, appear different to your system's device names. The SCSI Target numbers, however, are conventional and should be the same as the examples.

Configuring an External Hard Disk

Worked Example

The basic procedure for installing an external hard disk drive, connected to the SCSI daisy chain, is as follows:

- Power-down the system
  (*Do not use Suspend*)
- Connect the drive with termination and SCSI ID correctly set.

- Power-up the system and enter a command so that the necessary device files are created.
- Format (if necessary) and partition the disk.
- Create and check a file system in each disk partition that is to be used to store data in files.
- Create a mount-point directory and mount the filesystem(s).

Each of these steps is described in this worked example.

1. Shutdown the system, as the root user, using the command:

   ```
   # init 0
   ```

2. When safe to do so, power off the system and connect the new hard disk drive using the appropriate SCSI cable(s). (*this example assumes that the SCSI target ID has been set to 3 on the new disk drive*)

3. Power on all peripherals. Switch the Run/Stop switch to Stop then power on the system unit. This interrupts the boot process and causes the Boot PROM monitor prompt displayed (*refer to the Boot & Shutdown chapter for further details*). Switch the Run/Stop switch to Run.

4. At the PROM ok prompt, give the following command:

   ```
   ok boot -r
   ```

Note

This command will make the Solaris operating system create the necessary device files for the new disk drive unit.

5. When the system has booted, login as the *root* user and issue the `format` command, as shown below:

   ```
   # format
   ```

6. Select the appropriate disk from the list of available disks. In this worked example, we have only one disk to select from. The number selected is 0 (zero). An example is shown below:

```
AVAILABLE DISK SELECTIONS:
0. c1t3d0 <QUANTUM-FIREBALL_TM2110S-300X cyl 6483 ..
/pci@1f,0/pci@1/ide@4/dad@0,0
Specify disk (enter its number): 0
selecting c1t3d0
[disk formatted]
```

7. A menu of options will be displayed. You must select the partition option by typing sufficient letters to signify this choice. As this is the only choice, on the menu, which begins with the letter 'p', you can type the letter 'p' then press Return. Alternatively, you can type the full word, associated with the menu choice, then press Return.

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

8. A list of the available partitions will then be displayed, along with more menu choices.

```
PARTITION MENU:
   0 - change ‘0’ partition
   1 - change ‘1’ partition
   2 - change ‘2’ partition
   3 - change ‘3’ partition
   4 - change ‘4’ partition
   5 - change ‘5’ partition
   6 - change ‘6’ partition
   7 - change ‘7’ partition
   select - select a predefined table
   modify - modify a predefined partition table
   name - name the current table
   print - display the current table
   label - write partition map and label to the disk
    !<cmd> - execute <cmd>, then return
    quit
   partition> print
```

9. The format command now displays a list of the current partition settings.

Note

Slice (partition) 2 represents the entire disk and should not be changed.

```
Current partition table (unnamed):
Total disk cylinders available: 6483 + 2
(reserved ...)

Part  Tag    Flag  Cylinders     Size       Blocks
 0 unassigned wm  0              0     (0/0/0) 0
 1 unassigned wm  0              0     (0/0/0) 0
 2 backup wm  0 - 6482 1.97GB (6483/0/0) 4123188
 3 unassigned wm  0              0     (0/0/0) 0
 4 unassigned wm  0              0     (0/0/0) 0
 5 unassigned wm  0              0     (0/0/0) 0
 7 unassigned wm  0              0     (0/0/0) 0
```

10. To alter the settings of any partition, you must select the number, appropriate for the partition, then enter four values. These values are the ID Tag for the partition,

whether the partition is writable & mountable (or unmountable), the starting cylinder for the partition and the size of the partition.

The size of the partition can be entered as a number of disk blocks (*each 512 bytes in size*), number of cylinders, Megabytes or Gigabytes.

```
partition> 0
Part Tag     Flag Cylinders Size     Blocks
 0 unassigned wm  0           0      (0/0/0) 0

Enter partition id tag[unassigned]: root
Enter partition permission flags[wm]: wm
Enter new starting cyl[0]: 0
Enter partition size[0b, 0c, 0.00mb, 0.00gb]: 4557c
```

Note

There are only six, reserved, "Tag" names that can be assigned to a partition. If you attempt to use a word that is not in the list of six reserved words, the assignment of the tag will fail. If you are unsure how the partition will be used, it is probably safer to leave the tag as unassigned.

11. The process can now be repeated for all remaining partitions that will be used as filesystem or "raw" disk space.

```
partition> print
Current partition table (unnamed):
Total disk cylinders available: 6483 + 2 (reserved cylinders)

Part  Tag    Flag   Cylinders     Size        Blocks
 0 root       wm  0 - 4556       1.38GB      (4557/0/0) 2898252
 1 unassigned wm  0              0           (0/0/0) 0
 2 backup     wm  0 - 6482       1.97GB      (6483/0/0) 4123188
 3 unassigned wm  0              0           (0/0/0) 0
 4 unassigned wm  0              0           (0/0/0) 0
 5 unassigned wm  0              0           (0/0/0) 0
 7 unassigned wm  0              0           (0/0/0) 0
```

```
partition> 1
Part  Tag    Flag  Cylinders      Size         Blocks
 1 unassigned wm  4557 - 4878  100.00MB  (322/0/0) 204792

Enter partition id tag[unassigned]: var
Enter partition permission flags[wm]: wm
Enter new starting cyl[0]: 4557
Enter partition size[204792b, 322c, 100.00mb, 0.10gb]: 323c
partition> 3
Part  Tag    Flag  Cylinders      Size         Blocks
 3 unassigned wm  4880 - 5031    47.20MB  (152/0/0) 96672

Enter partition id tag[unassigned]: swap
Enter partition permission flags[wm]: wu
Enter new starting cyl[0]: 4880
Enter partition size[96672b, 152c, 47.20mb, 0.05gb]: 153c
partition> print
Current partition table (unnamed):
Total disk cylinders available: 6483 + 2 (reserved cylinders)


Part  Tag    Flag  Cylinders      Size         Blocks
 0 root       wm 0 - 4556        1.38GB (4557/0/0) 2898252
 1 var        wm 4557 - 4879   100.31MB  (323/0/0) 205428
 2 backup     wm 0 - 6482        1.97GB (6483/0/0) 4123188
 3 swap       wu 4880 - 5032    47.51MB  (153/0/0) 97308
 4 unassigned wm 0                  0      (0/0/0) 0
 5 unassigned wm 0                  0      (0/0/0) 0
 6 unassigned wm 0                  0      (0/0/0) 0
 7 unassigned wm 0                  0      (0/0/0) 0


partition> 7
Part Tag Flag Cylinders Size Blocks
 7 unassigned wm 0 0 (0/0/0) 0

Enter partition id tag[unassigned]: home
Enter partition permission flags[wm]: wm
Enter new starting cyl[0]: 5033
Enter partition size[0b, 0c, 0.00mb, 0.00gb]: 1450c
partition> print
Current partition table (original):
Total disk cylinders available: 6483 + 2 (reserved cylinders)
```

```
Part  Tag    Flag  Cylinders      Size         Blocks
 0 root       wm 0 - 4556        1.38GB (4557/0/0) 2898252
 1 var        wm 4557 - 4879   100.31MB  (323/0/0) 205428
 2 backup     wm 0 - 6482        1.97GB (6483/0/0) 4123188
 3 swap       wu 4880 - 5032    47.51MB  (153/0/0) 97308
 4 unassigned wm 0                  0      (0/0/0) 0
 5 unassigned wm 0                  0      (0/0/0) 0
 6 unassigned wm 0                  0      (0/0/0) 0
 7 home       wm 5033 - 6482   450.29MB (1450/0/0) 922200
```

12. Once all required partitions have been designated, the disk label must be updated. The disk label holds details of the starting slice of each partition and the number of (disk) cylinders within that partition.

To label the disk, you must select the following menu option:

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

13. Once the label has been written to the disk, you may quit from the format command by selecting the quit option, twice in succession.

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

#
```

14. Having created a series of partitions on the disk, if a partition is to be used to store files, a new filesystem must be created in that partition. To create a new filesystem, you must use the `newfs` command, as shown below: (*For brevity, the output of this command is not shown*)

```
# newfs /dev/rdsk/c1t3d0s0
...
# newfs /dev/rdsk/c1t3d0s1
...
# newfs /dev/rdsk/c1t3d0s7
...
#
```

15. The filesystems in the new partitions will be mounted to directories in the *root* filesystem. Once these directories have been created, the filesystems can be mounted to the mount-point directories.

These steps are shown below:

```
# mkdir /spareroot /var2 /export/home2
#
# mount /dev/dsk/c1t3d0s0 /spareroot
# mount /dev/dsk/c1t3d0s1 /var2
# mount /dev/dsk/c1t3d0s7 /export/home2
```

16. If a partition is to be used as swap space, it can be added to swap as shown below.

```
# swap -a /dev/rdsk/c1t3d0s3
# swap -l
swapfile dev swaplo blocks free
```

```
/dev/dsk/c1t3d0s3 32,27 8 97296 95064
#
```

17. In addition to using the format command, the prtvtoc command can also be used to display the partitions that are, actually, in use on that disk drive. It is important that the raw-disk device name is used with the prtvtoc command. Also, you must use Slice 2 as the partition device name (*which corresponds to the entire disk drive*).

```
# prtvtoc /dev/rdsk/c0t3d0s2
* /dev/rdsk/c1t3d0s2 partition map
*
* Dimensions:
* 512 bytes/sector
* 159 sectors/track
* 4 tracks/cylinder
* 636 sectors/cylinder
* 6485 cylinders
* 6483 accessible cylinders
*
* Flags:
* 1: unmountable
* 10: read-only
*
* First Sector Last
* Partition Tag Flags Sector Count Sector Mount Directory
   0         2  00     0   2898252 2898251 /spareroot
   1         7  00 2898252  205428 3103679 /var2
   2         5  00     0   4123188 4123187
   3         3  01 3103680   97308 3200987
   7         8  00 3200988  922200 4123187 /export/home2
#
```

18. If a partition's filesystem is to be automatically mounted, at boot time, or a partition must be added to the swap space at boot time, entries must be made in the `/etc/vfstab` file, as shown in the following example.

```
/dev/dsk/c0t3d0s3  -  -  swap  -  no  -
/dev/dsk/c0t3d0s0  /dev/rdsk/c0t3d0s0  /spareroot  ufs  1  no  -
/dev/dsk/c0t3d0s1  /dev/rdsk/c0t3d0s1  /var2       ufs  1  no  -
/dev/dsk/c0t3d0s7 /dev/rdsk/c0t3d0s7 /export/home2 ufs  2 yes  -
```

PCMCIA Interface

13

This chapter discusses how to use the PCMCIA interface to add memory, I/O, and/or communications facilities to your VoyagerIIi system using industry-standard credit card-sized PCMCIA cards (also known as PC Cards).

This chapter discusses how to use PCMCIA cards with the system and contains the following sections:

Introduction to PCMCIA

The PCMCIA (Personal Computer Memory Card International Association) standard defines the physical dimensions, electrical interface characteristics and software architecture of cards and slots that conform to the standard. This means that a wide range of standard cards are available from a variety of manufacturers to provide either data storage or peripheral expansion.

The PCMCIA standard defines cards of three thicknesses; each is about the same size as a credit card, uses a similar 68-pin connector and has a 3.3 mm thickness around its edge. The three types differ in the thickness of the center section. The center section of a Type I card is 3.3 mm thick; Type II cards are 5 mm thick; and Type III cards are 10.5 mm thick. The PCMCIA port in your VoyagerIIi can accommodate two Type I or II cards or one Type III card.

Because PCMCIA cards and the PCMCIA interface in your VoyagerIIi are designed to an industry standard, you can easily move cards between different computers. Some of the devices available on PCMCIA cards are:

- **Memory cards**: These include FLASH, SRAM and combined FLASH and SRAM cards. PCMCIA memory cards cannot be used to expand the main memory of your VoyagerIIi but should be viewed as a form of solid state hard disk. You can access the data on a PCMCIA memory card by mounting the card on your file system.
- **Modem and Fax/Modem cards**: These include a range of cards which can be used to equip a VoyagerIIi with a modem.
- **Interface cards**: These include network interface, scanner interface, and frame grabber cards.

- **Hard disk drives**: These include a range of different capacity products suitable for filesystem use which can be formatted and mounted like a conventional drive. These are an alternative to the removable hard disk packs for rapid system configuration or for software distribution.

You should consult your supplier for information about the PCMCIA cards available for your VoyagerIIi.

Note

Many PCMCIA cards are supplied with software and instructions which assume they are to be used with a PC compatible computer. These instructions do not apply to VoyagerIIi. Device drivers for using approved PCMCIA cards with your VoyagerIIi will be available from your Tadpole-RDI supplier.

The PCMCIA Port

Your VoyagerIIi provides two PCMCIA slots, arranged one above the other within a small opening on the rear panel. The PCMCIA port is illustrated in Figure 13-1.

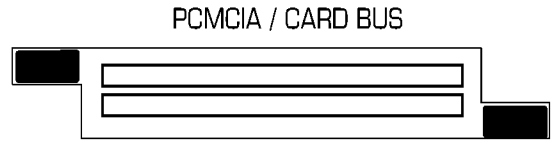


Figure 13-1 The PCMCIA Slots

Installing a PCMCIA Card

To install a PCMCIA card, proceed as follows:

1. Insert your PCMCIA card into the slot with the connector end in first, taking care to align it correctly in the card guides.
2. Push on the PCMCIA card firmly and it will click into position.

Note

PCMCIA cards are keyed to be fitted one side up only. If your PCMCIA card will not engage with the connector properly, remove it and check that it is the right way up.

Your VoyagerIIi automatically detects when you insert a PCMCIA card, and in some cases, may automatically configure it ready for use.

Removing a PCMCIA Card

Before removing a PCMCIA card from your system, you should disable it as advised in the associated documentation.

To remove a PCMCIA card, press the ejector button for the PCMCIA card you wish to remove.

Using PCMCIA Cards

Your VoyagerIIi provides a software driver for a Hayes-compatible modem card, and may later support Ethernet cards, memory cards and hard disks. Some less commonly used cards may require specific software driver support for Solaris.

Modem cards

Information about using specific PCMCIA modem cards with your VoyagerIIi will be available from your Tadpole-RDI supplier.

Network Cards

PCMCIA Ethernet cards can be used with your VoyagerIIi in addition to the built-in interface or with the built-in interface disabled.

Information about using specific PCMCIA network cards with your VoyagerIIi will be available from your Tadpole-RDI supplier.

Serial, Parallel & Audio I/O

14

This chapter describes how to use the serial and parallel interfaces. The audio sounder is also described.

It contains the following sections:

Using Serial Devices

You can connect a variety of serial devices such as terminals, modems and scanners to your VoyagerIIi via the serial port slot located on the I/O panel.

The serial port slot cable provides 2, 25-pin D-type connectors. Pinout information for this slot is provided in Appendix B.

To configure a serial port for a terminal or modem from within the OpenWindows or CDE desktops, login as root and use admintool as follows:

1. Launch admintool from within a cmdtool window with the following command:

   # **admintool**

2. From the **Browse** menu, select **Serial Ports**. The Serial Ports menu is displayed:

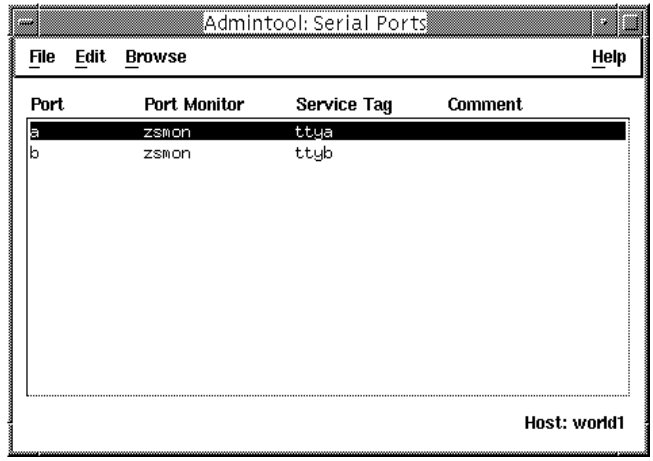


Figure 14-1 AdminTool - Serial Ports

Ports **a** and **b** are the serial ports on the I/O panel of your VoyagerIIi that can be used for terminal or modem connections.

3. To edit a port's configuration, double-click the associated entry's line. A Modify Serial Port window is displayed.

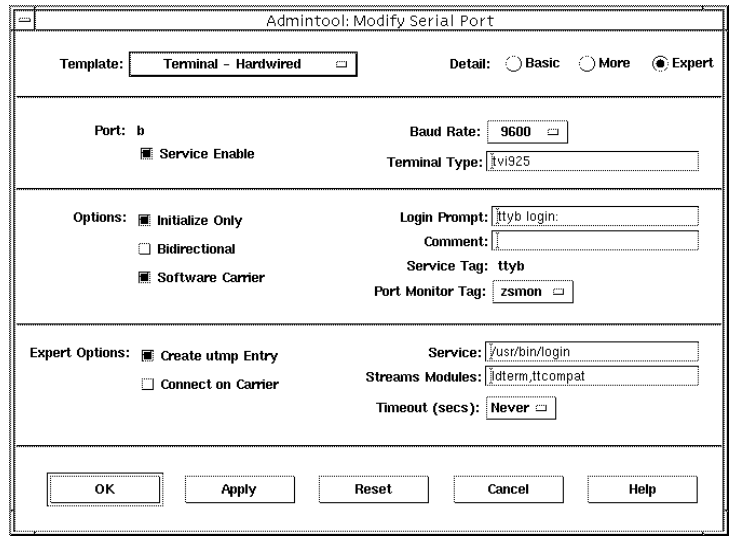


Figure 14-2 Modify Serial Port Window

Note

You should always select the template for the terminal port. If a selection is not made from the list of templates, the port may not be correctly configured.

4. A list of templates is provided, allowing the serial port to be configured for either terminal or modem use.

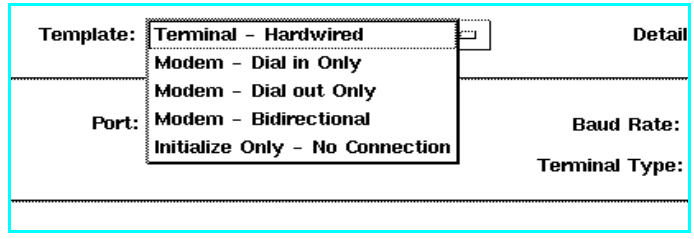


Figure 14-3 List of Modem Types

5. Use the Modify Serial Port window to edit the parameters, such as baud rate and terminal type, for the port to suit your external device and application and then click on **Apply** to save the changes. You will need to consult the documentation for your serial device for information about the serial interface requirements.

Note

The Modify Serial Port window has three display settings: Basic, More and Advanced. You are recommended to select the Advanced setting to see all of the characteristics that are being configured for the serial port.

For a more detailed guide to configuring serial devices, see the SunSoft Solaris documentation.

Using Parallel Devices

You can connect a range of devices to the parallel port on the rear of your VoyagerIIi, including printers and scanners. The parallel port provides a Centronics style, 25-pin, D-type connector.

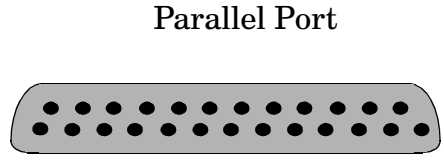


Figure 14-4 Parallel Port Connector

Configuring parallel devices

For information about configuring parallel devices, refer to your SunSoft Solaris documentation.

The device name of the parallel device is `/dev/ecpp0`.

Audio Sounder

A sounder, which emits a beeping noise, is provided to alert the user to certain system states. For example, when the system is booting, a beep will be sounded.

The sounder may also provide audible tones when a modem connection is being established to alert the user of modem activity.

Otherwise, no audio input or output is provided as standard.

Upgrading Your System

15

This chapter discusses how to upgrade your VoyagerIIi system.

This chapter contains the following sections:

Changes to the Main System Configuration

Changes to the main system configuration can only be undertaken by returning the unit to an approved Service Center. The main upgrade items are critical to the performance of the product and MUST be purchased through an approved Tadpole-RDI channel.

Processor Module

The processor module (which has a specified processor speed & cache size) is not field changeable, but can be upgraded as a return to service center option. Improved specifications for these components are constantly being made. These will be offered as upgrades subsequent to approval by Tadpole-RDI.

PCI Cards

PCI cards are not user changeable, but can be upgraded as a return to service center option. Upgrade options will depend on which PCI cards are supported at the time of the upgrade. (Industry standard PCI cards cannot be used without appropriate driver software and without changes to the card rear panel). The upgrade requires installation of the driver software, removing any card previously fitted, and plugging in the replacement card.

Memory Upgrades

The unit's DRAM can be upgraded to a maximum of 1GB.

Caution

The unit contains hazardous voltages and must not be opened.

Note

Cet appareil présente un danger d'électrocution et ne doit jamais être ouvert.

The upgrade can only be carried out by returning the unit to an approved Service Center.

Disk Upgrades

The removable disk packs are user changeable items. The upgrade involves purchasing a VoyagerIIi Disk Pack and inserting it into the unit subject to the availability of a free slot. This is a simple plug/unplug operation. The raw disk drivers contained within the disk packs are not user changeable, but can be upgraded as a return to service center option.

Figure 15-1 Disk Pack Removed from VoyagerIIi

Problem Solving & Support

16

This chapter provides information about solving problems that may arise. It describes how to obtain technical assistance, provides a problem solving checklist and describes how to solve some common software problems.

This chapter contains the following information:

Getting Further Help

If you are unable to diagnose the problem yourself, you can obtain technical support from your system administrator, from your system supplier, or from Tadpole-RDI Customer Support.

Contacting Customer Support

Customer support can be contacted by telephone or Email.

Telephone:
US: 1 800 734-7030
UK and Europe: +44 1223 278 200

Email:
US: support@rdi.com
UK and Europe: support@Tadpole.co.uk

In addition, technical support information is provided on our web-site at the following URL:

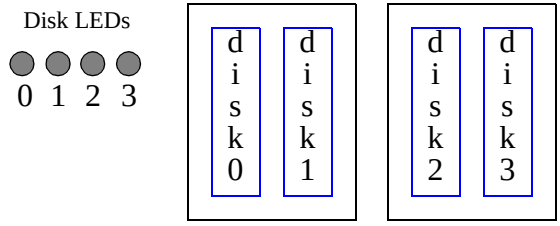
`http://www.Tadpolerdi.com`

When calling about a technical difficulty, please be ready to provide the following information. This will assist us in finding a solution to your problem as quickly as possible:

- Machine model and serial number (from the base of the unit)
- Machine configuration (what peripherals are connected and/or installed)
- For networking problems, a brief description of your network.
- A description of the problem and any steps you have taken to solve it. See “Problem Solving Checklists” on the following pages.
- Any warning messages or output you have observed.

Problem Solving Checklists

Startup Problems

Possible Cause	What to Check or Action to Take
No startup beep, LEDs are not lit	
Power is not being delivered to the unit.	Ensure that the power cord is connected to a supply and that the Power On Switch is set on.
System fails to boot operating system.	
Boot hard disk drive is not discovered at boot time.	Check that the removable hard disk drive unit is fitted correctly. The LED display should show which IDE disk drive units have been found during the boot sequence. Disk 0 is the first IDE disk slot, Disk 1 the second IDE disk slot and so on. If the disk pack has been installed in the right-hand disk bay (Disks 2 & 3) the system will not boot.  The disk drive in Slot 0 should be the boot disk. The boot disk is selected by the system based on the OpenBoot PROM settings. The OBP settings may be set incorrectly (see “Checking OBP Settings”, later in this chapter).

Possible Cause	What to Check or Action to Take
SCSI Target ID conflict	Check that all external SCSI devices have unique Target ID settings.
SCSI Boot Device is not being found by the system.	If you are trying to boot from a SCSI CD-ROM device, ensure that the target ID of the CD-ROM drive is set to the number six (6). If you are trying to boot from an external SCSI disk drive, check the OBP settings to see which device is designated as the boot disk (See OBP settings, later in this chapter).
You have configured your system to use NIS or NIS+ but the system has been disconnected from the network. Your system is looking for a name server but can not find an appropriate NIS or NIS+ server.	Reset and restart your system. As the system is booting, interrupt the boot process by pressing Stop-A. The OpenBoot `ok` prompt should be displayed. At the `ok` prompt, enter the following command: `ok` **`create no-resume?`** `ok` **`boot -s`** This will allow you to boot the system into a "single-user" state. While in this state, you are working as the superuser (root). You can now alter the boot controls that make the system search for a NIS or NIS+ server. See "Configuring your system to use a name server" for further details of working with NIS and NIS+.
A boot disk is not installed.	Check that the disk drives, installed in Slots 0/1 or connected to the SCSI connector, are valid boot disks.
OpenBoot PROM settings have been changed.	Reset and restart the system. As the system is booting, interrupt the boot process so that you see the OBP `ok` prompt. At the `ok` prompt, enter the following command: `ok` **`printenv`** The value for "`boot-device`" should contain the word: `disk` At the `ok` prompt, enter the following command: `ok` **`devalias`** The alias names of devices will be displayed. Check that the device pathname for the "`disk`" device is the correct pathname.

Suspend and Resume Problems

Possible Cause	What to Check or Action to Take
The system fails to Resume	
The removable hard disk drive does not contain usable Resume data.	Carry out a full system startup. See "Using Full System Startup" procedure.
Removable hard disk drive is not fitted.	Check that the removable hard disk drive is fitted. If not: ***1.*** Power-down the system. ***2.*** Fit the removable hard disk drive. ***3.*** Power-on the system.
SCSI Target ID conflict.	Check that the external SCSI disk, you are attempting to Resume from, does not have the same SCSI Target ID as another SCSI device.
There has been a hardware change since the last Save.	Your system could be attempting to Resume to a file-system on a disk drive that is not there. Check that all the appropriate disk drives are available and connected. Reboot the system.

System Suspend Login Problems

Possible Cause	What to Check or Action to Take
You cannot login after the system has been Suspended	
You are attempting to login as a different user to the user who `Suspended` the system.	Log in as the user who `Suspended` the system. If you do not know which user used the Suspend facility, you must use the Full System Startup procedure.

Keyboard and Mouse Problems

Possible Cause	What to Check or Action to Take
The keyboard or mouse does not work correctly	
The PS2 keyboard may be plugged into the PS2 mouse port.	Check the port in which the PS2 keyboard cable is connected. It should be the lower of the two PS2 ports. The Upper Port is for the PS2 mouse. The lower port is for the PS2 keyboard.
The PS2 mouse may be plugged in to the PS2 keyboard port.	See above.
The Sun keyboard does not work.	If you have both a Sun keyboard and a PS2 keyboard, the PS2 keyboard becomes the system's active keyboard. If you wish to use the Sun keyboard as your system keyboard, you will have to reboot your system. Before the system starts its boot operations, you will have to disconnect the PS2 keyboard.
The Sun mouse does not work.	Check that your Sun mouse is properly connected to the Sun keyboard. If you have a PS2 mouse connected to the PS2 mouse port and a Sun mouse connected to your Sun keyboard's mouse socket, you will have to reboot the system and disconnect the PS2 mouse before the system starts its boot operations.
'Interrupt Level 9' Message	This message will be displayed if you have a PS2 keyboard connected but no PS2 mouse.

Network Problems

Possible Cause	What to Check or Action to Take
You are unable to communicate over the network	

Faulty transceiver or transceiver cable.	Check basic Ethernet communication using the `ping` command. For example:
	`# ping remotehost`
	
	If the communications path is open between the local host and the remote host, a message should be displayed saying:
	
	`remotehost is alive`
	
	If there is a hardware or a configuration problem there will be no response. The command will time-out after a while, but you may terminate it with the **Ctrl-C** interrupt command. If `ping` fails, there may be a basic hardware or software configuration problem and you should check the hardware interfaces and basic software setup.
	
	Ask for help from an experienced network administrator about specific configuration requirements for your location.
	
	See "Configuring your system for TCP/IP Network".
	
	See "Configuring Naming Services"

Bad network connection.	
Entry for remote system is not in the local `/etc/hosts` file or entry for the local host is not in the remote system's `/etc/hosts` file.	
Cannot find name server or name service configuration files or they contain incorrect information.	
Internet addresses incorrect or duplicated.	
No write permission to requested remote resources.	

root Login Problems

Possible Cause	What to Check or Action to Take
You are unable to login as the root user	
Your system only allows the root user to login on the console terminal.	Check the contents of the /etc/default/login file. If the following line is not commented (begins with a # character) then root can only login from the console terminal: `CONSOLE=/dev/console`
You have forgotten the root password.	You must boot from CD-ROM into single-user mode and remove the root password from the `/etc/shadow` file using the following procedure: ***1.*** Interrupt the boot procedure, using Stop-A (Sun keyboard) or Break key (Ctrl-Pause on a PS2 keyboard). ***2.*** At the OBP ok prompt, give the command: `ok` **`boot cdrom -s`** ***3.*** Once you have booted into single-user mode, you must mount the boot disk's root partition, using the following command: `# mount /dev/dsk/c0t0d0s0 /a` (Remember to use the correct device name for the root partition) ***4.*** Edit the /etc/shadow file, using the 'vi' editor, and remove the encrypted password from the 2nd field of the root user's entry. Save and exit from the file. ***5.*** Reboot the system. ***6.*** As soon as the system has booted, log in as the root user (which should have no password) and assign a new password for the root user.

Other Hardware Problems

Possible Cause	What to Check or Action to Take
Display Problems	
Display is blank.	Check that the display unit is properly connected. The display may have a timeout blank control set. Try pressing a key on the keyboard or moving the mouse to see if the display is still functional.
SCSI devices are not responding.	Check to see that the devices are powered on. Check the SCSI cable connections. Remember that the SCSI devices should be connected to the system and powered on **before** the system is booted.
A printer is not printing.	Check that the Line Printing Scheduler (lpsched) process is running using the command: # **lpstat -t** If the scheduler is not running, use the run-control script to start the scheduler, as shown below: # **/etc/init.d/lp start**

Using the OpenBoot Diagnostics

OpenBoot is an industry standard (IEEE1275) ROM-based firmware implementation that controls your system between the time that it is powered on and the Solaris operating system takes control. During this time, OpenBoot carries out hardware testing and initialization before booting the operating system.

OpenBoot also provides a user interface and programming language, based on the Forth programming language, which can be used to perform certain diagnostics and change user-configurable options stored in NVRAM.

Displaying the OpenBoot user interface

Display the OpenBoot user interface as follows:

1. Power on the system
2. When the OpenBoot start-up screen is displayed, press **Stop-A** (if using a Sun keyboard) or **Ctrl-Pause** (if using a PS2 keyboard) or **Break** key, if available. The OpenBoot `ok` prompt will then be displayed.

   To see details of your system, give the command:

   ```
   ok banner
   ```

Checking SCSI devices

To ascertain which SCSI devices have been found connected, during the system startup, by the system, enter the following command:

```
ok probe-scsi
```

A list of the attached SCSI devices should be output by this command.

If no SCSI devices are listed but you do have SCSI devices connected that are powered-on, you can test the SCSI connection using the following OBP command sequence:

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

If the SCSI chip is working successfully, you should see no messages.

```
ok
```

Once this test has been run, you should disable diagnostics using the following command:

```
ok setenv diag-switch? false
```

Checking the network interface

As a check to see whether your system's Ethernet hardware and twisted-pair connection to the Ethernet media are functioning correctly, enter the following command:

```
ok watch-net
Internal loopback test -- succeeded
Transceiver check -- passed
'.' is a good packet. 'X' is a bad packet.
Type any key to stop.
..........
```

A series of periods (. . .) should be printed rapidly across the screen if the internal hardware and Ethernet connection are functioning correctly. If you are still having network problems, you should check your operating system network configuration. See "Network problems" on page 16-7.

Software Problems

The operating system controls the peripherals and is, therefore, a critical component in enabling the system to operate correctly. For example, a minor error in a network configuration file can completely prevent the network interface from operating.

This section provides some information on common software problems and gives brief advice about possible remedies in each case. By its very nature it cannot be complete and situations may arise where you need the help of an experienced system administrator or Tadpole-RDI Customer Support. See "Getting Further Help" on page 16-2, earlier in this chapter.

Stopping Processes

If you are running interactive commands on a command line, you can stop the current command process using the interrupt character, **Ctrl-C**. This normally causes a program to exit. However, not all programs are run interactively and may need to be terminated using alternative methods, as described in the next section.

Killing a Program

Before killing (*terminating*) a program, you must know its process ID number (PID) and whether that program is part of a set of programs which constitute a complete system task. To display a summary of the current system processes, use the following command:

```
# ps -ef
```

You can see whether a process is an isolated process or part of a set of, related, processes by studying the output of the `ps` command:

```
# ps -ef
     UID   PID  PPID  C  STIME TTY   TIME  CMD
    root    0    0    0   Apr 30 ?    0:03 sched
    root    1    0    0   Apr 30 ?    0:14 /etc/init -
    root    2    0    0   Apr 30 ?    0:00 pageout
    root    3    0    1   Apr 30 ?   37:46 fsflush
    root   307  304   0   Apr 30 ?   0:01  /usr/lib/...
    root    180   1   0   Apr 30 ?   0:06  /usr/sbin/cron
    ....
    root   1279  1266   0  09:48:25 pts/3 0:02  /bin/ksh
```

System processes will have a '`tty`' column entry of "?" because those processes are being run internally as opposed to by a user working at a terminal. The last process in the example listing is being run by the root user in a pseudo-terminal window.

Also in this example, there are two processes (PID 2 and 3) that are related to the FileSystem and Memory Management operations of the system.

Processes can be terminated, individually, using the `kill` command. The kill command can be given values which determine whether the process is terminated cleanly or "quick and dirty". The option `-15` represents a "clean" kill and the option `-9` represents a "dirty" kill.

```
# kill -15 180
# kill -9 1279
```

Killing processes using run-control scripts

When a process is one of a related group of processes, it may be better to use the run-control scripts to terminate all of that group of processes. For example, if you wish to stop all processes that relate to the system being a NFS client, you could invoke the appropriate run-control script.

```
# /etc/init.d/nfs.client  stop
```

The `/etc/init.d` directory contains all of the system's master run-control scripts. To restart the NFS client processes, the same script could be used:

```
# /etc/init.d/nfs.client  start
```

Operating system panic

If there is a hardware or software fault, the operating system may panic. This occurs when the operating system encounters a problem so serious it cannot continue to run the machine. If the system does panic, a message will be printed on the screen saying so, together with as much information as the operating system is able to gather about the cause. You should record the information for subsequent use by Customer Support. See "Getting Further Help" on page 16-2 of this chapter.

The system may be able to reboot automatically or may require a reset, as described below.

Failing program

Programs can fail to run for a variety of reasons, some of which are as follows:

- **Corrupt program**
- **The disk copy of the program has been corrupted**
- **Shared Library inconsistency:** The program was compiled with a shared library that is incompatible with the system. Use the `ldd` utility to determine what libraries the program is loading. This problem can only be resolved by relinking the application with the shared libraries.
- **Program Error:** A programming fault can cause a segmentation violation if, for example, a program attempts to write to an illegal or protected address.

- **Out of Swap Space or Memory Space**: A message may sometimes be printed on the console if either of these conditions occur. Running processes may suddenly and abnormally terminate.
- **Memory failure**: There has been a memory error (hardware) during program execution.

The Solaris operating system includes the `trace` utility that allows you to monitor the system calls made by a process. This can be used by an experienced UNIX programmer to track down the cause of a problem. In addition, experienced UNIX programmers may be able to use the `crash`, `adb` or `dbx` debugger utilities provided to determine the cause of a "*core dump*".

Warning Messages

The Solaris operating system often prints system information in the form of warnings. This does not necessarily mean that there is anything wrong, but it is helpful to understand which messages may be an indication of a problem and which are there for information.

Warning messages are generally displayed on the console terminal display but may also appear in a Console window or application window.

Some messages indicate that the system has run out of resources and requires attention. For example, a program may fail to start and may print a message such as:

```
      out of swap space
or    out of memory
or    FS full on /dev/c0t0d0s6
```

Messages such as these should be written down. This information may be required by Customer Support.

As a general rule, you should exit the offending program. It may also be prudent to reboot the system after such an event because applications and the operating system do not always recover gracefully from system failure.

If you run out of disk space you must either move files to a different filesystem, or to a networked server, or you must remove them.

Resetting the System

If the operating system has panicked, or the keyboard appears to have locked up and all other remedies have failed, you may have to reset the system.

A reset should only be used as a last resort because the operating system will have open files and unflushed buffers which will have to be repaired when the system is rebooted.

To reset the system, press **Stop-A** (on a Sun keyboard) or **Break** (**Ctrl-Pause** on a PS2 keyboard).

This will take you to the OBP `ok` prompt. Once at the OBP command level, you can boot the system using the following command:

```
ok boot
```

When the system starts to boot, the Solaris operating system will run the automatic filesystem check program, `fsck`. After completing the `fsck`, the system will continue to boot automatically.

OpenBoot PROM command reference

Listed below are some of the OBP commands that may be useful. This listing is not complete. The OBP commands should only be used by experienced system administrators or under the direction of a member of Customer Support.

OBP Command	Description
`boot -s`	Boot the system into single-user mode
`boot -r`	Perform a reconfiguration boot
`boot cdrom`	Boot from the SCSI CD-ROM device
`boot net`	Boot from a network server
`banner`	Display the hardware (system) banner information.
`devalias`	List the device hardware pathnames and their associated alias names.
`printenv`	Display a list of the OBP parameters and their current values
`reset-all`	Resets the system unit and re-initializes the system with new parameters
`setenv parameter value`	Set the OBP parameter to hold the data "`value`"
`sync`	Synchronize data in the buffer cache to disk.

Technical Specifications

A

This appendix provides detailed technical specifications for the VoyagerIIi.

Feature	Model VoyagerIIi
CPU	
Processor	UltraSPARC-IIi Module
Clock Speed	300MHz
Level 2 Cache	512kB
Memory	
DRAM	256MB up to 1GB
Storage	
Hard Disk Drive	4 x Ultra-DMA IDE disk channels (simultaneous activity)
	2 x removable disk packs each with capacities of up to 16GB
Indicators	
Status Indicators	Power On LED POST (Power On Self Test) LED Run/Stop LED Ethernet Activity LED SCSI Activity LED Disk Activity x 4 LEDs
I/O	
Buses	66MHz 32-bit PCI I/O bus
	2 x 33MHz 32-bit PCI buses (simultaneous activity)
Interfaces	
Ethernet	10/100 Base TX interface (auto-sensing)
SCSI	Ultra-SCSI (40MB/s) on a 68-way SCSI-3 socket
PCMCIA/CardBus	Two Type I/II cards or one Type III card
Parallel	Parallel IEEE P1284 compatible Centronics interface
Serial Ports	2 x RS232 serial interfaces (synchronous or asynchronous operation)
Keyboard/Mouse	Sun and PC

Feature	Model
	VoyagerIIi
Graphics	Range of PCI graphics solutions, SVGA to 2D/3D
PCI	PCI expansion slot for graphics or specialist I/O
Mouse/Keyboard	Combined keyboard and mouse port 6-pin mini-DIN connector Supports Sun Type 4 or Type 5 compatible keyboards and mouse.
Audio	Internal: beeper, basic PC card audio support (eg modem call progression)
Power	
Internal Mains PSU	World standard; mains inlet, switch, fuse
Software	
Operating System	Solaris 2.6 Desktop or Server options/2.5.1 Desktop OpenBoot 3.x, Self-Test and Diagnostics
Configuration	
Configuration	US/English for North American and International markets
Size and weight	
Dimensions	12.7 x 10.2 x 4.0 inches 323 x 259 x 101 mm
Weight	Circa 10.0 lb (4.5 kg)
Environmental	
Temperature	Operational: 5 to 35°C Non-operational: –20 to 50°C
Humidity	Operational: 8-80% non-condensing Non-operational: 5-95% non-condensing

Feature	Model
	VoyagerIIi
➲ **Standards/Approvals**	
Approvals	N.America: UL Safety, FCC Part 15 Class B (EMC) Europe: CE98 includes EN60950 Safety, EN55022 Emissions, EN50082-1 Immunity

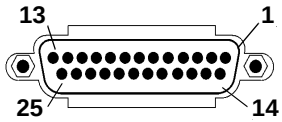
Connector Reference

B

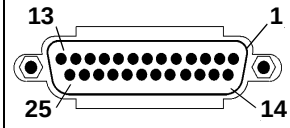
This appendix provides details of the connector pin assignments for the interfaces on the rear panel.

The connectors detailed are as follows:

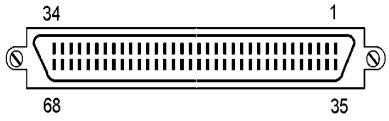
Parallel Port Connector

Connector	Pin	Signal	Pin	Signal
	1	/STROBE	14	/AUTOFEED
	2	DATA (0)	15	/ERROR
	3	DATA(1)	16	/INIT
	4	DATA(2)	17	/SELECT_IN
	5	DATA(3)	18	SIGNAL GROUND
	6	DATA(4)	19	SIGNAL GROUND
	7	DATA(5)	20	SIGNAL GROUND
	8	DATA(6)	21	SIGNAL GROUND
	9	DATA(7)	22	SIGNAL GROUND
	10	/ACK	23	SIGNAL GROUND
	11	BUSY	24	SIGNAL GROUND
	12	PE	25	SIGNAL GROUND
	13	SLCT		

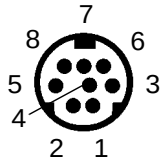
Serial Port Connector

Connector	Pin	Signal	Pin	Signal
	1	NO CONNECTION	14	B_TXD
	2	A_TXD	15	A_TRXC
	3	A_RXD	16	B_RXD
	4	A_RTS	17	A_RXC
	5	A_CTS	18	B_TRXC
	6	A_SYNC	19	B_RTS
	7	SIGNAL GROUND	20	A_DTR
	8	A_DCD	21	NO CONNECTION
	9	B_SYNC	22	NO CONNECTION
	10	B_RXC	23	NO CONNECTION
	11	B_DTR	24	A_TXC
	12	B_DCD	25	B_TXC
	13	B_CTS		

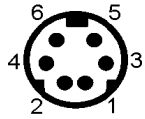
SCSI Connector

Connector	Pin	Signal	Pin	Signal
	1	SIGNAL GROUND	35	DB12
	2	SIGNAL GROUND	36	DB13
	3	SIGNAL GROUND	37	DB14
	4	SIGNAL GROUND	38	DB15
	5	SIGNAL GROUND	39	PARITY1
	6	SIGNAL GROUND	40	DB0
	7	SIGNAL GROUND	41	DB1
	8	SIGNAL GROUND	42	DB2
	9	SIGNAL GROUND	43	DB3
	10	SIGNAL GROUND	44	DB4
	11	SIGNAL GROUND	45	DB5
	12	SIGNAL GROUND	46	DB6
	13	SIGNAL GROUND	47	DB7
	14	SIGNAL GROUND	48	PARITY0
	15	SIGNAL GROUND	49	SIGNAL GROUND
	16	SIGNAL GROUND	50	SIGNAL GROUND
	17	TERMPWR	51	TERMPWR
	18	TERMPWR	52	TERMPWR
	19	SIGNAL GROUND	53	SIGNAL GROUND
	20	SIGNAL GROUND	54	SIGNAL GROUND
	21	SIGNAL GROUND	55	/ATN
	22	SIGNAL GROUND	56	SIGNAL GROUND
	23	SIGNAL GROUND	57	/BSY
	24	SIGNAL GROUND	58	/ACK
	25	SIGNAL GROUND	59	/RST
	26	SIGNAL GROUND	60	/MSG
	27	SIGNAL GROUND	61	/SEL
	28	SIGNAL GROUND	62	C/D
	29	SIGNAL GROUND	63	/REQ
	30	SIGNAL GROUND	64	I/O
	31	SIGNAL GROUND	65	DB8
	32	SIGNAL GROUND	66	DB9
	33	SIGNAL GROUND	67	DB10
	34	SIGNAL GROUND	68	DB11

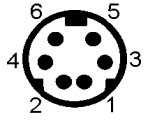
Sun Keyboard/Mouse Connector

Connector	Pin	Signal	Pin	Signal
	1	GROUND	5	SUN KBD OUT
	2	GROUND	6	SUN KBD IN
	3	+5V	7	NO CONNECTION
	4	SUN MSE IN	8	+5V

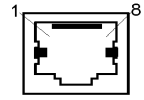
PS2 Keyboard Connector

Connector	Pin	Signal	Pin	Signal
	1	KBDATA	5	KBCLK
	2	NO CONNECTION	6	NO CONNECTION
	3	GROUND		
	4	+5V		

PS2 Mouse Connector

Connector	Pin	Signal	Pin	Signal
	1	MSE DATA	5	MSE CLOCK
	2	NO CONNECTION	6	NO CONNECTION
	3	GROUND		
	4	+5V		

Ethernet RJ45 Connector

Connector	Pin	Signal
	1	TP _TX+
	2	TP _TX–
	3	TP _RX+
	4	BI _D3+
	5	BI _D3–
	6	TP _RX–
	7	BI _D4+
	8	BI _D4–

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