VNMR and Solaris Software Installation

Varian NMR Spectrometer Systems
With VNMR 6.1C Software

Pub. No. 01-999158-00, Rev. B0702

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Revision history:
A0600 – Initial release for VNMR 6.1C
A0201 – Added reference about LaserJet color printer
B0401 – Updated *MERCURYplus* config info; added *MERCURY* CP/MAS parameters
B0501 – UNITY*INOVA* comes with Motorola 162 and Motorola PPC
B0702 – Added Hewlett-Packard Colour Inkjet CP1700D printer and Solaris 9.

Applicability of manual:
Varian NMR spectrometer systems

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Using This Manual

This manual was written to help you accomplish one of the following goals:

- **Upgrade to a new version of VNMR** (and Solaris if necessary) on a system using a Sun workstation as the host computer.

  – OR –

- **Set up a new spectrometer or host computer**, and install the software.

  – OR –

- **Install a new version of VnmrSGI™ or VnmrI™** on a Silicon Graphics workstation or an IBM RS/6000-series workstation, respectively.

The next sections identify which chapters you need to use to accomplish each goal. The flow chart on the next page illustrates accomplishing these goals using this manual.

Upgrading Software on Sun Workstations

This manual is used most often for software upgrades—installing a new version of VNMR. VNMR 6.1C requires Solaris 2.6, 7, or 8.

Installing Software on a New Spectrometer or New Host Computer

To set up a new spectrometer or a new host computer on an existing spectrometer, follow the instructions in **Chapter 2**, **Chapter 3**, **Chapter 4**, **Chapter 5**, and **Chapter 6**, in that order.

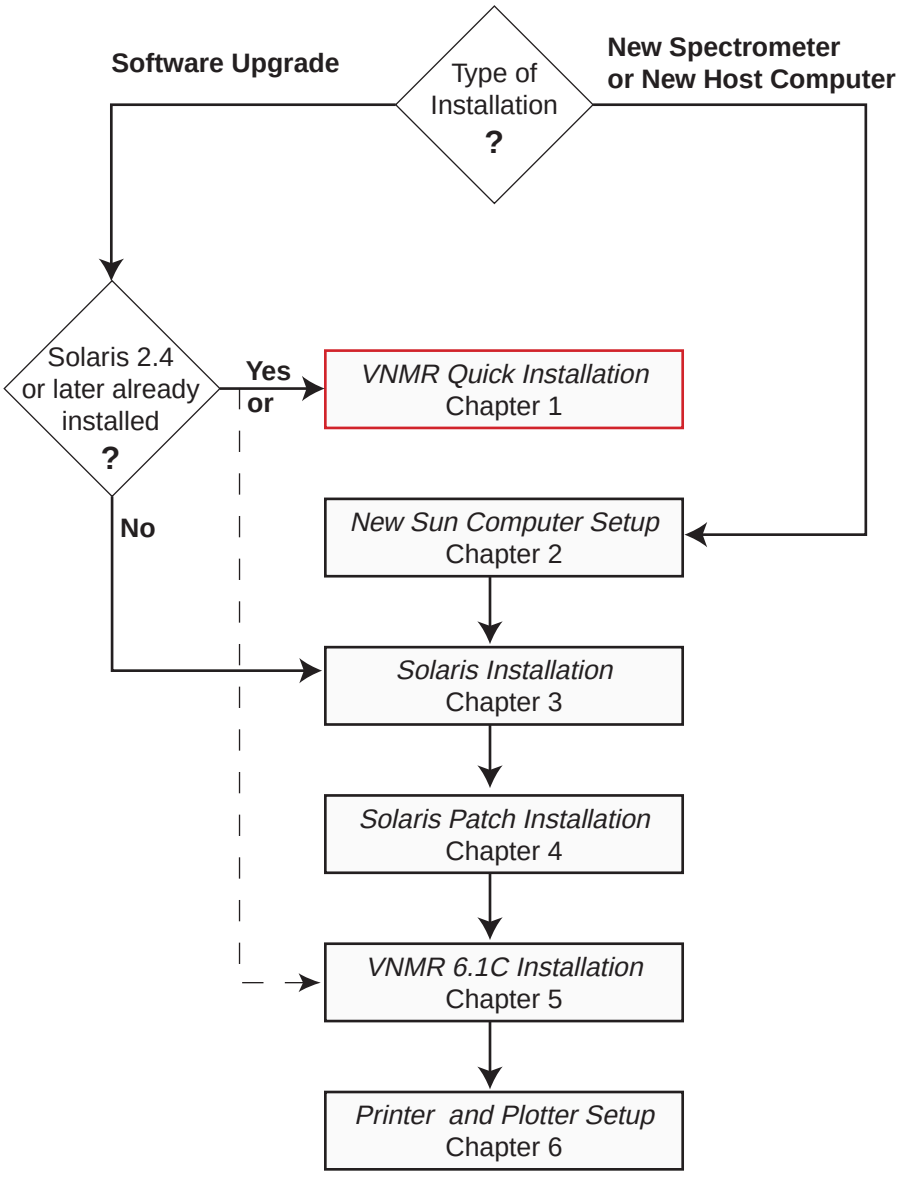
Installing VNMR on SGI or IBM Workstations

VnmrSGI or VnmrI are data station-only versions of VNMR—they do not support data acquisition.

- **VnmrSGI requires IRIX 5.2 or later**. To install VnmrSGI, go to **Chapter 7**.
- **VnmrI requires AIX 4.2 or later**. To install VnmrI, go to **Chapter 8**.

Appendixes

A series of appendixes provides technical support information that might be useful during the software installation.



Flowchart for Using This Manual

Chapter 1. VNMR 6.1C Quick Installation

Requirements

To install VNMR 6.1C, you must have a Sun host computer running **Solaris 2.6 or newer** (CDE is strongly recommended), **local CD-ROM drive**, and **at least 150 MB** of free hard-disk space. If these requirements are not met, you must start in Chapter 3.

A. Load VNMR from the CD-ROM

1. Log in as `root`. (Do not log in using `su -`. If so, log out and log in again.)
2. With OpenWindows or CDE running, insert the VNMR 6.1C CD-ROM and enter:

   ```
   # cd /cdrom/cdrom0
   # ./load.nmr
   ```

3. In the window that opens, click the button at the top for your system (e.g. UNITY*INOVA).* A list of options is displayed (legend: I is UNITY*INOVA*, M+ is *MERCURYplus*, Mv is *MERCURY-VX*, M is *MERCURY*, G2 is *GEMINI 2000*, U+ is UNITY*plus*, U is UNITY):

Option	*Description*	*System*
VNMR	Loads basic VNMR package	All
Fiddle_Example	Loads example of `fiddle` reference deconvolution	All
Gradient_shim	Loads software for shimming using gradients	All
Online_Manuals	Loads Varian NMR online manuals	All
GLIDE	Loads *GLIDE* interface. This is loaded automatically with UNITY*INOVA*, *MERCURYplus*, and *MERCURY-VX*.	M, G2, U+, U
PFG	Loads files for pulsed field gradient experiments, including `seqlib`, `psglib`, and `stdpar`	All
Kermit	Loads Kermit serial port communication software	All
GNU	Loads GNU C for compiling pulse sequences	All
Imaging_or_Triax	Loads imaging software	I, U+, U
Autotest	Loads AutoTest software	I
limNet	Loads limNet for Ethernet between Sun computers and Pascal-based VXR and Gemini systems	All
Userlib	Loads User Library software	All

Some systems have optional software that require passwords:

Option	*Description*	*System*
Diffusion	Loads software for running the diffusion experiment.	I, U+, U
LC-NMR	Loads software for driving LC-NMR experiments.	I, U+, U

STARS	Loads software for STARS simulation package.	I, U+, U
Backprojection	Loads software for back projection imaging.	I, U+, U
CSI	Loads files for chemical shift imaging.	I, U+, U
BIR_Shapes	Loads BIR-shaped pulse definitions for P_box to provide variable tip angle adiabatic pulses.	I, U+, U
DOSY	Loads DOSY experiment to separate resonances based on differing diffusion coefficients.	I, U+, U
VAST	Loads software for VAST sample changing accessory.	I, Mv
FDM	Loads software for the Filter Diagonalization Method.	All

4. Click the box next to each option you want to load. A check mark appears. If a password field appears, type the password (passwords are case-sensitive).
5. At the bottom of the screen, check the path for **`Destination directory`**. If the path shown is wrong, enter a new path. To keep the previous version, name the new version `/export/home/vnmr.x.y`, where `x.y` is the version of the VNMR (e.g., `vnmr.6.1C`).
6. Check the answer to **`Stop acquisition?`** (shown if acquisition is running.) Programs that connect VNMR with the NMR console are stopped. Stopping acquisition must be done before running `setacq` below.
7. Check the answer to **`Create /vnmr link`** `when done?` Set it to **`Yes`**.
8. Check the answer to `Create online manuals as link to CD?` If set to `Yes`, a link is created from the CD-ROM directory on the hard disk to the CD-ROM drive. This saves space on your hard drive, but the CD-ROM must be in its drive for access to the manuals.
9. Click on the **Install** button at the bottom of the window. This loads the selected software options. If needed, the destination directory and user `vnmr1` are created.
10. When the message "`Software Load Complete`" is displayed, click on **Dismiss**.

B. Install Sun Patches

Install the Sun patch for your version of Solaris from the `patch` directory on the VNMR installation CD-ROM. The patches fix a variety of Sun problems. For further information, refer to the `README` files in `patch` or refer to "Solaris Patch Installation" on page 51.

C. Update User Accounts and Restart Acquisition Communication

1. Update all user accounts with `makeuser`, starting with `vnmr1`:

   ```
   # cd /vnmr/bin
   # ./makeuser vnmr1
   ```

2. Restart communication between the host computer and the acquisition system:

   ```
   # cd /vnmr/bin
   # ./setacq
   ```

   When prompted to reboot the console, press the reset button on the console. Reboot the Sun computer if prompted to do so.

D. Configure VNMR

Log in as `vnmr1`. After VNMR loads, enter the **`config`** command in the VNMR input window. Configure the system hardware using the window that appears.

Chapter 2. New Sun Workstation Hardware Setup

Sections in this chapter:

This chapter describes how to set up a new Sun Ultra 5, 10, 30, or 60 workstation and how to connect it to a Varian NMR spectrometer.

2.1 Setting Up Sun Workstation Hardware

Setting up the Sun hardware involves the following steps:

Unpacking the Sun Computer

The first step in setting up the computer is removing it from the packaging. Go over the Sun documentation that came with the computer. If your Sun computer is already unpacked, go to the next section.

CAUTION: **Keep magnetic media (for example, tape cartridges, diskettes) away from the magnet if it is at field. Magnetic fields can erase the contents of magnetic media.**

1. Inspect all shipping cartons *immediately* for evidence of damage.
   - If any shipping carton is damaged, request that the carrier’s agent be present when the carton is opened.
   - If the agent is not present and the contents are found to be damaged, keep all contents and packing material for agent’s inspection.
2. Unpack the computer carefully (instructions might be printed on the outside of the shipping container).
   - Place the computer on a sturdy table or desk where you can easily work on the unit.
   - Place the other components separately on a sturdy table or desk, but do not connect any of the units yet.

Installing Additional Hardware and Connecting Cables

This section describes how to set up the computer hardware after it is unpacked. For an example of the different connectors on a Sun computer, see Figure 1, which shows the back panes of the Ultra 5 and Ultra 10 host computers.

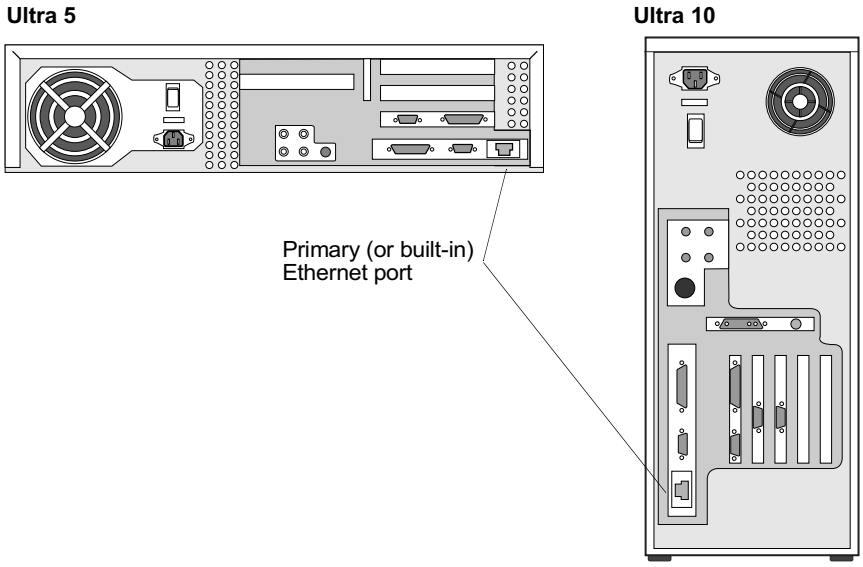


Figure 1. Ultra 5 and 10 Back View, Showing Connectors

1. If you purchased any add-on boards with your system (including a second Ethernet or SCSI board), install them in the computer now according to the instructions that came with the accessory.
2. If you purchased any optional internal devices, such as a floppy disk drive or an internal CD-ROM drive, install them now according to the instructions that came with the unit.
3. Place the computer and monitor in the final location.
4. Connect the keyboard, monitor, and mouse.

Connecting External SCSI Devices

The following steps describe how to connect external SCSI devices to the Sun computer. We recommend connecting no more than three SCSI devices on a SCSI bus.

For more information on external SCSI devices refer to "External SCSI Devices" on page 144 and to the documentation that shipped with the device.

1. Set the SCSI target address of your particular SCSI devices. Typically, SCSI addresses are assigned as follows:

SCSI Device	*SCSI Address*
External hard disk	0
First tape drive	4
Second tape drive	5
CD-ROM drive	6

2. Connect a SCSI cable from the computer's original SCSI bus to the first (optional) external SCSI device (tape drive, hard disk, CD-ROM).

   If you plan to use an external hard disk as the boot up disk, connect this disk to the original SCSI bus; then, connect all other optional SCSI devices in a daisy chain to the second SCSI bus. Connect a SCSI terminator to the open connector on the last device in the chain.

2.2 Connecting the Sun Workstation to the NMR Console

This section describes how to connect the Sun host computer to the NMR console. Choose one of the following procedures:

- "Connecting the UNITYINOVA and MERCURY Series," next
- "Connecting a New Host to a GEMINI 2000" on page 18
- "Connecting a New Host to a UNITYplus, UNITY, or VXR-S" on page 19

MERCURY series, UNITY*INOVA*, and *GEMINI 2000* NMR consoles connect to the host computer through an Ethernet interface. UNITY*plus*, UNITY, and VXR-S systems connect to the host computer with a SCSI cable and the Differential box.

Connecting the UNITY*INOVA* and *MERCURY* Series

MERCURY series, *GEMINI 2000*, and UNITY*INOVA* spectrometers connect to the host computer through an Ethernet interface.

The Sun computer can contain one or two Ethernet boards. If the Sun computer has two Ethernet boards, the built-in Ethernet is called the *first Ethernet*; this is labeled TP <...> on the back of the Sun computer and the port is referred to by UNIX as `eri0`, `le0`, or `hme0`. The *second Ethernet* is the one added as a PCI or S-bus board, and the port is referred by UNIX as `hme1` or `le1`. On Sun Blade computers, the port is referred to by UNIX as `hme0`, `hme1`, or `le1`.

If the spectrometer is to be connected to an Ethernet network, the host computer must have two Ethernet boards, one for the NMR console and one for the main Ethernet network. Either one of the Ethernet boards can be 10baseT (`le`) or autosensing 10/100baseT (`eri0` or `hme0`). Always select the fastest port (`eri` and `hme` are faster than `le`) for the main Ethernet network and connect the slower port to the NMR console. Table 1 lists the Ethernet board combinations and how to connect them to the NMR console and main network.

Table 1. Connecting 10baseT and 10/100baseT Ethernet Boards.

Sun Computer Ethernet Boards		*Ethernet Ports to Use*	
First	*Second*	*Main Network*	*NMR Console*
10/100	10/100	`eri0`	`hme0`
10/100	10/100	`hme0`	`hme1`
10/100	10	`hme0`	`le0`
10	10	`le0`	`le1`

To Connect MERCURY Series to the Host

The host computer can be connected to *MERCURY* series NMR consoles at any time, before, during, or after the software installation. The host and the console must both be connected and powered up, however, before the `setacq` command is executed.

The Ethernet cable is a shielded 10baseT reversal cable, identified by blue sleeves at both ends.

1. Connect the AUI-to-10baseT transceiver to the NMR console as (see Figure 2) follows:
   - ***MERCURYplus*** and ***MERCURY-VX*** – Connect to the ETHERNET PORT on the Acquisition CPU board, which is the first board on the left in the digital card cage.
   - ***MERCURY*** – Connect to the Ethernet controller, which is the second board from the left in the digital card cage.
2. Connect one end of the 10/100baseT cable to the transceiver.
3. Connect the other end of the 10/100baseT cable to the slower of the two Ethernet ports on the back of the Sun computer. Refer to Table 1.

To Connect the UNITYINOVA to the Host

The Ethernet cable is a shielded 10/100baseT reversal cable, identified by blue sleeves at both ends. The Motorola 162 CPU needs a transceiver; the Power PC does not.

1. Connect the AUI-to-10baseT transceiver to the Ethernet connector on the Acquisition CPU board, illustrated in Figure 3.

   The Acquisition CPU board is the left most board in the digital card cage, facing the front.
2. Connect one end of the 10/100baseT cable to the transceiver and route it through the opening in the left of the digital card cage and through the hole in the back of the console.
3. Connect the other end of the 10baseT cable to the slower of the two Ethernet ports on the back of the Sun computer. Refer to Table 1.

Connecting a New Host to a *GEMINI 2000*

GEMINI 2000 systems connect to the host computer with Ethernet.

1. Connect the Ethernet transceiver to the AUI connector on the Ethernet Controller board

   If using thinnet, connect a BNC tee and 50-ohm terminator to the transceiver.
2. Connect BNC cable or the 10baseT reverse cable (blue sleeves) to the transceiver.
3. Connect the other end of the cable as follows:
   - Non-networked systems – connect to the standard Ethernet port.
   - Networked (LAN) – use the slower of the two Ethernet ports. See Table 1.

   If using thinnet, connect a transceiver with a BNC tee and terminator to the Sun computer and attache the thinnet cable.

   If using the 10baseT reverse cable, connect to RJ45 on the Sun computer.

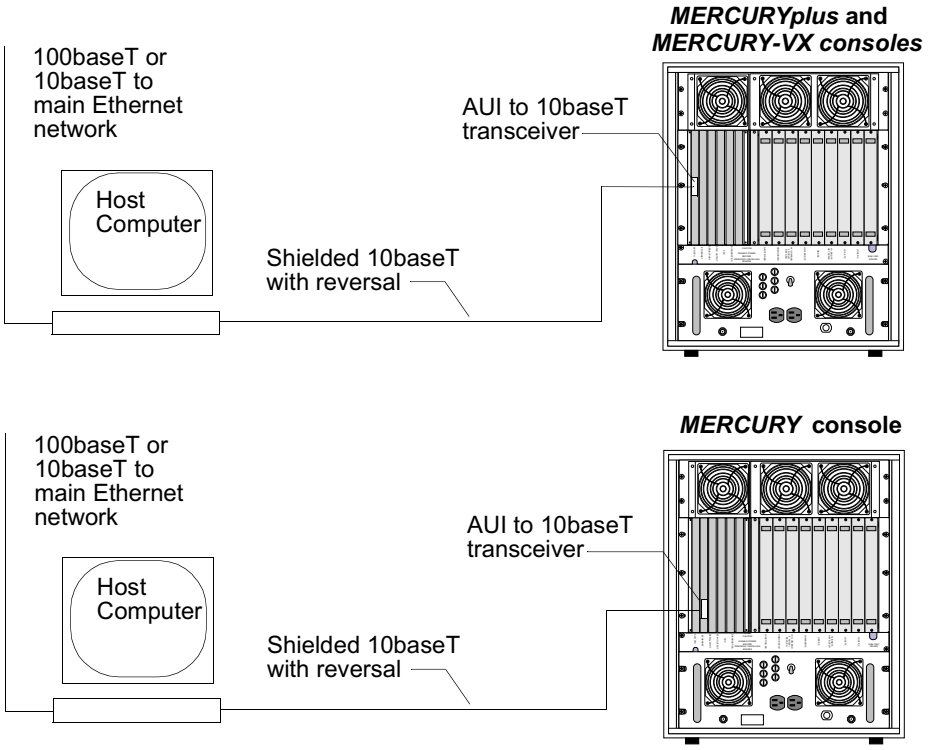


Figure 2. *MERCURY* series Ethernet Connections

Connecting a New Host to a UNITY*plus*, UNITY, or VXR-S

UNITY*plus*, UNITY, or VXR-S spectrometers connect to the host computer with a SCSI cable, through the Differential box. Before you connect the UNITYplus, UNITY, or VXR-S to a Sun computer, read through the *Compatibility* sections below. Then go to the following sections:

- "To Connect the Differential Box to the Host Computer" on page 21
- "To Connect the Differential Box to the NMR Console" on page 22

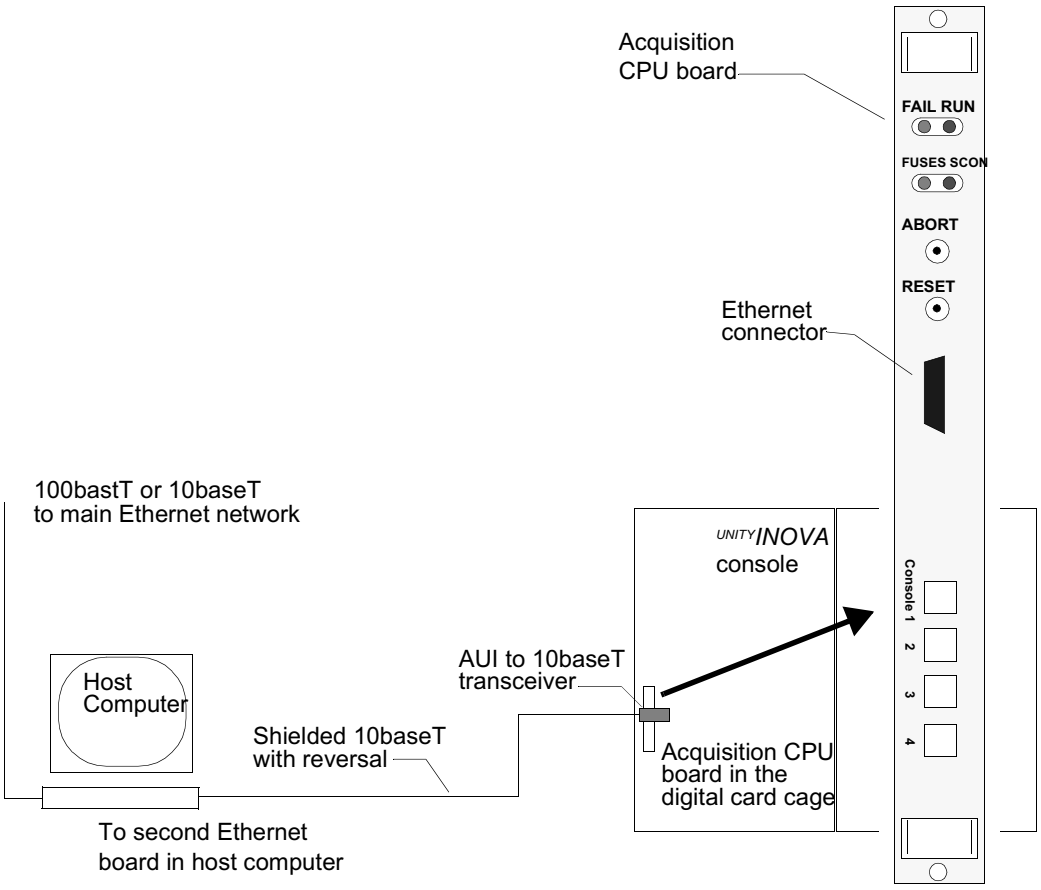


Figure 3. UNITY*INOVA* Universal Ethernet Connections

Compatibility

Read through the following sections to determine if you need any additional hardware before you install a Sun Ultra computer.

SCSI Addresses

The UNITY*plus* console claims SCSI address 2, and the UNITY and VXR-S consoles claim SCSI address 3. SCSI address 2 or 3 are not typically used by Sun Ultra computers unless four internal hard disks are installed. To determine if a device exists at SCSI address 2 or 3, use the following steps:

1. Turn on the computer. Press the Start-A keys (or L1-A) as soon as the Sun starts booting up.
2. Get to the new mode (OK boot prompt, enter n to switch).

3. Enter **`probe-scsi`**.

   For Ultra 5, 10, 30, and 60 computers, you might have to use the `probe-scsi-all` command.

4. Remove any device using SCSI address 2 for UNITY*plus* or SCSI address 3 for UNITY and VXR-S before connecting your computer to the console.

Fast/Wide SCSI on Ultra Computers

Sun Ultra computers with fast/wide SCSI require an adaptor kit. Table 2 lists the adaptors required to make the Ultra computers compatible with UNITY*plus*, UNITY, and VXR-S consoles. Refer to your sales representative for details.

Table 2. Sun Computer Compatibility with UNITY*plus*, UNITY, and VXR-S

Sun Computer	*Requirements*	*Comment*
Ultra 5, 10, 30, 60	PCI SCSI board, SCSI Cable/Adaptor kit (01-905501-00)	PCI SCSI board is fast/wide SCSI Recommend an active terminator at the Differential box, refer to "Active SCSI Termination" on page 150.
Ultra 1, 2	Mini50-to-DB50 adaptor cable	Ultra 1 has built-in SCSI II interface. Recommend an active terminator at the Differential box, refer to "Active SCSI Termination" on page 150.

DMA-Compatible HAL Board

UNITY and VXR-S systems require a DMA (direct memory access) compatible HAL (Host-to-Acquisition Link) board for proper operation (UNITY*plus* systems already have a DMA-compatible HAL board). This board is identified by a "DMA" sticker on the center of the baffle and the part number 00-968292-02 on the edge of the board beside the baffle. The "-02" will be handwritten if the HAL board was upgraded in the field. Contact Varian service before installing any software if you do not have the proper HAL board.

To Connect the Differential Box to the Host Computer

The differential box is a SCSI device that extends the length of the SCSI bus, allowing more flexibility in placing the host computer further away from the NMR console. As shipped, the differential box is internally terminated.

1. Connect the larger end of the Varian-supplied cable (which has different sized connectors on either end) to the J626 connector on the differential box.
2. Connect the smaller end of the Varian-supplied cable according to one of the following choices.
   - **No more than two SCSI devices** – As shown in Figure 4, connect the smaller end of the Varian-supplied cable to the second SCSI device.
   - **More than two SCSI devices, a second SCSI bus, or an external bootup disk** – As shown in Figure 5, connect the smaller end of the Varian-supplied cable to the second SCSI bus. Use the first SCSI bus to connect the SCSI peripherals, with a terminator on the last SCSI peripheral in the chain.

     Alternatively, you can connect the SCSI cables as shown in Figure 6, with the differential box connected to the Sun's built-in SCSI bus and SCSI peripherals connected to the second SCSI bus.

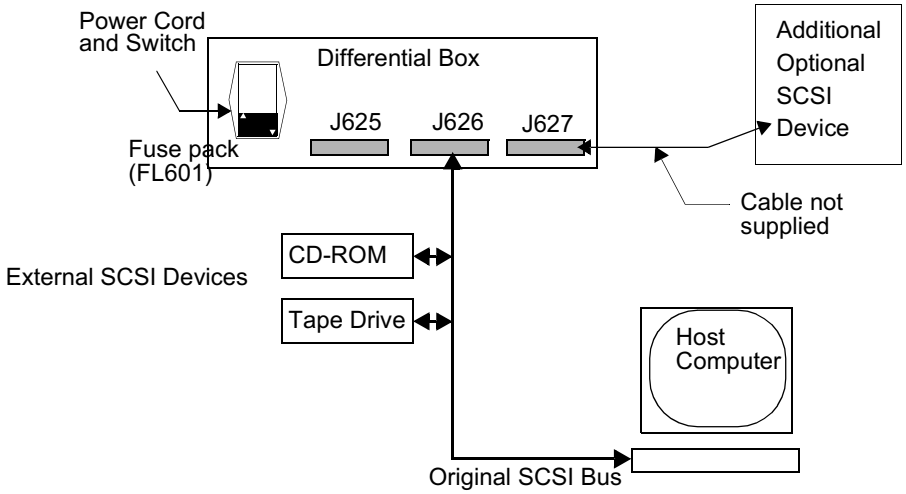


Figure 4. SCSI Connections Using One SCSI Bus

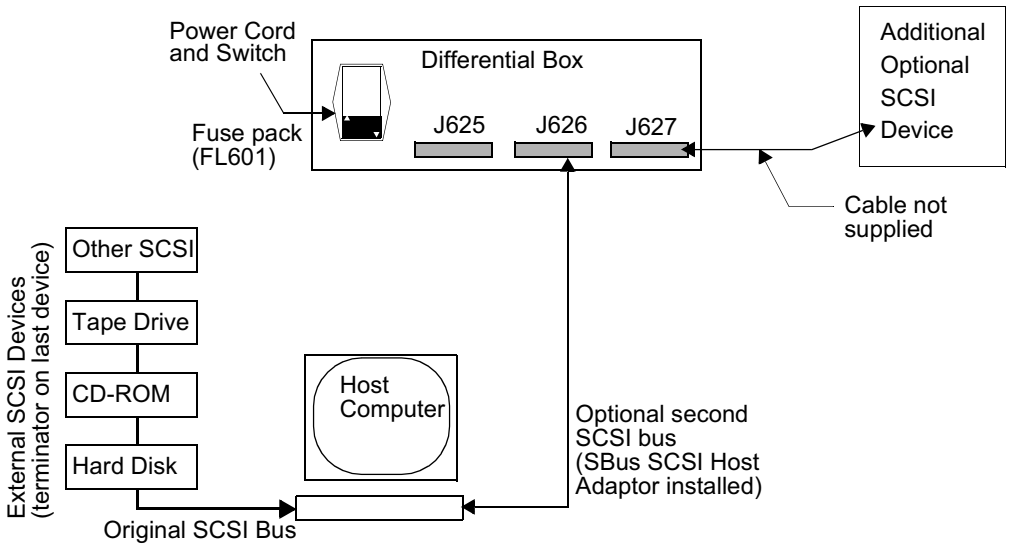


Figure 5. SCSI Connections Using a Second SCSI Bus for Differential Box

3. If you have additional, older, SCSI devices with large-sized SCSI connectors, connect these with SCSI cables that have large connectors at both ends (not supplied) from J627. You must also open the differential box and remove the internal termination and supply a SCSI terminator on the last device in the chain.
4. Go to the next section to connect the Differential box to the NMR console.

To Connect the Differential Box to the NMR Console

This procedure describes how to connect the Differential box to the UNITY*plus*, UNITY, or VXR-S NMR console.

1. With the differential box off, turn on the power to the computer.

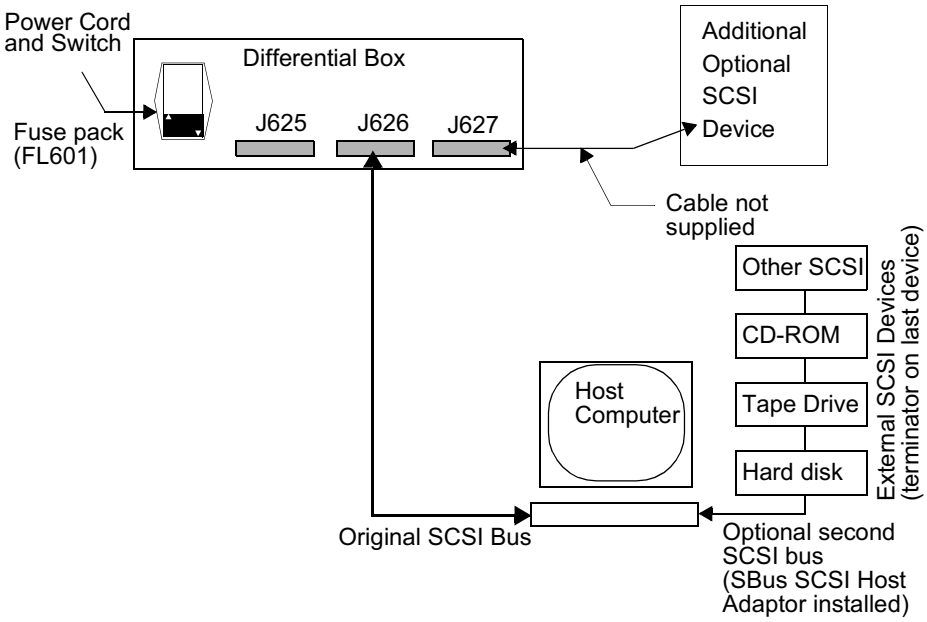


Figure 6. Alternative SCSI Connections Using a Second SCSI Bus for Peripherals

2. Connect a SCSI cable from J625 on the differential box to the appropriate connector on the NMR console:
   - **UNITY*plus*** – HOST INTERFACE J8210.
   - **UNITY** – HOST INTERFACE J210
   - **VXR-S** – HOST INTERFACE J210
3. Power on the differential box and reboot the NMR console by pressing the reset button located below the thumbwheel on the left side of the digital card cage.

   If the UNITY or VXR-S console is off, turn it on first, then the differential box.
4. Do not turn off the computer; instead, reboot by entering the `reboot` command. If the prompt is "`>`" enter **`b`**; if the prompt is "`ok`" enter **`boot`**.

   If you see a message like `Extra scsi data. Fatal error` or `Data Access Exception`, turn off the Sun computer and the Differential box and reboot the NMR console. Turn on the Sun computer and then the Differential box.

Chapter 3. Solaris Software Installation

Sections in this chapter:

This chapter describes how to install Solaris 9, 8, 7, or 2.6

If you are currently running Solaris 2.6 or later, upgrading your version of Solaris recommended, but is not required and you can skip to Chapter 5, “VNMR 6.1C Installation,” if you desire.

3.1 Solaris 9 Installation

This section describes how to install Solaris 9 software on a Sun computer to be used as an NMR spectrometer host.

CAUTION: **If Solaris 9 is preinstalled on your computer, do not use the preinstalled software. In order for VNMR to properly operate, you MUST manually load Solaris 9 using the two installation CDs.**

Start with *Solaris Quick Installation* in the next section to start the Interactive Solaris Installation program. Then, if you have any questions about a particular Solaris installation window, refer to the corresponding step in the section *Solaris Detailed Installation*, which starts on page 36.

CAUTION: **Do not use these instructions to load any other versions of Solaris or VNMR except Solaris version 9 and VNMR version 6.1C, unless so instructed in writing by Varian (not by Sun Microsystems, Inc.). Varian's software engineers and applications scientists have tested the compatibility of the Solaris and VNMR versions used in this manual and found it to be safe and fully operational for the supported Varian NMR spectrometer systems.**

Compatibility

Solaris 9 is supported only on UNITY*INOVA* and *MERCURY* series systems. Other systems—UNITY*plus*, UNITY, VXR-S, *GEMINI 2000*—are currently unsupported.

Table 3 lists the space requirements of the Solaris 9 software groups.

Table 3. Solaris 9 Software Group Space Requirements (MB)

Entire distribution plus OEM	2151
Entire Distribution	2114
Developer system support	1927
End user system support	1471
Core system support	716

Solaris 9 is a 64-bit operating system that generally retains compatibility and functionality for the existing 32-bit environment.

Ultra 1 and Ultra 2 computers require a flash PROM update before they can run the 64-bit mode of the Solaris 9 operating environment. The flash PROM update is described in the Sun manual *Solaris 9 Sun Hardware Platform Guide*.

Systems that can only run the 32-bit mode, including sun4c, sun4d, and sun4m platforms, do not require the flash PROM update. For these systems, do not select 64-bit mode.

Solaris Quick Installation

1. The Solaris installation program asks several questions about your network and system setup. Having this information before beginning the installation can save time later on.

   Table 4 lists the topics of the required information. Fill in the table before starting the installation. Consult a system/network administrator if necessary.

   If you need more information on a particular topic, refer to "Collecting System and Network Information for Solaris" on page 113.

2. Power up the computer and peripherals if not already done.

3. Get to the `ok` prompt:

   - On a running system, log in as `root` and enter:
     ```
     # init 0
     ```
   - On a new system, press **Stop-A** (L1-A on some keyboards) to stop the default boot routine.

   Wait for the `ok` prompt. If a `>` prompt appears, enter **`n`**.

4. If you have a second Ethernet board that is an X453A thinnet coax, disable it as described in "Disabling the X453A Thinnet Coax Ethernet Board" on page 111. Otherwise, go to the next step.

5. Choose the installation media. You have three choices for installing Solaris 9:

   - The Solaris 9 Installation CD. Insert the CD and follow the instructions.
   - The Solaris 9 Operating Environment DVD (if your system has a DVD-ROM drive). Insert the DVD and follow the instructions.
   - CD-ROMs 1 and 2

Installing Solaris 9 from the CDs

1. Insert the CD-ROM labeled "Solaris 9 Software, 1 of 2" and boot up from the CD-ROM:
   ```
   # boot cdrom
   ```

Table 4. Solaris 9 Preinstallation Worksheet

Category	*Comments*	*Your Configuration*
Host Name	Choose a host name; for example, `mercury300`, `inova750` **DO NOT USE:** `inova`, `inovaauto`, `gemcon`, or `wormhole`	
Primary Network Interface	For systems with a second Ethernet board, choose the one that will interface with the building or LAN network (not the NMR console). Use: `le0` for 10baseT Ethernet boards; `hme0` for Ultras or 10/100baseT Ethernet boards, and `eri0` for Blades.	
IP Address	Your network IP number for networked systems, or use 10.0.0.1 for non-networked spectrometers with no second Ethernet board	
Name Service	Choose NIS+ or NIS if the system is known to the name server, Choose Other if the site is using DNS, DCE, or similar. Choose None for no name service.	
Domain Name	Your network domain name; for example: `our.domain`	
Name Server	Choose Find One or Specify One If you choose Find One, the system finds name server information for you. If you choose Specify One, you will be asked for the following: Name Server Hostname – for example, `ourserver` Name Server IP Address – for example, `195.5.2.25` Subnet Mask – for example: `255.255.255.0`	
Proxy Server	Give name, e.g., `proxy.`*`domain`*`.com`	
Client Services Allocations	Used for allocating file systems for disk-less clients. VNMR does not require client services to be set up.	
Disk Layout	Disk layout sizes vary according to disk size. The installation procedure suggests proper sizes. The recommended layout would include `/` and `swap`, with `/export/home` as either a directory or slice. Solaris Developer System Support package requires up to 569 MB. VNMR requires from 82 to 147 MB, see Table 12 on page 53.	

2. Use the information written in Table 4 to fill in the Solaris installation windows.

   If you have questions about a particular Solaris installation window, refer to the step in the "Solaris Detailed Installation" on page 44 that corresponds to that window.

3. If you have a second Ethernet board that is an X453A thinnet coax, reenable it as described in "To Reenable the X453A Thinnet Coax Second Ethernet Board" on page 112. Otherwise, go ahead and install VNMR.

Solaris Detailed Installation

The following procedures correspond to the Solaris 9 installation windows as they appear.

Language and Locale

1. **Select Language and Locale** – Select **English** from the Languages list. Choose one of the following selections from the Locales List:
   - English (C – 7-bit ASCII)
   - USA–English (8859-1)
   - USA–English (ISO-8859-15)

   There is a pause.
2. **The Solaris Installation Program** – Read the information and click **Continue**.

Identify This System

This group of windows is used to identify the system. When a Confirm Information window appears, check the listed information with what you wrote in Table 4.

1. **Identify This System** – Click **Continue** to begin identifying the system.
2. **Network Connectivity** – Choose **Yes** or **No** according to the following:
   - Choose **Yes** if your system is a UNITY*INOVA*, *MERCURY* series, or *GEMINI 2000*.
   - Choose **Yes** if your system is a UNITY*plus*, UNITY, or VXR-S system that **will be** connected to a network.
   - Choose **No** if your system is a UNITY*plus*, UNITY, or VXR-S system that will **not** be connected to a network, and then skip to the *Time Zone Information* section below.

   This screen appears only when a second Ethernet board is installed and enabled.
3. **DHCP** – Specify whether your system should use or should not use DHCP for network interface configuration.
4. **Host Name** – Enter the host name of the computer. Refer to Table 4.

   The host name identifies the system on the network. We recommend choosing a host name that is all lower case. **DO NOT USE** `inova`, `inovaauto`, `gemcon`, or `wormhole` as a host name, these are reserved for the console. Use host names like `mercury300` or `inova750`.

   The host name must be unique within the domain in which it resides, and the name must be at least two characters, containing letters, digits, and minus signs (–).
5. **IP Address** – Enter the Internet Protocol address for your system. Refer to Table 4.

   The IP address must follow the site's address conventions. IP addresses contain four sets of numbers separated by periods (e.g., 129.200.9.1).
   - For systems with two Ethernet interfaces (e.g., one built-in and one add-on board), use an IP address provided by your network administrator.
   - For systems with one Ethernet interface *that only will be connected to the NMR console*, use 10.0.0.1 for the IP address.
   - For systems with one Ethernet interface *that will be connected to a network*, use an IP address provided by your network administrator.
6. **Subnets** – Specify whether your system is or is not part of a subnet.
7. **Netmask** – for example: `255.255.255.0`
8. **IPv6** – Specify whether the next generation Internet Protocol should or should not be enabled on your system.

9. **Default Route** – Specify how to set the default route. Choose **Find one** or **Specify one**.
10. **Confirm Information** – Verify that the information in the window is correct.
11. **Configure Security Policy** – Select **Yes** or **No** to configure Kerberos Security. At the time of this manual's publication, Varian has not verified the compatibility of the Kerberos Security software with VNMR.
12. **Confirm Information** – Verify that the information in the Kerberos window is correct.

The following windows are used to identify the name service and network used by your computer. When a Confirm Information window appears, check the listed information with what you wrote in Table 4.

1. **Name Service** – Select a name service. Refer to Table 4.
   - Select **NIS+** or **NIS** if the system is known to a name service.
   - Select **DNS** if the site is using DNS or a similar name service.
   - Select **LDAP** if the site is using LDAP or a similar name service.
   - Select None if the site is not using a name service.
2. **Domain Name** – Enter the domain name in which the system resides. Refer to Table 4.
3. **Name Server** – Choose **Find one** or **Specify one**. Refer to Table 4.
   - If you choose Find one, the system finds name server information for you.
   - If you choose Specify one, you will be asked for the following:

     Name Server Hostname – for example, `ourserver`

     Name Server IP Address – for example, `195.5.2.25`
4. **Confirm Information** – Compare the information listed in this window with the information written in Table 4. There is a long pause.

Time Zone Information

This group of windows is used to set the default time zone of your system. When a Confirm Information window appears, check the listed information.

- **Time Zone** – Enter the time zone information, geographic region, date, and time for your location.

When a Confirm Information window appears, check the listed information. There is a pause.

Configuring Solaris for Installation

After the system is identified, the interactive installation program displays the next group of screens, which ask about the following:

- Upgrade or initial installation
- System type
- Software group
- Disks
- Preserve data
- Automatically lay out file system?

- Mount remote file systems?

1. **Solaris Interactive Installation** – Choose **Initial** or **Upgrade**. If possible, select **Upgrade**.

   Read the information on the next screen and click **Continue**.

2. **Solaris Interactive Installation** – The **Initial** option overwrites the system disks when the new Solaris software is installed. You can accept the defaults or customize how Solaris is installed:

   - Select the type of Solaris to install.
   - Select disks to hold software you've selected.
   - Specify how file systems are laid out on disks.

   Select the way to install the Solaris software:

   - **Standard** installs your system from a Standard Solaris Distribution.
   - **Flash** installs your system from one or more Flash archives.

3. **Select Geographic Regions** – Select the geographic regions for which support should be installed, then click **Continue**.

4. **Select 64 Bit** – Select 64-bit if you want to include the Solaris 64-bit packages on this system.

5. **Select Software** – Choose one of the following:

   - For Solaris 9 on Ultra systems with the X1033A Ethernet board, choose **Entire Distribution plus OEM**.
   - For all other systems, choose at least **Developer System Support or** more.

   We do not recommend customizing the software packages.

6. **Select Disks** – Select the disks on which to install Solaris:

   a. Select disks from the Available Disks side.

   b. Click **Add** to move the disks to the Selected Disks side.

7. **Preserve Data?** – If you want to preserve a file system, keep it from being overwritten, click the **Preserve** button.

   In the Preserve screen, click the box next to the disk slices you would like to preserve (e.g., `/data`).

8. **Automatically Layout file Systems?** – Click **Auto Layout**.

   We suggest selecting the following file systems to automatically layout:

   - `/`
   - `swap`

   With only `root` (`/`) and `swap` selected, the other files systems in the list are collapsed into `root`. While this makes the space requirements for the `root` partition (or slice) bigger, you will not be constrained by fixed-sized slices; you will have more of the disk to work with. Also, this configuration can save up to 300 MB of disk space.

   If the disk has enough space, the `/export/home` directory is created and placed in its own partition. If the disk does not have enough space, you must create `/export/home` later.

   Alternatively, you can choose a different file system layout. Be sure, however, to always have at least the `root` (`/`) and `swap` file systems. Items that are selected are

set up in separate partitions. Items that are not selected are collapsed into the parent file system (they become a directory); this decreases the number of file systems but increases the size of the parent file systems. For example, we usually select `/usr` but not `/usr/openwin`. This way, `/usr/openwin` becomes contained by `/usr`.

9. **File System and Disk Layout** – Look at the File System column. At least the `root(/)` and `swap` file systems must be present. The `/export/home` file system might also be present; if not, you can create a `/export/home` directory (using `mkdir`) later. Click **Continue** and go to the next step.

   Figure 7 shows some example disk layouts as they appear in the Customize Disks window, which is opened by clicking **Customize** in the File System and Disk Layout window.

   If you chose to create more file systems than just `root(/)` and `swap`, compare the sizes listed under Size with the values listed in Table 5.

Table 5. Solaris 9 Disk Slice Sizes for VNMR

Slice	*Mount Point*	*Suggested Value*	*Description*
0	`/`	**400 MB**, at least	Contains directories and files essential for system operation; e.g., kernel, device drivers, boot programs.
1	`/var`	**60 MB**, at least	Contains systems files that are likely to change over the life of the system, e.g., compilations, mail files, uucp files, print spool files.
2	`overlap`		Spans the entire disk.
3	`swap`	**2 x RAM** or at least **100 MB**, whichever is more.	Space for virtual memory. Must be at least twice the amount of installed RAM or 100 MB, whichever is more. For example, for 32 MB of RAM use at least 100 MB for swap, or for 64 MB of RAM use 128 MB of swap (which is twice the RAM). Note that swap space can be added after Solaris is installed without repartitioning the disk.
4			
5	`/opt`	**25 MB**, at least	Contains mount points for third-party, unbundled software, and patches. If you plan to install other software, make this larger accordingly.
6	`/usr`	**827 MB**	Contains many of the standard UNIX programs, including OpenWindows and CDE files and programs.
7	`/export/home` or `/data`	Remainder	`/export/home` contains VNMR and VNMR user accounts. Give it as much disk space as possible.

- If the sizes in the window are the same or bigger than Table 5, click **Continue**. Note that if a `/export/home` file system does not exist, you must create a directory called `/export/home` for VNMR to use.
- If the sizes in the window are smaller than Table 5, click **Customize**.

18 GB internal (c0t1d0) with minimum slices

	Disk: c0t3d0	1304 MB
0	/	1226
1	swap	1585
2	overlap	17269
3		
4	/export/home	14458
5		
6		
7		

Capacity: 17269 MB
Allocated 17269 MB
Free: 0 MB

Boot Device: c0t3d0s0

With this layout, the directory `/export/home` must be created with the `mkdir` command before VNMR can be installed.

15.6 GB external (c0t0d0) and 12 GB internal (c0t1d0) with minimum slices

	Disk: c0t0d0	1304 MB
0		
1		
2	overlap	1304
3		
4		
5		
6		
7	/export/home	1304 MB

Capacity: 1304 MB
Allocated 1304 MB
Free: 0 MB

Boot Device: c0t3d0s0

	Disk: c0t3d0	1002 MB
0	/	875
1	swap	126
2	overlap	1002
3		
4		
5		
6		
7		

Capacity: 1002 MB
Allocated 1002 MB
Free: 0 MB

With this layout, `/export/home` is automatically created in a slice on the external hard disk (c0t0d0)

Figure 7. Example Disk Layouts for Solaris 9

Customize Disks – Alter the size fields on the listed disks to match the sizes in Table 5. Refer to Figure 7 for an example disk layout for a system with an external and internal hard disk.

The first external disk is identified by **`Disk: c0t0d0`** and the first internal disk is identified by **`Disk: c0t1d0`**. Typically, the systems places as many files systems as possible on the internal disk and places the rest on the external disk.

Your goal should be to match the sizes shown in Table 5 while trying to give as much space as possible to `/export/home`.

On a two-disk system, you might see `/export/home0` on the external disk and `/export/home` on the internal disk. If `/export/home0` is bigger than `/export/home`, change `/export/home` on the internal disk to `/data`, and then change `/export/home0` on the external disk to `/export/home`. That way, the entire external disk is available for `/export/home`, where VNMR is installed (see Figure 7).

10. **Mount Remote File Systems?** – Click the **Remote Mounts** button to set up mounts to remote file systems.

    This window enables you to specify and verify remote file systems to mount from a server. While you can always add remote mounts later, adding them now might be more convenient.

11. **Profile** – Check the information in the window. Click **Begin Installation** if the information is acceptable. Click **Change** if you need to change anything.

12. Select **Auto Reboot**. The system automatically reboots after Solaris is installed.

    The system automatically reboots after Solaris is installed. Then, you are asked for a `root` password. For more information about creating a `root` password, refer to "Choosing a Root Password" on page 116.

13. After the system has rebooted, you are prompted to activate the power saving shutdown (Autoshutdown). Select **No**.

    A prompt for the second CD appears. Insert the "Solaris 9 Software, 2 of 2" CD and follow the instructions.

If you have a second Ethernet board that is an X453A thinnet coax, reenable it as described in "To Reenable the X453A Thinnet Coax Second Ethernet Board" on page 112. Otherwise, go to Chapter 5, "VNMR 6.1C Installation," on page 53 to install VNMR.

Additional Solaris 9 Software

After you have installed Solaris 9, there are five additional CDs that you can install.

- **Solaris 9 Languages** contains messages files and other software in languages other than English. The appropriate contents are installed from this CD if you configure your system to a nonEnglish locale. If you used the Solaris 9 Installation CD, any software needed from the Solaris 9 Languages CD was automatically installed.
- Two CDs labeled **Solaris 9 Documentation** contain documentation sets in PDF and HTML formats for different language groupings. The sets provide manuals for users, administrators, and developers. You can also read the manuals directly from the CD. If you used the Solaris 9 Installation CD, any software needed from the Solaris Documentation CDs was automatically installed.
- **Solaris 9 Software Supplement** contains additional software for use on Sun hardware products. This CD might also contain patches needed by some systems, such as a

firmware patch that enables some older DVD drives to boot this Solaris release from DVD media. For most software on this CD, read the chapter "Installing Software from the Solaris 9 Software Supplement CD" in the *Solaris 9 Hardware Platform Guide*.

- **Solaris Software Companion** contains a collection of Linux applications and other Free and Open Source software for the Solaris 9 operating environment. For more information, visit the site *http://www.sun.com/software/solaris/freeware*. The contents of this CD are not included in the Solaris 9 Operating Environment DVD.

Sun Management Center 3.0 Platform 4 Update

There are also three CDs for installing Sun Management Center 3.0, which is designed to simplify the task of monitoring and managing Sun components by providing a single point of management.

3.2 Solaris 8 Installation

This section describes how to install Solaris 8 software on a Sun computer to be used as an NMR spectrometer host.

CAUTION: **If Solaris 8 is preinstalled on your computer, do not use the preinstalled software. In order for VNMR to properly operate, you MUST manually load Solaris 8 using the two installation CDs.**

Start with *Solaris Quick Installation* in the next section to start the Interactive Solaris Installation program. Then, if you have any questions about a particular Solaris installation window, refer to the corresponding step in the section *Solaris Detailed Installation*, which starts on page 36.

CAUTION: **Do not use these instructions to load any other versions of Solaris or VNMR except Solaris version 8 and VNMR version 6.1D, unless so instructed in writing by Varian (not by Sun Microsystems, Inc.). Varian's software engineers and applications scientists have tested the compatibility of the Solaris and VNMR versions used in this manual and found it to be safe and fully operational for the supported Varian NMR spectrometer systems.**

Compatibility

Solaris 8 is supported only on UNITY*INOVA* and *MERCURY* series systems. Other systems—UNITY*plus*, UNITY, VXR-S, *GEMINI 2000*—are currently unsupported.

Table 6 lists the space requirements of the Solaris 8 software groups.

Table 6. Solaris 8 Software Group Space Requirements

Entire distribution plus OEM	1321
Entire Distribution	1296
Developer system support	1249
End user system support	936

Solaris 8 is a 64-bit operating system that retains compatibility and functionality for the existing 32-bit environment.

Ultra 1 and Ultra 2 computers require the flash PROM update before they can run the 64-bit mode of the Solaris 7 operating environment. The flash PROM update is described in the Sun manual *Solaris 7 Sun Hardware Platform Guide*.

Systems that can only run the 32-bit mode, including sun4c, sun4d, and sun4m platforms, do not require the flash PROM update. For these systems, do not select 64-bit mode.

Solaris Quick Installation

1. The Solaris installation program asks several questions about your network and system setup. Having this information before beginning the installation can save time later on.

   Table 7 lists the topics of the required information. Fill in the table before starting the installation. Consult a system/network administrator if necessary.

   If you need more information on a particular topic, refer to "Collecting System and Network Information for Solaris" on page 113.

Table 7. Solaris 8 Preinstallation Worksheet

Category	*Comments*	*Your Configuration*
Host Name	Choose a host name; for example, `mercury300`, `inova750` Do not use: `inova`, `inovaauto`, `gemcon`, or `wormhole`	
Primary Network Interface	For systems with a second Ethernet board, choose the one that will interface with the building or LAN network (not the NMR console). Use: `le0` for 10baseT Ethernet boards; `hme0` for Ultras or 10/100baseT Ethernet boards, and `eri0` for Blades.	
IP Address	Your network IP number for networked systems, or use 10.0.0.1 for non-networked spectrometers with no second Ethernet board	
Name Service	Choose NIS+ or NIS if the system is known to the name server, Choose Other if the site is using DNS, DCE, or similar. Choose None for no name service.	
Domain Name	Your network domain name; for example: `our.domain`	
Name Server	Choose Find One or Specify One If you choose Find One, the system finds name server information for you. If you choose Specify One, you will be asked for the following: Name Server Hostname – for example, `ourserver` Name Server IP Address – for example, `195.5.2.25` Subnet Mask – for example: `255.255.255.0`	
Proxy Server (Solaris 8, 1/01 or later)	Give name, e.g., `proxy.`*`domain`*`.com`	
Client Services Allocations	Used for allocating file systems for disk-less clients. VNMR does not require client services to be set up.	
Disk Layout	Disk layout sizes vary according to disk size. The installation procedure suggests proper sizes. The recommended layout would include `/` and `swap`, with `/export/home` as either a directory or slice. Solaris Developer System Support package requires up to 569 MB. VNMR requires from 82 to 147 MB, see Table 12 on page 53.	

2. Power up the computer and peripherals if not already done.
3. Get to the `ok` prompt:

- On a running system, log in as `root` and enter:
  ```
  # init 0
  ```
- On a new system, press **Stop-A** (L1-A on some keyboards) to stop the default boot routine.

Wait for the `ok` prompt. If the `>` prompt appears, enter **`n`**.

4. If you have a second Ethernet board that is an X453A thinnet coax, disable it as described in "Disabling the X453A Thinnet Coax Ethernet Board" on page 111. Otherwise, go to the next step.
5. Installing Solaris 8 involves loading both CD-ROMs 1 and 2. Insert the CD-ROM labeled "Solaris 8 Software, 1 of 2" and boot up from the CD-ROM:
   ```
   # boot cdrom
   ```
6. Use the information written in Table 7 to fill in the Solaris installation windows.

   If you have questions about a particular Solaris installation window, refer to the step in the "Solaris Detailed Installation" on page 44 that corresponds to that window.
7. If you have a second Ethernet board that is an X453A thinnet coax, reenable it as described in "To Reenable the X453A Thinnet Coax Second Ethernet Board" on page 112. Otherwise, go ahead and install VNMR.

Solaris Detailed Installation

The following procedures correspond to the Solaris 8 installation windows as they appear.

Language and Locale

1. **Select Language and Locale** – Select **English** from the Languages list. Choose one of the following selections from the Locales List:
   - English (C – 7-bit ASCII)
   - USA–English (8859-1)
   - USA–English (ISO-8859-15)

   There is a pause.
2. **The Solaris Installation Program** – Read the information and click **Continue**.

Identify This System

This group of windows is used to identify the system. When a Confirm Information window appears, check the listed information with what you wrote in Table 7.

1. **Identify This System** – Click **Continue** to begin identifying the system.
2. **Network Connectivity** – Choose **Yes** or **No** according to the following:
   - Choose **Yes** if your system is a UNITY*INOVA*, *MERCURY* series, or *GEMINI 2000*.
   - Choose **Yes** if your system is a UNITY*plus*, UNITY, or VXR-S system that **will be** connected to a network.

- Choose **No** if your system is a UNITY*plus*, UNITY, or VXR-S system that will **not** be connected to a network, and then skip to the *Time Zone Information* section below.

This screen appears only when a second Ethernet board is installed and enabled.

3. **DHCP** – Specify whether your system should use or should not use DHCP for network interface configuration.
4. **Primary Network Interface** – Select the primary network interface from the list. Choose an interface (in order of preference): `eri0`, `hme0`, or `le0`.
5. **Host Name** – Enter the host name of the computer. Refer to Table 7.

   The host name identifies the system on the network. We recommend choosing a host name that is all lower case. Do not use `inova`, `inovaauto`, `gemcon`, or `wormhole` as a host name, these are reserved for the console. Use host names like `mercury300` or `inova750`.

   The host name must be unique within the domain in which it resides, and the name must be at least two characters, containing letters, digits, and minus signs (–).
6. **IP Address** – Enter the Internet Protocol address for your system. Refer to Table 7.

   The IP address must follow the site's address conventions. IP addresses contain four sets of numbers separated by periods (e.g., 129.200.9.1).

   - For systems with two Ethernet interfaces (e.g., one built-in and one add-on board), use an IP address provided by your network administrator.
   - For systems with one Ethernet interface *that only will be connected to the NMR console*, use 10.0.0.1 for the IP address.
   - For systems with one Ethernet interface *that will be connected to a network*, use an IP address provided by your network administrator.
7. **IPv6** – Specify whether the next generation Internet Protocol should or should not be enabled on your system.
8. **Confirm Information** – Verify that the information in the window is correct.
9. **Configure Security Policy** – Select **Yes** or **No** to configure Kerberos Security. At the time of this manual's publication, Varian has not verified the compatibility of the Kerberos Security software with VNMR.
10. **Confirm Information** – Verify that the information in the Kerberos window is correct.

The following windows are used to identify the name service and network used by your computer. When a Confirm Information window appears, check the listed information with what you wrote in Table 7.

1. **Name Service** – Select a name service. Refer to Table 7.
   - Select **NIS+** or **NIS** if the system is known to a name service.
   - Select **DNS** if the site is using DNS or a similar name service.
   - Select **LDAP** if the site is using LDAP or a similar name service.
   - Select None if the site is not using a name service.
2. **Domain Name** – Enter the domain name in which the system resides. Refer to Table 7.
3. **Name Server** – Choose **Find one** or **Specify one**. Refer to Table 7.
   - If you choose Find one, the system finds name server information for you.

- If you choose Specify one, you will be asked for the following:

  Name Server Hostname – for example, `ourserver`

  Name Server IP Address – for example, `195.5.2.25`

4. **Subnets** – Specify whether your system is or is not part of a subnet.
5. **Netmask** – for example: `255.255.255.0`
6. **Confirm Information** – Compare the information listed in this window with the information written in Table 7. There is a long pause.

Time Zone Information

This group of windows is used to set the default time zone of your system. When a Confirm Information window appears, check the listed information.

- **Time Zone** – Enter the time zone information, geographic region, date, and time for your location.

When a Confirm Information window appears, check the listed information. There is a pause.

Configuring Solaris for Installation

After the system is identified, the interactive installation program displays the next group of screens, which ask about the following:

- Upgrade or initial installation
- System type
- Software group
- Disks
- Preserve data
- Automatically lay out file system?
- Mount remote file systems?

1. **Solaris Interactive Installation** – Choose **Initial**.

   Read the information on the next screen and click **Continue**.
2. **Select Geographic Regions** – Select the geographic regions for which support should be installed, then click **Continue**.
3. **Select Software** – Choose one of the following:
   - For Solaris 8 on Ultra systems with the 1033 Ethernet board, choose **Entire Distribution plus OEM**.
   - For all other systems, choose at least **Developer System Support or** more.

   We do not recommend customizing the software packages.
4. **Select Disks** – Select the disks on which to install Solaris:
   a. Select disks from the Available Disks side.
   b. Click **Add** to move the disks to the Selected Disks side.
5. **Preserve Data?** – If you want to preserve a file system, keep it from being overwritten, click the **Preserve** button.

   In the Preserve screen, click the box next to the disk slices you would like to preserve (e.g., `/data`).

6. **Automatically Layout file Systems?** – Click **Auto Layout**.

   We suggest selecting the following file systems to automatically layout:

   - `/`
   - `swap`

   With only `root` (`/`) and `swap` selected, the other files systems in the list are collapsed into `root`. While this makes the space requirements for the `root` slice bigger, you will not be constrained by fixed-sized slices; you will have more of the disk to work with. Also, this configuration can save up to 300 MB of disk space.

   If the disk has enough space, `/export/home` is created and placed in its own slice. If not, you must create a `/export/home` directory later.

   Alternatively, you can choose a different file system layout. Be sure, however, to always have at least root (`/`) and `swap` file systems. Items that are selected are set up in separate partitions (slices). Items that are not selected are collapsed into the parent file system (they become a directory); this decreases the number of file systems but increases the size of the parent file systems. For example, we usually select `/usr` but not `/usr/openwin`. This way, `/usr/openwin` becomes contained by `/usr`.

7. **File System and Disk Layout** – Look at the File System column. At least the `root(/)` and `swap` file systems must be present. The `/export/home` file system might also be present; if not, you can create a `/export/home` director (using `mkdir`) later. Click **Continue** and go to the next step.

   Figure 8 shows some example disk layouts as they appear in the Customize Disks window, which is opened by clicking **Customize** in the File System and Disk Layout window.

   If you chose to create more file systems than just `root(/)` and `swap`, compare the sizes listed under Size with the values listed in Table 8.

   - If the sizes in the window are the same or bigger than Table 8, click **Continue**. Note that if a `/export/home` file system does not exist, you must create a directory called `/export/home` for VNMR to use.
   - If the sizes in the window are smaller than Table 8, click **Customize**.

     Customize Disks – Alter the size fields on the listed disks to match the sizes in Table 8. Refer to Figure 8 for an example disk layout for a system with an external and internal hard disk.

     The first external disk is identified by **`Disk: c0t0d0`** and the first internal disk is identified by **`Disk: c0t1d0`**. Typically, the systems places as many files systems as possible on the internal disk and places the rest on the external disk.

     Your goal should be to match the sizes shown in Table 8 while trying to give as much space as possible to `/export/home`.

     On a two-disk system, you might see `/export/home0` on the external disk and `/export/home` on the internal disk. If `/export/home0` is bigger than `/export/home`, change `/export/home` on the internal disk to `/data`, and then change `/export/home0` on the external disk to `/export/home`. That way, the entire external disk is available for `/export/home`, where VNMR is installed (see Figure 8).

8. **Mount Remote File Systems?** – Click the **Remote Mounts** button to set up mounts to remote file systems.

18 GB internal (c0t1d0) with minimum slices

	Disk: c0t3d0	1304 MB
0	/	1226
1	swap	1585
2	overlap	17269
3		
4	/export/home	14458
5		
6		
7		

Capacity: 17269 MB
Allocated 17269 MB
Free: 0 MB

Boot Device: c0t3d0s0

With this layout, the directory `/export/home` must be created with the `mkdir` command before VNMR can be installed.

15.6 GB external (c0t0d0) and 12 GB internal (c0t1d0) with minimum slices

	Disk: c0t0d0	1304 MB
0		
1		
2	overlap	1304
3		
4		
5		
6		
7	/export/home	1304 MB

Capacity: 1304 MB
Allocated 1304 MB
Free: 0 MB

Boot Device: c0t3d0s0

	Disk: c0t3d0	1002 MB
0	/	875
1	swap	126
2	overlap	1002
3		
4		
5		
6		
7		

Capacity: 1002 MB
Allocated 1002 MB
Free: 0 MB

With this layout, `/export/home` is automatically created in a slice on the external hard disk (c0t0d0)

Figure 8. Example Disk Layouts for Solaris 8

Table 8. Solaris 8 Disk Slice Sizes for VNMR

Slice	*Mount Point*	*Suggested Value*	*Description*
0	`/`	**400 MB**, at least	Contains directories and files essential for system operation; e.g., kernel, device drivers, boot programs.
1	`/var`	**60 MB**, at least	Contains systems files that are likely to change over the life of the system, e.g., compilations, mail files, uucp files, print spool files.
2	`overlap`		Spans the entire disk.
3	`swap`	**2 x RAM** or at least **100 MB**, whichever is more.	Space for virtual memory. Must be at least twice the amount of installed RAM or 100 MB, whichever is more. For example, for 32 MB of RAM use at least 100 MB for swap, or for 64 MB of RAM use 128 MB of swap (which is twice the RAM). Note that swap space can be added after Solaris is installed without repartitioning the disk.
4			
5	`/opt`	**25 MB**, at least	Contains mount points for third-party, unbundled software, and patches. If you plan to install other software, make this larger accordingly.
6	`/usr`	**827 MB**	Contains many of the standard UNIX programs, including OpenWindows and CDE files and programs.
7	`/export/home` or `/data`	Remainder	`/export/home` contains VNMR and VNMR user accounts. Give it as much disk space as possible.

This window enables you to specify and verify remote file systems to mount from a server. While you can always add remote mounts later, adding them now might be more convenient.

9. **Profile** – Check the information in the window. Click **Begin Installation** if the information is acceptable. Click **Change** if you need to change anything.

10. Select **Auto Reboot**. The system automatically reboots after Solaris is installed.

    The system automatically reboots after Solaris is installed. Then, you are asked for a `root` password. For more information about creating a `root` password, refer to "Choosing a Root Password" on page 116.

11. After the system has rebooted, a prompt for the second CD appears. Insert the "Solaris 8 Software, 2 of 2" CD and follow the instructions.

12. If you have a second Ethernet board that is an X453A thinnet coax, reenable it as described in "To Reenable the X453A Thinnet Coax Second Ethernet Board" on page 112. Otherwise, go to Chapter 5, "VNMR 6.1C Installation," on page 53 to install VNMR.

3.3 Solaris 7 Compatibility

Solaris 7 is supported only on UNITY*INOVA* and *MERCURY* series systems. Other systems—*MERCURY*, UNITY*plus*, UNITY, VXR-S, *GEMINI 2000*—are currently unsupported.

To install Solaris 7, use the same procedure as used for installing Solaris 2.6 on page 42. Table 9 lists the space requirements of the Solaris 7 software groups.

Table 9. Solaris 7 Space Requirements

Software Group	*32-Bit Support (Mbytes)*	*64-Bit Support (Mbytes)*
Entire distribution plus OEM	801	909
Entire Distribution	787	895
Developer system support	716	837
End user system support	438	532

Solaris 7 is a 64-bit operating system that retains compatibility and funtionality for the existing 32-bit environment.

Ultra 1 and Ultra 2 computers require the flash PROM update before they can run the 64-bit mode of the Solaris 7 operating environment. The flash PROM update is described in the Sun manual *Solaris 7 Sun Hardware Platform Guide*.

System that can only run the 32-bit mode, including sun4c, sun4d, and sun4m platforms, do not require the flash PROM update. For these system, do not select 64-bit mode.

3.4 Installing Solaris 2.6 or 7

This section describes how to install Solaris 2.6 and 7 software on a Sun computer to be used as an NMR spectrometer host.

Start with *Solaris Quick Installation* in the next section to start the Interactive Solaris Installation program. Then, if you have any questions about a particular Solaris installation window, refer to the corresponding step in the section *Solaris Detailed Installation*, which starts on page 44.

CAUTION: **Do not use these instructions to load any other versions of Solaris or VNMR except Solaris versions 2.6 and 7 and VNMR version 6.1C, unless so instructed in writing by Varian (not by Sun Microsystems, Inc.). Varian's software engineers and applications scientists have tested the compatibility of the Solaris and VNMR versions used in this manual and found it to be safe and fully operational for the supported Varian NMR spectrometer systems.**

Solaris Quick Installation

1. The Solaris installation program asks several questions about your network and system setup. Having this information before beginning the installation can save time later on.

   Table 10 lists the topics of the required information. Fill in the table before starting the installation. Consult a system/network administrator if necessary.

If you need more information on a particular topic, refer to "Collecting System and Network Information for Solaris" on page 113.

Table 10. Solaris 2.6 and 7 Preinstallation Worksheet

Category	*Comments*	*Your Configuration*
Host Name	Choose a host name; for example, `mercury300`, `inova750` Do not use: `inova`, `inovaauto`, `gemcon`, or `wormhole`	
Primary Network Interface	For systems with a second Ethernet board, choose the one that will interface with the building or LAN network (not the NMR console). Use: `le0` for 10baseT Ethernet boards; `hme0` for Ultras or 10/100baseT Ethernet boards.	
IP Address	Your network IP number for networked systems, or use 10.0.0.1 for non-networked spectrometers with no second Ethernet board	
Name Service	Choose NIS+ or NIS if the system is known to the name server, Choose Other if the site is using DNS, DCE, or similar. Choose None for no name service.	
Domain Name	Your network domain name; for example: `our.domain`	
Name Server	Choose Find One or Specify One If you choose Find One, the system finds name server information for you. If you choose Specify One, you will be asked for the following: Name Server Hostname – for example, `ourserver` Name Server IP Address – for example, `195.5.2.25` Subnet Mask – for example: `255.255.255.0`	
Client Services Allocations	Used for allocating file systems for disk-less clients. VNMR does not require client services to be set up	
Disk Layout	Disk layout sizes vary according to disk size. The installation procedure suggests proper sizes. The recommended layout would include `/` and `swap`, with `/export/home` as either a directory or slice. Solaris Developer System Support package requires up to 569 MB. VNMR requires from 82 to 147 MB, see Table 12 on page 53.	

2. Power up the computer and peripherals if not already done.
3. Get to the `ok` prompt:
   - On a running system, log in as `root` and enter:
     `# init 0`
   - On a new system, press **Stop-A** (L1-A on some keyboards) to stop the default boot routine.

   Wait for the `ok` prompt. If the `>` prompt appears, enter **`n`**.
4. If you have a second Ethernet board that is an X453A thinnet coax, disable it as described in "Disabling the X453A Thinnet Coax Ethernet Board" on page 111. Otherwise, go to the next step.
5. Insert the CD-ROM labeled "Solaris 2.6 Software" or "Solaris 7 Software" and boot up from the CD-ROM:
   `#` **`boot cdrom`**
6. Use the information written in Table 10 to fill in the Solaris installation windows.

   If you have questions about a particular Solaris installation window, refer to the step in the "Solaris Detailed Installation" on page 44 that corresponds to that window.

7. If you have a second Ethernet board that is an X453A thinnet coax, reenable it as described in "To Reenable the X453A Thinnet Coax Second Ethernet Board" on page 112. Otherwise, go ahead and install VNMR.

Solaris Detailed Installation

The following procedures correspond to the Solaris 2.6 installation windows as they appear.

Language and Locale

1. **Select Language and Locale** – Select **English** from the Languages list. Select USA–English (ASCII only) or USA–English (ISO-8859-1) from the Locales list.
2. **The Solaris Installation Program** – Read the information and click **Continue**.

Identify This System

This group of windows is used to identify the system. When a Confirm Information window appears, check the listed information with what you wrote in Table 10.

1. **Identify This System** – Click **Continue** to begin identifying the system.
2. **Host Name** – Enter the host name of the computer. Refer to Table 10.

   The host name identifies the system on the network. We recommend choosing a host name that is all lower case. Do not use `inova`, `inovaauto`, `gemcon`, or `wormhole` as a host name, these are reserved for the console. Use host names like `mercury300` or `inova750`.

   The host name must be unique within the domain in which it resides, and the name must be at least two characters, containing letters, digits, and minus signs (–).
3. **Network Connectivity** – Choose Yes or No according to the following:
   - Choose Yes if your system is a UNITY*INOVA*, *MERCURY*-series, or *GEMINI 2000*.
   - Choose Yes if your system is a UNITY*plus*, UNITY, or VXR-S system that **will be** connected to a network.
   - Choose No if your system is a UNITY*plus*, UNITY, or VXR-S system that will **not** be connected to a network, and then skip to the *Time Zone Information* section below.
4. **Primary Network Interface** – Select the primary network interface from the list. Select `hme0` if it is listed; otherwise, select `le0`.

   This screen appears only when a second Ethernet board is installed and enabled.
5. **IP Address** – Enter the IP address of the computer. Refer to Table 10.

   The IP address must follow the site's address conventions. IP addresses contain four sets of numbers separated by periods (e.g., 129.200.9.1).

- For systems with two Ethernet interfaces (e.g., one built-in and one add-on board), use an IP address provided by your network administrator.
- For systems with one Ethernet interface *that only will be connected to the NMR console*, use 10.0.0.1 for the IP address.
- For systems with one Ethernet interface *that will be connected to a network*, use an IP address provided by your network administrator.

6. **Confirm Information** – Compare the information listed in this window with the information written in Table 10.

Name Service and Network Information

This group of windows is used to identify the name service and network used by your computer. When a Confirm Information window appears, check the listed information with what you wrote in Table 10.

1. **Name Service** – Select a name service. Refer to Table 10.
   - Select NIS+ or NIS if the system is known to a name service.
   - Select Other if the site is using DNS, DCE, or a similar name service.
   - Select None if the site is not using a name service.
2. **Domain Name** – Enter the domain name in which the system resides. Refer to Table 10.
3. **Name Server** – Choose Find One or Specify One. Refer to Table 10.
   - If you choose Find One, the system finds name server information for you.
   - If choose Specify One, you will be asked for the following information:

     Name Server Hostname – for example, `ourserver`

     Name Server IP Address – for example, `195.5.2.25`

     Subnet Mask – for example: `255.255.255.0`

Time Zone Information

This group of windows is used to set the default time zone of your system. When a Confirm Information window appears, check the listed information.

- **Time Zone** – Enter the time zone information, geographic region, date, and time for your location.

Configuring Solaris for Installation

After the system is identified, the interactive installation program displays the next group of screens, which ask about the following:

- Upgrade or initial installation
- System type
- Software group
- Disks
- Preserve data
- Automatically lay out file system?
- Remote file systems

1. **Solaris Interactive Installation** – Choose **Initial**.

Read the information on the next screen and click **Continue**.

2. **Allocate Client Service?** – client services are not used by VNMR, so you can click **Continue**.

   However, your network administrator might want to allocate space for diskless clients and/or autoclient systems. We provide no further detail on these settings.

3. **Select Software** – Choose one of the following:

   - For Solaris 2.6 on Ultra systems with the 1033 Ethernet board, choose **Entire Distribution plus OEM**.
   - For all other systems, choose **Developer System Support.**

   We do not recommend customizing the software packages.

4. **Select Disks** – Select the disks on which to install Solaris:

   a. Select disks from the Available Disks side.

   b. Click Add to move the disks to the Selected Disks side.

5. **Preserve Data?** – If you want to preserve a file system, keep it from being overwritten, click the **Preserve** button.

   In the Preserve screen, click the box next to the disk slices you would like to preserve (e.g., `/data`).

6. **Automatically Layout file Systems?** – Click **Auto Layout**.

   We suggest selecting the following file systems to automatically layout:

   - `/`
   - `swap`

   With only `root (/)` and `swap` selected, the other files systems in the list are collapsed into root. While this makes the space requirements for the root slice bigger, you will not be constrained by fixed-sized slices; you will have more of the disk to work with. Also, this configuration can save up to 300 MB of disk space.

   If the disk has enough space, `/export/home` is created and placed in its own slice. If not, you must create a `/export/home` directory later.

   Alternatively, you can choose a different file system layout. Be sure, however, to always have at least `root(/)` and `swap` file systems. Items that are selected are set up in separate partitions (slices). Items that are not selected are collapsed into the parent file system (they become a directory); this decreases the number of file systems but increases the size of the parent file systems. For example, we usually select `/usr` but not `/usr/openwin`. This way, `/usr/openwin` becomes contained by `/usr`.

7. **File System and Disk Layout** – Look at the File System column. At least the `root(/)` and `swap` file systems must be present. The `/export/home` file system might also be present; if not, you can create a `/export/home` director (using `mkdir`) later. Click **Continue** and go to the next step.

   Figure 9 shows some example disk layouts as they appear in the Customize Disks window, which is opened by clicking **Customize** in the File System and Disk Layout window.

   If you chose to create more file systems than just `root(/)` and `swap`, compare the sizes listed under Size with the values listed in Table 11.

18 GB internal (c0t3d0) with minimum slices

	Disk: c0t3d0	1304 MB
0	/	1226
1	swap	1585
2	overlap	17269
3		
4	/export/home	14458
5		
6		
7		

Capacity: 17269 MB
Allocated 17269 MB
Free: 0 MB

Boot Device: c0t3d0s0

With this layout, the directory `/export/home` must be created with the `mkdir` command before VNMR can be installed.

15.6 GB external (c0t0d0) and 12 GB internal (c0t1d0) with minimum slices

	Disk: c0t0d0	1304 MB
0		
1		
2	overlap	1304
3		
4		
5		
6		
7	/export/home	1304 MB

Capacity: 1304 MB
Allocated 1304 MB
Free: 0 MB

Boot Device: c0t3d0s0

	Disk: c0t3d0	1002 MB
0	/	875
1	swap	126
2	overlap	1002
3		
4		
5		
6		
7		

Capacity: 1002 MB
Allocated 1002 MB
Free: 0 MB

With this layout, `/export/home` is automatically created in a slice on the external hard disk (c0t0d0)

Figure 9. Example Disk Layouts for Solaris 2.6

Table 11. Solaris 2.6 Disk Slice Sizes for VNMR

Slice	*Mount Point*	*Suggested Value*	*Description*
0	/	**40 MB**, at least	Contains directories and files essential for system operation; e.g., kernel, device drivers, boot programs.
1	/var	**60 MB**, at least	Contains systems files that are likely to change over the life of the system, e.g., compilations, mail files, uucp files, print spool files.
2	overlap		Spans the entire disk.
3	swap	**2 x RAM** or at least **100 MB**, whichever is more.	Space for virtual memory. Must be at least twice the amount of installed RAM or 100 MB, whichever is more. For example, for 32 MB of RAM use at least 100 MB for swap, or for 64 MB of RAM use 128 MB of swap (which is twice the RAM). Note that swap space can be added after Solaris is installed without repartitioning the disk.
4			
5	/opt	**25 MB**, at least	Contains mount points for third-party, unbundled software, and patches. If you plan to install other software, make this larger accordingly.
6	/usr	**536 MB**	Contains many of the standard UNIX programs, including OpenWindows and CDE files and programs.
7	/export/home or /data	Remainder	/export/home contains VNMR and VNMR user accounts. Give it as much disk space as possible.

- If the sizes in the window are the same or bigger than Table 11, click **Continue**. Note that if a /export/home file system does not exist, you must create a directory called /export/home for VNMR to use.
- If the sizes in the window are smaller than Table 11, click **Customize**.

  Customize Disks – Alter the size fields on the listed disks to match the sizes in Table 11. Refer to Figure 9 for an example disk layout for a system with an external and internal hard disk.

  The first external disk is identified by **Disk: c0t0d0** and the first internal disk is identified by **Disk: c0t3d0**. Typically, the systems places as many files systems as possible on the internal disk and places the rest on the external disk.

  Your goal should be to match the sizes shown in Table 11 while trying to give as much space as possible to /export/home.

  On a two-disk system, you might see /export/home0 on the external disk and /export/home on the internal disk. If /export/home0 is bigger than /export/home, change /export/home on the internal disk to /data, and then change /export/home0 on the external disk to /export/home. That way, the entire external disk is available for /export/home, where VNMR is installed (see Figure 9).

8. **Mount Remote File Systems?** – Click the **Remote Mounts** button to set up mounts to remote file systems.

   This window allows you to specify and verify remote file systems to mount from a server. While you can always add remote mounts later, adding them now might be more convenient.

9. **Profile** – Check the information in the window. Click **Begin Installation** if the information is acceptable. Click **Change** if you need to change anything.

10. Select **Auto Reboot**. The system automatically reboots after Solaris is installed.

    The system automatically reboots after Solaris is installed. Then, you are asked for a `root` password. For more information about creating a `root` password, refer to "Choosing a Root Password" on page 116.

11. If you have a second Ethernet board that is an X453A thinnet coax, reenable it as described in "To Reenable the X453A Thinnet Coax Second Ethernet Board" on page 112. Otherwise, go to Chapter 5, "VNMR 6.1C Installation," on page 53 to install VNMR.

Chapter 4. Solaris Patch Installation

Sections in this chapter:

Sun Microsystems distributes patches for Solaris from their web site. In the `patch` directory of the VNMR CD-ROM are the Solaris patches we have found necessary for proper VNMR operation. Install the Sun software patches appropriate for your system. Each patch has a `README` file that provides specific information about the patch.

For the latest information about Solaris patches, visit the SunSolve Online Web site at

```
http://sunsolve.sun.com
```

Or, visit the Varian NMR User Pages at

```
http://www.nmr.varianinc.com/userpages/
```

Before you begin installing the appropriate patch, make sure the following are true:

- You must be logged in as `root`.
- VNMR must not be running.
- No users should be logged on to your system (you can use the `who` command).
- The NMR console must be idle.
- The VNMR CD-ROM is mounted.

If your are not sure which version of Solaris you are using, enter the `showrev` command. If the `showrev` command shows `SunOS 5.8`, your system is running Solaris 8—similarly, `SunOS 5.7` is Solaris 7.

You can also use the `showrev` command to list which patches are currently installed on the system. For example, use `showrev –p` or `showrev –p | grep` *`xxxxxx`*, where *`xxxxxx`* is the first six digits of the patch.

4.1 Solaris 8 Patches for All Systems

The patch for Solaris 8 is located in the `patch/Solaris28` directory of the VNMR installation CD-ROM. The README file contains a description of the patch.

To install the Solaris 8 patch, log in as `root`, make sure not other users are logged on to the system, and follow these steps.

1. Change to the Solaris 28 patch directory on the VNMR CD-ROM:

```
# cd /cdrom/cdrom0/patch
# cd Solaris28
```

2. Install the 108940-07 patch:
3. ```
   # cd 108940-07
   # ./install_cluster .
   ```
4. Reboot the computer:
   ```
   # reboot
   ```
5. Go to the next chapter to install VNMR.

4.2 Solaris 7 Patches for All Systems

The patches for Solaris 7 are located in the `patch/Solaris27` directory of the VNMR installation CD-ROM. The README file contains descriptions of the patches.

1. As `root`, change to the Solaris 27 patch directory on the VNMR CD-ROM:
   ```
   # cd /cdrom/cdrom0/patch
   # cd Solaris27
   ```
2. Install the cluster of patches:
   ```
   # ./install_cluster.
   ```
3. Reboot the computer:
   ```
   # reboot
   ```
4. Go to the next chapter to install VNMR.

4.3 Solaris 2.6 Patches for All Systems

The patches for Solaris 2.6 are located in the `patch/Solaris26` directory of the VNMR installation CD-ROM. The README file contains descriptions of the patches.

1. As `root`, change to the Solaris 2.6 patch directory on the VNMR CD-ROM:
   ```
   # cd /cdrom/cdrom0/patch
   # cd Solaris26
   ```
2. Install the cluster of patches:
   ```
   # ./install_cluster .
   ```
3. Reboot the computer:
   ```
   # reboot
   ```
4. Go to the next chapter to install VNMR.
   ```

Chapter 5. VNMR 6.1C Installation

Sections in this chapter:

The procedures in this chapter describe how to install VNMR version 6.1C.

Note: Before starting this chapter, Solaris 2.6 or 7 must already be operating on your system. If you do not have Solaris 2.6 or later running on your system, refer to Chapter 3, “Solaris Software Installation,” for instructions.

VNMR 6.1C ships on a CD-ROM and is compatible with the Varian NMR spectrometers listed in Table 12. This table also lists VNMR disk space requirements.

Table 12. VNMR Disk Space Requirements

NMR Spectrometer	*Disk Space Requirements (all options loaded)*
MERCURYplus	127 MB
MERCURY-VX	127 MB
MERCURY	121 MB
UNITY*INOVA*	179 MB
Horizontal imaging systems	
UNITY*INOVA*	179 MB
UNITY*plus*	146 MB
GEMINI 2000	106 MB
UNITY*plus, UNITY, VXR-S*	146 MB

5.1 Backing Up the Current Version of VNMR

The VNMR installation script saves the `conpar` and `devicenames` files and the `probes` and `shims` directories from the current VNMR and places them in the new VNMR; however, printing a copy of `conpar` and a shim set is a good idea.

You are provided with the opportunity to save your current version of VNMR in *Loading VNMR* procedure (step 7).

5.2 Loading VNMR

The following loading procedure assumes that you are using a local CD-ROM drive. If you are using a remote CD-ROM drive, or if you have trouble mounting the CD-ROM, refer to "Mounting a CD-ROM" on page 105.

1. Log in as `root` (or become `root` with `su`, *not* `su -`).

   If you are using CDE, skip to step 2.

   If you are using OpenWindows and OpenWindows did not start automatically, enter the following command to start it:

   ```
   # /usr/openwin/bin/openwin
   ```

2. Insert the VNMR CD-ROM.

3. In the Terminal window (CDE) or ShellTool window (OpenWindows), enter:

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

   If you need help opening a Terminal window or ShellTool window, refer to "Opening a Terminal Window, Shell Tool, or Command Tool" on page 109.

4. To begin the load process, enter:

   ```
   # ./load.nmr
   ```

   After a few seconds, a window similar to Figure 10 appears.

5. At the top of the window, click the button that represents your system.

   The VNMR installation window for your system appears. Examples are shown in Figure 11.

6. Select the software options you want to load.

   - To select an option, click the check box next to the option. A red check mark shows that the option is selected.

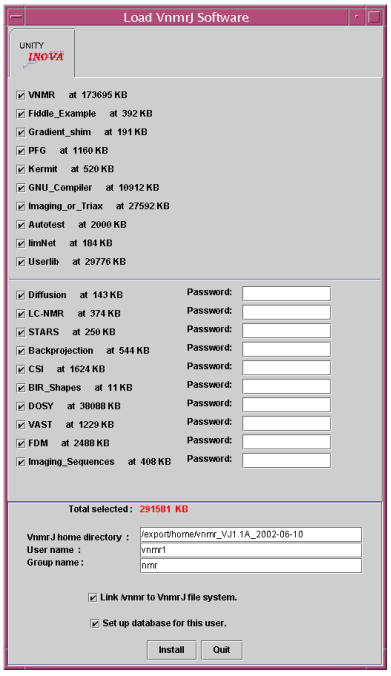
     Note that some of the options are sold separately and require a password for installation. Passwords are case sensitive.

   - To see a description of each option, click on the Help button at the bottom of the screen.

   - To install options later, after VNMR is installed, follow the steps in this procedure again, selecting only the options you want to load.

Figure 10. NMR System Choice Window

UNITY INOVA



MERCURY-VX

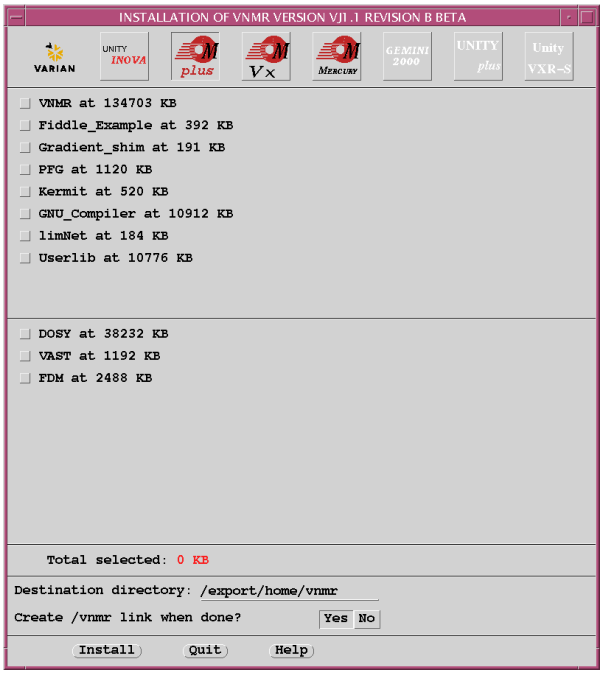


Figure 11. VNMR Installation Windows Examples

7. Enter the `Destination directory` for VNMR. The default directory is `/export/home/vnmr`.
   - To use the default directory, leave the `Destination directory` field unchanged.
   - To save the previous version of VNMR, replace `vnmr` with a different name (e.g., `vnmr6.1C`). Your current version of VNMR will be saved.
   - To change the directory in which VNMR is installed, replace the path `/export/home/vnmr` with the directory of your choice.

   If the destination directory does not exist, the installation program creates it. If the directory has the same name as your current VNMR directory, most of the current VNMR files are overwritten.
8. Select `Yes` or `No` to `Stop acquisition?`.
   - Select `Yes` to stop the programs that connect VNMR to the NMR console.

     Stopping acquisition now frees you from having to stop it manually before you set up the host computer for data acquisition (`setacq` command). This item does not appear for data station installations (or inactive acquisition).
   - Select `No` to leave acquisition running. You will then have to stop acquisition processes manually before you set up the host computer for data acquisition (`setacq` command). This choice allows you to continue running an experiment while you are loading a new version of VNMR.
9. Select `Yes` or `No` to create a `/vnmr` link.
   - Select `Yes` to automatically create the link. This places a link to the directory entered in step 7 on the root (`/`) level. This link is required for the proper

operation of VNMR and for creating user account and setting up acquisition. This links is also used to install software patches.

- Select `No` to if you do not want the link automatically created. You will then need to create this link manually before you can use the new version of VNMR. This choice allows you to continue using the old version of VNMR.

10. Select `Yes` or `No` to link to the online manuals on the CD-ROM. The Supplement CD-ROM contains updated online manuals.
    - Select `No` if you are loading online manuals onto your hard disk. This is recommended because the manuals display much faster and the CD-ROM does not have to be mounted. The online manuals require 60 to 75 MB.
    - Select `Yes` if you are not loading the online manuals onto your hard disk, but still want to use them. A link is created to the online manuals on the CD-ROM; the CD-ROM must be mounted in order to view the online manuals. If you decide to create the link, you can still load the online manuals and remove the link by running `load.nmr` again later.
11. After the installation window is filled in, click on the Install button.

    A new window appears showing the progress of the loading process, as shown in Figure 12.
12. When `Software Load Completed` appears, click the **Dismiss** button

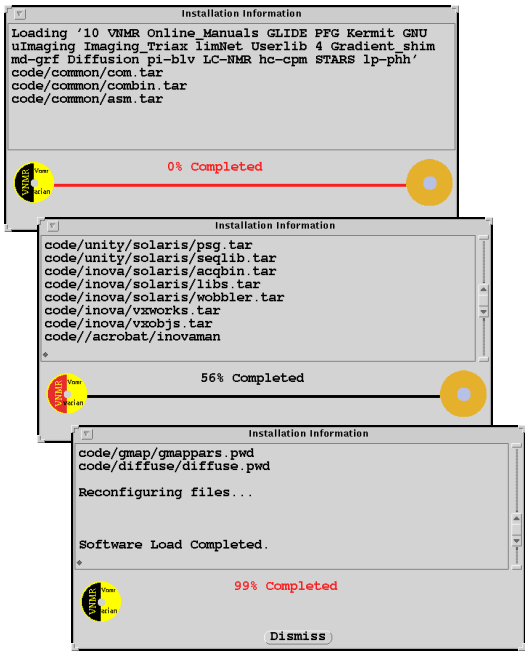


Figure 12. Installation Progress Windows

The VNMR software is now loaded. Go to the next section to update the `vnmr1` account.

5.3 Updating the vnmr1 Account

After a new version of VNMR is installed, you must update the `vnmr1` account. `vnmr1` is the NMR system administrator that has read, write, and execute access to all VNMR files (access similar to `root` over UNIX files).

This procedure uses the `makeuser` command. For more information on `makeuser`, refer to "About the makeuser Command" on page 119.

1. Log in as `root`.
2. In a Shell Tool or Terminal window, enter the following:

```
# cd /vnmr/bin
# ./makeuser vnmr1
```

The system displays:

```
Please enter location of VNMR system directory [/vnmr]:
```

3. Press Return to select the default (`/vnmr`) or enter the path of your custom (unlinked) VNMR system directory.

   The system displays:

   ```
   vnmr1 is already a defined user
   Do you wish to update files for vnmr1 (y or n) [n]: y
   Automatically configure the vnmr1 account (y or n) [y]: Y
   Do you wish to use the new Glide-style automation (y or n): Y
   Configure CDE files (y or n) [y]: y
   ```

4. Enter **y** to all the prompts.

   The system lists some files that are updated and backed up, and then, if necessary, displays:

   ```
   Complete, if necessary, the following login startup
   sequence.
   Root performs this to update the global parameter file.

   Sun Microsystems Inc.  SunOS X.X Generic November 19XX
   Choose s)un x)window t)ek d)umb g)raphon [s/x/t/d/
   g(default)]:x
   ```

5. Enter **x** for X Window, unless you have specific reasons for choosing another.

   The system then displays:

   ```
   input display server name:
   ```

   Enter the host name assigned to your Sun computer when Solaris was installed (for example, `nmrlab`).

   The system lists the files that are updated and the prompt reappears.

The `vnmr1` account is now updated. Proceed to the next section to set up or update user accounts.

5.4 Setting Up or Updating VNMR User Accounts

After VNMR software is loaded and the `vnmr1` account is updated, each existing NMR user account must be updated. The following section “Updating User Accounts” covers this procedure.

If you want to create new user accounts, follow the procedure in the section “Creating New User Accounts.”

The number of users on a VNMR system is limited by the amount of disk space available to the system.

Updating User Accounts

This procedure uses the `makeuser` command. For more information on `makeuser`, refer to “About the makeuser Command” on page 119.

1. Log in as `root` (or become `root` with `su`, *not* `su -`).
2. In a Shell Tool or Terminal window, enter the following:

   ```
   # cd /vnmr/bin
   ```

3. Enter the `makeuser` command for each account:

   `# ./makeuser user`

   where *user* is the name of the user account to be updated.

   The system displays:

   ```
   user is already a defined user
   Do you wish to update files for user_name (y or n) [n]: y
   Automatically configure the user_name account (y or n)
   [y]: y
   Configure CDE files (y or n) [y]: y
   ```

4. Enter **y** to all the prompts.

   The system lists some files that are updated and backed up and then, if necessary, prompts for your terminal type:

   ```
   Complete, if necessary, the following login startup
   sequence.
   Root performs this to update the global parameter file.

   Sun Microsystems Inc.  SunOS X.X Generic November 19XX
   Choose s)un x)window t)ek d)umb g)raphon [s/x/t/d/
   g(default)]:x
   ```

5. Enter **x** for X Window, unless you have specific reasons for choosing another type. The system then displays:

   ```
   input display server name:
   ```

   Enter the host name of your Sun computer that was created when Solaris was installed (for example, `nmrlab`).

   The system lists the files that are updated and the prompt reappears. Repeat these steps for each user account.

If you want to create new user accounts at this time, proceed to the next section.

Creating New User Accounts

This procedure uses the `makeuser` command. For more information on `makeuser`, refer to "About the makeuser Command" on page 119.

1. Log in as `root` (or become `root` with `su`, *not* `su -`).
2. In a Shell Tool or Terminal window, enter the following:

   `# cd /vnmr/bin`

3. Enter the `makeuser` command for each account you want to create:

   `# ./makeuser user`

   where *user* is the name of the user account to be created.

   The system displays:

   ```
   Please enter location of VNMR system directory [/vnmr]:
   Please enter home directory for user_name [/export/home]:
   ```

   Press Return to confirm the directory or type the name of another directory.

   The system displays:

   ```
   user_name is now an authorized user in the nmr group.
   Do you wish to update files for user_name (y or n) [n]: y
   Automatically configure the user_name account (y or n)
   [y]: y
   Configure CDE files (y or n) [y]: y
   ```

4. Enter **y** to all the prompts.

   The system lists some files that are updated and backed up, and then, if necessary, asks about terminal types.

   ```
   Complete, if necessary, the following login startup
   sequence.
   Root performs this to update the global parameter file.

   Sun Microsystems Inc.  SunOS X.X  Generic November 19XX
   Choose s)un x)window t)ek d)umb g)raphon [s/x/t/d/
   g(default)]:x
   ```

5. Enter **x** for X Window, (unless you have specific reasons for choosing another). The system then displays:

   ```
   input display server name:
   ```

   Enter the host name of your Sun computer that was assigned when Solaris was loaded (for example, `nmrlab`).

   The system lists the files that are updated and the prompt reappears. Repeat these steps for each user account.

After you finish creating new user accounts, continue VNMR installation with the next section, “Installing Solaris Patches.”.

5.5 Installing Solaris Patches

If you have not already installed the Solaris patches for your system, as described in Chapter 4, “Solaris Patch Installation,” do so now. The Solaris patches are located in the `patch` directory on the VNMR installation CD-ROM.

5.6 Setting Up the Host Computer for Data Acquisition

This section contains procedures that describe how to use the `setacq` command to establish communications between the host computer and the NMR console. Go to the procedure appropriate for your spectrometer system from the list below:

- “Setting UNITYINOVA, MERCURY-Series, GEMINI 2000 for Acquisition,” next
- “Setting UNITYplus, UNITY, or VXR-S for Acquisition” on page 60.

If you are installing a host computer for a data station or if you want to delay setting up for data acquisition, skip to the section “To Configure VNMR.”

Setting UNITY*INOVA, MERCURY-Series, GEMINI 2000* for Acquisition

This section describes how to use the `setacq` command to establish the acquisition link between the Sun host computer and a UNITY*INOVA*, *MERCURY*-series, or VXR-S console.

1. Make sure the host computer is connected to the console and the console is powered up.
2. Log in as `root`.

3. In a Terminal or Shell Tool, enter the following commands:

```
# cd /vnmr/bin
# ./setacq
```

4. When directed to do so, reboot the console by momentarily pressing the SYST RST button on the front of the console.

   The following prompt appears:

```
Please reboot the console.

Please select from the options below:
1. Your SUN is attached to the console via the standard ethernet
   port
2. Your SUN is attached to the console via the second ethernet
   port.
What is your configuration? (1 or 2) [2]:
```

5. Answer 1 if only one Ethernet interface is present. Answer 2 if two Ethernet interfaces are present

   The `setacq` process may take several seconds, and finally responds with the following:

```
NMR Console software installation complete
```

6. If needed, the system instructs you to reboot.

```
You must reboot Solaris for these changes to take effect
```

   Reboot the Sun computer:

```
# reboot
```

   If `setacq` repeatedly displays the message "`Console timed-out, is it connected?`", check that the Ethernet connections between the host computer and the console are connected properly and reboot the console. If they are, use Control–C to stop the messages and return to the # prompt; then run `setacq` again.

For *MERCURY* or *GEMINI 2000* – If `setacq` fails again, refer to "MERCURY and GEMINI 2000 Installation Troubleshooting" on page 133 to troubleshoot the installation.

Go to the section "Configuring VNMR" to finish installing VNMR.

Setting UNITY*plus*, UNITY, or VXR-S for Acquisition

This procedure describes how to use the `setacq` command to establish the acquisition link between the Sun host computer and a UNITY*plus*, UNITY, or VXR-S console.

1. **Make sure the differential box and the console are connected to the host computer and powered on.** You must also be logged in as `root`.

2. Enter the following commands

```
# cd /vnmr/bin
# ./setacq
```

   The system displays the message:

```
Installing NMR Console software . . . this takes a moment
```

   If the differential box or the console are not present or turned on, the command fails and displays the message:

```
NMR Console not found
Check Spectrometer Console and Differential Box
```

3. Check communications between the host computer and the console by entering:
   ```
   # mt -f /dev/rsh0 status
   ```
   Then start `Acqproc` by entering:
   ```
   # /etc/init.d/rc.vnmr start
   ```
   If you run `setacq` with either the differential box or the console not connected or not powered on, the command has no effect and you will have to reenter it after the equipment is ready.
4. Reboot the Sun computer:
   ```
   # reboot
   ```

Go to the next section, "Configuring VNMR," to finish installing VNMR.

5.7 Configuring VNMR

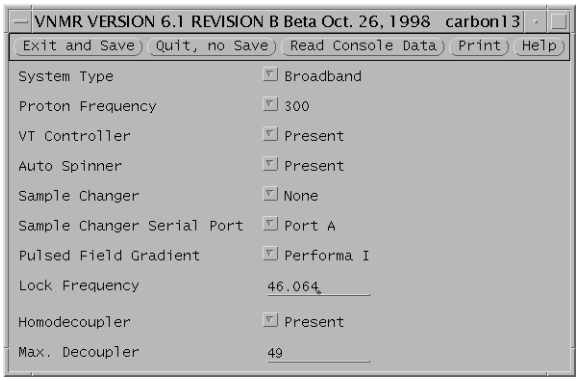
After the VNMR software is installed, it must be configured using the VNMR Configuration window.

1. Log in as `vnmr1`.
2. After VNMR starts, enter the following command in the VNMR input window:
   ```
   config
   ```
   A VNMR Configuration window, similar to Figure 13, opens.
3. If the Use Console Data button appears in the upper right of the window, click it first.
4. Check that the configuration values are correct for your system. For more information on these values, refer to the following tables:
   - Table 13, "MERCURY-Series Configuration" on page 63
   - Table 14, "UNITYINOVA, UNITYplus, UNITY, VXR-S General Configuration" on page 64.
   - Table 15, "UNITYINOVA, UNITYplus, UNITY, VXR-S RF Channels Configuration" on page 66.
   - Table 16, "GEMINI 2000 Configuration" on page 69.
5. When you are satisfied with the configuration values, click on Exit and Save.

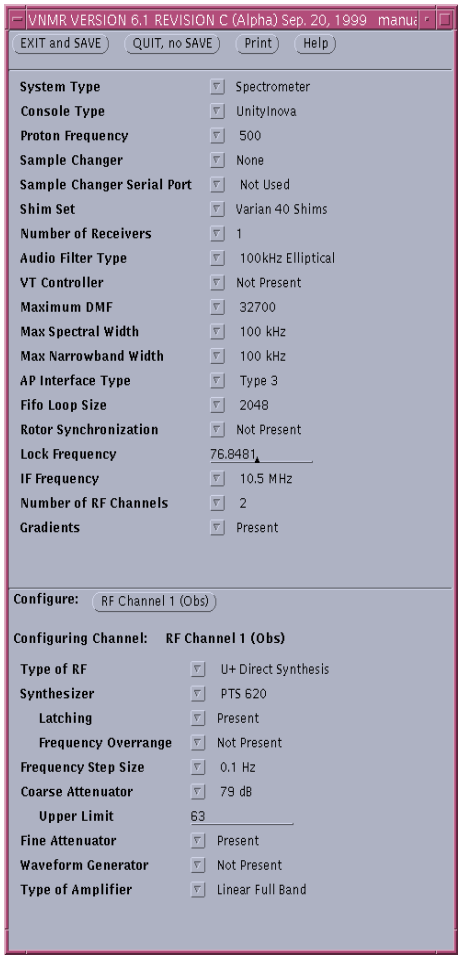
This completes VNMR software installation and configuration.

- To make the configuration values accessible to all NMR users, refer to "Giving All Users Access to Configuration Parameters" on page 125.
- For special information about configuring NMR imaging systems, refer to "Configuring NMR Imaging Systems" on page 131.
- To set up a printer or plotter, refer to Chapter 6, "Printer and Plotter Setup," for information.

MERCURY-series



UNITYINOVA, UNITYplus, UNITY, or VXR-S



GEMINI 2000

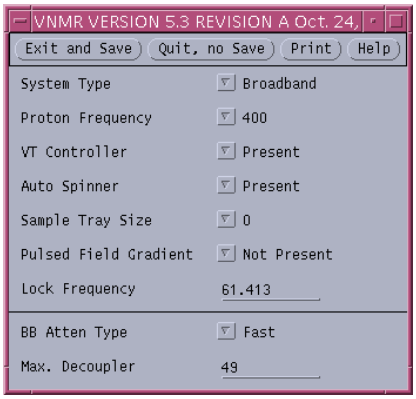


Figure 13. VNMR Configuration Windows

Table 13. *MERCURY*-Series Configuration

Parameters[1]	*Values*	*Descriptions*
System Type	4-Nucleus, Broadband	Sets whether the function of the workstation is to control a 4-Nucleus *MERCURY*-series NMR spectrometer or a Broadband *MERCURY*-series NMR spectrometer. Effective June 2000, the *MERCURY-VX* 300-MHz 4-Nucleus system uses the Hi/Lo Reference Generator board. For this system, in CONFIG window set System Type to Broadband (`rftype='fe'`). If the board type is unknown, look at the rf card cage in the back of the console. The third rf board from the left is the reference generator. If the top of the board is labeled Hi/Lo, select Broadband, but if it is labeled 4-Nucleus or 5-Nucleus select 4-Nucleus as the system type.
Proton Frequency	200, 300, 400	Sets the proton frequency for spectrometer-type systems.
VT Controller	Not Present, Present	Sets whether the VT controller is present
Auto Spinner	Not Present, Present	The optional spin hardware is standard on *MERCURYplus* and *MERCURY-VX*.
Type of Amplifier	aa, bb, cc	Specifies the type of amplifier. aa indicates 4-Nucleus, bb indicates broadband, cc indicates CP/MAS.
Sample Changer Serial Port	Not Used, Port A, Port B	Sets which serial port on the Sun computer that the sample changer is connected. Only applies to *MERCURYplus* and *MERCURY-VX*.
Pulsed Field Gradient	Not Present, Homospoil, Performa I, Performa II	Sets whether the optional pulsed field gradient (PFG) hardware is present. Homospoil is always present and can be used for gradient shimming and homospoil; It does not work with gradient experiments, such as gHMQC.
Lock Frequency	1 MHz to 160 MHz, in 0.1 Hz steps (entered directly)	The ^{2}H observe frequency. It is used to set the lock transmitter frequency. **To observe NMR signals, the value of Lock Frequency must be set correctly**.
Homodecoupler	Not Present, Present	Homonuclear decoupler is standard on *MERCURYplus* and *MERCURY-VX*.
Max. Decoupler	0 to 63 dB, in steps of steps of 1 dB. Usually less than 50.	This value is normally limited to 50 because a higher-power, continuous-decoupling can damage the probe. You can increase the maximum power, cautiously.

1. Several other system-wide parameters are set automatically.

Table 14. UNITY*INOVA*, UNITY*plus*, UNITY, VXR-S General Configuration

Label	*Choices*	*Explanation*
System Type	Spectrometer, Data Station	Sets whether function of the workstation is to control a spectrometer or to operate as a separate data station. If Data Station is selected, VNMR does not allow acquisitions (the `go` command, its aliases, and related commands do not work).
Console Type	VXR-S, Unity, UNITY*Plus*, UNITY*INOVA*, Gemini 2000, *MERCURY*, SISCO Imager	Sets spectrometer console type. For horizontal NMR imaging systems, select SISCO Imager.
Proton Frequency	85, 100, 200, 300, 400, 500, 600, 750, 800, 900, 3T, 4T	Sets ^{1}H frequency for spectrometer-type systems.
Sample Changer	None, Carousel, SMS 50 Sample, SMS 100 Sample, VAST, NMS, LC-NMR	Sets the type of optional sample changer. Select None if no sample changer is present or, if a sample changer is attached, to disable its use. Entries for SMS/ASM 50 Sample and SMS/ASM 100 Sample appear for UNITY*plus*, UNITY, and VXR-S.
Sample Changer Serial Port	Not Used, Port A, Port B	Sets serial port used for the sample changer. Select Not Used if no sample changer is present.
Shim Set	Varian 13 Shims, Varian 14 Shims, Oxford 15 Shims, Oxford 18 Shims, Varian 18 Shims, Varian 20 Shims, Varian 23 Shims, Varian 26 Shims Varian 28 Shims, Varian 29 Shims, Varian 35 Shims, Varian 40 Shims, Ultra Shims, Whole Body Shims	Sets type of shims on the system.
Number of Receivers	1, 2, or 4	Sets the number of receivers available in the system.
Audio Filter Type	100kHz Elliptical, 100kHz Butterworth, 200kHz Butterworth, 500kHz Elliptical	Sets type of audio filter in the system: 8-pole quasi-elliptical filter or 4-pole Butterworth.
VT Controller	Not Present, Present	Sets whether a VT controller is present

Table 14. UNITY*INOVA*, UNITY*plus*, UNITY, VXR-S General Configuration (Continued)

Label	*Choices*	*Explanation*
Maximum DMF	9900, 32700, 2.0e6	On UNITY*INOVA* and UNITY*plus*, DMF is used with `WALTZ`, `GARP`, `XY32`, `MLEV16`, `fm-fm`, and `squarewave`. Set DMF to 2.0e6. On UNITY and VXR-S, DMF is used with WALTZ modulation. For two-cabinet 200-, 300-, and 400-MHz systems equipped with linear amplifiers, as well as all 500- and 600-MHz systems, the maximum DMF is 32700. For other systems, the hardware present determines the maximum DMF. An alternate method to find the maximum DMF value is to use NMR: Set the maximum DMF to 32700, then set up a ^{13}C experiment with the parameter `dmf` arrayed with values of 9900 and 10000. If your hardware allows `dmf` greater than 9900, the two spectra should be essentially identical. If not, the second spectrum should show significantly worse decoupling. If that is the case, go back to `config` and set Maximum DMF to 9900.
Max Spectral Width	100 kHz, 200 kHz, 500 kHz, 2 MHz, 5 MHz	Set to 500 kHz for UNITY*INOVA*. Set to 100 kHz for systems with standard ADC. Set to 2 or 5 MHz for systems with Wideband NMR Module accessory.
Max Narrowband Width	100 kHz, 200 kHz, 500kHz	Defines maximum spectral width of the Input board.
AP Interface Type	Type 1, Type 2, Type 3, N/A	On UNITY*INOVA* and UNITY*plus* systems, AP Interface Type is not applicable. On VXR-S and UNITY systems, AP Interface Type sets the type of AP Interface board present on the system. Type 1 is for system with the older XL Interface board present on 200-, 300-, and 400-MHz systems with class C amplifiers and on early systems with ENI and/or TPL linear amplifiers (mostly VXR-500 systems). Type 2 is for systems with the newer AP Interface board present on all 200 through 600 MHz systems configured with linear amplifiers. Type 2 can now include systems with fine attenuators. Type 3 is for systems with an AP Interface boards with additional control lines to allow setting the decoupler modulation mode (`dmm`) with the AP bus instead of high-speed lines. You may have to test whether WALTZ decoupling works in order to verify if your system has a Type 2 or Type 3 AP Interface board. Switch to the other value if WALTZ does not work. Generally, horizontal NMR imaging systems use Type 1 for VXR and UNITY systems.
Fifo Loop Size	63, 1024, 2048	On UNITY*INOVA* and UNITY*plus*, set to 2048. On UNITY and VXR-S, use 63 for systems with the Output board (Part No. 00-953520-00) or 1024 for systems with the Acquisition Controller board (00-969204-00). Part numbers are visible on the boards.

Table 14. UNITY*INOVA*, UNITY*plus*, UNITY, VXR-S General Configuration (Continued)

Label	*Choices*	*Explanation*
Rotor Synchronization	Not Present, Present	Set to Present if system has the optional solids rotor synchronization accessory; else set to Not Present. This accessory requires the Acquisition Controller board (Part No. 00-969204-0x), Pulse Sequence Controller board (00-992560-0x), or Digital Acquisition Controller board (01-902022-00).
Lock Frequency	1 Hz to 160 MHz, in 0.1 Hz steps (enter the number directly)	On UNITY*INOVA* and UNITY*plus*, the value should be the same as found in the procedure in B.9 "Setting the Lock Frequency" page 122, which is the nominal ^{2}H observe frequency. On VXR-S and UNITY 300 through 600 MHz systems, the value is the same as set by thumbwheel switches on the Lock Transmitter board. For UNITY and VXR horizontal NMR imaging systems, lock frequency should be set to about 1.206 to get the correct ^{1}H frequency for 85-, 100-, 200-, or 300-MHz systems. The actual value will differ and should be manipulated until the spectrometer frequency is found. **To observe NMR signals, the value of Lock Frequency must be set correctly.**
IF Frequency	10.5 MHz, 20.0 MHz	On UNITY*INOVA*, select the intermediate frequency (I.F.) of your system.
Number of RF Channels	1, 2, 3, 4, 5	Sets number of rf channels available (the lock channel is not included). Systems normally have 2, 3, or 4 rf channels: The first channel is for direct observation. The second channel allows decoupling. An optional third channel allows decoupling of a second nucleus. An optional fourth channel allows decoupling of a third nucleus. The minimum value you can select is 2. *Do not change this value to eliminate the use of a channel.* For information on how to disable a channel, refer to the descriptions of the parameters dn2 and dn3 in the *VNMR Command and Parameter Reference*.
Gradients	Not Present, Present	Set to Present if your system has optional gradients for the X, Y, Z axis, or an Imaging Gradient Coil. If Gradients is set to present, go to the gradient/ channel configuration menu (Table 15) to configure the gradients.

Table 15. UNITY*INOVA*, UNITY*plus*, UNITY, VXR-S RF Channels Configuration

Label	*Choices*	*Explanation*
Configuring Channel	RF Channel 1 (Obs), RF Channel 2 (Dec), RF Channel 3 (Dec2), RF Channel 4 (Dec3), RF Channel 5 (Dec4), Gradients	Shows which rf channel is the current channel for the purposes of configuration. This item is present for information only; the value cannot be changed.

Table 15. UNITY*INOVA*, UNITY*plus*, UNITY, VXR-S RF Channels Configuration (Continued)

Label	*Choices*	*Explanation*
Type of RF	U+ Direct Synthesis, U+ H1 Only, Deuterium Decoupler Direct Synthesis, Broadband, Fixed Frequency, SIS Modulator	Sets type of rf generation on the current rf channel. Direct Synthesis uses the frequency directly from the frequency synthesizer with no mixing (also called rf type C). Broadband mixes the output from a frequency synthesizer with a fixed frequency source to generate the desired frequency (also called rf type B). Fixed Frequency uses rf generated from fixed frequency sources (also called rf type A). For UNITY*INOVA* and UNITY*plus*, select U+ Direct Synthesis or U+ 1H Only.
Synthesizer	Not Present, PTS160, PTS200, PTS250, PTS320, PTS500, PTS620, PTS1000	Sets the model of the PTS frequency synthesizer if present on the current rf channel. The model number is written on the front of the synthesizer. To make a selection for the Decoupler RF Channel on UNITY*INOVA* or UNITY*plus* with a fixed-frequency decoupler, select PTS320. On UNITY and VXR-S systems with a fixed-frequency decoupler, select Not present.
Latching	Not Present, Present	Sets whether current rf channel has a PTS frequency synthesizer with latching capabilities (all digits of the frequency value are sent to the synthesizer at once). On UNITY*INOVA* and UNITY*plus*, all synthesizers have latching capabilities, and Latching is always set to Present. On UNITY and VXR-S, latching is optional and requires a special version of the synthesizer with a custom interface between the synthesizer and the AP bus. If the synthesizer lacks latching capabilities, each digit (or pairs of digits) is sent to the synthesizer until the entire value is set. On horizontal NMR imaging systems, select Present for UNITY-style systems and Not Present for VXR.
Frequency Overrange	Not Present, 10000 Hz, 100000 Hz	Sets whether current channel has special version X46 of PTS frequency synthesizer in which the signal phase is stable over a larger range of frequencies than the standard synthesizer. If Frequency Overrange is set to 10000 or 100000, Latching must also be set to Present. To determine the overrange value for a PTS 320, look at the fifth character in the serial number—it will be *H*, *J*, or *K*. For *H*, set 100000 (0.1 resolution); For *J*, set 100000 (1:0 resolution); for *K*, set 10000 (0.1 resolution). On horizontal NMR imaging systems, select Present for UNITY-style systems and VXR systems with PTS Offset synthesizers, and select Not Present for VXR systems without a PTS Offset synthesizer installed.
Frequency Step Size	0.1 Hz, 0.2 Hz, 1 Hz, 100 Hz	Sets step size in the offset synthesizer (rf type A or B) or the PTS synthesizer on the current rf channel. If two channels have an offset synthesizer, one channel must have a step size of 100 Hz. If at least one channel has direct synthesis, the observe and decouple channels can have the 0.1 Hz step size. The 0.2 Hz choice is included because some PTS synthesizers have only 0.2 Hz resolution.

Table 15. UNITY*INOVA*, UNITY*plus*, UNITY, VXR-S RF Channels Configuration (Continued)

Label	*Choices*	*Explanation*
Coarse Attenuator	Not Present, 63 dB, 79 dB, 63.5 dB (SIS)	Sets type of coarse attenuator if present on current rf channel. Set to Not Present if no coarse attenuator, as in the case of class C amplifiers, set to 63 dB for a 63-dB attenuator (standard on UNITY), or set to 79 dB for a 79-dB attenuator (standard on UNITY*INOVA* and UNITY*plus* and optional on UNITY). On UNITY-style and VXR horizontal NMR imaging systems, select 63.5 dB (SIS).
Upper Limit	0 to 63 for 63-dB attenuator, or –16 to 63 for 79-dB attenuator (enter the number directly)	Sets an upper limit to the current rf channel to prevent damage from high power rf. The decoupler channel is usually set to 45 or 50 to prevent damage to the probe. On horizontal NMR imaging systems, enter 127.
Fine Attenuator	Not Present, Present	Sets whether current rf channel has a fine attenuator. Typically only the first two rf channels can have a fine attenuator. On UNITY*INOVA* and UNITY*plus*, all channels must have this label set to Present.
Waveform Generator	Not Present, Present	Sets whether current rf channel has a waveform generator.
Type of Amplifier	Class C, Linear Full band, Linear Low band, Linear Broadband, Shared	Sets type of amplifier on the current rf channel. Class C indicates the channel uses a class C amplifier. Linear Full Band indicates the channel uses a linear full-band amplifier. Linear Low Band indicates the channel uses a linear low-band amplifier. Shared means that the amplifier is fully declared with the third channel, and that the fourth channel shares this amplifier with the third channel. Linear Broadband indicates the channel goes to one amplifier for all frequencies, which is the usual selection from UNITY*INOVA* and UNITY*plus* horizontal NMR imaging systems. Contact your field service engineer if you have any questions about what class amplifiers are in your system. Refer to the `amptype` parameter in the *VNMR Command and Parameter Reference*.
X Axis	None, WFG+GCU, Performa I, Performa II/III, Performa II/III+WFG, Performa XYZ, Performa XYZ+WFG, SIS (12 bit), Homospoil	Sets value of the spatial axis. If the system has a waveform generator option with a gradient control unit, check the gradient values are correct next to the labels X Axis, Y Axis, and Z Axis. If the gradient is present for an axis, set the value to WFG+GCU. If the PFG option is installed, set the value to Performa I, Performa II, or Performa III; otherwise, set the value for the axis to None. Up to three gradients can be present, one for each spatial axis.
Y Axis	Same choices as X Axis.	Same explanation as X Axis.
Z Axis	Same choices as X Axis, Homospoil	Same explanation as X Axis. Homospoil is functional only for the Z axis.
Imaging Gradient Coil	None, Main	Detects the gradient coil configuration file that defines the current installed gradient coil (`sysgcoil`).

Table 16. *GEMINI 2000* Configuration

Label[1]	*Choices*	*Explanation*
System Type	$^{1}H/^{13}C$, Broadband	Sets whether function of the workstation is to control a $^{1}H/^{13}C$ *GEMINI 2000* NMR spectrometer or a broadband *GEMINI 2000* NMR spectrometer.
Proton Frequency	200, 300, 400	Sets ^{1}H frequency for spectrometer-type systems.
VT Controller	Not Present, Present	Sets whether a VT controller is present
Auto Spinner	Not Present, Present	Sets whether optional spin hardware is present.
Sample Changer	None, Carousel, ASM/SMS 50 Sample, ASM/SMS 100 Sample	Sets the type of optional sample changer. Select None if no sample changer is present or, if a sample changer is attached, to disable its use. Entries
Pulsed Field Gradient	Not Present, Present	Sets whether optional pulsed field gradient (PFG) hardware is present.
Lock Frequency	1 Hz to 160 MHz, in 19 Hz steps (entered directly)	Sets the ^{2}H observe frequency used to set the lock transmitter. **To observe NMR signals, the value of Lock Frequency must be set correctly.**
Values specific to broadband systems		
BB Atten Type	Slow, Fast	Sets broadband attenuator type to slow or fast. The RF Control board controls the output power of the transmitter and decoupler channels. There are two RF Control boards—the relay-switching version and the diode-switching version. Use Slow for the relay switching version. Use Fast for the diode-switching version. Refer to the VNMR *Command and Parameter Reference* to determine what version you have.
Max. Decoupler	0 to 63.5 dB, in steps of steps of 0.5 dB. Usually less than 50.	Sets maximum decoupler power. On broadband systems, this value is normally limited to 50 because high-power, continuous decoupling can damage the probe. You can increase the maximum power, cautiously.
Values specific to $^{1}H/^{13}C$ systems		
Homo Dec	Not Present, Present	Sets whether proton homonuclear decoupler is present.
Homo Dec Offset	0 to 2047 units, entered directly. Typically 1023.	Controls proton homonuclear decoupler power level.

1. Several system-wide parameters are set automatically.

Chapter 6. Printer and Plotter Setup

Sections in this chapter:

VNMR provides the Add Printer/Plotter window, a graphical interface for adding printers and plotters. This chapter describes printer and plotter setup using this window.

For more information on specific printers and plotters, refer to “Configuring Printer and Plotter Hardware” on page 151.

6.1 Adding a Printer or Plotter

This section describes how to add a printer or plotter using the Add Printer/Plotter window, (Figure 14). For each output device, you typically add both a printer and a plotter entry.

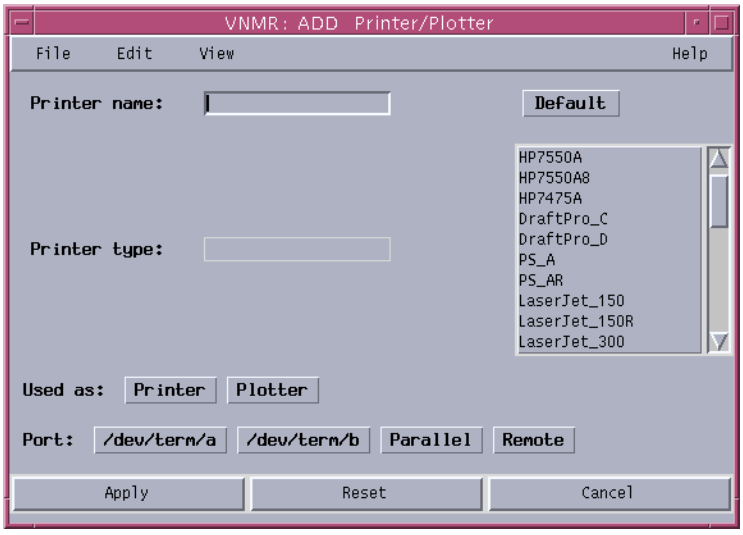


Figure 14. Add Printer/Plotter Window

1. Open a Shell or Terminal tool and enter **`su`** to become `root`.
2. Change to the `/vnmr/bin` directory.
   `# cd /vnmr/bin`

3. Enter the `adddevices` command to open the Add Printer/Plotter window:
   ```
   # ./adddevices
   ```
   The Add Printer/Plotter window opens, as shown in Figure 14.
4. In the Printer name field, type in the name of your printer. For a remote printer, the name must be the name already assigned to it. Otherwise, the name can be any descriptive name you wish, made up 14 characters or less—letters, numbers, and underscores—with no spaces, dashes, math operators, or special characters.
5. If this devices is to be the default printer, click on the **Default** button. Each system should designate one printer to be the default printer.
6. Select a VNMR printer or plotter type from the list by double-clicking on your choice from the scrolling list in the window. These types are described in Table 17..

Table 17. VNMR Printer and Plotter Types with Descriptions

VNMR Device Types	*Descriptions*
HP7475A	HP7475 plotter
HP7550A	HP7550 plotter using 11x17 inch paper
HP7550A8	HP7550 plotter using 8 1/2 x 11 inch paper
HPCP1700	HP Colour Inkjet CP1700 Printer . . .
DeskJet_300	HP DeskJet using 300 dpi and a vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value not recommended.
DeskJet_300R	HP DeskJet using 300 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
DraftPro_C	HP DraftPro plotter using size C paper
DraftPro_D	HP DraftPro plotter using size D paper
DraftMaster_A	HP DraftMaster plotter using size A paper
DraftMaster_B	HP DraftMaster plotter using size B paper
DraftMaster_C	HP DraftMaster plotter using size C paper
DraftMaster_D	HP DraftMaster plotter using size D paper
DraftMaster_E	HP DraftMaster plotter using size E paper
LaserJet_150	HP LaserJet (or DeskJet) using 150 dpi and a vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value not recommended.
LaserJet_150R	HP LaserJet (or DeskJet) using 150 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
LaserJet_300	HP LaserJet (or DeskJet) using 300 dpi and a vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value not recommended.
LaserJet_300R	HP LaserJet (or DeskJet) using 300 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
LJ_B_300R	HP LaserJet (or DeskJet) using 300 dpi, B-size paper, and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
LJ_A3_300R	HP LaserJet (or DeskJet) using 300 dpi, A3-size paper, and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.

Table 17. VNMR Printer and Plotter Types with Descriptions (Continued)

VNMR Device Types	*Descriptions*
LJ_A3_300R	HP LaserJet (or DeskJet) using 300 dpi, A3-size paper, and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
LaserJet_4550	HP Color LaserJet using 600 dpi.
LaserJet_600R	HP LaserJet (or DeskJet) using 600 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
LJ_B_600R	HP LaserJet (or DeskJet) using 600 dpi, B-size paper, and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
LJ_A3_600R	HP LaserJet (or DeskJet) using 600 dpi, A3-size paper, and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
PS_A	PostScript printer using vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value is not recommended.
PS_AR	PostScript printer (e.g., PS4069) using horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
PS4079_HPGL	Lexmark PS4079 or PS4079plus using 11x17 inch paper in HPGL mode. HPGL mode is required for color output.
QuietJet_96	HP QuietJet using low 96 dpi and a vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value not recommended.
QuietJet_96R	HP QuietJet using 96 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
QuietJet_192	HP QuietJet using 192 dpi and a vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value not recommended.
QuietJet_192R	HP QuietJet using 192 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
ThinkJet_96	HP ThinkJet using 96 dpi and a vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value not recommended.
ThinkJet_96R	HP ThinkJet using 96 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
ThinkJet_192	HP ThinkJet using 192 dpi and a vertical (portrait) orientation in which only the top part of the page can be used for plotting. This value not recommended.
ThinkJet_192R	HP ThinkJet using 192 dpi and a horizontal (landscape) orientation in which the entire page can be used for plotting, and a vertical orientation for printing.
Zeta	Zeta plotter using a single page for output (400 mm maximum plot width)
Zeta_L	Zeta plotter in a “long” orientation with an 800 mm maximum plot width.

7. Next to Used as, select whether the devices will be used as a Printer or Plotter.
8. Next to Port, select how the device is connected to the Sun computer:
   - Serial port—For serial port A, click on `/dev/term/a`. For serial port B, click on `/dev/term/b`. A list of Baud rates appears below the Port: selections, as shown in Figure 15. Select the appropriate baud rate for your device.
   - Parallel port—Click on Parallel.
   - Remote printer—Click on Remote. Two more fields appear below the Port: selections, as shown in Figure 16. For Remote host name, enter the name of the host that is connected to the printer you want to use. This host must known to

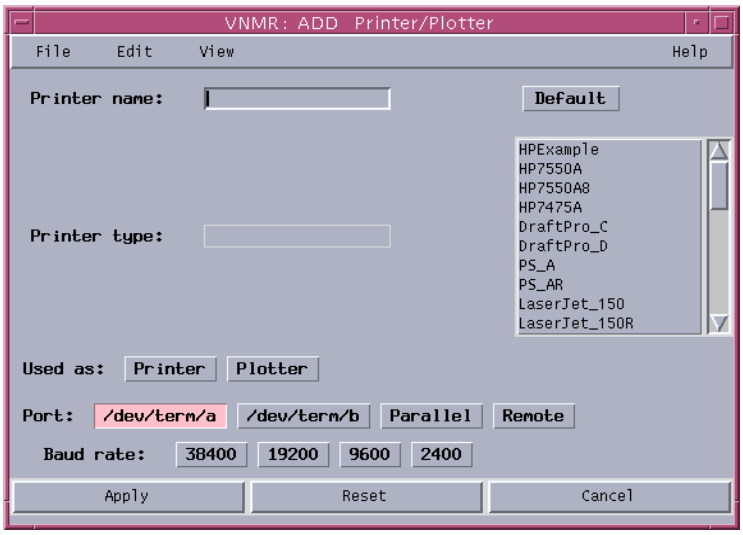


Figure 15. Baud Rate Selections for Serial Port Printers

your computer. For Remote host OS:, click on the button that represents the OS (Solaris or SunOS) of the remote host is running. If the remote host is running Solaris, IRIX, or AIX, click System V. If the remote host is running SunOS, click BSD.

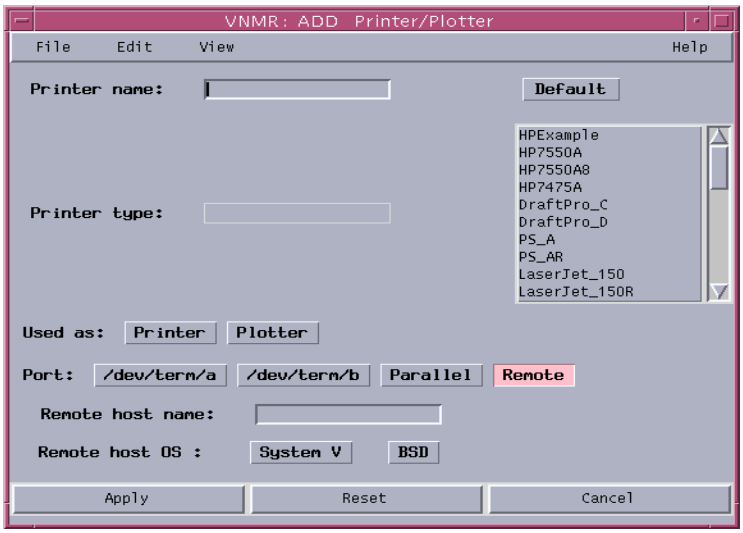


Figure 16. Baud Rate Selections for Serial Port Printers

9. After all the fields in the Add Printer/Plotter window are filled in, click on **Apply**.

   The device is added to the VNMR `devicenames` file. The device is also added to appropriate places in Solaris Print Service.

10. To add another printer or plotter, select **Add Printer** from the Edit menu, shown in Figure 17, and repeat this procedure.

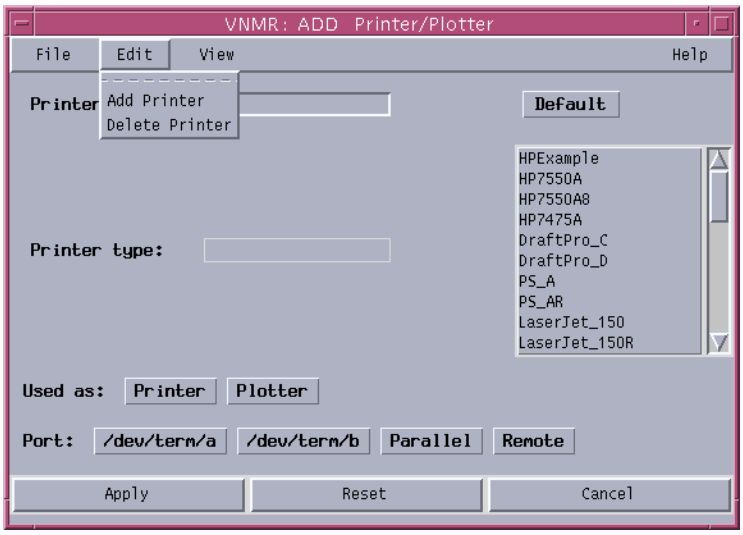


Figure 17. Add Printer/Plotter Window Edit Menu

Setting Up a Color LaserJet Printer

1. Using `adddevices`, open the ADD Printer/Plotter window shown in Figure 14 and set up a printer and plotter as PostScript (respectively, PS_A and PS_AR).
2. In the VNMR input window, type **`maxpen=8`**.
3. Type **`color`**.
4. In the **General** menu of the VNMR Color Selection window shown in Figure 18, click on the **Plot** button then choose **PostScript**.

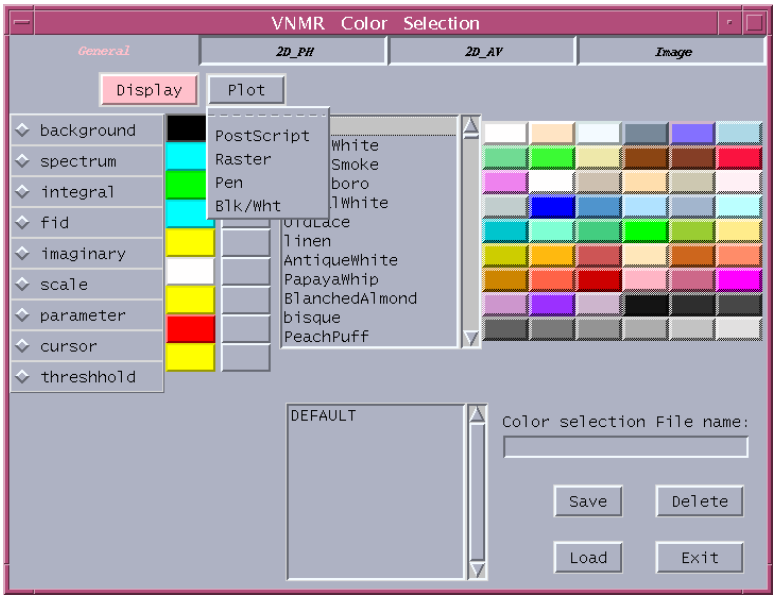


Figure 18. Color Menu

5. Choose the colors that you want.

You can select colors for contours from the **2D_PH** and **2D_AV** menus. In each menu, click on the **Plot** button and choose **PostScript**.

6. After you have selected the desired colors, enter a file name in the **Color selection File name** field.
7. Click **Save**, then **Load**.

For more information about color printing, see Chapter 9, "Display, Plotting, and Printing" in the *Getting Started* manual.

6.2 Deleting an Installed Printer or Plotter

This section describes how to delete a printer or plotter that was added using the Add Printer/Plotter window. Printers added using the Solaris AdminTool will not be deleted. To delete these printer, you need to use the Solaris AdminTool.

1. If not already open, open the Add Printer/Plotter window by becoming `root` and entering the `adddevices` command.
2. Select **Delete Printer** from the Edit menu (See Figure 17).

   The window shown in Figure 19 appears. The list on the right side of the window shows the printers and plotters set up for your system.

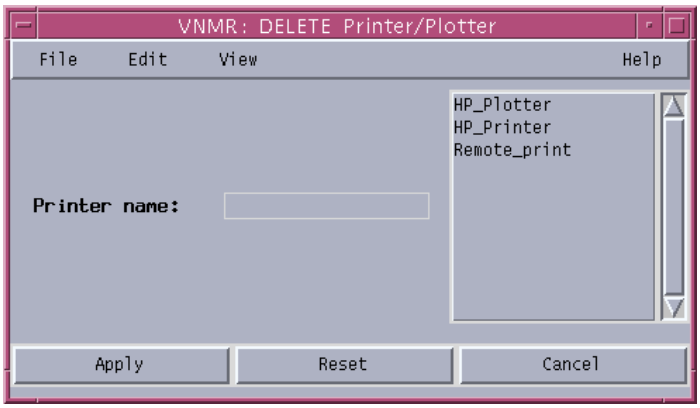


Figure 19. Delete Printer/Plotter Window

3. Double click on the printer or plotter in the list that you would like to delete.

   The name of the device you double-clicked appears next to Printer name.
4. Click on **Apply** to delete the printer or plotter.

6.3 Viewing Installed Printers and Plotters

This section describes how to determine which printers and plotters are installed on your system.

1. If not already open, open the Add Printer/Plotter window by becoming `root` and entering the `adddevices` command.
2. Click on the view menu. You will see the choices shown in Figure 20.

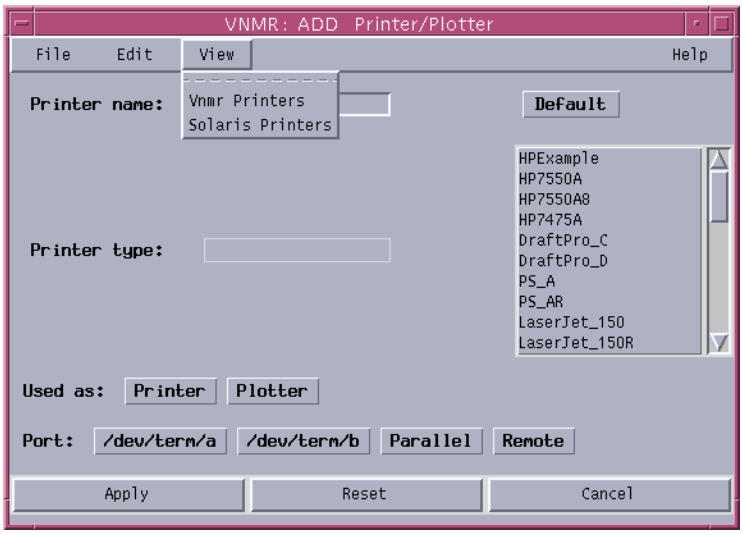


Figure 20. Add Printer/Plotter Window Edit Menu

3. To view VNMR printers, select Vnmr Printers from the View menu. A list appears similar to the example in Figure 21.

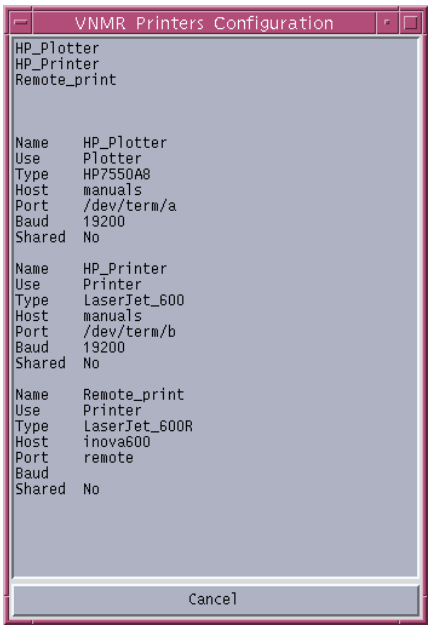


Figure 21. VNMR Printers View Window

4. To view Solaris printers, select Solaris Printers from the View menu. A window similar to the example in Figure 22 appears. This window might pause for a few seconds as Solaris obtains status information of various output devices and remote hosts.

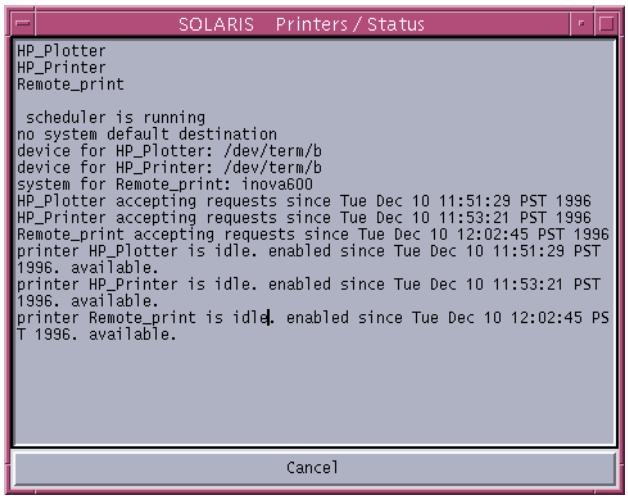


Figure 22. Solaris Printers View Window

6.4 Add Printer/Plotter Window Description

This section describes fields and buttons on the Add Printer/Plotter window (see Figure 23).

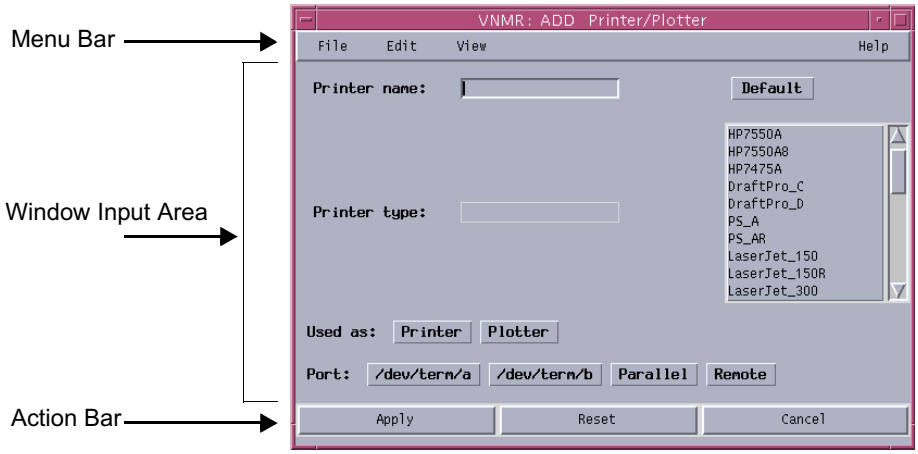


Figure 23. Add Printer/Plotter Window Description

Menu Bar

File Menu

Quit	Exits from the Add Printer/Plotter window.

Edit Menu

Add Printer	Opens a blank Add Printer/Plotter window so you can add a new printer or plotter.

Delete Printer	Opens the Delete Printer/Plotter window. This window shows a list of currently installed VNMR output devices. Double-clicking on an output device and clicking Apply deletes the device from VNMR. Devices are only deleted if they were originally added with the Add Printer/Plotter window. Devices added with Solaris AdminTool are not deleted.

View Menu

Vnmr Printers	Provides a list of output devices, along with some setup information, available to VNMR.
Solaris Printers	Provides a list of output devices, along with setup and availability information, available to Solaris Print Service.
Help	Provides information about the Add Printer/Plotter window.

Window Input Area

Printer name	Where you enter the name of the printer or plotter. For a remote printer, the name must be the name already assigned to it. Otherwise, you can enter any name that is 14 characters or less using letters, numbers, and underscores—no spaces, dashes, math operators, or special characters.
Default	Selects the default printer for VNMR. Each system should have a default printer.
Printer type	The device type you assign to your printer or plotter from the device type list. Refer to Table 17 for descriptions of the device types.
Scrolling window	Lists the VNMR device types. Refer to Table 17 for descriptions of the device types.
Used as	Selects whether the devices will be used as a printer or plotter.
Port	Selects how the device is connected to the Sun Computer: /dev/term/a is serial port A, /dev/term/b is serial port B, Parallel is the parallel port, and is for Remote is for remote printer setup.

Baud rate	Provides selections for the device baud rate. The baud rate buttons appear only when a serial port is selected.
Remote host name	Name of the remote computer attached to the printer you want to access. The remote host name field appears only when Remote is selected.
Remote host OS	OS (Solaris or SunOS) running on the remote host. Select System V for Solaris, IRIX, or AIX; select BSD for SunOS. The remote OS selection appears only when Remote is selected.

Action Bar

Apply	Sets up the printer or plotter in VNMR and Solaris.
Reset	Sets the window back to default values.
Cancel	Cancels the printer setup and reduces the Add Printer/Plotter window.

6.5 Selecting a Printer or Plotter in VNMR

To configure the system to the specific printer and/or plotter currently connected to the system, each VNMR user must define their choices for printers and plotters.

1. Click on the following with left button on the mouse:

   Main menu > **More** > **Configure** > **Select plotter**.

2. After a couple of seconds, a line of text appears in the top-most window:

   `Plotter set to....`

   If this is not the plotter that is connected currently to the system, continue clicking on the **Select plotter** button until the correct entry appears. The entries that appear in this window match the data without comments in the `devicenames` file. Once the correct entry is displayed in the window, proceed to the next step.

3. Click on **Select printer**.

4. Repeat step 2 above, replacing each mention of "plotter" with "printer."

These printer and/or plotter settings can be changed at any time by following the same steps again. The only prerequisite is that an entry for the device be a readable (without comments) entry in the `devicenames` file and that the current `printcap` file was created from that correct version of the `devicenames` file. (In fact, a "`Printer/Plotter set to` ..." entry for the device does not display in the window unless a proper entry exists in the `devicenames` file.)

Alternatively, after clicking on More and Configure, click on Show Output Devices. A list of available printers and plotters is displayed. Printers and plotters then can be set by parameter entry of the appropriate device name; for example, by typing:

```
printer='LaserJet_150'
plotter='HP7550A'.
```

Chapter 7. VnmrSGI Installation on SGI Workstations

Sections in this chapter:

This chapter describes how to install version 6.1C of VnmrSGI software on a Silicon Graphics workstation. Before you start this chapter, **IRIX version 5.2 or later must be operating on your system**.

To start installing VnmrSGI, begin at the next section, “Mounting a CD-ROM Drive.”

7.1 Mounting a CD-ROM Drive

VnmrSGI ships on a CD-ROM; therefore, you need access to a CD-ROM drive. The CD-ROM drive can be *local*, attached to the computer on which you are installing the software, or *remote*, available over the network. In either case, make sure the CD-ROM drive is correctly connected and powered up.

- For a local drive, go to the next section, “Mounting a Local CD-ROM Drive.”
- For a remote drive, go to “Mounting a Remote CD-ROM Drive” on page 82.

Mounting a Local CD-ROM Drive

This procedure describes how to mount a local CD-ROM on an SGI system.

1. Insert the CD-ROM into the drive and check if the CD-ROM is mounted by entering:

   ```
   # ls /CDROM
   ```

   If you see entries for the contents of the CD-ROM, skip to “Loading VnmrSGI” on page 84 to install the VnmrSGI software.

   If the `/CDROM` directory appears empty, either the CD-ROM has not been inserted or the drive is unable to mount the CD-ROM. Go to the next step.

2. Check the hardware communication with the CD-ROM drive by entering the `hinv` command.

   If you see an entry for the CD-ROM drive, go to step 3. If not, refer to the installation manuals provided by Silicon Graphics.

3. Enter **chkconfig** and check that objectserver and mediad are set to on.

   If the entry for objectserver is set to off, become root and enter the following commands:

   ```
   # /etc/init.d/cadmin stop
   # /etc/init.d/cadmin start
   ```

   If the entry for the mediad is set to off, become root and enter the following commands:

   ```
   # /etc/init.d/mediad stop
   # /etc/init.d/mediad start
   ```

   If you find no entry for objectserver or mediad, you might not have the correct software installed. Use the uname -a command to check which software version is installed. Use the Software Manager in the ToolChest to check that the software options dmedia* are installed. You can also enter versions long | grep dmedia. Refer to the software installation manuals from Silicon Graphics for more details.

   After the local CD-ROM is mounted, skip to "Loading VnmrSGI" on page 84.

Mounting a Remote CD-ROM Drive

If the CD-ROM drive is attached to a remote Sun or Silicon Graphics computer, you must first mount the drive locally.

Below we refer to *remotehost* as the remote host that has the CD-ROM drive attached, and we refer to the *localhost* as the local host where the VnmrSGI software is to be loaded. The procedure that needs to be followed depends on whether the *remotehost* is running IRIX, Solaris, or SunOS.

- If the remote host is running IRIX, follow the procedure below.
- If the remote host is running Solaris, skip to the procedure called "If the Remote Host is Running Solaris" on page 83.

If the Remote Host is Running IRIX

If the remote host is running IRIX, use this procedure. If the remote host is running Solaris or SunOS, skip to one of the next procedures.

1. Insert the CD-ROM in the remote host.

   If the remote host is running IRIX 5.2 or later, the CD-ROM should be automatically mounted. If the remote host is running an earlier version of IRIX, see the appropriate Silicon Graphics manuals.

2. After the CD-ROM is mounted on the remote host, mount the CD-ROM on the local host by becoming root on the local host and entering the following command:

   ```
   # mount remotehost:/CDROM /CDROM
   ```

   You are now ready to load the VnmrSGI software from the CD-ROM, as described in "Loading VnmrSGI" on page 84.

3. After you are finished with the installation, unmount the CD-ROM on the local host by entering the following command:

   ```
   # umount /CDROM
   ```

If the Remote Host is Running Solaris

If the remote host is running Solaris, use this procedure. If the remote host is running SunOS, skip to the next procedure. To mount the CD-ROM drive from the *remotehost*, you need the root password and a login ID with a password for the *remotehost*.

1. Insert the CD-ROM into the drive.
2. Log in to the *remotehost* as a normal user (not root because Solaris does not permit remote login as root) enter the user's password, and then become root on the *remotehost*:

   ```
   localhost.user1> rlogin remotehost -l user2
   Password: user2_password
   remotehost.user2> su
   Password: root_password
   ```

3. The volume manager may have already mounted the CD-ROM. To check, enter:

   ```
   # df -k
   ```

   Look for an entry that looks like this: /cdrom/vnmr_61. Remember this entry because you will use in the following steps.

   If the CD-ROM is not mounted, create a mount point for the CD-ROM drive and mount it on the *remotehost*:

   ```
   # mkdir /cdrom
   # mount -r -F hsfs /dev/sr0 /cdrom
   ```

   If you get the message that the device is busy, the CD-ROM drive is already mounted; you can proceed with the rest of this procedure. Solaris normally mounts local devices during bootup.

4. Check if the file /etc/dfs/sharetab exists:

   ```
   # cd /etc/dfs
   # ls
   dfstab  fstypes  sharetab
   ```

   Remember whether sharetab exists or not for use in the next step.

5. Enter the share command as shown below. This command enables anyone on the network to mount the CD-ROM. To restrict the systems that can mount the CD-ROM, replace ro with ro=*hostname1*:*hostname2*:*hostname3*:...

   ```
   # share -F nfs -o ro /cdrom/vnmr_61 (or /cdrom)
   ```

   At this point, sharetab definitely exists. This file tells the *remotehost* that the CD-ROM can be remotely mounted. If sharetab existed in step 4, the next two commands do not need to be executed. Otherwise, execute the following two commands as root:

   ```
   # /usr/lib/nfs/nfsd -a 16
   # /usr/lib/nfs/mountd
   ```

6. You can check the mount again with the dfmounts command:

   ```
   # dfmounts
   RESOURCE SERVER    PATHNAME      CLIENTS
    -       remotehost /cdrom/vnmr61 localhost
   ```

   The name /cdrom might also appear under PATHNAME.

7. Get back to the *localhost* by entering exit twice.

   The first exit returns you to user2 on *remotehost*; the second exit command returns you to *localhost*.

8. Mount the remote CD-ROM drive as follows:

   a. Become `root` on the *`localhost`*.

   b. Enter the following commands:

```
# cd /
# mkdir /CDROM
# mount remotehost:/cdrom/vnmr_61 /CDROM
(or remotehost:/cdrom)
```

You are now ready to load the VnmrSGI software, as described in "Loading VnmrSGI" on page 84. After VnmrSGI is loaded, you can disable the access with `unshare /CDROM` or by rebooting *`remotehost`*.

7.2 Loading VnmrSGI

This section describes how to load VnmrSGI from the CD-ROM.

1. If you are not already logged in as `root` on your SGI system, become `root`.
2. Enter the following to change to the CD-ROM:

```
# cd /CDROM
```

3. Set up the installation by entering the following:

```
# ./load.nmr
```

   After a few seconds, a window appears similar to that shown in Figure 24.

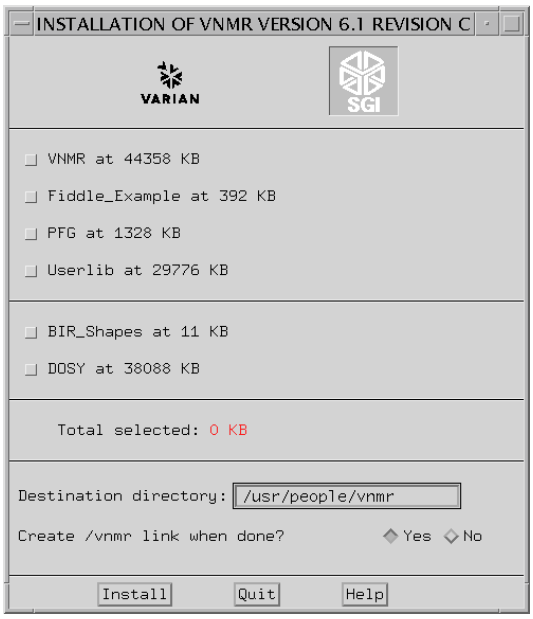


Figure 24. VnmrSGI Installation Window

4. Select the software options you want to load.

   - To select an option, click the check box next to the option. A red check mark shows that the option is selected.

     Note that some of the options are sold separately and require a password for installation. Passwords are case sensitive.

   - To see a description of each option, click on the Help button at the bottom of the screen.

   - To install options later, after VNMR is installed, follow the steps in this procedure again, selecting only the options you want to load.

     Online manuals are read using Adobe Acrobat Reader 3.0, which requires IRIX version 5.3 or later. Online manuals cannot be loaded if you are running IRIX 5.2 or earlier.

5. Enter the `Destination directory` for VNMR. The default is `/usr/people/vnmr`.
   - To use the default directory, leave the `Destination directory` field unchanged.
   - To change the directory in which VNMR is installed, replace `/usr/people/vnmr` with the directory of your choice.
   - To save the previous version of VNMR, replace `vnmr` with a different name (e.g., `vnmr6.1C`).

   If your hard disk has enough space, we strongly recommend keeping the previous VNMR version and installing the new version alongside it. If `/usr/people/vnmr` is the directory for the previous version, for example, you might set `/usr/people/vnmr6.1C` to be the new installation directory. As part of the installation, the software creates the proper link to the `vnmr6.1C` directory. Later on, you can delete the old version when it is no longer needed.

   If the destination directory does not exist, the installation program creates it. If the directory has the same name as your current VNMR directory, most of the current VNMR files are overwritten.

6. Select `Yes` or `No` to create a `/vnmr` link.
   - Select `Yes` to automatically create the link. This places a link to the directory entered in step 5 on the root (`/`) level. This link is required for the proper operation of VNMR and for creating user account and setting up acquisition.
   - Select `No` to if you do not want the link automatically created. You will then need to create this link manually before you can use the new version of VNMR. This choice allows you to continue using the old version of VNMR.

7. Select `Yes` or `No` to link to the online manuals on the CD-ROM.
   - Select `No` if you are loading online manuals onto your hard disk. This is recommended because the manuals display much faster and the CD-ROM does not have to be mounted. The online manuals require about 96 MB.
   - Select `Yes` if you are not loading the online manuals onto your hard disk, but still want to use them. A link is created to the online manuals on the CD-ROM; the CD-ROM must be mounted in order to view the online manuals. If you decide to create the link, you can still load the online manuals and remove the link by running `load.nmr` again later.

8. After the installation window is filled in, click on the Install button.

   A new window appears showing the progress of the loading process.

9. When the message `Software Load Completed` appears, click the Dismiss button.

10. If necessary, unmount or unshare any remote CD-ROM drives. Proceed to the next section to configure the `vnmr1` account.

7.3 Setting Up the vnmr1 Account

After a new version of VnmrSGI is installed, you must configure the `vnmr1` account. `vnmr1` is the account name of the NMR system administrator who has read, write, and execute access to all VnmrSGI files (access similar to `root` over UNIX files).

1. In a Shell Tool or Terminal window, enter the following:

   ```
   # cd /vnmr/bin
   # ./makeuser vnmr1
   ```

   The system displays:

   ```
   Please enter location of VNMR system directory [/vnmr]:
   ```

2. Press Return to select the default (`/vnmr`) or enter the path of your custom VnmrSGI system directory.

   The following message appears:

   ```
   vnmr1 is already a defined user
   Do you wish to update files for vnmr1 (y or n) [n]: y
   Automatically configure the vnmr1 account (y or n) [y]: y
   ```

3. Answer **yes** to the two questions by entering *y*.

   The system lists the files that are updated and the prompt reappears. Go to the next section to update or create new user accounts.

7.4 Updating or Creating New VNMR User Accounts

After a new version of VnmrSGI is installed, you must update each NMR user account as described in the next section, “Updating User Accounts.”

To create new user accounts, follow the procedure in the section “Creating New User Accounts.” The number of users on a VnmrSGI system is limited by the amount of disk space available to the system.

Updating User Accounts

1. In a Shell Tool or Terminal window, enter:

   ```
   # cd /vnmr/bin
   ```

2. Enter the `makeuser` command for each user account:

   ```
   # ./makeuser user
   ```

   where *user* is the name of the user account to be updated. The system displays:

   ```
   user is already a defined user
   Do you wish to update files for user_name (y or n) [n]: y
   Automatically configure the user_name account (y or n)
   [y]: y
   ```

3. Answer **yes** to the two questions by entering ***y***.

   The system lists the files that are updated and the prompt reappears. Repeat these steps for each user account.

Creating New User Accounts

1. In a Shell Tool or Terminal window, enter:

   ```
   # cd /vnmr/bin
   ```

2. Enter the `makeuser` command for each account you want to create:

   ```
   # ./makeuser user
   ```

   where *user* is the name of the user account to be created. The system displays:

   ```
   Please enter home directory for user_name [/usr/people]:
   ```

To each prompt, press Return to confirm the directory or enter a custom directory. The system responds:

```
user_name is now an authorized user in the nmr group.
Do you wish to update files for user_name (y or n) [n]: y
Automatically configure the user_name account (y or n)
[y]: y
```

3. Answer **yes** to the two questions by entering *y*.

   The system lists the files that are updated and the prompt reappears. Repeat these steps for each user account you want to create.

   If `user_name` is a new user, when you first log in, a notifier may appear on session management using the `.sgisession` file. You may wish to customize .sgisession for your other applications. See the message in `/usr/share/misc/sessionwarnings/sgisession.nomove.msg`.

If this procedure fails to create a new user, use the standard procedures in the Silicon Graphics manuals to create a new user (i.e., the User Manager in the System Toolchest). Then follow the above procedure to enable the user account for VnmrSGI.

This completes the loading of VnmrSGI. The following sections provide additional procedures:

- To set up the desktop for VnmrSGI, go to "Setting Up the Desktop," next.
- To set up printers and plotters, go to "Configuring Printers and Plotters" on page 89.
- To customize X Window System resources, go to "Customizing X Window System Resources" on page 91.

7.5 Setting Up the Desktop

This section describes setting up your desktop for VnmrSGI.

Starting the Toolchest

After an account is configured for VNMR, you can start the SGI Toolchest.

- To start the SGI Toolchest, hold down the right mouse button and select Toolchest.

  The Toolchest menu bar appears on the screen, which should include a menu item called `Vnmr`. Use the left mouse button to select items in the `Vnmr` menu.

The following is a list of the items in the `Vnmr` menu.

`VnmrSGI`	Start the VNMR program
`VNMR Online Help`	Start the VNMR online manuals
`VNMR Acq Status`	Start the VNMR acquisition status program
`VNMR PulseTool`	Start the VNMR PulseTool Bloch equation simulator
`VNMR Background`	Set the computer screen background to the Varian logo.

Remote acquisition can be monitored by using the VNMR Acq Status button. Place the cursor in the Acq Stat window and use the right mouse button to select Properties. In the Host Computer field, enter the name of the remote host.

Making VnmrSGI Start Automatically

IRIX 5.2 and later keeps track of desktop windows. Each window present at the time of login starts the application associated with it. To start VnmrSGI each time you log in, do the following:

1. Log in and start VnmrSGI by selecting **VnmrSGI** from the **Vnmr Toolchest** menu.
2. Set the desktop to save windows continuously (every 10 minutes and at logout—this is the default setting) as follows:
   a. From the **Toolchest,** select **Desktop** > **Customize** > **Windows**.
   b. Under **Save Windows & Desks**, select **Continuously**.
3. Leave the shell window with the title `vnmr` or `VNMR` on the desktop and log out. When you log back in, VnmrSGI automatically restarts from this window.
4. To "freeze" your desktop settings instead of updating the windows continuously, do the following:
   a. From the **Toolchest,** select **Desktop** > **Customize** > **Windows**.
   b. Under **Save Windows & Desks**, select **Explicitly**.
   c. Click **Set Home Session** to save the desktop settings.

   Any further changes to the desktop are not saved and restarted at the next login, unless you click on Set Home Session again.

When updating the desktop for the first time, you may see a warning about customization using the `.Xdefaults` file. The `.Xdefaults` file might need to be customized for your other applications. Copy the file `.Xdefaults` into a backup file, and then modify it for your other applications. If you wish, some of the contents of the file `.Xdefaults` can be copied into the file `.Sgiresources` instead. This may be done for VnmrSGI applications, but might not be valid for all of your other applications.

Making a VnmrSGI Icon

Icons and windows saved on the desktop reappear when you log back in. You can create your own executable icons by creating an executable file in a directory and double-clicking on it. An icon can be placed on the desktop for easy use. To create an icon to execute VnmrSGI, do the following:

1. Create a script text file called `RunVnmr` by opening a UNIX shell and entering the following:
   ```
   cd $home
   vi RunVnmr
   ```
2. Enter the following line in the `RunVnmr` text file:
   ```
   xterm –iconic –n VNMR –T vnmr –e Vn &
   ```
3. Save the `RunVnmr` file and exit from the editor.
4. Make the file executable by entering the following `chmod` command:
   ```
   chmod +x RunVnmr
   ```
5. Check the permissions of the `RunVnmr` file by entering `ls -l`.
6. Open an icon view by selecting **Toolchest** > **Desktop** > **Home Directory**, and then find the `RunVnmr` file.

You can now double-click on the new icon to start VnmrSGI. You might wish to drag the icon into another directory, or onto the desktop.

7.6 Configuring Printers and Plotters

VnmrSGI can produce output on many different printers and plotters. New devices can be added to the configuration after the initial installation. If several systems are connected together using Ethernet, printers or plotters on one system can be used by all the systems. Each device can be plugged into one of the serial ports on a workstation. The cable connecting the port to the device usually must be a null modem cable or have a null modem adaptor.

The `editdevices` command enables the system administrator to examine and modify the list of hardcopy devices available to VnmrSGI. Other users can examine this list, but can not make changes. When logged in as `root`, the system administrator can automatically create a new version of `/etc/printcap` when changes are made to the list of devices available to VnmrSGI. The `editdevices` program is entered from UNIX.

If you are familiar with a UNIX text editor, such as `vi` or `jot`, you can use it to edit the file `/vnmr/devicenames` instead of using the `editdevices` command.

Table 17 on page 92 lists the VNMR printer and plotter device types.

Printing or Plotting Locally or Over a Network

For system V FSD printers, you need to have the BSD `lpr` print spooling system installed. Enter the following command to see if it is installed:

```
versions long | grep lpr
```

You should see and entry containing `sw.bsdlpr`. If you do not, the BSD lpr print spooling system software must be installed first. Refer to the installation manuals provided by Silicon Graphics.

To access printers and plotters over an Ethernet network, use these steps:

1. Log in as `root` and add the remote printer host to the file `/etc/hosts.equiv`.
2. Copy the `printcap` file into the `/etc` directory:

```
# cp /etc/printcap /etc/printcap.bkup.data
# cp /vnmr/user_templates/printcap  /etc/printcap
```

This file will be modified by the `editdevices` program, as described below.

If you are attaching printers and plotters directly to the serial ports on the SGI computer, use the SGI tools (the Printer Manager in the System Toolchest) to set up these printers and plotters. Then, when using the `editdevices` program to define the printers and plotters for VnmrSGI, be sure the device name in `editdevices` matches the name used by the SGI Printer Manager.

Starting editdevices

1. Enter `editdevices` either from UNIX or from a VnmrSGI window as follows:
   - From UNIX, make sure you are logged in as `root`, and then enter the following:

```
# cd /vnmr/bin
# ./editdevices
```

- From a VnmrSGI window, first make sure the window is large enough to contain the display, and then enter the following:

  `editdevices`

  If the window is not large enough, the command aborts with the message:

  `Screen size is too small, abort!`

  To enlarge the window, move the cursor to the edge of the window and then hold down the left mouse button and drag the widow to the appropriate size. You can also click on the title bar with the right mouse button and select the Size button from the pop-up menu.

The `editdevices` command uses the environment variable `vnmrsystem` to locate the file `devicenames`. If `vnmrsystem` is not defined, `/vnmr` is used as the default value. Each entry from this file is read in and the first one is displayed. If the file contains no entries, the command displays a message stating this.

2. After `editdevices` finishes its startup, the screen should look similar to Figure 25 (some of the fields on the screen may be blank if this is the initial loading of VnmrSGI).

   If your display is unsatisfactory, most likely the value of shell variable `term` is incorrect. Check the value with the `set` command and correct it if necessary. On most systems, the correct value is `xterm`.

Using editdevices

When you use the modify or create commands, the cursor moves to the “device name” field. You enter each field (device name, Use, and so on) in turn, ending each entry by pressing the Enter key. After entering the last field, pressing Enter takes you back to the top to the device name field. Assuming you are satisfied with what you have entered, press the up-arrow key to go back to the command line, and then press the left or right arrow keys until you have highlighted the save button. Now, press Enter to save this new device. When you are finished entering devices, use the exec button to save the devices and create the new `printcap` file. For a description of the editdevices fields, refer to “editdevices Field Descriptions for VnmrSGI and VnmrI” on page 161.

Below is a step-by-step example of using `editdevices` to set up an HP plotter:

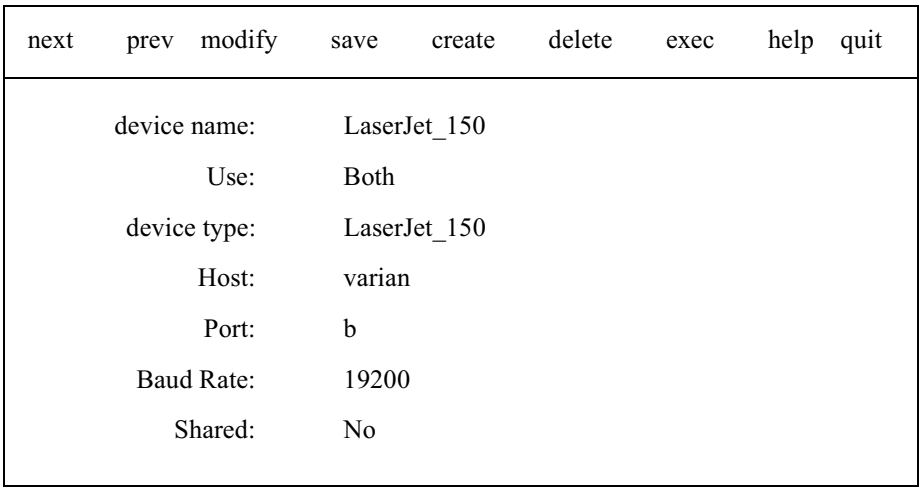


Figure 25. VnmrSGI `editdevices` Screen Display

1. If not already done, log in as `root` and start the program according to the section, "Starting editdevices" on page 89.
2. Press the right-arrow key until the create button is highlighted, and then press Enter.
3. Enter the information in each field (the information in Figure 25 is given as an example below):
   a. Enter a device name, for example `LaserJet_150`, and press Enter.
   b. Enter the use, `Both`, and press Enter.
   c. Enter the device type, `LaserJet_150`, and press Enter.
   d. Enter the host, `varian` for example, and press Enter.
   e. Enter the port, `b` for example, and press Enter.
   f. Enter the baud rate, `19200`, and press Enter.
   g. Enter the Shared attribute, `No`, and press Enter.
4. Press the up-arrow key to return to the command line. Press the left-arrow key to highlight save, and then press Enter.
5. Repeat steps 2, 3, and 4 as necessary for other output devices.
6. Press the right-arrow key until the exec button is highlighted, then press Enter. You may be asked:

   ```
   There is no "lp" name for default device, do you want to add one?
   ```

   Answer `n`. As the program exits, the message `Created Printcap` displays.
7. If a change in the `printcap` file was attempted, the success of the procedure can be verified by examining the `/etc/printcap` file:

   ```
   # more  /etc/printcap
   ```

   If the `editdevices` procedure succeeded, a section appears at the end of the `printcap` file that matches the information you put into, or left without comment (no "#" character at the beginning of the line) in the `devicenames` file. (This section is called the "Custom Section.")
8. Log out as `root`:

   ```
   # logout
   ```

   To make the printer or plotter operational in VNMR, follow the instructions in "Selecting a Printer or Plotter in VNMR" on page 80.

7.7 Customizing X Window System Resources

The app-defaults Directory

Some X Window resources for VNMR are specified in text files in the directory `/vnmr/app-defaults`. These text files set the factory-default X resource specifications (e.g., colors, fonts, geometry) of the X windows generated by the VNMR commands `acqstat`, `config`, `enter`, `pulsetool`, `status`, and `vnmr`.

Although a privileged user can change the settings in the `/vnmr/app-defaults` files, creating similar directories in a user's home directory and then setting the defaults in the user's own `app-defaults` files is a better approach. A specification set in a user's `app-defaults` files overrides any other `app-defaults` settings. To create a customized set

of X resources, users should change to their home directory and enter the following UNIX command:

```
cp -r /vnmr/app-defaults .
```

The .Xdefaults File

The `.Xdefaults` file in the *home* directory includes resources for the X Window manager. These resources can be changed by using a text editor. Table 18 lists the default resources in the .`Xdefaults` file. These resources can also be used in the file `.Sgiresources` file. An exclamation mark "`!`" as the first character in the entry means the entry is commented out. The `xlsfonts` command lists the fonts available on the server. All the color values can be found in the file `/usr/lib/x11/rgb.txt`. Some changes in the desktop environment and `.Sgiresources` may be overridden by the `.Xdefaults` file.

Use the following steps to put changes to the window resources into effect.

1. From the **Toolchest**, select **System** > **Restart Window Manager**. A popup menu appears.
2. Move the mouse pointer to select **OK** and press the left mouse button.

Note: The VnmrSGI `Acqstat`, `status`, `config`, and `enter` application window sizes are based on the size of the font for that application.

Table 18. VnmrSGI Resources in .`Xdefaults`, `app-defaults`, `Sgiresources` Files

Resource	*Default Value*	*Description*
`*Vnmr*clientDecoration:`	`-title`	Controls the "title bar" of the three VNMR windows. `-title` displays no title bar at all. `title` displays plain title bars on top of each window. `all` displays Motif-style title bars on top of each window, which is typical for most applications running on Silicon Graphics computers but not the default selected by Varian.
`*Vnmr*foreground`	`blue`	Foreground color for the VNMR windows.
`*Vnmr*background:`	`gray98`	Background color for the VNMR windows.[1]
`*Vnmr*fontList:`	`9x15`	Font for VNMR windows. The size of the font affects the initial size of the VNMR windows. [2]
`*Vnmr*pointerColor:`	`red`	Pointer cursor color within VNMR.
`*Vnmr*pointerColorBackground:`	`white`	Pointer cursor border color within VNMR.
`*Vnmr*dps*text*fontList:`	`9x15`	Font for `dps` application.
`*Vnmr*confirmer*fontList:`	`courb24`	Font for `confirmer` application.
`*dg*clientDecoration:`	`-title`	Controls the title bar for the dg window
`*PulseTool*fontList:`	`8x13`	Font for `PulseTool`.
`*Status*fontList:`	`9x15`	Font for `status` application.
`*Config*fontList:`	`6x10`	Font for `config` application.
`*Enter*fontList:`	`9x15`	Font for `enter` application.

Table 18. VnmrSGI Resources in .`Xdefaults`, `app-defaults`, `Sgiresources` Files

Resource	*Default Value*	*Description*
`*resizeBorderWidth:`	`6`	Standard SGI option.
`4Dwm*SG_autoSave:`	`True`	Standard SGI option.
`4Dwm*SG_frameOutline:`	`False`	Standard SGI option.
`4Dwm*iconPlacement:`	`right top`	Standard SGI option.
`4Dwm*positionIsFrame:`	`True`	Standard SGI option.
`*keyboardFocusPolicy:`	`explicit`	Standard SGI option.
`*startupKeyFocus:`	`True`	Standard SGI option.
*Toolchest*clientDecoration:	all	Standard SGI option.

*1. Some users may find setting *Vnmr*background to "gray" to be a pleasant choice.*
2. If this entry is commented out with the presence of a exclamation point ("!"), as is the case in the default configuration, the window manager determines the best font based on the size of the monitor.

Chapter 8. Vnmrl Installation on IBM Workstations

Sections in this chapter:

This chapter describes how to install VnmrI software on an IBM RS/6000-series workstation. Before you start this chapter, **AIX version 4.2 or later must be operating on your system**.

To start installing VnmrI, begin in the next section, “Mounting a CD-ROM.”

8.1 Mounting a CD-ROM

VnmrI ships on a CD-ROM; therefore, you need access to a CD-ROM drive. The CD-ROM drive can be *local*, attached to the computer on which you are installing the software, or *remote*, available over the network. In either case, make sure the CD-ROM drive is correctly connected and powered up.

- For a local drive, go to the next section, “Mounting a Local CD-ROM Drive.”.
- For a remote drive, skip to “Mounting a Remote CD-ROM Drive” on page 96.

Mounting a Local CD-ROM Drive

This procedure describes how to check and mount the local CD-ROM drive.

1. Insert the CD-ROM into the drive.
2. To check if the CD-ROM is mounted, enter in a shell window:
   ```
   # mount
   ```
   The system should respond similar to the following, showing that the CD-ROM is mounted at the `/cdrom` mount point.
   ```
   /dev/cd0      /cdrom cdrfs      Jun 12 15:13 ro
   ```
   Otherwise, use `smit` to mount the CD-ROM drive.
3. Enter the following to list the contents of the CD-ROM:
   ```
   ls /cdrom
   ```
   You should see entries for the contents of the CD-ROM. If the `/cdrom` directory appears empty, you must unmount and mount `/cdrom`.

After the CD-ROM is mounted, go to "Loading VnmrI" on page 99 to load VnmrI.

Mounting a Remote CD-ROM Drive

If the CD-ROM drive is attached to a remote computer, you must first mount the drive locally.

Below we refer to *remotehost* as the remote host that has the CD-ROM drive attached, and we refer to the *localhost* as the local host where the VnmrI software is to be loaded. The procedure that needs to be followed depends on whether the *remotehost* is running AIX, Solaris, or SunOS.

- If the remote host is running AIX, follow the procedure below.
- If the remote host is running Solaris, skip to the procedure "If the Remote Host is Running Solaris" on page 96.
- If the remote host is running SunOS, skip to the procedure "If the Remote Host is Running SunOS 4.1.x" on page 98.

If the Remote Host is Running AIX

If the remote host is running AIX, use this procedure. If the remote host is running Solaris or SunOS, skip to one of the next procedures.

1. Insert the CD-ROM in the remote host.
2. After the CD-ROM is mounted on the remote host, mount the CD-ROM on the local host by becoming `root` on the local host and entering the following commands:

```
# mkdir /cdrom
# mount remotehost:/cdrom /cdrom
```

You are now ready to load the VnmrI software from the CD-ROM, as described in "Loading VnmrI" on page 99.

After you are finished loading the software, unmount the CD-ROM by entering the following commands:

```
# umount /cdrom
# rmdir /cdrom
```

If the Remote Host is Running Solaris

If the remote host is running Solaris, use this procedure. If the remote host is running SunOS, skip to the next procedure.

To mount the CD-ROM drive from the *remotehost*, you need the `root` password and a login ID with a password for the *remotehost*.

1. Insert the CD-ROM into the drive.
2. Login to the *remotehost* as a normal user (not `root` because Solaris does not permit remote login as `root`) enter the user's password, and then become `root` on the *remotehost*:

```
localhost.user1> rlogin remotehost -l user2
Password: user2_password
remotehost.user2> su
Password: root_password
```

3. The volume manager may have already mounted the CD-ROM. To check, enter `df -k` and look for an entry that looks like this: `/cdrom/vnmr_61`. Remember this entry because you will use in the following steps.

   If the CD-ROM is not mounted, create a mount point for the CD-ROM drive and mount it on the *remotehost*:

   ```
   # mkdir /cdrom
   # mount -r -F hsfs /dev/sr0 /cdrom
   ```

   If you get the message that the device is busy, the CD-ROM drive is already mounted; you can proceed with the rest of this procedure. Solaris normally mounts local devices during bootup.

4. Check if the file `/etc/dfs/sharetab` exists:

   ```
   # cd /etc/dfs
   # ls
   dfstab     fstypes    sharetab
   ```

   Remember whether `sharetab` exists or not for use in the next step.

5. Enter the `share` command as shown below. This command enables anyone on the network to mount the CD-ROM. If you want to restrict the systems that can mount the CD-ROM, replace `ro` with `ro=hostname1:hostname2:hostname3:...`

   ```
   # share -F nfs -o ro /cdrom/vnmr_61 (or /cdrom)
   ```

   At this point `sharetab` exists. It tells the *remotehost* that the CD-ROM can be remotely mounted. If `sharetab` existed in step 4, the next two commands do not need to be executed. Otherwise, execute the following two commands as `root`:

   ```
   # /usr/lib/nfs/nfsd -a 16
   # /usr/lib/nfs/mountd
   ```

6. You can check the mount again with the `dfmounts` command:

   ```
   # dfmounts
   RESOURCE SERVER      PATHNAME      CLIENTS
    -       remotehost  /cdrom/vnmr61 localhost
   ```

   The name `/cdrom` might also appear under `PATHNAME`.

7. Get back to the *localhost* by entering `exit` twice.

   The first `exit` returns you to `user2` on *remotehost*; the second `exit` command returns you to *localhost*.

8. Mount the remote CD-ROM drive as follows:

   a. Become root on the *localhost*.

   b. Enter the following commands:

      ```
      # cd /
      # mkdir /cdrom
      # mount remotehost:/cdrom/vnmr_61 /cdrom
      (or remotehost:/cdrom)
      ```

You are now ready to load the VnmrI software, as described in "Loading VnmrI" on page 99. After VnmrI is loaded, you can disable the access with `unshare /CDROM` or by rebooting *remotehost*.

If the Remote Host is Running SunOS 4.1.x

If the remote host is running SunOS 4.1.x, use this procedure. If the remote host is running Solaris, use the previous procedure. To mount the CD-ROM drive from the *remotehost*, you need the root password of the *remotehost*.

1. Login to the *remotehost* as root:
   ```
   localhost.user1> rlogin remotehost -l root
   Password: root_password
   ```
2. If not already done, make a mount point for the CD-ROM drive and mount it on the *remotehost*:
   ```
   # mkdir /cdrom
   # mount -r -t hsfs /dev/sr0 /cdrom
   ```
   If you get a message that the device is busy, ignore it and proceed with the following steps.
3. Using a text editor such as vi, edit the file /etc/exports. Check if the line below exists; if it does not exist add it. For future use, note if the file /etc/exports is a new file.
   ```
   # vi /etc/exports
   /cdrom    -ro
   ```
   Access to specific systems only can be set by entering the line as
   ```
   /cdrom    -ro,access=localhost
   ```
   Save the file and exit the text editor.
4. Enable the mount of the CD-ROM by entering:
   ```
   # exportfs /cdrom
   ```
5. If the file /etc/exports in step 3 was a new file, you must either start two daemons or reboot the *remotehost*:
   ```
   # /usr/etc/nfsd 8 &
   # /usr/etc/rpc.mountd -n
   ```
6. Get back to the *localhost* typing exit twice.

   The first exit returns you to user2 on *remotehost*, the second exit command returns you to *localhost*.

   After VnmrI is loaded, you can disable access with exportfs -u /cdrom. To permanently disable access, you must remove the line in /etc/exports (or remove the file /etc/exports).
7. Mount the remote CD-ROM drive as follows:
   a. Become root on the *localhost*.
   b. Enter the following commands:
      ```
      # cd /
      # mkdir /cdrom
      # mount remotehost:/cdrom /cdrom
      ```

You are now ready to load the VnmrI software, as described in "Loading VnmrI" on page 99.

8.2 Loading Vnmrl

This section describes how to load VnmrI from the CD-ROM.

1. If you are not already logged in as `root`, become `root`.
2. Change to the mounted CD-ROM:
   `# cd /cdrom`
3. Enter the following to set up the installation:
   `# ./load.nmr`

   After a few seconds, a window appears similar to that shown in Figure 26.

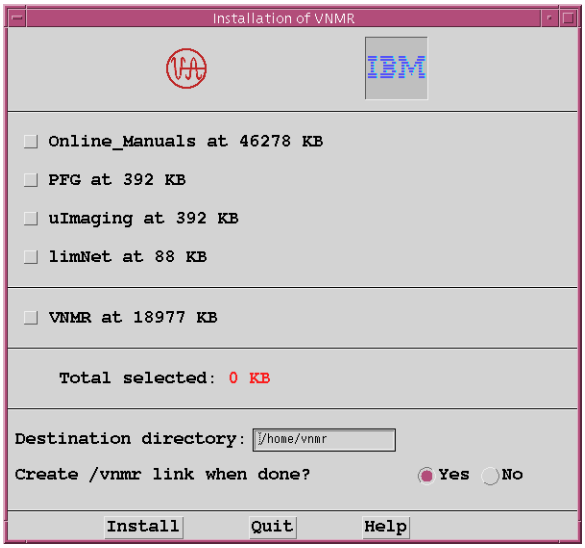


Figure 26. VnmrI Installation Window

4. Select the software options you want to load.
   - To select an option, click the check box next to the option. A red check mark shows that the option is selected.

     Note that some of the options are sold separately and require a password for installation. Passwords are case sensitive.
   - To see a description of each option, click on the Help button at the bottom of the screen.
   - To install options later, after VNMR is installed, follow the steps in this procedure again, selecting only the options you want to load.
5. Enter the `Destination directory` for VNMR. The default is `/home/vnmr`.
   - To use the default directory, leave the field unchanged.
   - To change the directory in which VNMR is installed, replace `/home/vnmr` with the directory of your choice.
   - To save the previous version of VNMR, replace `vnmr` with a different name, such as `vnmr6.1b`.

   If your hard disk has enough space, we strongly recommend keeping the previous VNMR version and installing the new version alongside it. If `/home/vnmr` is the directory for the previous version, for example, you might set `/home/vnmr6.1` to be the new installation directory. As part of the installation, the software creates the proper link to the `vnmr6.1` directory. Later, you can delete the old version when it is no longer needed.

   If the destination directory does not exist, the installation program creates it. If the directory has the same name as your current VNMR directory, most of the current VNMR files are overwritten.

6. Select `Yes` or `No` to create a `/vnmr` link.
   - Select `Yes` to automatically create the link. This places a link to the directory entered in step 5 on the root (`/`) level. This link is required for the proper operation of VNMR and for creating user account and setting up acquisition.
   - Select No to if you do not want the link automatically created. You will then need to create this link manually before you can use the new version of VNMR. This choice allows you to continue using the old version of VNMR.
7. After the installation window is filled in, click on the Install button. A new window appears showing the progress of the loading process.
8. When the message Software Load Completed appears, click the Dismiss button. If necessary, unmount or unshare the remote mounted CD-ROM drive.

Proceed to the next section to configure the vnmr1 account.

8.3 Setting Up the vnmr1 Account

After a new version of VnmrI is installed, you must configure the `vnmr1` account. `vnmr1` is the NMR system administrator that has read, write, and execute access to all VnmrI files (access similar to `root` over UNIX files).

1. In a Shell Tool or Terminal window, enter:

   ```
   # cd /vnmr/bin
   # ./makeuser vnmr1
   ```

   The system displays:

   ```
   Please enter location of VNMR system directory [/vnmr]:
   ```

2. Press Return to select the default (`/vnmr`) or enter the path of your custom VNMR system directory. The following message appears:

   ```
   vnmr1 is already a defined user
   Do you wish to update files for vnmr1 (y or n) [n]: y
   Automatically configure the vnmr1 account (y or n) [y]: y
   Configure CDE files (y or n) [y]: y
   ```

3. Answer **yes** to the first two questions by entering *y*. If CDE (Common Desktop Environment) is loaded, or will be, on your system, answer **yes** to the last question.

   The system lists the files that are updated and the prompt reappears. Go to the next section to update or create new user accounts.

8.4 Updating or Creating New VNMR User Accounts

After a new version of VnmrI is installed, you must update each VNMR user account as described in the next section. To create new user accounts, follow the procedure in "Creating New User Accounts." The number of users on a VnmrI system is limited by the disk space available to the system.

Updating User Accounts

This procedure describes how to update existing VNMR user accounts.

1. In a Shell Tool or Terminal window, enter:

```
# cd /vnmr/bin
```

2. Enter the `makeuser` command for each account:

   ```
   # ./makeuser user
   ```

   Where *user* is the name of the user account to be updated.

   ```
   user is already a defined user
   Do you wish to update files for user_name (y or n) [n]: y
   Automatically configure the user_name account (y or n)
   [y]: y
   Configure CDE files (y or n) [y]: y
   ```

3. Answer **yes** to the first two questions by entering *y*. If CDE (common desktop environment) is loaded, or will be, on your system, answer yes to the last question.

   The system lists the files that are updated and the prompt reappears. Repeat these steps for each user account.

Creating New User Accounts

This procedure describes how to create new VNMR user accounts.

1. In a Shell Tool or Terminal window, enter the following:

   ```
   # cd /vnmr/bin
   ```

2. Enter the `makeuser` command for each account you want to create:

   ```
   # ./makeuser user
   ```

   Where *user* is the name of the user account to be created.

   ```
   Please enter location of VNMR system directory [/vnmr]:
   Please enter home directory for user_name [/export/home]:
   ```

   Press Return to confirm the directory or enter a custom directory. The system responds:

   ```
   user_name is now an authorized user in the nmr group.
   Do you wish to update files for user_name (y or n) [n]: y
   Automatically configure the user_name account (y or n)
   [y]: y
   Configure CDE files (y or n) [y]: y
   ```

3. Answer **yes** to the first two questions by entering *y*. If CDE (common desktop environment) is loaded, or will be, on your system, answer yes to the last question.

   The system lists the files that are updated and the prompt reappears. Repeat these steps for each user account you want to create.

This completes the loading of VnmrI 6.1C. The following sections provide additional procedures:

- To set up printers and plotters, go to "Configuring Printers and Plotters," next.
- To customize X Window System resources, go to "Customizing X Window System Resources" on page 104.

8.5 Configuring Printers and Plotters

Using printers and plotters involves making two sets of changes. The first modifications are made using the `smit` program, which is used to define within AIX the various output devices and "queues" that are active. The second modifications are made to the file `/vnmr/devicenames`, which is used by VNMR to know what printers and plotters are

available to it, and what the characteristics of each device are. These modifications do not take effect until VnmrI is started, so if VNMR is running and you need to add or modify a printer or plotter, you should exit VNMR, make the changes, and restart VNMR.

Refer to Table 17 on page 104 for a list of VNMR printer and plotter devices types.

Configuring Remote Printers and Plotters

All of the following changes should be made as `root` from a console window:

1. If printers and plotters are connected to remote computers on the network, ensure that the appropriate host names and IP addresses are in `/etc/hosts`. This can be done either by editing `/etc/hosts` directly or by using `smit`.
2. To allow access to a remote printer or plotter, use `smit` as follows:

   Print Spooling
   Add a Print Queue
   Manage Remote Printer Subsystems
   Remote
   Standard Processing
   NAME of queue to add = lj (use name used on remote host)
   HOSTNAME of remote server = u500 (use name of remote host)
   Name of QUEUE on remote server = lj (use name used on remote host)

Starting the editdevices Program

If you are familiar with a UNIX text editor, such as `vi` or `textedit`, you can use it to edit the file `/vnmr/devicenames` instead of using the `editdevices` command.

1. Start `editdevices` from either UNIX or from a VNMR window as follows.
   - From UNIX, make sure you are logged in as `root`, and then enter:
     ```
     # cd /vnmr/bin
     # editdevices
     ```
   - From a VNMR window, first make sure the window is large enough to contain the display, and then enter:
     ```
     editdevices
     ```
     If the window is not large enough, the command aborts with the message:
     ```
     Screen size is too small, abort!
     ```
     Use the mouse to resize the window if this occurs. Move the cursor to the edge of the window until the pointer becomes a circle and press the right mouse button to pop up a menu. Choose Resize from the menu.

   The `editdevices` command uses the environment variable `vnmrsys` to locate the device names file `devicenames`. If `vnmrsys` is not defined, `/vnmr` is used. Each entry from this file is read in and the first one is displayed. If the file contains no entries, the command displays a message stating this.
2. After `editdevices` finishes its startup, the screen should look like Figure 27 (note that some fields may be blank if this is the initial loading of VNMR).

   The top line lists the commands of `editdevices`. Below this line are fields with the attributes of the current device entry. When the screen first appears, the next button displays in reverse video (white letters in a black box).

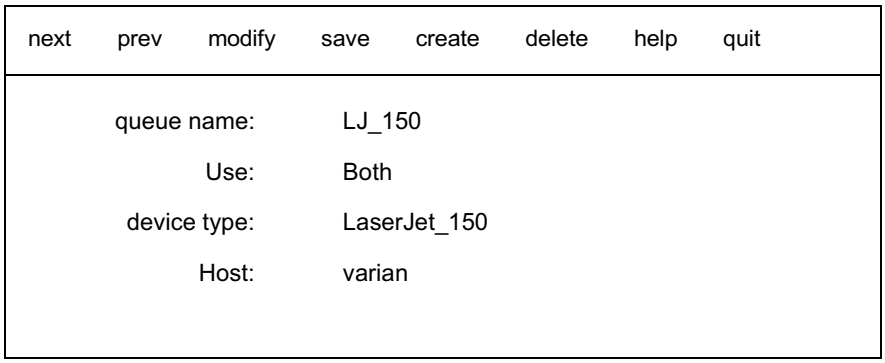


Figure 27. VnmrI `editdevices` Screen Display

If your display is unsatisfactory, most likely the value of shell variable *term* is incorrect. Check the value with the *set* command and correct it if necessary.

Using the editdevices Program

When you use the modify or create button commands, the cursor moves to the queue name field. You enter each field (queue name, Use, and so on) in turn, ending each entry by pressing the Enter key. After entering the last field, pressing Enter takes you back to the top to the "queue name" field. Assuming you are satisfied with what you have entered, press the up-arrow key to go back to the command line, and then the left or right arrow keys until you have highlighted the save button. Now, press Enter to save this new device. When you are finished entering devices, use the quit button to exit. For a description of the editdevices fields, refer to "editdevices Field Descriptions for VnmrSGI and VnmrI" on page 161.

Below is a step-by-step example of using `editdevices` to set up an HP plotter:

1. If not already done, log in as `root` and start the program according to the section, "Starting the editdevices Program" on page 102.
2. Press the right arrow key until the create button is highlighted, and then press Return.
3. Enter the information in each field:
   a. Enter a queue name, for example HP, and press Return.
   b. Enter the use, Plotter, and press Return.
   c. Enter the device type, HP7550A, and press Return.
   d. Enter the host, unity500 for example, and press Return.
4. Press the up arrow to return to the command line. Press the left arrow to highlight save, and then press Return.
5. Repeat steps 3 and 4 as necessary for other output devices.
6. Press the right arrow until the quit button is highlighted, then press Return to exit.
7. Log out as root by entering: **`logout`**

   To make the printer or plotter operational in VNMR, follow the instructions in "Selecting a Printer or Plotter in VNMR" on page 80.

8.6 Customizing X Window System Resources

The app-defaults Directory

Some X Window resources for VnmrI are specified in text files in the directory `/vnmr/app-defaults`. These text files set the factory-default X resource specifications (e.g., colors, fonts, geometry) of the X windows used by the VnmrI commands `acqstat`, `config`, `ecctool`, `enter`, `pulsetool`, `status`, and `vnmr`.

Although a privileged user can change the settings in the `/vnmr/app-defaults` files, creating similar directories in a user's home directory and then setting the defaults in the user's own `app-defaults` files is a better approach. A specification set in a user's app-defaults files overrides any other `app-defaults` settings. To create a customized set of X resources, users should change to their X resource directory and enter the following:

```
cd ~/app-defaults
cp –r /vnmr/app-defaults .
```

The .Xdefaults File

The `.Xdefaults` file in the *home* directory includes resources for the X Window manager. These resources can be changed by using a text editor. Table 19 lists the default resources in the .`Xdefaults` file. A "`!`" as the first character in the entry means the entry is commented out. The "`*`" stands for any character.

The `xlsfonts` command lists the fonts available on the server. All the color values can be found in the file `/usr/lpp/X11/lib/X11/rgb.txt`. Some changes in the desktop environment may be overridden by the `.Xdefaults` file. You can also use the `showrgb` command to list the colors available on the server.

Table 19. VnmrI Default Resources in the .`Xdefaults` File

Resource	*Default Value*	*Description*
*Vnmr*clientDecoration:	-title	Sets the VnmrI windows to be displayed with or without a title bar.
Mwm*background:	Gray	Background color of the window's border and decorations.
#Mwm*foreground:	Black	Foreground color of window's border and decoration.
#Mwm*activeForeground:	gold	Foreground color of the active window's border and decorations.
Mwm*activeBackground:	Gray	Background color of the active window's border and decorations.
#Mwm*title*activeBackground:	DarkOliveGreen	Background color of active window's title.
#Mwm*title*activeForeground:	yellow	Foreground color of active window's title.
#Mwm*activeTopShadowColor:	Gray	Color of active window's top shadow.
#Mwm*activeBottomShadowcolor:	Gray	Color of active window's bottom shadow.
#Mwm*iconPlacement:	top right	Placement of active window's icon.
Mwm*resizeBorderWidth:	6	Width of window border. Default value is 10.

Appendix A. Solaris Reference Information

Sections in this appendix:

This appendix contains reference information for Solaris that might be useful during the software installation.

A.1 Mounting a CD-ROM

VNMR ships on a CD-ROM; therefore, you will need access to a CD-ROM drive. The CD-ROM drive can be local, attached to the computer on which you are installing the software, or remote, available over the network. In either case, make sure the CD-ROM drive is correctly connected and powered up. Insert the CD in the CD-ROM drive (if necessary use a CD caddy).

Volume Manager

If you are having trouble opening the CD-ROM (`/cdrom/cdrom0`), check to see if Volume Manager is running:

```
ps -ef | grep vold
```

If you see an entry containing `/usr/sbin/vold`, Volume Manager is running.

If Volume Manager is not running, start it by becoming `root` and entering:

```
/etc/init.d/volmgt start
```

Mounting a Local CD-ROM Drive

This procedure describes how to mount the local CD-ROM drive if it is not already mounted. The CD-ROM drive is local if it is attached to the computer on which you will be loading VNMR.

1. Insert the CD-ROM into the drive.
2. Become root.
3. Check to see that the CD-ROM has been mounted by Solaris as follows:

```
# cd /
# ls cdrom
```

If the `/cdrom` directory does not exist, enter the following commands:

```
# mkdir /cdrom
# mount -r -F hsfs /dev/sr0 /cdrom
```

If the `/cdrom` directory does exist but shows no files when you enter `ls`, mount the CD-ROM as follows:

```
# mount -r -F hsfs /dev/sr0 /cdrom
```

You are now ready to install the VNMR software. For more information use the UNIX command `man` on `mount`, `umount`.

Mounting a Remote CD-ROM Drive

If the CD-ROM drive is attached to a remote Sun computer, you must first mount the drive locally.

Below we refer to *remotehost* as the remote host that has the CD-ROM drive attached, and we refer to the *localhost* as the local host where the VNMR software is to be loaded. The procedure that needs to be followed depends on whether the *remotehost* is running Solaris or SunOS.

If the Remote Host is Running Solaris

If the remote host is running Solaris, use this procedure. If the remote host is running SunOS, skip to the next procedure.

To mount the CD-ROM drive from the *remotehost,* you need the root password and a login ID with a password for the *remotehost*.

1. Insert the CD-ROM into the drive.
2. Login to the *remotehost* as a normal user (not root, Solaris does not permit remote login as root) enter the user's password, and then become root on the *remotehost:*

   ```
   localhost.user1> rlogin remotehost -l user2
   Password:
   remotehost.user2> su
   Password:
   ```

3. The volume manager may have already mounted the CD-ROM. To check, enter `df -k` and look for an entry that looks like this: `/cdrom/vnmr_61b`. This is the entry you will use in the following steps. Otherwise, create a mount point for the CD-ROM drive and mount it on the *remotehost:*

   ```
   # mkdir /cdrom
   # mount -r -F hsfs /dev/sr0 /cdrom
   ```

   If you get the message that the device is busy, the CD-ROM drive is already mounted; you can proceed with the rest of this procedure. Solaris normally mounts local devices during bootup.

4. Check if the file `/etc/dfs/sharetab` exists:

   ```
   # cd /etc/dfs
   # ls
   dfstab    fstypes    sharetab
   ```

5. Whether `sharetab` exists or not, enter the `share` command as shown below. This command enables anyone on the network to mount the CD-ROM. If you want to

restrict the systems that can mount the CD-ROM replace `ro` with `ro=hostname1:hostname2:hostname3:...`

```
# share -F nfs -o ro /cdrom/cdrom0
```

At this point `sharetab` exists. It tells the *remotehost* that the CD-ROM can be remotely mounted. If `sharetab` existed in step 3, the next two commands do not need to be executed. Otherwise, execute the following two commands as root:

```
# /usr/lib/nfs/nfsd -a 16
# /usr/lib/nfs/mountd
```

6. Double check with the `dfmounts` command:

```
# dfmounts
RESOURCE  SERVER      PATHNAME        CLIENTS
-         remotehost  /cdrom/cdrom0   localhost
```

The name `/cdrom` might also appear under `PATHNAME`.

7. Get back to the *localhost* by entering `exit` twice.

The first `exit` will make you `user2` on *remotehost,* the second `exit` command will bring you back on *localhost*.

8. Mount the remote CD-ROM drive as follows:

a. Become root on the *localhost.*

b. Enter the following commands:

```
# cd /
# mkdir /cdrom
# mount remotehost:/cdrom/cdrom0 /cdrom
(or remotehost:/cdrom)
```

You are now ready to install the VNMR software. For more information use the UNIX command *man* on *mount, umount.*

After VNMR is loaded, you can disable the access with `unshare /cdrom` or by rebooting *remotehost.* For more information use the UNIX command `man` on `dfmounts`, `dfstab`, `mountd`, `nfsd`, `share`, `sharetab`, `unshare`.

If the Remote Host is Running SunOS 4.1.x

If the remote host is running SunOS 4.1.x, use this procedure. If the remote host is running Solaris, use to the previous procedure.

To mount the CD-ROM drive from the *remotehost,* you need the root password of the *remotehost.*

1. Login to the *remotehost* as root*:*

```
localhost.user1> rlogin remotehost -l root
Password:
```

2. If not already done, make a mount point for the CD-ROM drive and mount it on the *remotehost:*

```
# mkdir /cdrom
# mount -r -t hsfs /dev/sr0 /cdrom
```

If you get a message that the device is busy, ignore it and proceed with the next steps.

3. Using a text editor such as `vi`, edit the file `/etc/exports`. Check if the line below exists, if it does not exist add it. Note if the file is a new file.

```
# vi /etc/exports
```

```
/cdrom    -ro
```

Access to specific systems only can be set by entering the line as

```
/cdrom    -ro,access=localhost
```

4. The command below enables the mount of the CD-ROM.

```
# exportfs /cdrom
```

5. If the file `/etc/exports` in step 3 was a new file, you must also start two daemons or reboot the *remotehost:*

```
# /usr/etc/nfsd 8 &
# /usr/etc/rpc.mountd -n
```

6. Get back to the *localhost* typing `exit` twice.

   The first `exit` will make you `user2` on *remotehost,* the second `exit` command will bring you back on *localhost*.

After VNMR is loaded, you can disable the access with `exportfs -u /cdrom`. To permanently disable access, you must remove the line in `/etc/exports` (or remove the file `/etc/exports`). For more information use the UNIX command `man` on `exports`, `exportfs`, `mountd`, `nfsd`, `showmount`, `xtab`.

7. Mount the remote CD-ROM drive as follows:

   a. Become root on the *localhost.*

   b. Enter the following commands:

```
# cd /
# mkdir /cdrom
# mount remotehost:/cdrom /cdrom
```

You are now ready to install the VNMR software. For more information use the UNIX command *man* on *mount, umount.*

A.2 Shutting Down the Sun Computer

Using the recommended shutdown procedure is essential for preserving data and internal housekeeping information. The Solaris operating system does not necessarily write to the disk when a program tells it to. Rather, data is kept in cache memory until Solaris determines that a write to disk is needed. Data and status information could (and will) be lost if the L1-A or STOP-A key sequences are used or if the power switch is actuated. We recommend using the `init S` command, `halt` command, or the `shutdown -y -g120 -i0` command, which, in 2 minutes, brings the computer to run level 0 where it is safe to turn off the power.

On Sun Ultra systems, the command **`init 5`** shuts down the systems power.

After you are sure you have saved the files you will need later, you are ready to shut down the system and prepare to install a new version of Solaris. The steps below offer a safe method for shutting down UNIX.

To shut down the system, you must be logged in as `root` from the “login:” prompt (and not from a shell or by entering the `su` command). If you are currently in VNMR, exit VNMR before shutting down UNIX.

1. If not already logged in as `root`, log in and enter the `root` password (if used):

```
login: root
password: root_password
```

2. Change to the `/etc` directory and remove the file `acqpresent`:
   ```
   varian# cd /etc
   varian# rm acqpresent
   ```
3. If you want to shut down immediately, enter the `shutdown` or `init S` command:
   - Solaris – **`init 0`**
   - SunOS – **`/etc/shutdown -h now`**

   If you want to set a wait period to allow other users to get off the system, enter the `shutdown` command as follows:
   - Solaris – **`/etc/shutdown -y -g`*`sec`*** **`-i0`**
   - SunOS – **`/etc/shutdown -h`** ***`hour:min`***

   SunOS—For example, the command `/etc/shutdown -h 15:30` sends messages to users warning of a shutdown and shuts down the system at 3:30 P.M.

   Solaris—For example, the command `/etc/shutdown -y -g30 -i0` sends messages to users warning of a shutdown in 30 seconds.

   At shutdown, the system forces any information on its way to the hard disk to be written out immediately, cleans up any processes that are running, and executes an orderly shutdown of the system. The process takes about 20 seconds. When the system is safely shut down, the monitor prompt "`>`" or "`ok`" appears.

A.3 Opening a Terminal Window, Shell Tool, or Command Tool

This section describes how to open a Terminal window, Shell Tool or a Command Tool. Shell and Command Tools (sometimes referred to as UNIX shells) are used to enter UNIX commands. A Terminal window is the CDE version of a Command Tool.

1. Move the mouse to a blank area on the screen, not on a window.
2. Press and hold the right mouse button. The Workspace popup window appears.
3. While holding the right mouse button, slide the cursor to the arrow next to Programs.
4. Highlight Terminal, Shell Tool, or Command Tool and release the right mouse button.

   The Shell Tool or Command Tool opens.

A.4 System Requirements

This section lists some Sun and software requirements.

Sun Requirements

Varian currently supports the Sun workstations shown in Table 20. This table also lists the versions of the Solaris operating system that are currently compatible with VNMR software. If you purchased a Sun workstation from a source other than Varian, or plan to use an existing Sun workstation, any of the Sun workstations listed here are acceptable.

The host workstations must have at least 32 megabytes (MB) of RAM, but 64 MB is recommended (CDE requires 24 MB of RAM). Solaris and VNMR require a minimum total hard disk space of 1 GB.

Table 20. Sun Workstations, Sun Architecture, and Solaris Versions

Sun System	*Sun Architecture*	*Solaris Version*
Ultra	Sun-4u	2.6 (3/98 or later), 7
SPARCstation 20	Sun-4m	2.6, 7, 8
SPARCstation 5	Sun-4m	2.6, 7, 8
SPARCstation 4	Sun-4m	2.6, 7, 8
SPARCclassic	Sun-4m	2.6, 7, 8
SPARCstation LX	Sun-4m	2.6, 7, 8
SPARCstation 10	Sun-4m	2.6, 7, 8
SPARCstation IPX	Sun-4c	2.6, 7, 8
SPARCstation IPC	Sun-4c	2.6, 7, 8
SPARCstation ELC	Sun-4c	2.6, 7, 8
SPARCstation SLC	Sun-4c	2.6, 7, 8
SPARCstation 2	Sun-4c	2.6, 7, 8
SPARCstation 1+	Sun-4c	2.6, 7, 8
SPARCstation 1	Sun-4c	2.6, 7, 8

Monitors can be any size, monochrome or color. Graphics can be “plain” or the PGX version (the GX version provides higher performance). Base level graphics work fine with VNMR. Higher performance graphics configurations (e.g., Creator, Elite) are also compatible with VNMR.

CDE Requirements

Solaris 2.6, 7, and 8 ship with CDE (Common Desktop Environment), which is a new user interface developed by Hewlett-Packard, Sun, Novell, and IBM. CDE is automatically loaded with Solaris 2.6 and later.

Disk Space	Both packages require `swap`, `/usr`, and `/opt` to be increased. 512 MB is barely big enough and `/export/home` will be quite small, with little space for users or data. A second disk can be mounted as `/export/home` instead of creating it on the first disk, which would resolve this problem.
/usr	CDE is loaded in `/usr/dt`. Therefore, extra space (about 85 MB) is needed in the `/usr` partition. Combine `/usr` and `/usr/openwin` into one partition of 275 MB. (This still does not leave any space for the answer book, which requires another 120 MB). Also, the minimum requirement for CDE is 24 MB of RAM. We have loaded it on a Sparc 2 with 24 MB but increased the `swap` space. Your memory and `swap` space should be at least 96 MB total.

NIS

Loading Solaris and VNMR while on NIS can cause problems if `vnmr1` is also in the NIS tables (also known as yellow pages). Having `vnmr1` in the NIS tables is not recommended. `vnmr1` is initially created without a password. When someone logs in for the first time as `vnmr1`, a password is requested. The computer finds the `vnmr1` entry in both the local and NIS files and drops out, never letting `vnmr1` enter a new password, or logging in. Sun has acknowledged this as a bug and fixed it with Solaris 2.6 and later. The work around for is to become `root` and enter the command **`passwd -r files vnmr1`**. You are then asked for the password (twice). From then on you can log in as `vnmr1`. Also `acqproc` is required to have a password, unless the following command is executed as root: **`passwd -d acqproc`**.

A.5 Disabling and Reenabling a X453A Thinnet Coax Ethernet Board

The X453A Thinnet Coax Ethernet board must be disabled before Solaris is installed and then reenabled after Solaris is installed. The appropriate steps in the Solaris installation procedures refer you to the procedures in this section.

Disabling the X453A Thinnet Coax Ethernet Board

To temporarily disable the X453A thinnet coax second Ethernet board, use these steps:

1. At the "`ok`" prompt enter the following commands:

   ```
   ok set-default sbus-probe-list
   ok show-sbus
   ```

   The system lists SBus slot assignments similar to the following:

   ```
   SBus slot 5 ledma le SUNW, bpp espdam esp
   SBus slot 4 aft-misc SUNW, CS4321 power management
   SBus slot 1
   SBus slot 2 le
   SBus slot 3
   Sbus slot 0
   ok
   ```

   The `le` represents the second Ethernet board. In the above example, it is installed in SBus slot 2. Write down the slot number of where your Ethernet board is installed.

2. Enter the following:

   ```
   ok printenv sbus-probe-list
   ```

   The system displays a series of digits.

   ```
   sbus-probe-list=541230
   ```

3. Enter the following command, with `xxxx` representing the series of digits with the slot number containing the second Ethernet board omitted:

   ```
   ok setenv sbus-probe-list xxxx
   ```

   For example, entering the command with the list displayed in step 4 above, it would look like `setenv sbus-probe-list 54130`, with the number "2" omitted.

4. Enter the following to initiate the changes:

   ```
   ok reset
   ```

5. Press the Stop–A (or L1-A) keys to stop the system after the Sun banner is displayed.

6. To verify that `le` is not shown next to the slot you omitted in step 6, enter:
   ```
   ok show-sbus
   ```
   To continue with our example, the following list would display:
   ```
   SBus slot 5 ledma le SUNW, bpp espdam esp
   Sbus slot 4 aft-misc SUNW, CS4321 power management
   SBus slot 1
   SBus slot 2
   SBus slot 3
   SBus slot 0
   ok
   ```
   The system now ignores the second Ethernet board while Solaris is installed. After you install Solaris, you will reenable the second Ethernet board.
7. Boot up the Solaris CD-ROM and proceed with the Solaris installation.

To Reenable the X453A Thinnet Coax Second Ethernet Board

The steps in this section describe how to reenable the second Ethernet board. Follow the instructions in this section if you have a second Ethernet board installed and disabled it as described earlier in this manual.

1. Log in as `root` and enter the `root` password you just created:
2. At the root prompt "#," enter:
   ```
   # init 0
   ```
3. When the "`ok`" prompt appears, enter:
   ```
   ok set-default sbus-probe-list
   ```
4. Enter the `printenv` command as follows:
   ```
   ok printenv sbus-probe-list
   ```
   The system displays the following with a series of digits that now include the slot number you previously eliminated:
   ```
   sbus-probe-list 541230
   ```
5. Reset and reboot the Sun computer:
   ```
   ok reset
   ```
   Press the Stop–A (or L1–A) keys to stop the system after the Sun banner is displayed. You might have to switch back to the *new* mode.
6. Enter the `show-sbus` command and verify that the `le` entry is at the SBus slot you omitted earlier:
   ```
   ok show-sbus
   SBus slot 5 ledma le SUNW, bpp espdam esp
   SBus slot 4 aft-misc SUNW, CS4321 power management
   SBus slot 1
   SBus slot 2 le
   SBus slot 3
   SBus slot 0
   ok
   ```
7. Reboot the computer:
   ```
   ok boot
   ```
8. When the system shows the `login` prompt, log in as `root`.

A.6 Collecting System and Network Information for Solaris

The installation program asks you to supply some system and network information before installation begins. You can save time by collecting this information now, before booting from the Solaris CD-ROM.

Use the preinstallation worksheet to record your system information. Each field on the worksheet is described in this section, describing what the field means and if VNMR has special requirements in that particular area.

Stand-alone, Non-networked System—If your system is not connected to a network, you need to know or create only the host name, root password, and the time zone. If your system is on a network, you need additional information that is described in this section.

Upgrade From SunOS—If your system is already running UNIX (SunOS) and you are going to install Solaris, you must get the information from your current setup as described below. Also, check your setup with your system and network administrators. Be sure you have backed up any information you wish to keep.

Host Name

A computer on a network is often called a host. Its host name is the name that uniquely identifies the computer. When choosing a host name, make sure the name you select is unique within both your local area network and, if applicable, your name service domain.

In many networks, the choice of a host name is left up to the owner of the computer (subject to the requirement of uniqueness). A host name can be up to 64 upper case or lower case characters. It is strongly recommended that you use all lower case characters in the host name because some networking software that might be used in other computers on the network could require lower case host names. Choose a name that starts with a lower case letter, followed by any combination of lower case letters, numbers or hyphens. The name, however, cannot end with a hyphen.

Finding the Host Name

Enter `uname -n` from within a C Shell to display host name information for a Sun computer.

VNMR Requirements

VNMR for UNITY*INOVA, MERCURY* series, and *GEMINI 2000* reserve the IP names `gemcon`, `inova`, `inovaauto`, and `wormhole`. Do not use these names for your host name if you are installing VNMR on one of these spectrometers. Names such as `mercury300` or `inova750`, however, can be used. We also recommend a name that is all lower-case.

Primary Network Interface

If your system has more than one Ethernet board installed, you must specify which Ethernet board (network adaptor) is the system's primary network interface.

VNMR Requirements

In order of preference, select `eri0`, `hme0` or `le0`.

IP Address

Your computer must have a unique Internet Protocol network address (IP address) if your computer is to be attached to a network.

Finding the IP Address

Ask your network or system administrator. Alternatively, you can use one of the following UNIX commands:

- If the software is being installed on a computer that is already connected to a network where NIS is present, use the command:
  `ypcat hosts | grep `uname -n``
  Note the use of back quotes (`) to enclose the last command argument.
- If your system is not connected to a network or if NIS is not present, use:
  `grep `uname -n` /etc/hosts`

VNMR Requirements

For NMR spectrometers with no second Ethernet board installed in the host computer, use 10.0.0.1 for the IP address. Otherwise, no special requirements for VNMR.

Name Service Type

The name service prompt allows choosing between NIS+, NIS, Other (DCE) or None.

Finding the Name Service Type

Ask your network administrator what name service the network uses.

VNMR Requirements

None.

Domain Name

The domain name is the name assigned to a group of computers that are administered together. All computers in the group (domain) are accessed by the same NIS or NIS+ maps.

Finding the Domain Name

Your network administrator should be able to provide the domain name. Or the domain name can be found by entering the command `domainname`.

VNMR Requirements

None.

Name Server Host Name and IP Address

If you select either NIS or NIS+ as the name service type, it is assumed that there is a different computer on the network that is the current NIS or NIS+ server. You can select how the name server will be found—allow the software to find one or specify one explicitly.

If you want to specify a name server, you must provide the host name and IP address of the server that provides the name service.

Finding the Name Server Information

On an existing computer, the server's name can be displayed by entering the command `ypwhich`. The server's IP address can be displayed by entering the command *y*`pcat hosts | grep` `` `ypwhich` ``. Again, note the use of back quotes (`).

Also, during the Solaris installation, you can elect to have the system find the name server.

VNMR Requirements

None.

Enable IPv6

Consult your system administrator.

Proxy Server (Sun Blade 100 and Blade 1000)

Finding the Proxy Server Information

Use Netscape to find this information.

1. Open Netscape and select **Edit**, then **Preferences**.
2. In the Preferences window, select **Advanced**, then **Proxies**. If you know the proxy server address, enter it in either the Manual or Automatic configuration fields; otherwise consult your system administrator about network proxies.

Subnet Mask

If your system is part of a subnet, you must provide a the subnet mask number. The subnet mask is a number used to split Internet addresses into the network (Internet) and host parts.

Finding the Subnet Mask Number

If your site does not use multiple subnets, use the default number; otherwise, consult your network administrator. For a computer connected to a network, use the following command:

```
cat /etc/netmasks
```

VNMR Requirements

None.

Setting the Time Zone

Solaris software uses world time zones and automatically adjusts the system clock for daylight-savings time if appropriate. You can set the time zone by selecting geographic region, hours offset from GMT, or by selecting the name of a file in the directory `/usr/share/zoneinfo`.

A.7 CD-ROM Boot Commands

The following is a list of CD-ROM boot commands for different Sun computers:

Sun Computer	*Boot Command*
Ultra systems	**`boot cdrom`**
SPARCstation 4, 20, 5, 10	**`boot cdrom`**
SPARCclassic, SPARCstation LX	**`boot cdrom`**
SPARCstation 2	**`boot cdrom`**
SPARCstation IPX, ELC	**`boot cdrom`**
SPARCstation 1, 1+	**`boot sd(0,6,2)`**
SPARCstation IPC, SLC	**`boot sd(0,6,2)`**

A.8 Choosing a Root Password

A root password may contain any number of characters, but only the first eight characters of the password are significant. For example, if you enter `a1b2c3d4e5f6` as your root password, then `a1b2c3d4` could also be used to gain root access.

1. Enter your root password, and then enter the same password again to confirm it, as prompted. The system continues to reboot. After the message "`The system is ready`" appears, you are prompted to log in.
2. Type `root` at the `login:` prompt and press Return.
3. Enter your root password at the prompt. The root prompt (#) appears.

A.9 Choosing a User Password

Passwords help maintain system security. You can change a password with the UNIX command `passwd`. When choosing a password, consider the following:

- Select a password at least six characters long.
- Use letters or numbers or a combination of both, but do not use special characters such as `! @ # $ % ^ & * _ + | } { : ? > < \ /`. Many of these characters have special meaning to UNIX and could cause chaos if encountered in a password.
- Use either upper or lower case, but remember that since UNIX is case-sensitive, the password must be entered each time in the same case.
- Select a password that you can easily remember. If you forget your password, you cannot log into the system, and the system does not tell you, or even `root`, the password. The `root` account can, however, reset passwords.
- If extra system security is required, you might consider adding numbers or combining two dissimilar words with no space between the words.

Appendix B. VNMR Reference Information

Sections in this appendix:

This appendix contains reference information for VNMR that might be useful during the software installation.

B.1 Creating a Backup Version of VNMR

By default, VNMR loads into the destination directory `/export/home/vnmr`. However, you can choose any partition of adequate size (up to 180 MB with online manuals) and you can name the destination directory whatever you want. As long as the soft link at the root level points to the VNMR directory, VNMR will work.

In the VNMR installation window, you will be asked to specify a destination directory for VNMR. The following will help you decide where to load VNMR. Always choose `Yes` to create the `/vnmr` link.

- If you have enough disk space in `/export/home`, enter the destination directory `/export/home/vnmr6.1`. Choose `Yes` to created the link.
- If you do not have enough disk space in `/export/home`, but you have another partition that is big enough, set the destination directory that partition. For example, enter `/data/vnmr6.1`. Choose `Yes` to created the `/vnmr` link.
- If you do not have another partition big enough for VNMR, you can `tar` the current `vnmr6.1b` directory to tape and then delete from the hard disk, or you can delete some directories from `vnmr6.1b` to make space.
- To `tar` the `vnmr.6.1b` directory to tape and then delete the directory, enter the commands below. Never back up to tape using the absolute path name.

```
# cd /export/home
# tar cvf /dev/rmt/0mb vnmr6.1b
# rm -r vnmr6.1b
```

- To delete some directories from `vnmr6.1b` to make space, enter:

```
# cd vnmr6.1b
# rm -r acrobat
```

B.2 Creating and Removing the /vnmr Link

This section describes how to create the root-level link to the VNMR system directory. By default, VNMR is loaded into `/export/home/vnmr`. However, you can load VNMR into any partition and you can name the destination directory anything you want. This link is required for creating user accounts, setting up acquisition, and running VNMR.

If you are switching between versions of VNMR, be sure to run `setacq` and `makeuser`.

Creating the /vnmr Link

If you did not create the link during the VNMR installation or if you are switching to another version of VNMR, use the following steps to create the link. The name of the link must be `/vnmr`. The directory that the link points is where VNMR is installed, which can be anywhere. You must be `root` to create the link.

1. Open a Terminal or Shell Tool window and become `root`.
2. Enter the following command as root:

   ```
   # ln -s /export/home/vnmr6.1 /vnmr
   ```

   Where */export/home/vnmr6.1* is the name of the directory that contains the VNMR software you want to use.
3. To test the link enter:

   ```
   # cd /vnmr
   # pwd
   /export/home/vnmr6.1
   ```

Removing the /vnmr Link

To create a link to a different version of VNMR, you must first remove the `/vnmr` link. Changing to the root level before removing the link is the safest way to proceed.

1. Open a Terminal or Shell Tool window and become `root`.
2. Change to the root directory:

   ```
   # cd /
   ```
3. Remove the link:

   ```
   # rm vnmr
   ```

B.3 vnmr1 Cannot Log In

A bug in the NIS system may occasionally prevent vnmr1 from logging in. If this occurs, become root or superuser and enter the following command to reset the vnmr1 password: `passwd -r files vnmr1`.

You might also have to comment out the `nis` entries next to `passwd` and `group` in the `/etc/nsswitch.conf` file (shown in Figure 28), and uncomment them after the `vnmr1` account is set up.

```
# /etc/nsswitch.nis:
#
# An example file that could be copied over to /etc/nsswitch.conf; it
# uses NIS (YP) in conjunction with files.
#
# "hosts:" and "services:" in this file are used only if the
# /etc/netconfig file has a "-" for nametoaddr_libs of "inet" transports.

# the following two lines obviate the "+" entry in /etc/passwd and /etc/
group.
passwd:     files nis
group:      files nis

# consult /etc "files" only if nis is down.
hosts:      xfn nis [NOTFOUND=return] files
networks:   nis [NOTFOUND=return] files
protocols:  nis [NOTFOUND=return] files
rpc:        nis [NOTFOUND=return] files
ethers:     nis [NOTFOUND=return] files
netmasks:   nis [NOTFOUND=return] files
bootparams: nis [NOTFOUND=return] files
publickey:  nis [NOTFOUND=return] files

netgroup:   nis

automount:  files nis
aliases:    files nis

# for efficient getservbyname() avoid nis
services:   files nis
sendmailvars:   files
```

Figure 28. `nsswitch.conf` File Contents

Find the two lines that begin with `passwd` and `group` and add comment before `nis` as follows:

Change from:

```
passwd:      files nis
group:       files nis
```

To:

```
passwd:      files #nis
group:       files #nis
```

B.4 About the makeuser Command

The `makeuser` command is used to create and update user accounts for VNMR. User names can contains the following:

- Alphabet characters, upper and lower case
- Numeric characters

- Underscore
- Dash (not as the first character in the name)

If an account already exists and the home directory is exported from a remote server, `makeuser` will update the account only if run from that account. `root` or another superuser account will not be able to update that account and will receive a message similar to the following:

```
Cannot create files in the home directory of vnmr1
Is this directory exported from a remote system using NFS?
```

To create a new VNMR user and add a home directory for the user, the `makeuser` command must be run by the `root` account. To create the necessary VNMR files and directories in the user's home directory, `root` can also use `makeuser`; however, if the user account already exists, the user can run `makeuser` to update his or her own files. In this case, the `makeuser` command calls the `updaterev` macro to update VNMR experiments and the global files.

Each user has a personal login name and each login name has its own home directory and default "dot" files (for example, `.login`, `.cshrc`). These files are executed and defines the environment in which the user operates each time the user logs on.

The files `.cshrc`, `.login` and `.dtprofile` are replaced or created by `makeuser`. It also creates `.openwin-menu` and `.xinitrc` for X as well as the VNMR user directory (`~/vnmrsys`) and its subdirectories and `global`. The new versions of these files are configured for VNMR. If this is an upgrade, you should run `makeuser` for each account. The `makeuser` command, when run as `root`, also adds new user accounts to the `passwd` and `group` files.

The `makeuser` command copies the original files, adding the date of the upgrade to the filename. `makeuser` also replaces or creates the global parameter file in the user's VNMR directory. The new version of VNMR includes new parameters and saves the current version of the user's VNMR directory for reference.

All users "own" their home directory files. That is, each user has the permission to read from, write to, and execute his or her own files. In addition, each user has read and execute access (that is, can read the contents of) to the system files (`/vnmr`).

If a user has been using ChemPack from our `userlib`, `makeuser` moves it to a backup location. VNMR 6.1 C includes the current version of ChemPack.

The number of users on a VNMR system is limited by the amount of disk space available to the system.

B.5 Logging On to VNMR

To log in to VNMR, you enter your login name and password at the UNIX login prompt (`login:`). If CDE is installed, the system provides a login screen.

For example, to log in as `vnmr1`, enter the following:

```
login: vnmr1
password: vnmr1_password
```

After the login name and password are entered VNMR starts automatically on systems running OpenWindows. On systems running CDE, you start VNMR by double-clicking the VNMR icon in the CDE control panel.

B.6 Adding Space for User Data

If the system has a second hard disk, a subdirectory on the second drive can be created for each user who wants to store data on that disk. The commands below provide an example of how you might do this. They assume you selected `/data` as the mount point for the second hard disk when the when you installed Solaris; substitute the name you choose if different:

In Solaris shell or terminal window, enter the following commands:

```
varian# cd /data
varian# mkdir vnmr1
varian# chown vnmr1 vnmr1
varian# chgrp nmr vnmr1
```

To refer to the directory, you would enter `/data/vnmr1`.

B.7 About the setacq Command

The `setacq` command establishes the link between the NMR console and VNMR on the host computer.

On UNITY*INOVA*, *MERCURY*, and *GEMINI 2000* systems, the `setacq` command catches the Ethernet address that the console is sending and creates entries in `/etc/ethers`, `/etc/hosts`, and `/etc/hostname.le?` or `/etc/hostname.hme?` as appropriate. The `setacq` command also updates the `/etc/nsswitch.conf` and `/etc/inetd.conf` to enable the use of local files and support the console. The `setacq` process may take several seconds, and finally responds with the following:

- If `setacq` repeatedly displays the message "`Console timed-out, is it connected?`", check that the Ethernet connections between the host computer and the console are connected properly and reboot the console. If they are, use Control–C to stop the messages and return to the # prompt; then run `setacq` again.
- If `setacq` fails again, follow the guidelines in Appendix C, "MERCURY and GEMINI 2000 Installation Troubleshooting," to troubleshoot the installation.

On UNITY*plus*, UNITY, and VXR-S systems, the differential box and the console must be connected to the host computer and powered on before `setacq` is run. Unless `setacq` has been executed previously, the system installs a version of the UNIX kernel suitable for use with acquisition. If you run `setacq` with either the differential box or the console not connected or not powered on, the command has no effect and you will have to reenter it after the equipment is ready.

B.8 Host-Console Connection in Multiuser Environments

Typically, the connection daemons between the host and the console are started by `root`, the UNIX system administrator, which means that any user who needs to kill or start the host-console daemons must know the `root` password. In multi-user environments, this is not practical. An alternate method of stopping and starting the host-console daemons is to install and use the special login name `acqproc`. This command starts a script (called `execkillacqproc`) that can either start or kill the host-console daemons, as follows:

- If the host-console daemons are not running, `acqproc` starts them (with `root` privileges).
- If the host-console daemons are running, `acqproc` stops them.

To install the `acqproc` login name on a system, take the following steps:

1. Log in as root and enter the `root` password (if implemented).
2. Enter **`cd /vnmr/bin`**.
3. Enter the `makesuacqproc` command:
   `# ./makesuacqproc`
   This command installs the login name `acqproc` and sets proper ownership and permission for the script `execkillacqproc`.
4. If necessary, the system displays a prompt requesting the following information:
   `Please enter location of VNMR system directory (default: /vnmr)`
   Press the **Return** to accept the default directory.
   The system prompts:
   `acqproc is now a login that will start or kill Acqproc.`
5. `Acqproc` can now be started or killed from the `login` prompt:
   `login: acqproc`
   or by any user:
   `varian> su acqproc`
   If the systems ever asks for a password, log in as `root` and enter the following:
   `# passwd -d acqproc`

B.9 Setting the Lock Frequency

It is *essential* that the lock frequency be set correctly in order to observe NMR signals.

On VXR-S and UNITY systems, the lock frequency is adjusted with a series of thumbwheel switches on the lock transmitter. As the field decays, this number must be set downward to lower the lock frequency.

On UNITY*INOVA* and UNITY*plus* systems installations that include installing a magnet, the lock frequency must be set with the following procedure after VNMR is installed. The true ^{2}H frequency is used. This procedure is not normally done again unless the magnet quenches or a large change in field strength occurs.

The following procedure applies to UNITY*INOVA* and UNITY*plus* systems and does not work on other systems, including UNITY systems.

1. Make sure the magnet is “at field.”
2. If a water sample is not in the magnet, insert it. This can be tap water.
3. Set **`sw=100000`** (`sw=500000` if UNITY*INOVA* or `sw=2000000` if wideline).
4. Set **`tn='H1' z0=z0 lockfreq='n'`**.
5. Enter **`ga`**. If you don’t see any peaks, the system is off resonance.
   By changing the value of `tof`, locate the water resonance. Make the change 50 kHz to 70 kHz for UNITY*plus* (1 MHz to 1.5 MHz for wideline) OR 200- TO 400-kHz for UNITY*INOVA* so each spectral window will overlap its neighbors.
6. Center the water resonance you located in the spectral window by placing the cursor on the line and entering **`movetof`**.
7. Acquire a spectrum with the line centered in the window.

8. Enter the command **setlockfreq**.

   setlockfreq calculates and sets the lock frequency parameter lockfreq.

You are now ready to run the VNMR config program (as described in the next section). While in the program, verify the value for the parameter lockfreq is correct (refer to the description of lockfreq in the *VNMR Command and Parameter Reference* for typical values for lockfreq).

B.10 About the config Program

The VNMR config program is the interface with the system global configuration parameter file conpar. Only one copy of conpar exists on each spectrometer, and all users of VNMR share this copy. As the software is shipped, only the VNMR system administrator vnmr1 can make changes to configuration parameters using the config program in the interactive mode (refer to the description of config in the *VNMR Command and Parameter Reference* for information about config modes, conpar parameters, and additional information about using config).

Basic Steps for Using Config

The following procedure configures VNMR for a new installation or a software upgrade.

1. Make sure the host computer is connected to the spectrometer and the system has been rebooted at least once.
2. Make sure you are logged in as vnmr1.
3. Open the VNMR CONFIG window. This can be done by one of several ways:
   - In the input window of VNMR (this window has no prompt), enter **config**.
   - With the left button of the mouse, click the following buttons:

     Main Menu > More > Configure > Hardware

   The monitor displays the VNMR CONFIG window. The window has 2 or 4 panels: command buttons in the top panel, a list of labels and their current values generally applicable to all systems in the second panel, a channels/gradients configuration menu in the third panel, and a list of labels and for UNITY-series values pertaining to rf channels (and gradients if the system contains this option) in the bottom panel.

   To select a command from the buttons at the top of the window, place the mouse cursor over the desired button, then press and release the left mouse button. The buttons have the following actions:

Exit and Save	Saves all the changes made since opening config to a new version of the conpar file, then closes config. Note that because the old version of conpar is erased, you might want to back up the conpar file before starting config.
Quit, No Save	Closes config without saving any of the changes made since opening the program
Print	Prints the current VNMR CONFIG window. Keep in mind that if you make further changes before quitting or quit config without saving the changes, the printout might not have the same values for parameters as is in the conpar file.

Help	Opens a scrollable window with information about `config`.
Use Console Data	On UNITY*INOVA*, and UNITY*plus* systems, this button makes `config` capture from the system all values except Sample Changer, Rotor Synchronization, Frequency Overrange, and the Upper Limit of decoupler power. For UNITY*INOVA* only, the Gradients entry, `config` recognizes Performa I and Performa II, but other gradients are not recognized. On *MERCURYplus* and *MERCURY-VX* systems, this button makes `config` capture from the system all values except Sample Changer and Sample Changer Serial Port. For the VT Controller entry, if VT is found, `config` does not change the value set, and if VT is not found, `config` changes the value to Not Present. On UNITY and VXR-S systems, this button captures System Type, Maximum Spectral Width, and Fifo Loop Size values only.

4. With left button of the mouse, click on the **Use Console Data** button. Wait until all values are set in the window before continuing.

5. Look through the list of labels and the current value of each in the center panel. For each label listed, take one of the following actions:

   - If the current value for a label is correct, make no change and continue to the next label.
   - If the current value for a label is incorrect, move the mouse to the right to highlight the value, then move the mouse up or down. Each possible value is highlighted as you move the mouse up or down. When the value you want is highlighted, release the mouse button. Continue to the next label.

     Some items require entering a value directly from the keyboard. You can distinguish these because the value shows in normal video instead of inverse video. There is either a small diamond or a blinking solid triangle to the right of the current value. The blinking triangle means that item has been selected; it receives keyboard input. If not selected, move the mouse cursor into the panel containing the item and position it to the right of the displayed values in the blank area. Now click the left or middle button. The right button does not work here. The grey diamond becomes a solid triangle. Now enter the number followed by a carriage return. The solid triangle becomes a diamond again, indicating the program accepted the input. If a problem occurs, a message describing what is wrong appears in the panel and the bell sounds. The default value then appears. You must delete it using the Delete key before entering a new value.

6. *MERCURY* series and GEMINI 2000, skip to step 12. For other systems, check the labels and values in the lower panel (fourth) for each rf channel in your spectrometer. Start by seeing if the words “Configure: RF Channel 1 (Obs)” already appear in the third panel channel configuration menu. If they do, skip to step 7.

   If another rf channel is listed, position the cursor on the words in the third panel, where you see the word “Configure”, and then press and hold down the right mouse button. A drop-down menu will appear. Move the mouse up or down to select RF Channel 1 (Obs), then release the mouse button.

7. Check that each label and value in the lower panel is correct for rf channel 1.

8. Now check the labels and values in the lower panel for the second rf channel in your spectrometer. Select rf channel 2 the same way you previously selected the first rf channel. Then check that each label and value in the lower panel is correct for rf channel 2. If you need help or are unsure of the meaning of a label, refer to the explanation given above.

9. If the system has a third rf channel, select it the same way you previously selected rf channel 1 and rf channel 2. Then check that each label and value in the lower panel is correct for rf channel 3. If you need help or are unsure of the meaning of a label, consult the explanations given above.

   You can only configure channel 3 if your system has the appropriate hardware and the Number of RF Channels label (in the second panel) is set to 3 or greater.

10. If the system has a fourth rf channel, select it the same way as previous channels. Then check that each label and value in the lower panel is correct for rf channel 4. If you need help or are unsure of the meaning of a label, consult the explanations above.

    You can only configure channel 4 if your system has the appropriate hardware and the Number of RF Channels label (in the second panel) is set to 4.

11. If the system has a waveform generator option with a gradient control unit, you need to check that the gradient values are correct. Position the mouse over the Configure button (in the channels/gradients configuration menu in the third panel) and click the left button until the label Gradients appears. In the lower panel, the labels X Axis, Y Axis, and Z Axis should appear. Check each label and value:

    - If the gradient is present for an axis, set the value to WFG+GCU.
    - If the PFG option is installed, set the value to Performa I or Performa II.
    - Otherwise, set the value for the axis to None.

    Up to three gradients can be present, one for each spatial axis.

12. This completes configuring the system using the VNMR CONFIG window. Click on the EXIT and SAVE button to save the data.

B.11 Giving All Users Access to Configuration Parameters

After the system administrator has run VNMR and run the `config` program for the first time, you may wish to allow all users to access these parameters. The system administrator can enable this by entering, from a UNIX window, the series of commands shown below.

```
varian# cd /vnmr
varian# chmod g+w .
varian# cd /vnmr
varian# chmod g+w conpar
```

B.12 Deleting VNMR Files to Free Disk Space

During the installation of VNMR, a large number of files are automatically loaded onto your computer, occupying disk space that may be in short supply. This section lists some of the files you may wish to delete, and the possible consequences of doing so.

All of these files are directories located in the `/vnmr` directory after a normal software installation. Either the `root` or `vnmr1` account can delete the contents of the directories. Table 21 lists the typical sizes of these directories. Actual size is system dependent.

Table 21. Typical Sizes of Some VNMR Directories

Directory	*Size (MB)*
`seqlib`	2.1
`par200, par300,` etc	2.1
`psg`	1.7
`manual`	1.0
`parlib`	1.2
`fidlib`	7.2
`psglib`	0.6
`acrobat`	150

VNMR files include the following directories:.

`seqlib` Contains the compiled pulse sequences that are used in two situations—when you start an acquisition or when you wish to display the pulse sequence graphically using the `dps` command. The first case never applies to a data station computer, but the second does so you may or may not wish to delete these files from a data station. On a host computer (the one attached to the spectrometer), you can, of course, eliminate pulse sequences that are not relevant to your system or that you never use. If you subsequently need to use the pulse sequence, you can always regenerate it from the source code listing in `psglib`, which is significantly smaller than the `seqlib` files. In other words, if you wish to use the pulse sequence in the future, and are pressed for space, eliminate the `seqlib` file but not the `psglib` file.
For SGI systems, `seqgen` only works for IRIX 5.3 and later.

`parxx0` Located in `/vnmr`, these directories (`par200`, `par300`, . . . `par750`) contain two directories each for each field strength, 200 MHz through 750 MHz. These two directories are `stdpar`, which are the "standard" parameters for different nuclei, and `tests`, which are used for system testing. On a spectrometer, you are urged to retain the `parx00` directory for your field strength (for example, `par600` for a 600-MHz system); the others can be deleted. The `stdpar` directory must be retained only if you use the `setup` command or automated `setup` menus to start routine experiments, or if the automatic sample changer is used. If you do not use these automation features, you can eliminate the individual files within the directory, but do not delete the directory itself, because the `config` program expects it to exist. On a data station, the `parx00` files are only useful if you are using the data station to set up experiments for subsequent acquisition on a spectrometer. Otherwise, all `parx00` directories can be removed.

`manual` Contains the online manual. It can be eliminated at the expense of losing the function of the VNMR `man` command; this is not recommended unless you are seriously short of space.

`parlib`	Contains parameter sets used to set up different experiments (for example, APT, DEPT, and COSY). On a data station on which you will not be setting up experiments, you can eliminate the entire directory (but remember, the automated experiment `setup` commands and menus will now not work properly). On a spectrometer, you are urged to retain the `parlib` directory, since so many macros and menus depend on these files; you can, however, certainly eliminate pulse sequences files without relevance to your system (for example, `xpolar` on a system without solids capability).
`fidlib`	Contains sample data with which you can learn to use the software. Since you will always have new people being trained, having a few files in this directory is very helpful, but certainly not essential if you have other data files accessible on the system. Sometimes, it can be helpful in reporting bugs if you can reproduce them on the `fidlib` files, to prove that they are not data-dependent bugs; however, this is not essential.
`psglib`	Contains the source code (listings) of the pulse sequences that Varian supplies with each system. Pulse sequence listings can be useful (over and above the manual) if you wish to know about some detail of the sequence; they are essential if you wish to modify the sequence. If neither of these things applies, you can eliminate the entire directory. Alternatively, you can eliminate files that are not relevant to your system, such as `xpolar` on a system without solids capability.
`acrobat`	Contains two directories (`online` and `sol`) that hold the interactive hypertext manuals. The `sol` directory contains the Adobe Acrobat Reader for Solaris, which allows you to view the hypertext manuals. The `online` directory contains the files for the manuals. If you don't plan to purchase Adobe Acrobat Exchange, which provides full text search capabilities throughout the entire manual set, you can delete the `vn_index.pdx` file and the `vn_index` directory and its contents. Also, you can go through the manuals files and delete the manuals you don't anticipate needing.

Two useful UNIX commands for deleting files are `df`, which shows you how much space is free on your disk as a whole, and `du -s -k *` for Solaris, which shows how much space each of the subdirectories or files in the current directory is occupying. On a Sun, the `du` command reports the number of 1024-byte blocks used. Together, these commands give an idea of how much you stand to gain by eliminating certain files.

To delete entire directories, you should logged in as vnmr1 and you should be "in" the `/vnmr` directory (enter `cd /vnmr`), and then use `rm –r` *`directory`*, for example, `rm –r psg`. To delete the contents of a directory, but not the directory itself, use the command `rm –r` *`directory`*`/*`, for example, `rm –r seqlib/*`.

B.13 X Window System Resources in app-defaults Directory

X Window resources (listed in Table 22) are specified in text files in the directory `/vnmr/app-defaults` directory. These text files set the factory-default X resource specifications (e.g., colors and fonts) of the X windows generated by the VNMR commands `acqi`, `config`, `ecctool`, `enter`, `pulsetool`, `qtune`, `status`, and `vnmr`.

Table 22. Default X Resources in the `.Xdefaults` and `app-defaults` Files

Resource	*Default Value*	*Description*
*Vnmr*foreground	blue	Foreground color for the VNMR windows.
*Vnmr*background:	gray90	Background color for the VNMR windows.[1]
*Vnmr*font:	10x20	Font for VNMR application.
*Vnmr*fontList:	10x20	Font for VNMR windows. The size of the font affects the initial size of the VNMR windows. [2]
*Vnmr*button*font:	9x15bold	Font for VNMR buttons.
*Vnmr*buttonfontList:	9x15bold	Font list for VNMR buttons.
*Vnmr*dps*button*font:	8x13	Font for `dps` application.
*Vnmr*dps*button*fontList:	8x13	Font for `dps` application.
*Vnmr*dps*text*font:	9x15	Font for `dps` application.
*Vnmr*dps*text*fontList:	9x15	Font for `dps` application.
*Vnmr*dps*text*color:	black	Font color for `dps` text.
*Vnmr*dps*command*color:	red	Font color for `dps` commands.
*Vnmr*dps*baseline*color:	steelblue	Color for `dps` baseline.
*Vnmr*dps*pulse*color:	green	Color for `dps` pulse.
*Vnmr*dps*highlight*color:	gray	Color for `dps` highlights.
*Vnmr*dps*second*color:	white	Color for `dps` seconds label.
*Vnmr*dps*msecond*color:	gold	Color for `dps` milliseconds label.
*Vnmr*dps*usecond*color:	gold	Color for `dps` microsecond label.
*Vnmr*fontColor:	blue	Font color for VNMR application.
*Vnmr*errorLines:	1	Number of error lines for VNMR application.
*Vnmr*confirmer*font:	courb24	Font for `Confirmer` application.
*Vnmr*confirmer*fontList:	courb24	Font list for `Confirmer` application.
*Vnmr*saveGeometry:	True	Location, size, and shape of VNMR windows.

*1. Some users may find setting *VNMR*background to "gray" to be a pleasant choice.*
2. If this entry is commented out with the presence of a exclamation point ("!"), as is the case in the default configuration, the window manager determines the best font based on the size of the monitor.

Although a privileged user can change the settings in the `/vnmr/app-defaults` files, creating similar directories in a user's home directory and then setting the defaults in the user's own `app-defaults` files is a better approach. A specification set in a user's app-defaults files overrides any other `app-defaults` settings.

To create a customized set of X resources, change to you home directory and enter the UNIX command:

```
cp -r /vnmr/app-defaults .
```

To save the current VNMR geometry (window location, size, and shape), set `saveGeometry` to `True`.

B.14 Configuring and Testing limNET™

This section describes how to configure the optional limNET software, using the following procedures:

- Start the limNET server.

- Set up the nodes file.
- Test the limNET software.

Before configuring limNET, make sure the following conditions are met:

- Sun Ethernet interface is physically connected to the network.
- Solaris is configured to be connected to a network.
- Local host is included in the `/etc/hosts` file.

Writing data from a PASCAL-based spectrometer to the Sun host requires *world write permission*, i.e., the directory on the Sun that the data is written to must have permissions set as `rwx rwx rwx`.

Starting the limNET Server

Use the following steps to start the limNET server.

1. Log in as `root`.
2. Enter the `makelimnet1` command:
   ```
   varian# cd /vnmr/limnet
   varian# ./makelimnet1
   ```
3. Enter the `limnetd` command to start the limNET server:
   ```
   varian# cd /etc
   varian# ./limnetd &
   ```
4. Enter the `eaddr` command to get the Ethernet address and verify the system environment:
   ```
   varian# /vnmr/bin/eaddr
   ```
   Typical output will look like this:
   ```
   02:60:8c:2c:b9:1f unity300
   ```
   This information will be entered into the `NODES` file *on the Gemini* (not on *GEMINI 2000*), using the command `ADDNOD`. The numbers and letters are grouped into groups of four in doing so. Using this example, the Gemini command will be `ADDNOD(U300,'0260','8C2C','B91F', 8)`. Note that the name you enter into the Gemini NODES file does *not* have to agree with the response to the `eaddr` command on the workstation, but rather must conform to the Gemini naming standards (six letters or fewer, beginning with a letter). Entering this information into the `NODES` file on the Gemini is required to be able to initiate data transfer from the Gemini, but will have no effect on the ability to initiate data transfer from the workstation.

   Note that the address displayed by the `eaddr` command and entered into the Gemini `NODES` files is the hardware address of the Ethernet board on your workstation, and has no relation whatsoever to the "IP address" that you are using if the workstation is on an Ethernet network communicating with other workstations.
5. If the automatic startup does not work, change directory to the `/etc/rc3.d` and move `S21rc.limnet` to another directory; we suggest `/vnmr/limnet`.

Using Devices Other Than le0

By default, the `limnetd` server on the UNIX host looks for `/dev/le0` or `/dev/ie0`. If another device is used (such as `/dev/hme0`, `/dev/hme1`, `/dev/le1`), you must take steps to enable this network. On a spectrometer host, run `setacq` first.

1. Log in as **root**.
2. Open a UNIX shelltool and change to the /etc directory.
   ```
   # cd /etc
   ```
3. Look for the file hostname.*device*, where *device* is hme0, hme1, or le1.

   If the file does not exist, create it, substituting hme0, hme1, or le1 for *device* and your computer's host name for *host*:
   ```
   # cat > hostname.device
       host
   ```
   Press **Control-D**.
4. Edit the file /etc/hosts file and add the following entry, substituting the host name you used in step 3 for *host*:
   ```
   10.0.0.1      host
   ```
5. Change to the /etc/rc3.d directory:
   ```
   # cd /etc/rc3.d
   ```
6. Edit the S21rc.limnet file and change the following line, substituting hme0, hme1, or le1 for *device*:
   ```
   /etc/limnet &
   ```
   to
   ```
   /etc/limnet /dev/device &
   ```
7. Reboot the computer. The limnetd server will automatically start during boot up.

Setting Up the Nodes File

Messages from the limNET server most likely mean an error has occurred.

1. Log in as vnmr1.
2. Go to each Gemini (not *GEMINI 2000*) or VXR-4000 system on which limNET has already been installed and enter EADDR to read the Ethernet address of that system (limNET uses hardware addresses, not assignable software addresses as in the IP scheme commonly used for Ethernet communication). The output of EADDR will appear like this:
   ```
   ADDRESS OF THIS NODE ON THE ETHERNET

   719  7952  14696
   001317  017420  034550
   02CF  1F10  3968
   ```
   Write down this address for the next step.
3. Use the vi text editor to create a node database file for your local area network:
   ```
   varian> vi /vnmr/nodes
   ```
   Each node entry is on a separate line, with the node elements in the following order:
   - The first element is the name of the remote node. This name can be anything you choose, and will be the name you use when you wish to initiate data transfer from the workstation.
   - The next element is its Ethernet address, in a hexadecimal format. The address should be taken from the *last* line of the EADDR output above in step 2, broken into groups of two characters and changed into lower case. For example, the last line above is 02CF 1F10 3968. This becomes 02:cf:1f:10:39:68.

- The last element is the burst size for that node, which must be a number from 1 to 8. A value of 8 is suggested.

Below are typical lines from this file:

```
vxr4000 02:cf:1f:20:03:69 8
gemini 02:cf:1f:10:39:68 8
```

Create an entry in this database file for each remote node you wish to access. Everyone who needs to use limNET must have read access to this file, but only the system manager needs to have write access.

The user interface is stored with the other user programs in the `bin` subdirectory of the VNMR system directory. The interface expects the environment variable `vnmrsystem` to be defined; this is how it locates the node database. Furthermore, the `bin` subdirectory must be included as part of your environment variable "`path`" so the interface will be found. This information is required to complete the installation, because the user interface serves to demonstrate that limNET is working.

4. The command below sets the `vnmrsystem` environment variable to `/vnmr`:

   `varian> setenv vnmrsystem /vnmr`

   This command adds `/vnmr/bin` to the search path:

   `varian> set path=($path /vnmr/bin)`

   If a `set path` command already exists in the `.login` file, insert `/vnmr/bin` in the list of paths, making sure the path name is separated by a space from the adjoining path names.

Testing the limNET Software

When a transfer is initiated from a VXR, Gemini, or XL host, the permission mode for the remote file are checked for world access. That is, to read a file from a remote UNIX system, the world must be able to read the file; to write a file to a remote UNIX system, the world must have writer permission to the directory on the remote UNIX system. In addition, writing a file does not overwrite an existing file. See the manual *Getting Started* for details.

1. With all of the installation steps completed, and assuming that the remote system is named `vxr4000` in the node database, enter the following command to verify the software installation:

   `varian# /vnmr/bin/eread osv700 vxr4000 osv700`

   After a few seconds, the computer responds with a block count of 64 followed by 88. Any other messages indicate that an error has occurred.

2. Remove the file you have just read by entering:

   `varian# rm osv700.prg`

   This finishes the limNET configuration.

B.15 Configuring NMR Imaging Systems

The imaging software must be installed before configuring an NMR system for imaging. The imaging software includes macros, menus, parameters, and executables used for imaging. Before configuring systems for imaging users should make sure they have a "Fifo Loop Size" of 1024, 2048 or greater in their configuration.

In VNMR, enter **createtable**. This macro creates your gradient table, which is used by CONFIG when selecting the system gradient coil for imaging. The gradient table location has been moved from /vnmr/gradtables to /vnmr/imaging/gradtables. Starting with VNMR 6.1A, the installation program copies these files from the previous /vnmr directory, if they exist.

Your previous gradient table(s) may be copied to the new directory instead of running the createtable macro, but the macro is recommended.

To set up the paths to the imaging macros and menus, do the following:

1. In VNMR, select **Setup > App Mode**.
2. Select **Imaging** to set up the correct path to imaging macros and menus.

Horizontal Bore Systems

1. When using new parameter sets, remember to set the following:

   ```
   alock='n'
   spin='n'
   solvent='none'
   wshim='n'
   ```

   wshim may be changed later, if desired, and the correct method string has been selected; but, initially disabling wshim is better because it defaults to shimming on the lock. The parameter sets that have these problems are usually s2pul and sh2pul. The macro sispar sets these parameter values and creates the presig parameter. This macro is called when new parameters are retrieved, as long as appmode='imaging' and the amplifiers are configured for broadband.

2. If you wish to use image.c, ssfp.c, multiecho.c, shorte.c, adiabat.c, cpmg.c, depth.c, hahn.c, pe1d.c, or satxfer.c, add the following two lines after the variable declarations:

   ```
   initparms_sis();
   griserate=trise/gradstepsz;
   ```

   All other pulse sequences use the latest versions that were installed with VNMR.

3. The PSG element vdelay(list_no,elem) that used delay lists, which were created with the element create_delay_list, is now called vdelay_list(list_no,elem).

Appendix C. *MERCURY* and *GEMINI 2000* Installation Troubleshooting

Sections in this appendix:

The instructions in this appendix may help you fix problems that may occur during system installation.

C.1 Troubleshooting the Bootup Files

When the *MERCURY* or *GEMINI 2000* console is turned on, it tries to boot up automatically from the Sun computer. In order for this to finish, several files need to be set up correctly.

Enabling the Network Interface on the Sun

The Sun computer must have its network enabled. This should be done during the installation of Solaris. Use the following steps to check whether the network is enabled.

1. Login as `root` and enter the following commands
   `varian# cat /etc/hostname.le0`
   This should show the Sun hostname. If it does, skip to step 5.
   If “`file not found`” is displayed, you must correct this as described in the following steps.
2. Change to the `/etc` directory:
   `varian# cd /etc`
3. Use the `vi` editor (or any other text editor) to create `hostname.le0`:
   `varian# vi hostname.le0`
4. Enter the hostname into this file and then save the file.
5. Edit the `hosts` file using a text editor such as `vi`.
   `varian# vi hosts`
   The `hosts` file looks like the following, where *`hostname`* is the system host name:

   ```
   #
   # Internet host table
   #
   127.0.0.1   localhost   loghost   hostname
   ```

   Edit this file to make it look like the following:

   ```
   #
   # Internet host table
   #
   ```

```
127.0.0.1        localhost   loghost
132.190.46.32     hostname
```

The IP address "*132.190.46.32*" is an example. If your Sun computer is on the net, use the IP address supplied by your network administrator. If the system is not on a local area network (attached only to the console) we recommend that you use **10.0.0.1** as the host computer address.

6. Reboot the Sun computer:
   ```
   varian# reboot
   ```
7. Verify that the eighth line during the bootup sequence is similar to the following:
   ```
   configuring network interfaces: le0
   ```
   –OR–
   ```
   configuring network interfaces: le0 le1
   ```
   If it is similar, skip to the next section to check that the console starts and attempts to communicate.

   If instead you see a message that looks similar to the following:
   ```
   ifconfig: ... :bad address
   ```
   The file `/etc/hostname.le1` exists and must be deleted using the following command:
   ```
   varian# rm /etc/hostname.le1
   ```
   Reboot the Sun computer:
   ```
   varian# reboot
   ```

Check that the Console Starts and Attempts Communication

1. Connect a terminal up to the diagnostic port of the acquisition CPU in the *MERCURY* or *GEMINI 2000* console.
2. Set the ACQ bootup switch 1 on the external connector board to on.
3. Reboot the console.

   When the acquisition CPU LED turns from red to green, the message "`Acquisition Process Started`" should appear on the diagnostics screen.

   Next, the LED on the Ethernet CPU should turn from red to green (this may take another 8 seconds) and the message "`CMC: Requesting Internet address for 02:CF:1F:xx:xx:xx`" should appear on the diagnostic screen.

   The console should get this far, with or without a Sun attached. If this does not happen, check the CPUs, the jumpers, PROMS, and bootup switch.
4. Within a few seconds, the message "`CMC: Received IP address xxx.xxx.xxx.xxx`" should appear. If it does not, return to the Sun computer and (assuming you are still `root`) enter the following command:
   ```
   varian# snoop -d lex
   ```
   where *x* is `0` if the console is connected through 10baseT (twisted pair) cable, or *x* is `1` if the console is connected with a second Ethernet card using BNC coaxial cable.

   The following should appear:
   ```
   (OLD BROADCAST) Who is 2:cf:1f:xx:xx
   ```
   If you have not executed `setacq` successfully, this same message repeats every 5 seconds. If `setacq` was successful, you should get at least 3 or 4 more lines, or many more if the bootup process completes. If you do not see this message, check the connection between the Sun computer and the console and reboot the console.

5. Exit `snoop` by pressing Control-C.

Running setacq

This procedure describes how to use the `setacq` command to establish the acquisition link between the Sun and the console.

1. Make sure the host computer is connected to the console and the console is powered up.
2. In the Shell Tool, enter the following commands:
   ```
   # cd /vnmr/bin
   # ./setacq
   ```
3. When directed to do so, reboot the console by momentarily pressing the SYST RST button on the front of the console. The system displays the prompt:
   ```
   Please select from the options below:
   1. Your SUN has one ethernet port.
   2. Your SUN has two ethernet ports.
   What is your configuration? (1 or 2) [1]:
   ```
4. Answer 1 for a system that will not be connected to a LAN. Answer 2 for a system that will be connected to a LAN.

   After several seconds, the system displays:
   ```
   NMR Console software installation complete
   ```
   If needed, the computer prompts you to reboot.
   ```
   You must reboot Solaris for these changes to take effect
   ```
5. If needed, reboot the Sun computer:
   ```
   # reboot
   ```
   If `setacq` repeatedly displays the message "`Console timed-out, is it connected?`", check that the Ethernet connections between the host computer and the console are connected properly and reboot the console. If they are, press Control–C to stop the messages and return to the # prompt; then run `setacq` again.

   If the message "`console timed-out, is it connected?`" keeps appearing, repeat the procedure in "Enabling the Network Interface on the Sun" on page 133

Manually Changing the Network Files

If `setacq` does not complete within a minute, terminate it by pressing Control-C and then reboot the Sun. While the Sun is booting up, watch the *MERCURY* or *GEMINI 2000* diagnostic screen. Further messages should appear: "`CMC: Received IP address xxx.xxx.xxx.xxx:`". If this does not appear, verify several files as described below.

1. Change directory to `/etc`:
   ```
   varian# cd /etc
   ```
2. Verify that the `ethers` file exists:
   ```
   varian# vi ethers
   ```
   It should contain the following line:
   ```
   2:cf:1f:xx:xx:xx        gemcon
   ```
   It might display `gemcon1` (which is fine), but with the Ethernet address as shown on the console diagnostics screen (in the `ethers` file there should be no leading zeros).

3. Verify the `hosts` file:
   `varian# vi hosts`
   It should contain the line:
   `10.0.0.xxx gemcon`
   It might display `gemcon1`, which is fine.
   If a second Ethernet card is in the Sun computer, verify that `hosts` file contains the following line:
   `10.0.0.yyy wormhole`
4. If your system is connected to a LAN, verify that the file `hostname.le1` exists:
   `varian# vi hostname.le1`
   It should contain the same name as in the `hosts` file, "`wormhole.`" If any of this is not correct, you must correct it using a text editor such as `vi`.
5. Edit the file `inetd.conf`:
   `varian# vi inetd.conf`
   Look for the line "`tftp dgram udp wait root /usr/sbin/in.tftpd in.tftpd -s /tftpboot`." Verify that "`tftp`" is the first word on the line and is NOT preceded by a # character. Edit the file if necessary.
6. If the system is on a local area network, verify the file `nsswitch.conf`:
   `varian# vi nsswitch.conf`
   Check that the following two lines are correct:
   ```
   hosts:          nis [NOTFOUND=continue] files
   ethers:         nis [NOTFOUND=continue] files
   ```
   Verify that it says "`continue`" and not "`return`." Change if necessary. If it just says "`nis files`", leave it.
7. Verify that the directory `/tftpboot` exists:
   `varian# ls -l /tftpboot`
   If it does not exist, enter the following:
   `varian# cd /; mkdir tftpboot`
   If `/tftpboot` exists, you should have a `rarpd` running after a reboot.
8. Enter **`ps -ef | grep rarp`**.
   At least one line of output should display. If not, and the `ethers` and `inetd.conf` files were fine, reboot the Sun.

Completing the Console Bootup

If any fixes are made, reboot the Sun. If all this was fine, the diagnostics screen should show the message "`CMC: Received IP address 160.0.160.xxx`" followed by "`CMC: Requesting bootup file.`" This should then be followed by the message "`CMC: Bootup complete, Requesting apmon/autshm`," and a series of dots (one for every packet transferred, a blank between the dots for the `apmon` file and the `autshm` file).

1. If the messages do not appear, enter **`ls -l /tftpboot`** and verify that the directory `/tftpboot` contains the files `lnc`, `apmon`, and `autshm`, and that the permission mode is `rw-rw-rw-` for all three.
   If not correct, copy the files from `/vnmr/acq` by entering the following, where *`filename`* is `apmon`, `autshm`, or `lnc`:
   `varian# cd /tftpboot; cp /vnmr/acq/filename .`

2. Then change permissions by entering the following:
   ```
   varian# chmod 666 apmon autshm lnc
   ```

Bootup Completes, But No Diagnostics

After these messages, all the files have been received from the Sun, and the diagnostic screen should be cleared and such information as memory size, Acode location, Data location, NT=xxx, and CT=yyy should appear.

If the screen does not clear, most likely the output board is not responding. Also possible is that the serial port is not connected to the spinner if the hardware is installed.

If a BUSSTRAP is displayed, look for the following numbers, and check the corresponding board:

```
FF0500        OUTPUT BOARD
FF0400        23 kHz ADC (HC systems only)
FF0800        ADC/STM (BB systems only)
A00000        ADC/STM (BB systems only)
```

If all of the files check out, and the system still does not boot up, call your local service representative.

C.2 Notes on IP Name Resolution

The Acqproc and acqi programs use the interface between the Sun host computer and the console. For *MERCURY* and *GEMINI 2000* systems, this is over Ethernet, using standard IP protocols. Therefore, the console must have an IP name and an IP number. Actually, when only one is known, the program can look up the other.

The setacq program creates an IP name and an IP number for both the console and the second Ethernet board in the Sun. setacq starts with the name wormhole for the second Ethernet board in the Sun and with the name gemcon for the console. It also tries to assign IP numbers. Then setacq assigns 10.0.0.1.

In most cases, the first choice should be the one used and the total list would be similar to the following:

```
Console name:       gemcon
Console IP#:        10.0.0.21
2nd Ethernet name:  subspace
2nd Ethernet IP#:   10.0.0.1
```

The above information is then written to a file called /vnmr/acq/**console_name**. If you completed the procedures in Section C.1, you must create the *console_name* file by hand; otherwise, neither Acqproc nor acqi will run. setacq updates the files /etc/hosts and the /etc/ethers, even if the system is on the NIS.

In addition to these files, setacq updates the /etc/nsswitch.conf file, a file available only with Solaris. In this file, you can specify how to search for information in the file. If the system does not use NIS, everything is in the /etc files and nothing is updated. If the system uses NIS, the following two entries

```
hosts:        nis [NOTFOUND=return] files
ethers:       nis [NOTFOUND=return] files
```

are changed to:

```
hosts:        nis files
ethers:       nis files
```

The effect is that when NIS answers `NOTFOUND`, the search continues in the local files ("`return`" stops the search).

`setacq` also fixes `/etc/inetd.conf` and creates `/etc/hostname.le1`.

Both `Acqproc` and `acqi` look in `/vnmr/acq/`*`console_name`* (only the first line) for the console name. This is the only information used. The rest of the information is retrieved from internal UNIX tables.

C.3 lockfreq and H2BO

When upgrading a Gemini to a *GEMINI 2000* system, you have to convert the old `H2BO` parameter to `lockfreq`. `lockfreq` is the true deuterium resonance frequency, whereas `H2BO` is an offset. The table below may help in converting one to the other.

^1H *frequency*	`lockfreq`=	*Typical* `lockfreq`	*Typical* `H2BO`
200	30.0MHz + `H2BO`	30.697612	697512
300	45.4MHz + `H2BO`	46.062489	662489
400	60.8MHz + `H2BO`	61.463000	663000

Appendix D. UNITY*INOVA*, *MERCURYplus*, and *MERCURY-VX* Acquisition CPU Initialize

If a new Acquisition CPU is installed in the console, it may be necessary to initialize the NVRAM information on this CPU. The procedure in this appendix describes how to enter the information into the NVRAM using VxWorks.

1. Attach a terminal (or SUN window) according to one of the following:
   - For UNITY*INOVA* – attach a terminal (or SUN window) to the diagnostic port on the back of the console. This system comes with a Motorola 162 or Motorola PPC.
   - For *MERCURYplus* and *MERCURY-VX* – attach a terminal (or SUN window) to port 1 (Console) on the Acquisition CPU. You can temporarily use the spinner cable if you add a null modem.
2. Reset the Acquisition CPU and press any key during the count down to prevent the CPU from booting up. This brings the Acquisition CPU into VxWorks.

   The `[vxWorks]:` prompt appears.
3. Enter **`c`** and press Return to enter the VxWorks *command mode*:

   `[vxWorks]: c`

   VxWorks responds with a "`prompt: value`" for each option. The list below shows the values, in bold, that must be entered. Table 23 lists the entry and action for each prompt.

Table 23. VxWorks Prompts, Values, and Descriptions

Prompt	*Motorola 162*	*Motorola PPC*	*Description*
[vxWorks]:	**c**	**c**	Type the c
boot device:	**ei**	**dc**	Set to ei / dc
processor number:	**0**	**0**	Set to zero
host name:	**.**	**.**	Clear
file name:	**.**	**/tftpboot/vxBoot/vxWorksPPC**	Clear or Set
inet on ethernet (e):	**.**	**.**	Clear
inet on backplane (b):	**.**	**.**	Clear
host init (h):	**.**	**.**	Clear
gateway inet (g):	**.**	**.**	Clear
user:	**vnmr1**	**vnmr1**	Set to vnmr1
ftp passwd (pw) (blank—use rsh):	**.**	**.**	Clear
flags:	**0xca**	**0xca**	Set to 0xca
target name (tn):	**.**	**.**	Clear
startup scripts (s):	**/vnmr/acq/vwScript**	**/vnmr/acq/vwScriptPPC**	Script name
other:			Clear

4. Take one of the following actions for each prompt:
   - If the value in the prompt is correct, press Return.
   - If the value in the prompt is incorrect, enter the correct value as shown below in bold.
   - If the value in the prompt is to be blank, type period (.) and press Return to clear the value.

```
[vxWorks]: c
boot device: ei (dc for PPC)
processor number: 0
host name:
file name: (/tftpboot/vxBoot/vxWorksPPC for PPC)
inet on ethernet (e):
inet on backplane (b):
host init (h):
gateway inet (g):
user: vnmr1
ftp passwd (pw) (blank—use rsh):
Flags:0xca
target name (tn):
startup scripts (s): /vnmr/acq/vwScript
(/vnmr/acq/vwScriptPPC for PPC)
other:
```

5. To restart the bootup process, enter:

```
[vxWorks]: @
```

6. Open a Sun shell window and as `root`, enter the following command:

```
# /vnmr/bin/setacq
```

   Answer the questions as they appear.

When the small kernel is used, startup script(s) can be left blank. It must be set when `vxboot.big` is used; it is ignored when `vxboot.small` is used (our default).

Appendix E. Hardware Reference Information

Sections in this appendix:

This appendix contains additional information for hardware, including Sun computers, spectrometer types, HAL board, SCSI devices, and internal hard disks, that might be useful during software installation.

E.1 Identifying HAL Board Compatibility

On UNITY and VXR-S systems with the Sun-4m or Sun-4c (except SPARCstation 1 and 1+) as the host computer, the system must have a DMA (direct memory access) compatible HAL (Host-to-Acquisition Link) board for proper operation (UNITY*plus* systems already have a DMA-compatible HAL board).

This board is identified by a “DMA” sticker on the center of the baffle and the part number 00-968292-02 on the edge of the board beside the baffle. The “-02” will be handwritten if the HAL board was upgraded in the field. Contact Varian service before installing any software if you do not have the proper HAL board. UNITY*INOVA* and *GEMINI 2000* systems do not use HAL.

E.2 Sun Workstations Connectors

The next series of illustrations show the back panels of the support Sun workstations:

- Figure 29 shows the Ultra30
- Figure 30 shows the Ultra 1
- Figure 31 shows the SPARCstation 4
- Figure 32 shows the SPARCstation 20
- Figure 33 shows the SPARCstation 5
- Figure 34 shows the SPARCstation 10
- Figure 35 shows the SPARCclassic.

Note that on an IPC or IPX using a color monitor, connect the monitor to connector labeled SBus Slot (not to the connector labeled with the video icon—this connector is used with monochrome monitors).

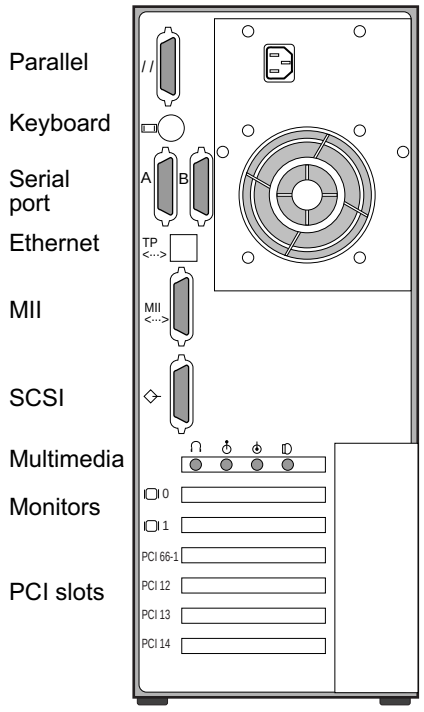


Figure 29. Ultra 30 Back View, Showing Connectors

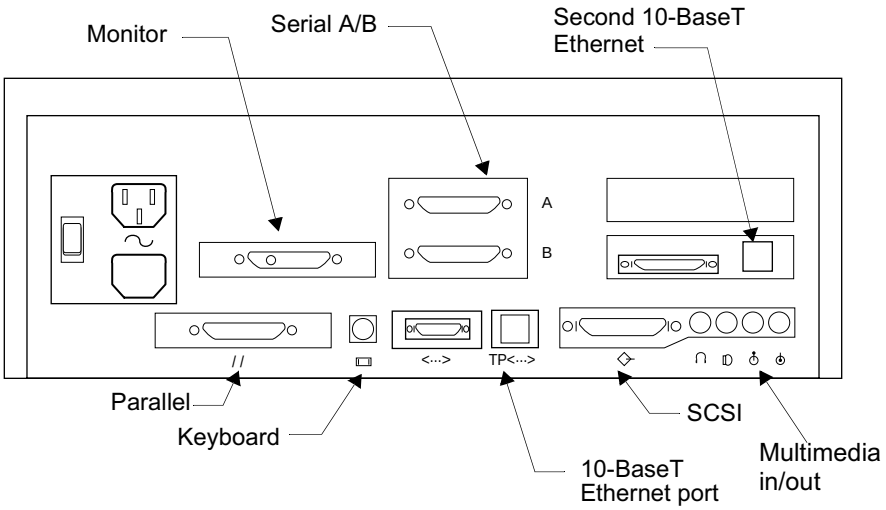


Figure 30. Ultra 1 Back View, Showing Connectors

Peripherals purchased for the SPARCstation 10 from Varian are supplied with a parallel cable that connects the SPARCstation 10 parallel port, shown in Figure 34.

If you have a SPARCstation 10 and you want to connect it to a thick or thin Ethernet network, connect the Varian-supplied splitter cable to the Audio/AUI port, shown in Figure 34. Connect your Ethernet cable (or transceiver box) to the Ethernet cable on the splitter cable.

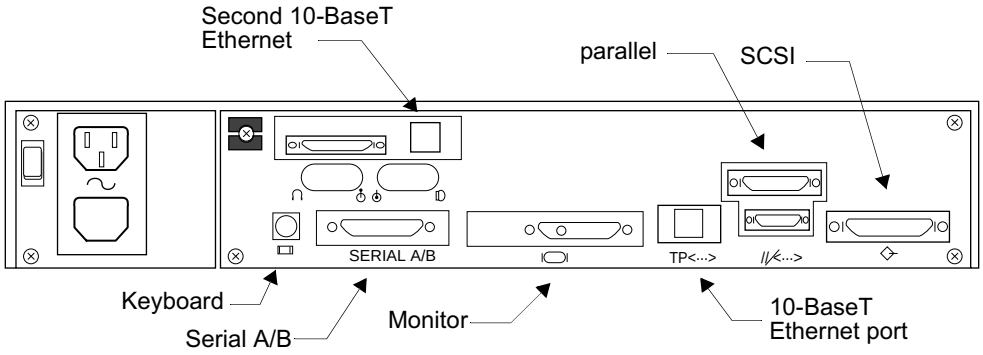


Figure 31. SPARCstation 4, Back View, Showing Connectors

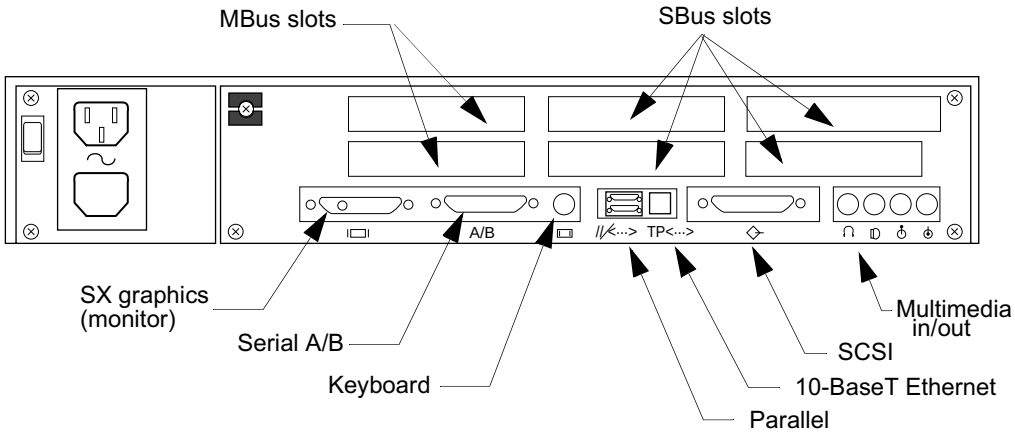


Figure 32. SPARCstation 20, Back View, Showing Connectors

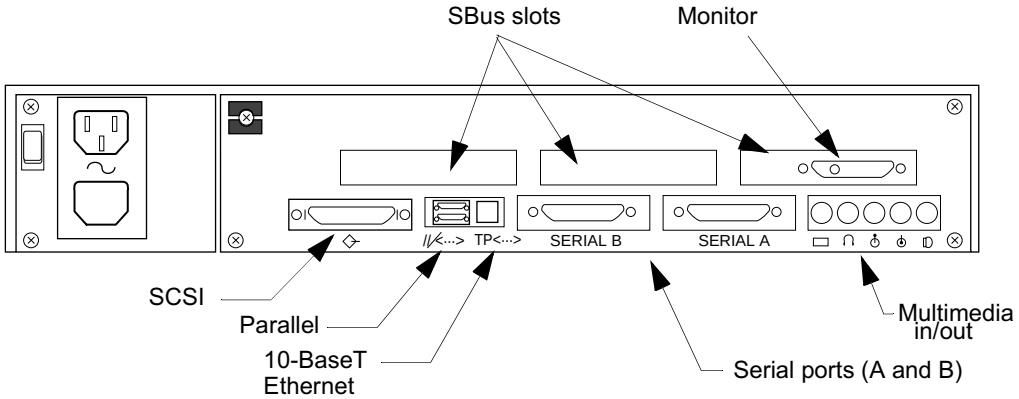


Figure 33. SPARCstation 5, Back View, Showing Connectors

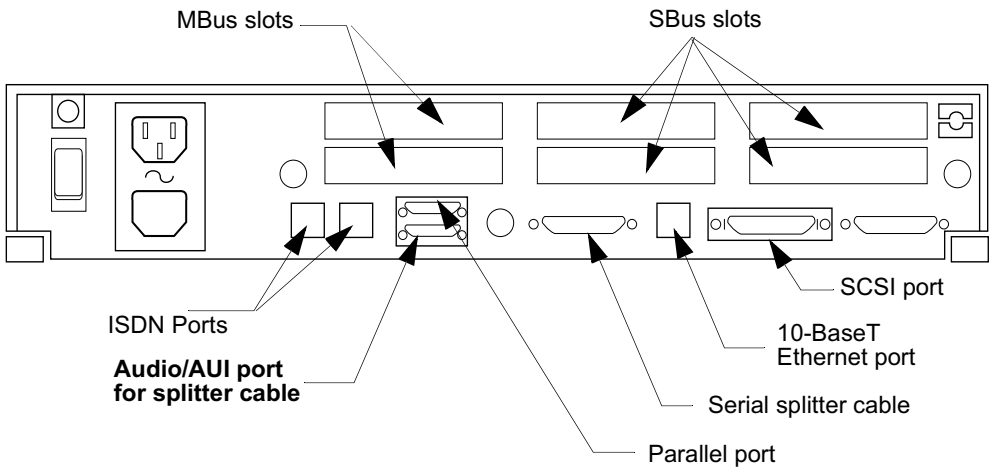


Figure 34. SPARCstation 10, Back View, Showing Connectors

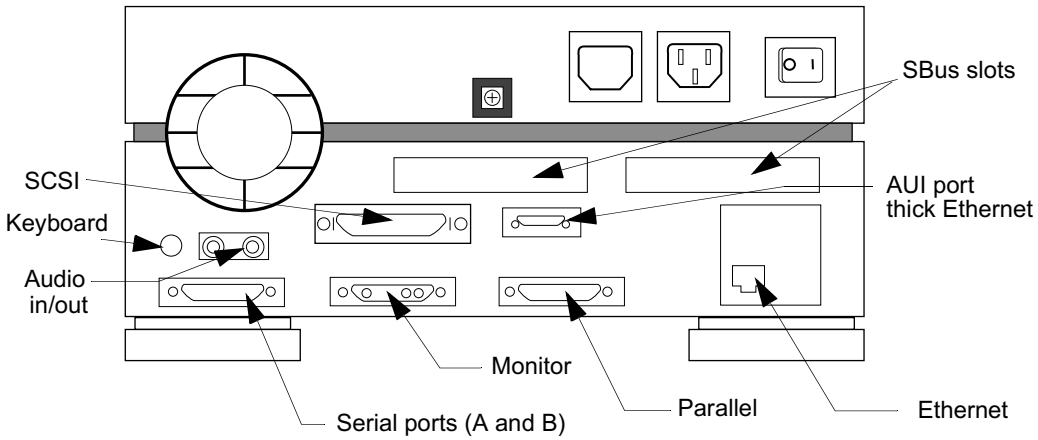


Figure 35. SPARCclassic (or LX), Back View, Showing Connectors

E.3 External SCSI Devices

This section provides information for setting up SCSI devices and set the appropriate SCSI target addresses. Each SCSI device must have a unique address, as listed in Table 24 and Table 25.

Typically, the internal hard disk is assigned SCSI target address 3, the spectrometer system is assigned SCSI target address 2, a tape drive is assigned SCSI target address 4 or 5, and a CD-ROM drive is assigned SCSI target address 6. The UNITY*plus* console uses SCSI target address 2, while the UNITY and VXR-S consoles use SCSI target address 3. The UNITY*INOVA* or *GEMINI 2000* console requires no SCSI target address because they do not use a HAL board.

If you plan to use the computer's original SCSI bus to connect to the differential box, you can connect no more than two devices between the computer and the differential box.

Table 24. UNITY*INOVA*, UNITY*plus*, and *GEMINI 2000* SCSI Address Assignments

External SCSI Device	*SCSI Address (SCSI ID)*	*Device Name on 1st SCSI bus: SunOS Unit # (Solaris Device)*	*Device Name on 2nd SCSI bus: SunOS Unit # (Solaris Device)*
External hard disk	0	sd3 (c0t0d0)	sd7 (c1t0d0)
Second internal hard disk	1	sd1 (c0t1d0)	sd5 (c1t1d0)
UNITY*plus* HAL board	2	sh0 (c0t2d0)	sh0 (c1t2d0)
First internal hard disk	3	sd0 (c0t3d0)	sd4 (c1t3d0)
First tape drive	4	st0	st2
Second tape drive	5	st1	st3
CD-ROM	6	sr0 (c0t6d0)	sr1 (c1t6d0)
Host CPU	7		

Table 25. UNITY and VXR-S SCSI Address Assignments

External SCSI Device	*SCSI Address (SCSI ID)*	*Device Name on 1st SCSI bus: SunOS Unit # (Solaris Device)*	*Device Name on 2nd SCSI bus: SunOS Unit # (Solaris Device)*
External hard disk	0	sd0, sd3 (c0t0d0)	sd7 (c1t0d0)
First internal hard disk	1[1]	sd1 (c0t1d0)	sd5 (c1t1d0)
Second internal hard disk	2	sd4 (c0t2d0)	sd6 (c1t2d0)
UNITY, VXR-S HAL board	3	sh0 (c0t3d0)	sh0 (c1t3d0)
First tape drive	4	st0	st2
Second tape drive	5	st1	st3
CD-ROM	6	sr0 (c0t6d0)	sr1 (c1t6d0)
Host CPU	7		

1. SCSI target address of the internal hard disk must be changed to this address (SCSI ID 1) from the factory setting (SCSI ID 3).

E.4 Activating a Second Hard Disk After Solaris is Installed

This section describes how to add a second hard disk (external) after Solaris is already installed. If both hard disks were configured when Solaris was installed, skip this section. If only one hard disk was configured when Solaris was installed and you want to add a second hard disk, use the procedure below.

This procedure describes how to add a `/data` mount point on a second hard disk. The `/data` mount point uses the slice 2 (`s2`), which spans the entire disk.

Activating a new hard disk requires the following three procedures:

- Installing the new disk.
- Partitioning and labeling the new disk.
- Creating a new file system on the disk.

To Install the New Disk

This procedure describes how to set up the new disk. Refer to "External SCSI Devices" on page 144, for more details.

1. Exit VNMR, exit OpenWindows, and log out.
2. Log in as root:
   ```
   login: root
   password: root_password
   ```
3. Shut down the UNIX system:
   ```
   # init 0
   ```
   At shutdown, the system forces any information on its way to the hard disk to be written out immediately, cleans up any processes that are running, and executes an orderly shutdown of the system. The process takes about 20 seconds. When the system is safely shut down, the monitor prompt ">" or "ok" appears.
4. After the monitor prompt ">" or "ok" appears, turn off the power to the Sun computer.
5. Set the SCSI target address of the hard disk you are adding. External hard disks usually have a push-button switch on the back of the drive for setting the SCSI target address. Refer to "External SCSI Devices" on page 144. Typically, 0 is the SCSI target address for an external hard drive.
6. Connect the SCSI cable and power cable to the hard disk drive.
7. Power up all the units. Stop the bootup process by pressing Stop-A (L1-A on some keyboards).
8. Wait for the ">" or "ok" prompt. If the ">" prompt is displayed, enter **n** to switch to the "ok" prompt.
9. Enter the `probe-scsi` command to list all the SCSI devices connected to the SCSI chain. You will see output similar to the following:
   ```
   ok probe-scsi
   Target  0
   Unit    0    Disk    SEAGATE    ST41600N
   SUN1.3G0100541169 ...
   Target  3
   Unit    0    Disk    SEAGATE     ST1480
   SUN0424751600664494 ...
   Target  4
   Unit    0    Removable Tape  ARCHIVE VIPER 150
   21531-004 ...
   ok
   ```
   Write down thee target address of your new disk. You will need to know it later.
10. Boot the computer using the `boot -r` command. The `-r` option reconfigures the UNIX kernel and loads the appropriate drivers for the new disk.
    ```
    ok boot -r
    ```

To Partition and Label the New Disk

This procedure describes how to use the `format` program to partition and label the new disk drive.

1. After the login prompt appears, log in as root:

```
login: root
password: root_password
```

2. Run the `format` program to partition and label the new disk. The following is example output from the `format` command.

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

AVAILABLE DISK SELECTIONS:
   0.   c0t0d0   <SUN1.3G cyl 1965 alt 2 hd 17 sec 80>
        /sbus@1,f8000000/exp@,800000/sd@0,0
   1.   c0t3d0   <SUN0424 cyl 1151 alt 2 hd 9 sec 80>
        /sbus@1,f8000000/exp@,800000/sd@3,0
Specify disk (enter its number):0
   selection c0t0d0
   [disk formatted]
```

   Enter the number next to your new disk. In this example, we selected the first disk in the list. This disk happens to be an external 1.3 GB disk at SCSI target address 0.

   The Format Menu appears:

```
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 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   - 8-character volume name
  quit
format>
```

3. Enter **p** at the `format>` prompt. The `PARTITION MENU` appears:

```
format> p
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 table
  print   – display the current table
  label   - write partition map and label to the disk
  quit
partition>
```

This menu allows you to change the partition values.

4. Change the size of partition 2 to equal the size the disk. At the `partition>` prompt, enter **2**, and complete the dialog similar to the following example:

```
partition> 2

Part  Tag        Flag  Cylinders  Size     Blocks
0     backup     wm    0 – 1964   1.27GB   (1965/0/0)
Enter partition id tag [unassigned]: backup
Enter partition permission flags [wm]: wm
Enter new starting cy [0]: 0
Enter partition size [2672400b, 1965c, 0.00mb]: 1304.88mb]:
1304.88mb
partition>
```

Each question provides the current value in brackets. Do not change any value. The size shown in brackets is the size of the entire disk. Use that value.

5. Change the size of the other partitions—0, 1, 3, 4, 5, 6, 7—to 0. Start with partition 0 by entering **0** at the `partition>` prompt. An example of the complete dialog appears as follows:

```
partition> 0

Part  Tag         Flag  Cylinders  Size     Blocks
0     unassigned  wm    0          0        (0/0/0)
Enter partition id tag [unassigned]: unassigned
Enter partition permission flags [wm]: wm
Enter new starting cy [0]: 0
Enter partition size [0b, 0c, 0.00mb]: 0.00mb]: 0.00mb
partition>
```

Complete a similar dialog for the other partitions, changing the size of each partition to 0.00mb.

6. After the last partition is finished, enter **p** at the `partition>` prompt to list the partition table. Make sure that all partitions except for 2 show 0 under size and that partition 2 shows the size of the entire disk under size.

```
partition> p
current partition table (unnamed):
Total disk cylinders available: 1965 + 2 (reserved cylinders)

Part  Tag          Flag  Cylinders  Size     Blocks
0     unassigned   wm    0          0        90/0/0
1     unassigned   wm    0          0        90/0/0
2     backup       wm    0 - 1964   1.27GB   91965/0/0
3     unassigned   wm    0          0        90/0/0
4     unassigned   wm    0          0        90/0/0
5     unassigned   wm    0          0        90/0/0
6     unassigned   wm    0          0        90/0/0
7     unassigned   wm    0          0        90/0/0
partition>
```

If a partition needs correcting, repeat step 5 above for that partition.

7. Enter **l** (lower case L) at the `partition>` prompt to label the disk:

   ```
   partition> l
   Ready to label disk, continue? y
   ```

8. Enter **q** to quit the partition to leave the `PARTITION MENU` and return to the `FORMAT MENU`.

9. Enter **q** again to leave the format program.

To Create the New File System on the New Disk

This procedure describes how to use the `newfs` command and edit the `vfstab` file to create a new file system on the new disk.

CAUTION: **Running the `newfs` command on a volume will make data unrecoverable on that volume. Be sure the `newfs` command is run on the correct disk.**

1. Run the *v* command on slice 2 of your new disk. The following example shows the command being run on slice 2 (*s2*) of SCSI target 0 (*t0*). Be sure to select the correct target of your new disk.

   ```
   # newfs /dev/rdsk/c0t0d0s2
   newfs: construct a new file system /dev/rdsk/c0t0d0s2:(y/n)? y
   software shows several numbers representing superblock backups
   ```

2. Edit the `/etc/vsftab` to add the new disk:

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

   Add the following line:

   `/dev/dsk/c0t0d0s2 /dev/rdsk/c0t0d0s2 /data ufs 5 yes -`

   Where `/data` is the name of the volume. This is a typical name, but you can choose a name that is logical to your system. Whatever name you choose, you will need to know it when you create the mount point later.

   Write and quit from `vi`.

3. Create the mount point to the new disk drive with the following commands:

```
# cd /
# mkdir /data
# mount /data
```

Where `/data` is the name of the vo.lume you used in the previous step.

The new disk is now mounted. You can use the `df -k` command to check it.

E.5 Active SCSI Termination

You may need to use active SCSI terminators if you experience SCSI problems, such as error messages, slow SCSI bus, communication failures, or system crashes. Active terminators can eliminate errors and speed up SCSI bus communications—even on systems with both SCSI-1 and SCSI-2 devices. The Differential Box is a SCSI-1 device, and using an active terminator can eliminate errors and the need of a second SCSI board in the host dedicated to the HAL interface.

To order the active terminator, call Varian service at 1-800-356-4437 and request the active terminator (Part No. 01-902819-00). It will be sent to you immediately. The kit includes an active terminator and an adapter for the Differential Box.

Using an active terminator with the Differential Box requires the 3 resistor packs to be removed (see the previous section). Also, all external SCSI devices connected between the host computer and the Differential Box must be daisy chained with the faster devices (SCSI-2) at the computer end and the slower devices (SCSI-1) at the Differential Box end. The SCSI connections on the Differential Box must be connected in the following order:

1. System console on J-625.
2. Active terminator on J-626.
3. Sun computer on J-627.

E.6 Shim Gradient Supply Data Connection on UNITY*INOVA*

Due to a problem with the MSR (Magnet and Sample Regulation) board on early UNITY*INOVA* systems, the shim supply on these spectrometers was connected to the Acquisition CPU board. In the meantime, the MSR boards in these systems should have been retrofitted (modified) by Varian service. If you find that on your UNITY*INOVA* the shims cable (Part No. 01-903415-00 for Varian shims, 01-905599-00 for RRI shim modules) is still plugged into the Acquisition CPU board (RJ45 connection on serial port 2, J17-2), you should move that connection to the MSR board (serial port 1, J1-1) and reboot the console.

If you are using VNMR 6.1A or earlier and observe problems with the shims connected to the MSR board, you should contact Varian service to fix the MSR board prior to loading VNMR 6.1B. MSR board upgrades and fixes are described in the service bulletins MP950011 (lock display problem), MP960006, and MP980004 (boot-up problems).

VNMR 6.1B *requires* the shims to be plugged into the MSR board. Without this, you will be unable to load shims, and gradient shimming will reset all shims to zero. Note that the original UNITY*INOVA* RRI serial cable, Part No. 01-903416-00, went from the CPU or MSR boards to the Breakout Panel, requiring a separate cable between the console and the RRI Module. This cable has been replaced by cable 01-905599-00. The 14-Channel Shim Supply uses a flat ribbon cable, 00-958408-10, that makes the connection from J11 of the MSR board to J11 of the 14-Channel Shim Supply.

Appendix F. Printers and Plotters Troubleshooting

Sections in this appendix:

This appendix contains troubleshooting and setup information for printers and plotters.

F.1 Configuring Printer and Plotter Hardware

This section describes a number of printers and plotters tested as compatible with VNMR. Check the Varian website for new printers that work with VNMR. For printers supplied with older spectrometers, refer to the original system manuals supplied with the printer or refer to the on-line manuals. The following printers and plotters are covered in this manual:

Hewlett-Packard LaserJet 840C Printer

Printer I/O	HP IEEE-1284-B Parallel Universal serial bus 1284-B receptacle
Printer Language	HP PCL 3.
Printer Memory	2 MB standard memory
Cartridges	black and color
Resolution	Black – 600 x 600 dpi with black pigmented ink Color – HP color layering technology
Pages per Minute	Black – 4 ppm Black and color – 0.8 ppm
Configuration Control	Software controlled.

There are two buttons and three lights on the front of the printer. The lights indicate when the printer is operating correctly or when it needs attention from you and the buttons are used to control the printer.

Self-Test Procedure

1. Turn the HP DeskJet 810C and 830C series printer off and remove the cable that connects the printer to the computer.
2. Turn the printer back on.
3. Press and hold the **Power** (top) button. Press the **Resume** button 4 times and then release the **Power** button.
4. The self-test page will print with a report containing the printer model name, serial number and a diagonal self-test pattern. The test pattern verifies that all nozzles on the print cartridge are firing. If a gap appears along the diagonal self-test pattern, one or more nozzles are not firing.

Operation

1. With the power off, connect the interface and power cables. Press **go** to turn the power on. The ready light should come on.
2. Open a UNIX window, log in as `root`, and activate `LaserJet_150`, `LaserJet_150R`, `LaserJet_300`, `LaserJet_300R, LaserJet_600, and LaserJet_600R` using the procedures in the beginning of this chapter.
3. From within VNMR, set the parameter `printer` to the name you entered in the previous step, for example, `printer='LaserJet_300'` or `printer='lj'`. Enter `printon dg printoff` to produce a test print.

   To use as a plotter, set the parameter `plotter` to the name you entered in the previous step, for example, `plotter='lj 300'` (If you activated more than one resolution, there will be different names corresponding to the different resolutions). To test, enter `pl page`.

Lexmark Optra Color 45 Inkjet Printer

Printer I/O	IEEE 1284 ECp compliant,1284-B receptacle, Internal Solutions Port (6 options).
Printer Language	PostScript Level and PCL 5c emulation.
Printer Memory	8 MB.
Cartridges	Dual head thermal inkjet
Resolution	600 x 600 dpi
Pages per Minute	Black - 8 ppm Color - 4 ppm
Configuration Control	Software controlled.

The Varian supplied customized Optra Color 45 printer/plotter includes special software and is HPGL, PS, and PCL compatible. This custom printer is not available from other sources. The optional tri-port serial port board is installed in the Varian Optra Color 45 allowing either serial or parallel port mode. The Optra Color 45 replaces the Lexmark 4079, HP 7475, and the HP 7550A plotters.

Self-Test Procedure

1. Follow the set up instructions in the printer manual and then plug into ac power.
2. The print display should show **Ready** and the green light is **on**.

3. Press the **Menu** button until **TESTS MENU** is displayed and push **Select**.
4. Press the **Menu** button until **Print Demo** is displayed and push **Select** twice.
5. A multi-color page should be printed and the Menu returns to **Ready**.

SUN Computer Page Size Setup

To plot on 11 x 17 paper (the default printer option is 8.5 x 11 paper), the menu selection on the Optra Color 45 and the VNMR software must be changed.

Optra Color 45 Menu Selection

1. Push the **Menu** button to scroll through the setup options to the **Paper** Menu and push the **Select** button.
2. Push the **Menu** button to scroll to the **Paper Size** option and push the **Select** button.
3. At **Tray 1 Size** push the **Select** button.
4. Push the **Menu** button to scroll through the **paper size** options and push **Select** to save the desired paper size.
5. Push the **Go** Button to return to the **Ready** state.

Software Edit

You will have to edit, copy and paste within the `devicetable` file in `/vnmr` to change the x and y plot size from the default 8.5 x 11 (Letter) paper to 11 x 17 paper.

When installing the Optra Color 45 with `/vnmr/bin/./adddevices` on a Sun computer, Postscript (`PS`) is the best `Printer type` to use. If you choose the HP 7550 or the HP 7475 for HPGL the resolution is much less than the PS resolution.

WARNING: **DO NOT set the Optra Color 45 to the `Lexmark Printer type`. The printer will not work**

SUN Serial Port Setup

It is best to run the Optra Color 45 on the SUN parallel port, but if you already have a printer/plotter on the parallel port, the Optra Color 45 can use a serial port. The serial port default speed is 9600 on the Optra Color 45 and the Sun, but the Optra Color 45 will run at the baud rate of 38400 for faster printing/plotting. If you are having problems printing/plotting, it is a good idea to check the serial port settings with `admintool`. You must be root to use `admintool`, and it is run from a shell tool.

`Admintool` - *Change to Serial Port*

After opening `Admintool` do the following:

- Click on **Browse**
- Click on **Serial Ports**
- Double clock on **a** or **b** to open up `Modify Serial:Port`
- The `Template` window should be `Terminal-Hardware`, change if necessary.
- Click on the **Baud Rate** box to change the baud rate.
- Click on **expert**.

Optra Color 45 Change to Serial Port

The Optra Color 45 Menu Selection for serial port is:

1. Push the **Menu** button to scroll to the **Serial** Menu and push the **Select** button, **SERIAL OPTION 1**is displayed.
2. Push the **Select** button to select **SERIAL OPTION 1**level.
3. Push the **Menu** button to scroll to **Baud option** and push **Select**.
4. Push the **Menu** button to scroll to the desired (recommend 38400) baud rate.
5. Push **Select** to save the baud rate.
6. Push the **Go** button to return to the **Ready** menu.

Gemini (non-Sun) Setup

The Optra Color 45 is plug-n-play on the Gemini (non-2000) and VXR. If there is a problem plotting check the following:

1. Push the **Menu** button to scroll to the **Serial** Menu and push **Select** twice.
2. Push the **Menu** button to scroll to the **Serial Protocol**. and push **Select**.
3. Push the **Menu** button to scroll to the **Serial Protocol = XON/XOFF** and push **Select** to save.
4. Push the **Return** button to go up one level to the **Serial Protocol** level.
5. Push the **Menu** button to scroll to **Robust XON** and push **Select**.
6. Push the **Menu** button to scroll to **= On** and push **Select** to save.
7. Push the **Go** button to return to the **Ready** state.
8. The baud rate for the serial port should be set to 9600. See Setting up the serial port baud rate on the Optra Color 45.

Hewlett-Packard DeskJet 970CXI Printer

Printer I/O	Centronics Parallel Universal serial bus 1284-B receptacle
Printer Language	HP PCL 3.
Printer Memory	512 Kbyte standard memory sufficient for full page graphics at 600 dpi.
Cartridges	black and color
Resolution	Black – 600 x 600 dpi Color – depends on paper type
Pages per Minute	Black – 12 ppm Black and color – 10 ppm
Configuration Control	Software controlled.

The Hewlett-Packard 970CXI features 600 dpi color printing and is software controlled. It has a color cartridge and a black cartridge. The control panel has two switches. Refer to the Hewlett-Packard manual for operating procedures.

There are three buttons. The power button and light should always be used to turn the printer on and off. Using a power strip, surge protector, or a wall-mounted switch to turn on the printer may cause premature printer failure.

The cancel button stops the print task.

The resume button and light is used when the light above the resume button is flashing. Press the button to continue printing.

Varian software does not support two sided printing.

Hewlett-Packard LaserJet 2100 Printer

Printer I/O	Centronics Parallel, 1284-B receptacle LocalTalk port
Printer Language	HP PCL 6
Printer Memory	4 MB standard memory (expandable to 52 MB
Cartridges	black
Resolution	1200 x 1200 dpi
Pages per Minute	10 ppm
Configuration Control	Software controlled.

The Hewlett-Packard LaserJet 2100 features 1200 dpi printing and is software controlled. The control panel has two switches and two lights. Refer to the Hewlett-Packard manual for operating procedures.

Self-Test Procedure

To print the configuration page, press and release the **go** (large button at bottom of control panel) and **job cancel** (button at top of control panel with upside down triangle) buttons simultaneously when the printer is in the ready mode.

Hewlett-Packard Color LaserJet 4550 Printer

Printer I/O	Bidirectional parallel port (requires a “C” connector), Two Enhanced Input/Output (EIO) slots; paper handling accessory port; infrared receiver port. IEEE compliant, 1 open EIO slot, HP JetDirect EIO print server for fast Ethernet 10/100Base-TX in second EIO slot. (optional) HP JetDirect 600N and 610N (EIO) internal print servers, external print servers, connectivity card
Printer Language	HP PCL 5C, PostScript Level 3 Emulation, HP PCL 6
Printer Memory	64 MB standard memory (expandable to 192 MB)
Resolution	600 dpi
Pages per Minute	16 ppm (black); 4 ppm (color)
Configuration Switches	Expanded Control Panel

Operation

Set up as described in the Hewlett-Packard printer manual.

Hewlett-Packard LaserJet 5000 Series Printers

Printer I/O	IEEE 1284-compliant bidirectional parallel, RS-232 9-pin serial, 2 PCI-based EIO slots
Printer Language	HP PCL 5e, HP PCL 6, and Postscript Level 2 emulation
Printer Memory	4 MB standard memory (expandable to 100 MB)
Resolution	1200 dpi
Pages per Minute	16 ppm
Configuration Switches	Control Panel

Overview

The Hewlett-Packard 5000 provides large format (11 x 17) printing at 16 pages per minute.

The control panel has an LCD display, three LEDs and six buttons.

The LaserJet 5000 features 1200 dpi resolution, but for NMR typical applications the plot lines are too fine. You may even fail to plot a full page at this resolution without expanding the printer memory since a full 11 x 17 page takes up to 32 MBytes of pixel information. Also even in parallel interface applications transferring data is unacceptably slow. For good plot resolution, 600 dpi is a good choice; for publication quality spectra and reproduction 300 dpi is a better option since the plot looks darker.

Switching between large and standard formats requires changing the paper size in the printer configuration menu on the LaserJet 5000.

Self-Test Procedure

1. Load paper and toner cartridge. Press the **Go** button to turn printer on. Wait until the printer warms up.
2. The READY message should be displayed.
3. Press **Menu** until the display reads **INFORMATION MENU**.
4. Press **Item** until the display reads **PRINT CONFIGURATION**.
5. Press **Select** to print the configuration page.
6. The configuration page shows the printer's current configuration.

Operation

Set up as described in the Hewlett-Packard printer manual.

Hewlett-Packard Color Inkjet CP1700D Printer

Printer I/O	Bidirectional parallel port (requires a "C" connector) Two Enhanced Input/Output (EIO) slots Paper handling accessory port Infrared receiver port. USB, IEEE-1284 (parallel), Infrared, and network LIO. (optional) HP JetDirect 600N and 610N (EIO) internal print servers, external print servers, connectivity card
Printer Language	HP color Inkjet cp1700: HP PCL 3 enhanced HP color Inkjet cp1700d: HP PCL 3 enhanced HP color Inkjet cp1700ps: HP PCL 3 enhanced Adobe PostScript 3 Software RIP
Printer Memory	16 megabyte (MB) built-in random access memory (RAM), cannot be upgraded. 4 megabytes (MB) built-in read only memory (ROM), cannot be upgraded
Resolution	1200 x 1200 dpi (black); 2400 x 1200 dpi (color)
Pages per Minute	16 ppm (black); 14.5 ppm (color)

Overview

The control panel has an LCD display representing ink levels and printer status. There are also three push buttons to control power on/off, resume, and cancel. The resume and power switches have a LED associated with them.

The CP1700D features 1200 dpi resolution for black and white printing and 2400 dpi for color, but for NMR typical applications the plot lines are too fine. You might even fail to plot a full page at this resolution without expanding the printer memory since a full 11 x 17 page takes up to 32 MBytes of pixel information. Also, even in parallel interface applications transferring data is unacceptably slow. For good plot resolution, 600 dpi is a good choice; for publication quality spectra and reproduction 300 dpi is a better option since the plot looks darker.

Self-Test Procedure

1. Load paper, ink tanks, and print heads.
2. Press the power button to turn printer on. Wait until the printer initializes and reports `Ready`.
3. Press and hold the **resume** button on the control panel for three seconds until the LCD display reports `processing Job`.
4. Release the button. A test page is automatically printed.

Operation

Set up as described in the Hewlett-Packard printer manual.

F.2 Printer Troubleshooting and Hints

The troubleshooting steps and hints in this section should assist you in solving problems with printers. For troubleshooting updates, please check the Varian website.

Serial Printer Outputs Strange Characters

If you have a LaserJet series printer that prints strange characters, the following steps should fix the problem

1. Open a Command Tool or Terminal Window.

   Move the mouse pointer to an empty part of the screen and press the right button. Drag down to Programs to open the popup menu, and select a terminal window.

2. Change the baud rate to 19200 by entering:
   ```
   varian# stty 19200
   ```

3. Get the report of the terminal's current settings by entering:
   ```
   varian# stty -g
   ```
   The system returns a long list of characters separated by colons. Write down the information for future reference.

4. Become super user:
   ```
   varian# su
   password:root_password
   ```

5. Change to the `/kernel/drv`:
   ```
   varian# cd /kernel/drv
   ```

6. Make a copy of the `options.conf` file:
   ```
   varian# cp options.conf options.conf.old
   ```

7. Use a text editor, such as `vi`, to edit the `options.conf` file. Find the line towards the bottom of the file that begins `ttymodes="x:x:x"`, where "*x:x:x*" is the terminal settings.

   Replace the settings between the quotes with what you wrote down from the `stty -g` command.

8. Reboot the computer.

The LaserJet series printer should no longer print strange characters.

Parallel Printer Installation on Sun Ultra 5, 10, 30, 60

Before installing a parallel printer on a Sun PCI-based systems (Ultra 5, 10, 30, 60):

1. Verify that all Solaris 2.6 patches from Sun are loaded.
2. Using an editor, modify the file `/vnmr/tcl/bin/add_printer` as follows:
3. Change `bpp0` to `ecpp0` in lines 78 and 283.
4. Verify than an IEEE-1284 fully compliant cable is used to connect the parallel printer to the Ultra 5/10/30/60.

Note: Varian stocks the IEEE-1284 fully compliant cable under Varian part number 81-839841-00, Centronics to DB 25 M-M.

Install the parallel printer according to the normal procedure.

Serial or Parallel Printer Port?

If your printer has a parallel printer port, it is best to use the Sun work station parallel port for connection. Serial port printing is slower. There is a program in the `userlib` directory

that speeds up the serial port, but the parallel port printer connection is best and easiest to install.

Do Not Remove or Modify devicenames

A Solaris software upgrade overwrites or removes the `/vnmr/devicenames` file. You must save this file before upgrading. After the upgrade restore this file to your new version and reboot the host computer with the printer on.

Use the `adddevices` command to create a new printer/plotter entry for VNMR. Do not short cut by modifying `devicenames`. This does not complete the installation of the printer/plotter.

Use adddevices Menu to Control Printer

To control a printer with the `lp` command, it is necessary to set the desired printer as the default using the adddevices menu as described in Chapter 6, “Printer and Plotter Setup,” .

Printing on A3 and B-Size Paper

In order to use A3 format paper on the LaserJet 600R, change two lines in the LaserJet 600R entry:

wcmaxmax: 250 to 400

wc2maxmax: 180 to 250

To plot on 11 × 17 paper with a Lexmark PS 4079, set:

wc2max: 210

wcmax: 400

Controlling LaserJet Plot Quality

The current version of VNMR uses various plotter type definitions for PC plotting on LaserJet printer/plotters. Table 26 lists plot resolutions based on definitions from the file `/vnmr/devicetable`).

Table 26. LaserJet Plot Resolution:

Plotter Type	*Resolution Plot*	*Orientation*
LaserJet_15O	150 dpi	portrait
LaserJet_150R	150 dpi	landscape
Laser3et_300	300 dpi	portrait
LaserJet_300R	300 dpi	landscape
LaserJet_600	600 dpi	portrait
LaserJet_600R	600 dpi	landscape

The 600-dpi (dots per inch) definitions offer the highest resolution and a maximum amount of detail, particularly in complex 1D spectra, but at the expense of a data matrix four times the size of a 300-dpi matrix, or 16 times the size of a 150-dpi matrix. Using 600 dpi may

lengthen the plot (data transfer) time considerably, especially when using a serial connection. Older LaserJet models offer only 300 dpi and 150 dpi resolutions.

One disadvantage of 600 dpi plots is that VNMR plots lines one pixel wide, resulting in a line width of 0.04 mm. This gives the impression of a faint, gray plot that is often not suited for reproduction and publication. The solution for this problem is simple: if you use a 300 dpi or 150 dpi plotter type definition (see above), then you obtain line widths of 0.085 and 0.17 mm, respectively. This makes the plots look much darker and easier to reproduce for publication.

For optimum results you may want to have multiple plotter definitions (e.g using the definitions LaserJet 150R. LaserJet_300R. and LaserJet_600R) for the same plotter. This permits adjusting the plot resolution depending on what the output is used for, simply by switching between plotter definitions.

Plotting in Portrait Format

When plotting in portrait format (e.g., using a LaserJet_300 type printer definition) you will find that you cannot fill the plot - the maximum vertical size of the spectrum (`wc2`) is 140 mm. This was done deliberately many years ago: with `wysiwyg=y` (the only display option up to a few years ago) this still gives an acceptable display width, whereas with the full chart height (240 mm) only a very small portion of the graphics area is used.

With newer VNMR releases we can deactivate the aspect ratio by selecting `wysiwyg=n`. This causes VNMR to fill the graphics screen, irrespective of the chart dimensions. this makes it possible to use the full portrait plot format without disadvantage. You can do this simply by changing `wc2maxmax` in the relevant entry in `/vnmr/devicetable` to 240 (8.5 x 11) or 255 (DIN A4). After this, type **plotter=plotter** in VNMR. Now, you can set `wc2` to the true maximum for portrait plots.

F.3 Setting Local Solaris Printer for Use by SunOS Systems

If you have a printer or plotter connected to your Solaris system, this device is available for other systems to use remotely, including SunOS systems. This section describes how to set up a printer or plotter so that the device can be used remotely by a SunOS system.

To Turn Off Banner Pages for All Printers

To turn off the banner page for all printers, edit the `standard` file before configuring any printers.

1. Change directories as follows:
   ```
   varian# cd /usr/lib/lp/model
   ```
2. Use a text editor, such as `vi`, to edit the `standard` file. Find the line `nobanner="no"` and change it to read `nobanner="yes"`. This turns off the banner page.
3. Go to the next section to configure the printer or plotter as Postscript.

To Configure the Printer for Postscript

When the `printon` and `printoff` sequence is used on the remote SunOS system, the printer prints an initial blank page. To eliminate this blank page, use the Solaris Printer Manager admintool to set up a new printer and set Printer Type and File Contents to

Postscript. This device is then available for SunOS systems to use remotely. Your remote system refers to the device by a new name (ten characters or less).

To Turn Off Banner Pages for Individual Printers

To turn off the banner page on printers already configured for remote use, edit the *printer_name* file and set nobanner="yes".

1. Change directories as follows:

   ```
   varian# cd /etc/lp/interfaces
   varian# ls
   ```

   A list of all configured printers and plotters appears.

2. Choose which devices for which you want to turn off the banner page.

3. Use a text editor, such as vi, to edit the *printer_name* file, which is the name of the device. Find the line nobanner="no" and change it to read nobanner="yes". This turns off the banner page.

F.4 editdevices Field Descriptions for VnmrSGI and Vnmrl

The commands on the top line of the screen are used to select the mode of operation. The current command is highlighted in reverse video. To select a command, move the cursor with the left-arrow key or the right-arrow key until the reverse video highlights the desired command. You can also select the command by typing the first letter (lower case only) of the command. Confirm your choice by pressing the Enter key.

To send output to a device, the computer needs to know the name of the device, its type, which computer it is attached to, and whether it allows printing, plotting, or both. If the device is attached to the local computer, the VNMR system needs to know through which serial port it is connected, and what baud rate the device is configured to use.

Note: Sun uses the adddevices screen for setup as described in Chapter 6, "Printer and Plotter Setup," .

VnmrSGI editdevices Screen for SGI

The top line of the VnmrSGI editdevices screen has the following commands, in order from left to right.

next	Displays the next device entered in the file. If you try to go past the end of the file, the system displays "no more."
prev	Displays the previous device entered in the file. If you try to go past the start of the file, the system displays "no more."

modify	Changes any field in the record defining the current device. The cursor initially moves to the first field of the current entry, the "device name." The cursor can be moved to other fields with the up-arrow and down-arrow keys. The left-arrow and right-arrow keys position the cursor within a particular field. Change a field by deleting the current value and entering a new value. When finished, press the Enter key to move to the next entry. The computer looks up the value for certain fields. If the value you entered is not valid, the computer displays a message stating this and asks if you want to change the value you entered. Exit by pressing the up-arrow key until the cursor returns to the command line. The save button is highlighted to remind you that the change must be saved before leaving `editdevices`.
save	Updates the device name file with the changes made using the modify, create, and delete button commands.
create	Similar to the modify button except the fields describing the device are cleared.
delete	Removes the current entry from the `devicenames` file. The system asks you to confirm this operation.
exec	Similar to the save button except exec also creates a new version of `/etc/printcap`. You must select exec to incorporate any changes made in the `devicenames` file.
help	Provides online help. It also lists device types, baud rates, ports available, and remote hosts.
quit	Exits from `editdevices`. Any entries that have been modified but not saved will be lost.

Only `root` (the UNIX system administrator) can use exec to modify the file `/etc/printcap`. Users other than `root` are restricted to next, prev, quit, and help.

A description of each field follows:

device name:	The name of each printer and plotter, which can be any name that you like: `varian`, `fred`, `LaserJet1`, and so on. The only constraint is that if you have multiple computers on a network (e.g., a host and a data station), the name you give to each plotter must be the same on each computer, in order to allow sharing of printers and plotters (i.e., the ability of computer A to print or plot on an output device attached to computer B). One entry in the file should be the default printer device, named "`lp`."
Use:	Can be `Plotter`, `Printer`, or `Both`. Dot-matrix and laser devices are capable of being used as `Both` printers and plotters, while pen plotters can only be used as plotters. PostScript ™ printers are fully supported on all systems for plotting only; printing is not supported by unmodified VNMR. For printing, the normal output generated is ASCII. Software for converting ASCII to PostScript is sometimes bundled with PostScript plotters. Use of this software in conjunction with modifications to the printing script `/vnmr/bin/vnmrprint` or the `/etc/printcap` file allows printing from VNMR to PostScript printers. In general, the only use for the `Printer` entry is for the device named `lp`
device type:	An entry from the first column in Table 17 on page 72, and entered exactly as shown in the device type column.

	Note that a single physical device (printer or plotter) can have two or more entries in the device list, because of the different configurations. For example, an HP7550 plotter might be given the device type `HP7550A` in order to plot on 11 x 17 inch paper and a different name and the device type `HP7550A8` in order to plot on 8-1/2 x 11 inch paper.
Host:	The name of the computer to which the output device is attached, which can be either the local computer (the one on which you are typing) or a remote computer on the same network on which VNMR software is also installed.
Port:	The port the device is on—`a`, `b`. If the device is on a remote computer, this entry is ignored, but it is a good idea to enter the correct information anyway.
Baud Rate:	The speed of the device—`1200`, `2400`, `4800`, `9600`, or `19200`. If the device is on a remote computer, this entry is ignored, but it is a good idea to enter the correct information anyway.
Shared:	`No` or `Yes`. In almost all cases this is `No`. `Yes` is used only when the printer or plotter in question is on a remote computer, and the file system in which the output file is created is a *shared* file system (i.e., a system is mounted by both the local and remote computers).

Vnmrl editdevices Screen for IBM

The top line of the VnmrI editdevices screen has the following commands, in order from left to right.

next	Displays the next device entered in the file. If you try to go past the end of the file, the computer displays “no more.”
prev	Displays the previous device entered in the file. If you try to go past the start of the file, the computer displays “no more.”
modify	Changes any field in the record defining the current device. The cursor initially moves to the first field of the current entry, the “device name.” The cursor can be moved to other fields with the up-arrow and down-arrow keys (R8 and R14 on the Sun keyboard). The left-arrow and right-arrow keys position the cursor within a particular field. Change a field by entering a new value. The computer erases all characters to the right of the cursor when you start typing. When finished, press the Enter key to move to the next entry. The computer looks up the value for certain fields. If the value you entered is not valid, the computer displays a message stating this and asks if you want to change the value you entered. Exit by pressing the up-arrow key until the cursor returns to the command line. The save button is highlighted to remind you that the change must be saved before exiting `editdevices`.
save	Updates the device name file with the changes made using the modify, create, and delete button commands.
create	Similar to the modify button except the fields describing the device are cleared.
delete	Removes the current entry from the `devicenames` file. The computer asks you to confirm this operation. You must load an unaltered copy of `/vnmr/devicenames` to get the entry back.

help	Provides online help. It also lists device types, baud rates, ports available, and remote hosts.
quit	Exits from `editdevices`. Any entries that have been modified but not saved will be lost.

Only `root` (the UNIX system administrator) or `vnmr1` can use `save` to modify the `/vnmr/devicenames` file. Users other than `root` are restricted to next, prev, quit, and help.

A description of each field in the `editdevices` screen follows:

queue name:	The name of each printer and plotter. It can be any name you like: `varian`, `fred`, and so on. The queue name should be listed in the `/etc/qconfig` file. The length of queue name can not exceed seven characters.
Use:	Can be `Plotter`, `Printer`, or `Both`. Dot-matrix and laser devices are capable of being used as `Both` printers and plotters, while pen plotters can only be used as plotters. In general, the only use for the `Printer` entry is for the device named `lp0`.
device type:	An entry from the first column of Table 17 on page 72, and entered exactly as shown in the Device Type column. Note that a single physical device (printer or plotter) can generate two (or more) entries in the device list, because of the different configurations described above. For example, a Hewlett-Packard HP7550 plotter might be given one name, and the device type `HP7550A`, in order to plot on 11 x 17 paper, and a different name and the device type `HP7550A8` in order to plot on 8-1/2 x 11 inch paper.
Host:	The name of the computer to which the output device is attached, which can be either the local computer (the one on which you are typing) or a remote computer (on the same network on which VNMR software is also installed).

Symbols

Numerics

A

B

C

Q

R

S

T

U

V

W

X

Y