V/SCSI-2 4220SN Cougar

Single or Dual Channel

Fast SCSI-2 Host Adapter

Systems Integration Guide

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Introduction

This manual is written for experienced Sun system administrators who will install Interphase V/4220SN SCSI-2 controllers on a Sun file server. This manual describes the installation of the 4220SN controller; however, experience with Sun file servers and SunOS is required. Necessary skills include installation of boards and installation of software from tape or CD-ROM. Depending on your particular installation, modification of configuration files and generation of a new kernel may be required.

Organization of This Manual

This manual contains instructions for installing the 4220SN.

Chapter 1, Introduction introduces the document. It describes the organization of the manual, how to use it, and reference documents to help readers understand the product.

Chapter 2, **Software Installation** contains step-by-step instructions for installing the Interphase 4220SN software, including the building of a new UNIX kernel.

Chapter 3, **Hardware Installation** contains detailed descriptions and illustrations for installing the 4220SN hardware.

Chapter 4, The Disk Maintenance Utility contains detailed information necessary to use the *scsi_util* utility.

The Appendices contain supplemental information which may be useful during installation of the Interphase 4220SN.

Conventions and Terminology

The term "4220SN" refers to the Interphase V/SCSI-2 4220SN Cougar hardware and software.

The SCSI port provided by the motherboard is referred to as **Port 1** or the **primary SCSI channel**. The port provided by a SCSI daughter card (if installed) is called the **Port 2** or the **secondary SCSI channel**.

The installation procedures are divided into a series of numbered steps.

Directories and *filenames* in text are printed in italics. *Variables* are printed in italics.

Examples of program output, commands and prompts, and sections of code are indented and printed in `fixed-width font`.

```
This is an example of program output or sections of code.
```

Commands to be entered exactly as they appear in the text are printed in **boldface** type. Pressing **Return** at the end of the command is assumed when not literally expressed.

Keys to be pressed are shown in **boldface** type. For example, the carriage return key is shown in boldface type as **Return**. (On many keyboards, this key is labeled "Enter".)

User entries when mixed with program output are printed in **Bold Fixed-Width** font. User entries in text are printed in **boldface**.

User entries may be entered in either upper- or lower-case font when *in* the Installation program.

References to UNIX programs and their man page entries follow the standard UNIX conventions (e.g., **man(1)**). Options in commands are printed in boldface type and are enclosed in brackets ([ ]).

Metasymbols and other text which must be replaced before they can be keyed in are printed in ***bold italic***.

Notes of importance are signified as follows:

Caution

In a "note" the heading is centered above in boldface type. The text is indented on both left and right margins. The note text contains information that is useful and explanatory. A "caution" as illustrated here contains important information which, if ignored, may result in loss of data or damage to hardware or software.

Overview of the Installation Process

The following is an outline of the steps involved in installing the 4220SN in a Sun file server:

1. Load and install 4220SN software from tape or CD-ROM.

2. Shut down the server. Turn off the power and disconnect the power source.

3. Remove the covers to gain access to the slots and backplane.

4. Install 4220SN hardware.

5. Boot the server.

Product Compatibility

The 4220SN software is currently available for use with SunOS versions 4.1.1 through 4.1.3 and can be installed in the following Sun file servers:

- Sun 4/470

- Sun 4/490

- Sun Galaxy 600 MP

If your system does not appear in the above list, please contact your Interphase sales representative for current availability of software drivers.

Related Documents

Sun Microsystems publications that you will find useful include:

- Sun System and Network Administration.

  This manual is supplied by Sun Microsystems and contains information that all system administrators of Sun NFS servers should be familiar with and have available for consultation.

- SunOS 4.1.2 Reference Manual.

  This manual is supplied by Sun Microsystems and contains information that all Sun system users will need.

- Sun Cardcage Slot Assignments and Backplane Configuration Procedures.

  This manual is supplied by Sun Microsystems and contains required information for adding hardware to a Sun file server.

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Software Installation

This section describes the installation procedure for the Interphase V/SCSI-2 4220SN software.

Backup copies of all system files which are replaced or modified are made prior to any changes. If a previous version of the 4220SN driver is installed, the software automatically detects the prior installation and users are prompted to perform the update procedure.

Users installing one Cougar board and the default configuration of up to eight disks, two cartridge tapes, two exabyte tapes, and two cdroms should use the Auto installation. All other situations require a Custom installation.

Please read through the entire software installation procedure prior to installing the software. Make sure that disk space, operating system and installation media requirements are met prior to initiating the installation process.The requirements are listed below.

If you have any questions regarding the installation, usage, or troubleshooting of 4220SN software or hardware during the warranty period, please call Interphase Customer Service. Save all packing materials in case you need to return an item to Interphase Corporation for service.

Before You Start

Several requirements must be fulfilled to ensure a successful installation. Interphase Corporation recommends your system be backed up prior to installing or updating your board. Review the steps to install the software and have the necessary information ready before beginning the process.

Disk Space Requirements

*   Approximately 2.6 megabytes of disk space in */usr* for binaries and to build a new kernel.

*   Approximately 1.5 megabytes of disk space in / for a new kernel.

*   At least 0.75 megabytes of free disk space in either the */usr/tmp, /var/tmp* or */tmp* file system. If space is unavailable, the Installation program will prompt for another file system with enough free space. Use **df**(1) to find an appropriate file system.

Operating System Requirements

- SunOS version 4.1.1, 4.1.2 or 4.1.3 on the target server on which the 4220SN will be installed.

Hardware Requirements

- The device name of the tape drive or CD-ROM from which you are installing the 4220SN software. If the tape drive is remote, the node name of the remote host that controls the tape drive is also required.

- The 4220SN software product installation tape or CD-ROM installation disk.

Security Requirements

- If the installation media is mounted remotely, the files must be accessible with root privileges from the local host.

- If using a tape drive on a remote host, please ensure that the local host is in the remote host's */.rhosts* file.

If these conditions can not be ensured, the installation process should not be started.

The installation program loads the software distribution into a directory specified by the user. By default, files are placed in the */usr/tmp/unbundled/VC* subdirectory.

Once the files are loaded, the install program is executed, files are placed in their ultimate location and the 4220SN software is installed.

Note

The install program preserves the original copy of any file it replaces or modifies under the name *./VC/file.orig* (in the original directory).

If the installation aborts for any reason, an informative error message is printed. Correct the problem and run the installation program again.

Standard system configurations will allow the installation process to function using the 'Automatic procedure. Sites which have a nonstandard configuration may require that a portion of the installation functions be performed manually using the Custom procedure.

Loading and Installing the 4220SN Software

The software installation is largely automated. If for any reason the installation should fail, fix the problem and restart the process. Running the install program several times in succession should cause no harm. The correct remedy for most failures (e.g., a write-protected directory or a filled file system) is to re-run the installation program (*/usr/etc/extract_unbundled*).

1. To begin the installation process, log in as *root*.

2. Load the tape or CD-ROM in the drive and execute the installation command.

    a. To install from a local CD-ROM drive, load the installation CD-ROM disk in the CD-ROM drive. Create a mount point and mount the CD-ROM drive.

        ```
        mkdir /cdrom
        mount -r /dev/sr0 /cdrom
        ```

        Change the working directory to the mount point, and execute *cdinstall*.

        ```
        cd /cdrom
        ./cdinstall
        ```

    b. If the CD-ROM is remote, it is mounted as an NFS file system on the machine on which the 4220SN will be installed.

        Load the installation CD-ROM disk in the CD-ROM drive, mount the CD-ROM and export the CD-ROM file system. This is done on the system to which the CD-ROM is attached.

        ```
        hostprompt# rlogin remotesystem
        remoteprompt# mount -r /dev/sr0 /cdrom
        remoteprompt# exportfs -i -o ro /cdrom
        remoteprompt# logout
        ```

If necessary create a mount point and mount the CD-ROM via NFS.

```
hostprompt# mkdir /cdrom
hostprompt# mount -r remotesystem:/cdrom /cdrom
```

Change working directories to the mount point and execute *cdinstall.*

```
hostprompt# cd /cdrom
hostprompt# ./cdinstall
```

If using *cdinstall* to install your software proceed to Step 4.

c. For installation from a tape, place the tape in the drive and execute the *extract_unbundled* command.

```
/usr/etc/extract_unbundled
```

The following shows the beginning of a typical installation using *extract_unbundled.*

3. Identify the installation media location.

```
Enter media drive location [local | remote]: local
```

a. Enter **remote** to access the installation media across a network. The local host should be in the remote host's */.rhosts* file.

Enter **local** if the installation media is directly connected to the machine being updated.

b. Enter the name of the device where the installation media will be located.

If the device is remote, the following prompt is displayed.

```
Enter the hostname of remote drive:
```

If the device is local, the following prompt is displayed.

```
Enter Device Name (e.g. rst0, rmt0, rfd0c) : /dev/rst0
```

c. Press **Return** when the media is in place.

```
**Please mount the release media if you haven't done so already.**
Press return when ready:
```

4. The installation program is starting. First the product and files to be installed on your system are identified. The file sizes and dates detailed in the following screen may vary from the examples depending on the release version installed.

```
The following product will be installed:
2+0 records in
2+0 records out

Interphase V/SCSI-2 4220SN Cougar Controller Release 1.0.2
(Fri Apr 16 09:34:14 CDT 1993) for SunOS 4.1.1 and higher
Copyright (c) 1992,1993 Interphase Corporation. All Rights Reserved.

        Type  KBytes    File
-------------------------------------------------
file 1: ascii 2         This_File
file 2: tar   32        install_unbundled.tar
file 3: tar   1744      4220SN_A02_BIN.sun4.tar
file 4: tar   1744      4220SN_A02_BIN.sun4m.tar
file 5: ascii 4         COPYRIGHT_NOTICE
-------------------------------------------------

Do you want to continue [y|n]? y
```

Defaults are indicated in brackets "[   ]".

To install this product, enter **y** at the prompt *Do you want to continue [y / n]?*.

To halt installation, enter **n** and the Unix prompt is displayed.

5. If a recent backup of your system has not been performed, it is highly recommended that a backup be done now.

```
/usr/etc/extract_unbundled : Extracting Installation Scripts
tar: blocksize = 32
x ./install_unbundled, 7515 bytes, 15 tape blocks
x ./Prerequisites.sh, 3625 bytes, 8 tape blocks
x ./PRODUCT, 501 bytes, 1 tape blocks

/usr/etc/extract_unbundled : Begin Install Script Execution

 Although the following installation is expected to install and
 work normally, Interphase Corporation strongly recommends you
 make backups (i.e. copies) of your Operating System files
 prior to performing the following installation.


CONTINUE INSTALLATION OR EXIT TO BACKUP FILES [C|E] ?
```

To exit the installation process, enter **e**. The Unix prompt is returned.

To continue the installation procedure, enter **c**.

```
     CONTINUING INSTALLATION


               .
               . (list of files omitted for brevity)
               .

 Finished reading tape into /usr/tmp/unbundled/VC ...

 Interphase V/SCSI-2 4220SN Cougar installation script.

 Initializing. OK.
```

Please proceed to Step 6.

6. The Cougar software programs are installed.

    a. **If this is a new installation**, the following is displayed.

    ```
    Verifying that enough room exists to install the V/SCSI-2 4220SN Cougar

    Installing V/SCSI-2 4220SN Cougar software ...

    V/SCSI-2 4220SN Cougar software installed OK.

    Current kernel configuration file is named GENERIC
    New kernel configuration file will be named GENERIC_VC

    Do you wish to name the new configuration file yourself? [y/n] n
    ```

    To allow the system to automatically name the kernel configuration file (GENERIC_VC), please enter **n** (no). Default configuration changes for the new file are detailed in Figure 2-1.

    To name the new kernel configuration file, please enter **y** (yes). The following prompt is displayed:

    ```
    Please Enter New Name, default: [GENERIC_VC] :
    ```

    Press **Return** to use the default name or enter a unique name for the new kernel configuration file. Proceed to the next step.

    b. **If this is an update to the software**, the software detects a prior installation on your system.

    The update process uses your current configuration. The Cougar device driver, the Disk Maintenance Utility and the Cougar Configuration Utilities are installed and a new kernel is built.

    To modify your devices or add more controllers, use the *scsi_cfg* utility after the update is performed.

The following message and prompt are displayed.

```
It appears that the V/SCSI-2 4220SN Cougar has already been
installed on this machine

Do you wish to update the V/SCSI-2 4220SN Cougar? [y|n] y
```

To retain the previous version, enter **n** (no). The installation program is exited and the Unix prompt is returned.

To update the software and to continue with the installation, enter **y** (yes).

The following information is displayed.

```
Verifying that enough room exists to install the V/SCSI-2 4220SN Cougar

Installing V/SCSI-2 4220SN Cougar software ...

V/SCSI-2 4220SN Cougar software installed OK.

To complete the V/SCSI-2 4220SN Cougar installation, it is necessary to
build a new Unix kernel.

Would you like the kernel named "GENERIC_VC" built automatically now [y|n] y
```

The program uses the name of the previous kernel configuration file.

7. The new kernel is identified and the default parameters are detailed on the following screen.

```
You may select the AUTO configuration or the CUSTOM configuration
for your system changes. If you select AUTO configuration, your
system will be modified with the following V/SCSI-4220SN additions

V/SCSI-4220SN        Base Address        Interrupt Vector
  vcc0                 9000 hex              e0 hex

Primary SCSI Channel id = 7     Secondary SCSI Channel id = 7

Dev Name     SCSI Id    Type     Dev Name     SCSI Id    Type
   vc0          0       disk        vc8          0       disk
   vc1          1       disk        vc9          1       disk
   vc2          2       disk        vc10         2       disk
   vc3          3       disk        vc11         3       disk
   vc4          4       tape        vc12         4       tape
   vc5          5       tape        vc13         5       tape
   vc6          6       cdrom       vc14         6       cdrom

The AUTO configuration is the default. If you wish to select
controllers or devices other than the AUTO configuration, you must
select the CUSTOM configuration option.

How do you wish to install (AUTO, CUSTOM or exit) [AUTO] : a
```

Figure 2-1. Default Device Parameters (AUTO Configuration)

To perform the Auto installation, allowing the program to perform the installation, enter **a** or press **Return** to accept the default. The above configuration is yielded. Step 8. explains the Auto procedure.

To do a Custom or manual installation, enter **c**. Proceed to the section, "Custom Installation Procedure" on page 2-11.

To halt installation, enter **exit**. The installation program will abort and the Unix prompt is returned.

Note

vc5 and vc13 are configured for exabyte tape devices by default when using the AUTO configuration.

Automatic Installation Procedure

The automatic installation streamlines the installation process. A new configuration file is built. The *conf.c* file, *devices* file and *files* file are modified. Device nodes are created for the devices shown in Figure 2-1.

A new kernel based on the new configuration file must be built and linked. The program will build and link the kernel automatically or allow the user to do so. The manual procedure requires system administration knowledge.

8. If the Auto configuration is selected, the following information is displayed.

```
Editing /sys/sun4/conf/GENERIC_VC
Editing /sys/sun/conf.c
Editing /sys/sun4/conf/devices
Editing /sys/sun4/conf/files

Creating scsi_util special device /dev/rsvc0
Creating Sun special device /dev/rsvc0c
Creating SCSA device /dev/rsiovc0
Creating blk/chr devices /dev/vc0[a-h], /dev/rvc0[a-h]
Creating scsi_util special device /dev/rsvc1
Creating Sun special device /dev/rsvc1c
Creating SCSA device /dev/rsiovc1
Creating blk/chr devices /dev/vc1[a-h], /dev/rvc1[a-h]
.
.
.

Creating chr devices /dev/rvc4v,  /dev/nrvc4v,  /dev/nrvc4f,  /dev/rvc4f,
                     /dev/rvc4vc, /dev/nrvc4vc, /dev/nrvc4fc, /dev/rvc4fc

Creating CD-ROM device /dev/vc6, /dev/rvc6
Creating SCSA device /dev/rsiovc6
.
.
.
V/SCSI 4220SN Cougar edits were successful and complete.

To complete the 4220SN installation, it is necessary to
build a new Unix kernel.

Would you like the kernel named "GENERIC_VC" built automatically now? [y|n] y
```

You may stop to make the new kernel manually or allow the program to build and link the kernel for you. To build and link the kernel, proceed to Page 2-20, Step 11.

Custom Installation Procedure

The Custom installation program also allows the user to install one or more boards accommodating any combination of supported SCSI devices on each board. The following device parameters must be user specified:

- SCSI channel (primary or secondary)
- Device type
- SCSI Id
- Logical Unit Number
- Use of Qtags
- Transfer Type
- Tape Type (if the device is a tape)

Various parameters for each controller and SCSI device must be specified. Interrupt vector and SHIO (short I/O) or hardware address of each controller must be assigned. Parameters for each controller are established on the Controller Configuration Menu shown in Figure 2-2. Device parameters are established on the Device Configuration Menu shown in Figure 2-4. Jumper settings based on the short I/0 addresses for each board specified are diagramed by the program.

Each 4220SN controller and SCSI device to be controlled via the 4220SN(s) must be individually installed for a custom installation. A new configuration file is created. The *conf.c* file is modified. Entries are added to the *devices* file and the *files* file to support the Cougar device driver. Device nodes for the new devices are automatically created.

A new kernel based on the new configuration file must be built and linked. The program will build and link the kernel automatically or allow the user to do so. The manual procedure requires system administration knowledge.

Appendix E includes a Controller/Devices Worksheet. Complete a worksheet for each controller as it is configured. This information is required for the hardware installation.

```
                  Controller Configuration Menu
                  ---------- ------------- ----

  V/SCSI-4220SN Cougars Installed

  Controller    Name     Address in hex     Interrupt Vector     Status
  ---------     ----     --------------     ----------------     ------
      0         vcc0          9000                  e0           Enabled
      1              >>> CONTROLLER NOT INSTALLED <<<
      2              >>> CONTROLLER NOT INSTALLED <<<
      3              >>> CONTROLLER NOT INSTALLED <<<
      4              >>> CONTROLLER NOT INSTALLED <<<
      5              >>> CONTROLLER NOT INSTALLED <<<
      6              >>> CONTROLLER NOT INSTALLED <<<


  Controller Commands:
  ---------- --------
     install controller,            disable controller,
     enable controller,             modify controller entry,
     change devices on controller,  ⊥ spawn shell,
     quit

  Please Enter Command (i:d:e:m:c:!:q) :
```

Figure 2-2. Controller Configuration Menu

Information for each board installed is entered on the Controller
Configuration Menu. Name, Address, Interrupt Vector and Status are
displayed for each board installed. If a board is not installed the
message >>> *CONTROLLER NOT INSTALLED* <<< is displayed on the
corresponding line.

The install controller option is used to add/install a controller.

The disable option deactivates a controller and all devices configured on
this controller, changing their status from "enabled" to "disabled".

The enable option reactivates a controller that was disabled, changing
its status from "disabled" to "enabled".

The modify controller option is used to change the values of an existing
controller entry.

The change devices option is used to access the "Device Configuration
Menu" where the devices connected to the chosen controller can be
added/removed/modified.

The ! spawn shell option permits the user to temporarily leave this program and run a Bourne shell.

The quit option allows the user to stop adding/modifying controllers and continue with the installation. (Be sure the devices are added prior to using this option.)

9. On the Controller Configuration Menu, enter **i** to install a controller.

    The controller is named automatically as shown in the prompt below.

```
Install Controller 0

Please Enter Controller 0 I/O Address in hex: 0x9000
```

a. Enter a starting address (in hex) for the controller's short I/O space.

    The address must be a multiple of 2k (0x800, 0x0000, 0x0800, 0x1000, ... 0xF000). The installation program checks if another controller is using the same base address and ensures that the address is a 2k multiple.

    #### Important

    The program can only check for another controller using the same base address. It does not know if its base address falls into the range of memory used by an existing controller. If another controller uses 0x9900 as a base address, the program can not detect 0x9800 as a problem.

    Using 0x9000, 0x9800, ... will work in most cases. If you have a problem or know that these addresses are in use, check your configuration file for the base addresses used and consult the manufacturer's specifications for the amount of short I/O space used by each controller. Each Cougar board always uses 2k (0x800) of short I/O space.

    Boards are jumpered to 0x9000 at the factory. Please refer to Chapter 3, Hardware Installation for instructions to set jumpers. After entering the base address to be used, a screen is displayed indicating the pins in jumper block J12 which need to be jumpered. Determine the name and address of each controller and write this information on the worksheet for the appropriate controller. To jumper your boards at this time, please refer to Chapter 3, step 4. for complete instructions.

If you have removed the board from its packaging and wish to check the settings, rotate the board to place P1 on the Bottom Right. Refer to Figure 3-3, page 3-9.

```
   Primary Base I/O Address Jumper Setting for V/SCSI-2 4220SN Cougar


          J     J     J     J     J     J     J     J
          1     1     1     1     1     1     1     1
          2     2     2     2     2     2     2     2

   Pin   15    13    11     9     7     5     3     1
         ---------------------------------------
         | o     o     o     o     o     o     o     o
         |                 |x|         |x|   |x|
         | o     o     o     o     o     o     o     o
         ---------------------------------------
   Pin   16    14    12    10     8     6     4     2
   |     |                                         |     |
   | P2  |                                         | P1  |
    ----                                            ----


Please update your worksheet for this board, now

   <Press Return to Continue>
```

Figure 2-3. Screen for Changing Default I/O Address Jumpers

Table 3-4 (page 3-12) shows the jumper settings for all possible addresses.

b. Enter the Interrupt Vector value (in hex). The program will check the value against the configuration file and request a new value if the value entered is in use. Each interrupt vector must be unique. Changing Interrupt Vectors does not require hardware changes.

```
Please Enter Interrupt Vector in hex, 0xe0
```

The controller address and interrupt vector are entered, and the
following message is displayed.


```
Controller 0 Installed

Editing /sys/sun/conf.c
```


10. After the controller is installed, the Device Configuration Menu is
    displayed. Install/modify each SCSI device using this menu.


```
                    Device Configuration Menu

Controller      Name      Address in hex    Interrupt Vector      Status
----------      ----      --------------    ----------------      ------
    0           vcc0          9000                 e0            Enabled

Dev #  Type   Name  ID  LUN  Chn   Qtags   Xfer Type  Tape Type      Status
-----  ----   ----  --  ---  ---   -----   ---------  ---------      ------
  0    >>> DEVICE NOT INSTALLED <<<
  1    >>> DEVICE NOT INSTALLED <<<
  2    >>> DEVICE NOT INSTALLED <<<
  3    >>> DEVICE NOT INSTALLED <<<
  4    >>> DEVICE NOT INSTALLED <<<
  5    >>> DEVICE NOT INSTALLED <<<
  6    >>> DEVICE NOT INSTALLED <<<
  7    >>> DEVICE NOT INSTALLED <<<
  8    >>> DEVICE NOT INSTALLED <<<
  9    >>> DEVICE NOT INSTALLED <<<
 10    >>> DEVICE NOT INSTALLED <<<
 11    >>> DEVICE NOT INSTALLED <<<
 12    >>> DEVICE NOT INSTALLED <<<
 13    >>> DEVICE NOT INSTALLED <<<
 14    >>> DEVICE NOT INSTALLED <<<
 15    >>> DEVICE NOT INSTALLED <<<

Device Commands:
---------------
   install device,      disable device,
   enable device,       modify device entry,
   ! spawn shell,       quit -- return to controller menu

Please Enter Command (i:d:e:m:!:q) :
```


Figure 2-4. Device Configuration Menu

Device commands are:

The install option is used to install a device.

The disable option is used to take a device out of service and marks its status "disabled".

The enable option is used to place a disabled device into service.

The modify option allows the user to change values for a chosen device.

The ! spawn shell option permits the user to temporarily leave this program and run a Bourne shell.

The quit option returns the Controller Configuration Menu.

a. Enter **i** on the Device Configuration Menu to install a device. The first device on each controller should be device 0 (e.g., have a SCSI ID # of 0) on the primary port.

b. Enter **p** or **s** for primary or secondary (main board or daughter card) in response to the prompt:

```
Devices may be installed on the primary SCSI channel or the
secondary SCSI channel if a V/SCSI-4220SN SCSI daughter card
is installed. Logical device 0 must always be installed and
enabled for proper operation of the devices configured on each
controller.

Please Enter Channel, (p)rimary, (s)econdary, default:[primary] : p
```

c. Enter **d**, **t** or **c** for disk, tape, or cd-rom. This is the type of device you are installing.

```
Please Enter SCSI Device Type: disk, tape or cdrom default:[disk]:d
```

Note

The first device installed on each controller must be on the Primary port.

d. Enter the SCSI Identifier of the device you are installing. The controller itself had its SCSI IDs (main board and daughter card) set to 7 at the factory. Each device should have a separate and unique number. The primary and secondary ports are totally independent from each other for SCSI IDs. Please mark on your worksheet the SCSI IDs assigned to each device and check the devices to ensure that IDs correspond.

```
Please Enter Device SCSI Id, 0 thru 6. default:[0] : 0
```

e. Designate the logical unit number, if more than one logical unit is using the same SCSI ID.

```
Please Enter Logical Unit Number, 0 thru 7. default:[0] : 0
```

f. Queue Tags are enabled or disabled using this option. **Remember SCSI-1 devices, tape devices, and some SCSI II disks do not support Queue Tags**.

```
Please Enter Queue Tags: (d)isable, (e)nable. default:[disable]:
```

g. Specify the transfer type. Enter **s** for synchronous or **a** for asynchronous.

```
Please Enter Transfer Type: (s)ynchronous, (a)synchronous,
default:[sync] :
```

h. If the device type is tape, the prompt requests the tape type. The tape type determines the transfer block size. Enter the type of tape used. Enter **c** if the tape is 1/4 inch cartridge tape or **d** for DAT or Exabyte.

```
Please Enter Tape Type: (c)=1/4"cart. (d)=DAT/Exabyte,default:
[1/4"cart.] :
```

A message identifying the device installed and the device nodes created is displayed.

```
Controller 0, Device 0 Installed

Creating special devices /dev/vc0[a-h], /dev/rvc0[a-h],
/dev/rsvc0
```

The Device Configuration Menu with the device information completed for installed devices is displayed:

```
                     Device Configuration Menu

Controller     Name     Address in hex     Interrupt Vector     Status
----------     ----     --------------     ----------------     ------
    0          vcc0          9000                 e0            Enabled

Dev #  Type   Name  ID  LUN  Chn   Qtags   Xfer Type  Tape Type   Status
-----  ----   ----  --  ---  ---   -----   ---------  ---------   ------
  0    disk   vc16  0    0   Pri  Disabled   Sync        n/a      Enabled
  1    >>> DEVICE NOT INSTALLED <<<
  2    >>> DEVICE NOT INSTALLED <<<
  3    >>> DEVICE NOT INSTALLED <<<
                  .
                  .
                  .
 12    >>> DEVICE NOT INSTALLED <<<
 13    >>> DEVICE NOT INSTALLED <<<
 14    >>> DEVICE NOT INSTALLED <<<
 15    >>> DEVICE NOT INSTALLED <<<

Device Commands:
---------------
   install device,       disable device,
   enable device,        modify device entry,
   ! spawn shell,        quit -- return to controller menu

Please Enter Command (i:d:r:m:!:q) :
```

i. Enter **i** to install an additional device (refer to Step a. on page 2-16).

    *The first device on each controller **must not** be disabled unless the controller has been disabled.*

    When all devices for the controller are installed, enter **q**. The Controller Configuration Menu is displayed.

```
Controller 1, Device Modifications Complete
                 Controller Configuration Menu

V/SCSI-4220SN Cougars Installed


Controller     Name     Address in hex     Interrupt Vector     Status
----------     ----     --------------     ----------------     ------
    0          vcc0         9000                  e0            Enabled
    1              >>> CONTROLLER NOT INSTALLED <
    2              >>> CONTROLLER NOT INSTALLED <<<
    3              >>> CONTROLLER NOT INSTALLED <<<
    4              >>> CONTROLLER NOT INSTALLED <<<
    5              >>> CONTROLLER NOT INSTALLED <<<
    6              >>> CONTROLLER NOT INSTALLED <<<


Controller Commands:
-------------------
  install controller,            disable controller,
  enable controller,             modify controller entry,
  change devices on controller,  ! spawn shell,
  quit


Please Enter Command (i:d:e:m:c:!:q) :
```

j. Enter **i** to install another controller (refer to Step 9. on page 2-13)
    When all controllers are installed, enter **q** to start the system
    re-configuration process.

The system files are modified and the device nodes are made to
conform to the configuration.

Building the Kernel

11. The user has the option to allow the installation software to build and link the kernel or to manually build and link the kernel.

```
System Configuration File, Modification Complete


V/SCSI-2 4220 Cougar edits were completed successfully.

To complete the 4220SN installation, it is necessary to
build a new Unix kernel.

Would you like the kernel named "GENERIC_VC" built automatically now? [y|n] y
```

Step a. details the system-generated process. Step b. outlines the instructions to manually build and link the kernel.

a. Enter **y** to allow the program to build and link the kernel for you. The following details the process performed by the system. Please write down the name of your new kernel for future reference.

```
Building a new kernel. This may take a while.
cd /sys/sun4/conf
config GENERIC_VC1
Doing a "make depend"
cd ../GENERIC_VC1
make

cc -sparc -c -O -Dsun4 -DROCKET_NC DSUN4_470 -DOMNINET -DOLDSCSI -DHSFS -DNFSSERVER
        -DNFSCLIENT -DUFS -DINET -DKERNEL -I. -I.. -I../.
cc -sparc -c -O -Dsun4 -DROCKET_NC DSUN4_470 -DOMNINET -DOLDSCSI -DHSFS -DNFSSERVER
        -DNFSCLIENT -DUFS -DINET -DKERNEL -I. -I.. -I../.
cc -sparc -c -O -Dsun4 -DROCKET_NC DSUN4_470 -DOMNINET -DOLDSCSI -DHSFS -DNFSSERVER
        -DNFSCLIENT -DUFS -DINET -DKERNEL -I. -I.. -I../.




            .
        .  [Complete listing has been omitted for brevity]
            .

loading vmunix
rearranging symbols
text        data        bss         dec         hex
1105920     207024      188136      1501080     16e798
```

```
Your new kernel has been built, installed as /vmunix.generic_vc1,
and linked to /vmunix.

The current running kernel /vmunix.generic_vc has been moved to
/vmunix.last

You will need to perform the following list of tasks to complete
the installation of the V/SCSI-2 4220SN Cougar.

    /usr/etc/shutdown -fh +5 to install GENERIC_VC1 kernel
    Power off the server.
    Install the V/SCSI-2 4220SN Cougar hardware.
    Connect additional SCSI devices.
    Restart the system.

Now please continue with the installation instructions in the
Interphase V/SCSI-2 4220SN Cougar Installation Manual.
```

b. Enter **n** to build and link the kernel manually.

```
The man pages for the Interphase V/SCSI-2 4220SN Cougar utilities and software
are now available on this system. To access them when using the man command,
set the MANPATH shell environment variable to include "/usr/man/VC" before
"/usr/man".

You may need to export this directory for mounting by clients who need access
to these server specific man pages.

Before you can use the new hardware, you must make and install the
new kernel. You can continue with the hardware installation now
or after you build the new kernel (the configuration filename is
GENERIC_VC).
```

Caution

If the *n* option is selected, your hardware will not function
properly until a new *vmunix* made from the new configura-
tion file is built and installed.

Interphase Corporation highly recommends allowing the program to build and link the kernel. Only users who have a high degree of expertise with kernels and Unix configuration files should build and link the kernel manually.

To build the kernel, perform the following commands at the Unix prompt:

```
cd /sys/sun4/conf
config [newkernelname]
```

See manpage config(8) for more information. The subdirectory in the above example may vary depending on the Sun Station on which the software is installed: i.e., use Sun4 for 400 series; Sun4m for 600 series.

The message *doing make depend* is displayed on the screen.

```
cd ../newkernelname
make
```

To retain a copy of the old kernel (in the root directory), the kernel must be renamed to prohibit overwriting the file. Rename the old kernel using the following command:

```
mv /vmunix /vmunix.pre_vc
```

Move new kernel to the root directory:

```
mv ./vmunix /newkernelname
```

Create a symbolic link to the new kernel:

```
ln -s /newkernelname /vmunix
```

Completing Your Software Installation

12. If the 4220SN software was installed from a tape, remove the tape from the drive and store it safely.

    If you installed the 4220SN software from CD-ROM using *cdinstall*, eject the disk and store it safely. The following commands will assist in ejecting the CD-ROM drive.

    a. Change directory to *root*.

    ```
    cd  /
    ```

    b. Eject the disk from the CD-ROM drive.

    ```
    eject /dev/sr0
    ```

13. Modify your *MANPATH* environmental variable to include */usr/man/VC.* Your *.cshrc* or *.profile* file may require changes also. Export the 4220SN man page directory.

14. Shutdown the system.

    ```
    /usr/etc/shutdown -fh +5
    ```

    Once the software installation is completed, install the board(s) in the server as described in Chapter 3.

Software Installation Utilities

In addition to the installation program, Interphase provides several other programs for verifying, deinstalling, and reinstalling your configuration files.

The *verify* Program

The *verify* program checks that all 4220SN files were properly installed and that the 4220 kernel is running on the system.

Before you execute the *verify* program, reboot the system with the new kernel. Change directory to */usr/etc/install/VC*. The syntax for the program is shown below:

```
verify
```

The following information is displayed upon running this utility

```
V/SCSI 4220SN Cougar verification script.

Initializing .....OK.

Kernel installation of V/SCSI-2 4220SN Cougar verified OK.

Verifying V/SCSI-2 4220SN Cougar software installation...

V/SCSI-2 4220SN Cougar software verified OK.

Software verification finished.
```

The *deinstall* Program

The 4220SN *deinstall* program is used to remove the Cougar configuration from the kernel if the user needs to use the previous kernel.

The *deinstall* program restores the original copies of the system configuration and data files back to their original locations and moves the 4220SN versions of the files into a VC subdirectory. For example, *deinstall* moves the current */usr/sys/sun/conf.c* file to */usr/sys/sun/VC/conf.c.vc*, and it moves the original copy located in */usr/sys/sun/VC/conf.c.orig* to its original location. The executable kernel

file is changed. The *deinstallation* process is not complete until you reboot the server with the original (non-4220SN) kernel.

Note

If the configuration files are changed after the 4220SN software is installed, the system reverts to the state it was in immediately before the 4220SN installation when *deinstall* is run. Any changes to the system after installing the 4220SN and prior to deinstalling, are lost.

A subsequent execution of the *reinstall* program will restore the 4220SN files to their proper locations.

Before you execute the *deinstall* program you must change directory to */usr/etc/install/VC*. The syntax for the program is shown below:

```
deinstall [-n]
```

The *-n* switch prevents the *deinstall* program from executing any commands. Instead it prints each of the commands it would have executed at the standard output.

The following information is displayed.

```
V/SCSI-2 4220SN Cougar deinstallation script.

Initializing.....OK.

You are about to deinstall the V/SCSI-2 4220SN Cougar software.
This process will not delete any files, but will move them into
a place from which they may be reinstalled later.

Are you sure you really want to do this? [y|n]

Deinstalling V/SCSI-4220SN Cougar software...

V/SCSI-4220SN Cougar software deinstalled OK.

Make sure to re-install your previous UNIX kernel as /vmunix
before rebooting.
```

Enter **y** at the prompt *Are you sure you really want to do this?* to continue the deinstallation process.

The *reinstall* **Program**

The 4220SN *reinstall* program is the complement to the 4220SN *deinstall* program. It restores all of the copies of the 4220SN executable, data, and configuration files that were moved by *deinstall.*

The 4220SN *reinstall* program moves the original copies of the 4220SN system configuration and data files back to their original locations and moves the original versions of the files into an VC subdirectory. For example, *reinstall* moves the current */usr/sys/sun/conf.c* file to */usr/sys/sun/VC/conf.c.orig*, and it moves the 4220SN copy located in */usr/sys/sun/VC/conf.c.vc* to its installed location */usr/sys/sun/conf.c.*

Note

The reinstallation process is not complete until you reboot the server with the vc kernel.

A subsequent execution of the *deinstall* program will restore the SunOS files to their original locations.

Before executing the *reinstall* program, change directory to */usr/etc/install/VC.* The syntax for the program is shown below:

```
reinstall [-n]
```

The *-n* switch prevents the *reinstall* program from executing any commands. Instead it prints each of the commands it would have executed to the standard output.

The following information is displayed.

```
V/SCSI-2 4220SN Cougar reinstall script.

Initializing.....OK.

You are about to reinstall the V/SCSI-2 4220SN Cougar software.
This process will not delete any files, but will move them into
a place from which they may be deinstalled later.

Are you sure you really want to do this? [y|n]

Reinstalling V/SCSI-4220SN Cougar software...

V/SCSI-4220SN Cougar software reinstalled OK.

Make sure to re-install the UNIX kernel you built during the
installation phase.
```

Enter **y** at the prompt, *Are you sure you really want to do this?*, to continue reinstallation.

The *scsi_cfg* utility

The *scsi_cfg* utility is used to install, enable and modify controllers and devices after installation is completed.

The system automatically uses the current kernel configuration file name and adds the suffix *_VC*. The system allows the user to assign a unique name for the new configuration file.

To access the utility, enter the following:

```
cd /usr/etc/install/VC
scsi_cfg
```

The following messages and prompt are displayed:

```
V/SCSI-2 4220SN Cougar SCSI Configuration Utility.

Initializing ........ OK.

The V/SCSI-2 4220 Cougar installation has detected GENERIC_VC as the
current system configuration file. The V/SCSI-2 4220 Cougar
installation will create a new configuration file GENERIC_VC_VC based on
GENERIC_VC unless you supply an alternate name.

Current kernel configuration file is named GENERIC_VC
New kernel configuration file will be named GENERIC_VC_VC

Do you wish to name the new configuration file yourself? [y|n] y

Please Enter New Name To Use, default:[GENERIC_VC2]
```

Enter the new name of the kernel. The Controller Menu is displayed. See page 2-12 for information about the Controller Menu.

3

Hardware Installation

Before attempting installation, read this chapter thoroughly to ensure the safe installation of the Cougar board into your system. If any questions regarding installation are not answered in this chapter, please contact Interphase Customer Service.

Note

If software was installed using Auto installation, your configuration file was set to use the factory default I/O address. In this case, do not change the factory default I/O address.

If the custom software installation is used, the jumpers are user-specified for the short I/O address(es) that the board(s) will use.

Installation Prerequisites

Installing the Hardware

The following items may be needed when installing the 4220SN.

- A standard (flat blade) screwdriver
- A 2mm (or 5/64") allen wrench
- Your Sun hardware manuals

Note

The Software installation portion of the installation process (Chapter 2) should be completed prior to installing the hardware.

Configuring the 4220SN

The 4220SN must be properly configured before installing. The following steps must be performed:

- Configure the SCSI devices
- Verify that the terminators are installed correctly
- Place the 4220SN board into the Sun chassis
- Install cable from 4220SN to SCSI devices

SCSI Device Installation

Device Termination

SCSI devices are connected by a common cable for each SCSI system. All SCSI devices operate on common signals and have hardware "terminators" on both ends of the cable. Terminators can be connected to either SCSI devices or SCSI cables. They are required to ensure reliable data transfers.

Devices connected to SCSI cables must have the correct number of terminators to operate properly and to prevent damage to the SCSI chip. Only two terminators, one at each end of the cable, can be on a SCSI cable. If more than two SCSI devices are connected to a SCSI cable, the terminators on the middle devices must be removed. Please refer to Figure 3-1 for possible configurations in a SCSI system.
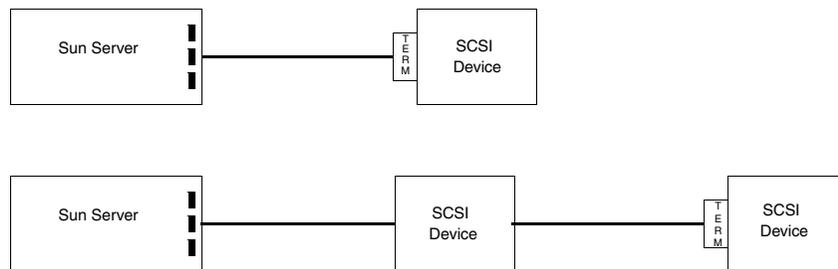
Figure 3-1. SCSI Terminator Configuration

1. Check SCSI Termination

    SCSI specifications require the bus to be terminated at both ends of the SCSI cable. ***No other termination is allowed.*** Otherwise, a bus impedance mismatch will occur.

    The 4220SN primary channel (Channel 0) and optional secondary SCSI channel (Channel 1) are provided with separate terminating resistors. The following statement applies to either channel: If the port is at either end of the SCSI cable, the terminating resistors of the channel should be left in place. If the port is not at the end of the cable, the termination should be removed. All versions of the 4220SN and its daughter cards are shipped with termination installed.

    It is recommended that the 4220SN be strapped to supply termination power to the SCSI Bus.

    Table 3-1. Termination SIP Resistors

Type of Board	SIP Resistors
Single-Ended Motherboards	RP1, RP2
Single-Ended Daughter cards	RP1, RP2
Differential Motherboards	RP1, RP2, RP3, RP4, RP5, RP6
Differential Daughter Card	RP1, RP2, RP3

    These resistors provide termination for Channel 0. Most standard configurations will require leaving these resistors installed. If Channel 0 is not at one end of the SCSI cable, remove these resistors from the motherboard/daughter card. To determine the location of the resistors, refer to Figure 3-2.

Single-Ended Motherboard   Differential Motherboard

Single-ended Daughter Card   Differential Daughter Card
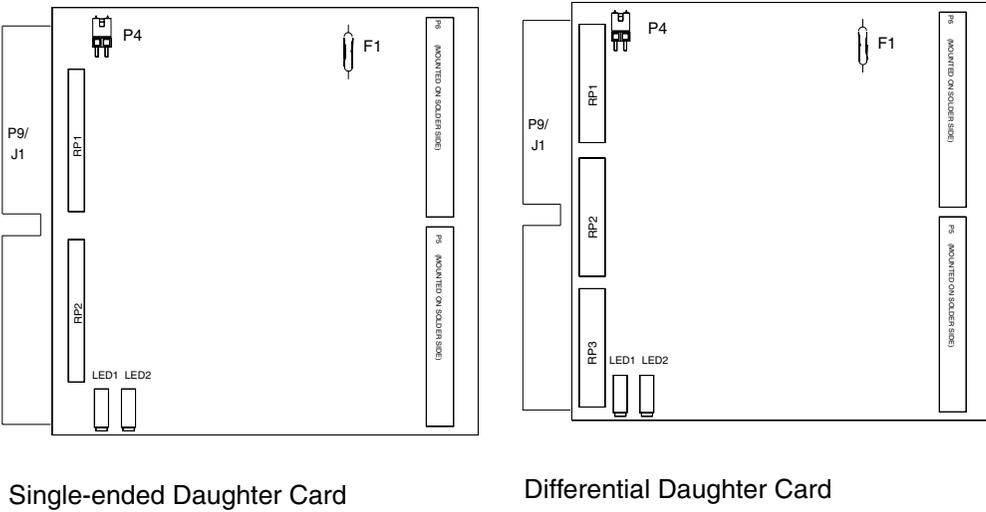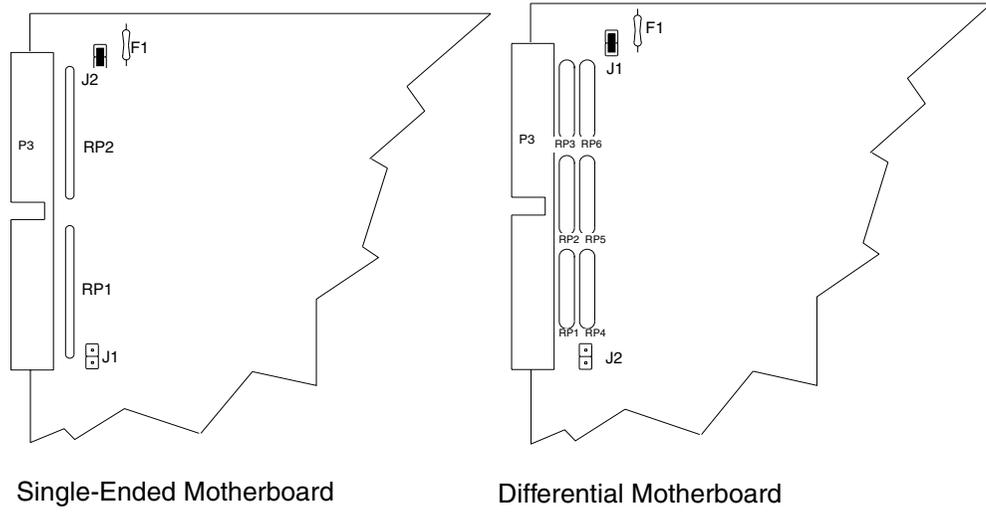
Figure 3-2. Termination for 4220SN Boards

SCSI Device IDs

The SCSI ID is a number assigned to any SCSI device. This number must be between 0 and 7. The SCSI ID number is used by the computer to communicate with connected devices. Each SCSI device on the same SCSI bus must have a unique ID number to identify it. When two or more SCSI devices communicate, a SCSI device should be designated as either an initiator or a target; however, some devices are capable of either function. The 4220SN functions as an initiator only. Devices with higher ID numbers have a higher priority when communicating on the SCSI bus.

Most SCSI peripheral devices are shipped with a preset/preassigned SCSI ID number. A SCSI ID switch is located on the back panel of most devices. Refer to the user's manual for each device to change the SCSI ID number.

2. Check SCSI IDs

    a. Ensure no two devices on a channel have the same SCSI ID.

        Check worksheets for each controller to ensure no two devices on the same channel have the same SCSI IDs.

        Each motherboard is part of a primary channel (channel 0 default ID for the mother/daughter board is 7).

        Each daughter card is part of a secondary channel (channel 1 default ID for the mother/daughter board is 7).

    b. Make sure the SCSI ID of each device matches the entry made for it in the software during configuration.

        If AUTO installation was used in the software installation, the assigned IDs are listed in Figure 2-1 and in the example worksheet in Appendix E. If a CUSTOM installation was performed, the SCSI IDs were user-entered and should be recorded on a worksheet.

    c. Change IDs if necessary.

        Each SCSI ID is set on the physical device, following the manufacturer's instructions. If any physical device SCSI ID does not match the ID assigned in the configuration, consult the manufacturer's instructions and set those IDs to correspond to the software configuration.

        A SCSI ID can be changed on a motherboard by altering the jumper settings for J5 pins 1-6 (see Figure 3-3 or Figure 3-4). The board SCSI ID was set to 7 at the factory.

Table 3-2. Jumper settings for Primary SCSI Channel ID
(J5 pins 1-6).

Primary SCSI ID	Pin Number		
	1-2	3-4	5-6
0	On	On	On
1	On	On	Off
2	On	Off	On
3	On	Off	Off
4	Off	On	On
5	Off	On	Off
6	Off	Off	On
*7	*Off	*Off	*Off

* = Factory Default

A SCSI ID for a daughter card can be changed by altering the jumper settings for J5 pins 7-12 on the motherboard (see Figure 3-3 or Figure 3-4). The SCSI ID for the card was set to 7 at the factory.

Table 3-3. Jumper settings for Secondary Channel ID
(J5 pins 7-12)

Secondary SCSI ID	Pin Number		
	7-8	9-10	11-12
0	On	On	On
1	On	On	Off
2	On	Off	On
3	On	Off	Off
4	Off	On	On
5	Off	On	Off
6	Off	Off	On
*7	*Off	*Off	*Off

* = Factory Default

Caution

System power and peripheral power must be turned OFF before attempting to install the 4220SN. Failure to do so may result in severe damage to the board and/or system.

Cabling Requirements

Cabling Requirements. The proper cable must be used for your configuration. A twisted pair cable is required for differential boards. A 50 pin male DSub connector (part number AMP 746790) is recommended.

4220SN Hardware Installation

3. Prepare the Server for 4220SN Hardware Installation

    a. Expel all users from the server and shut it down with *shutdown(8)*. If you have previously run the *deinstall* script, run the *reinstall* script before shutdown.

    ```
    shutdown -fh +5
    ```

    b. Power the system down, and unplug it from the power outlet.

    c. Remove the cosmetic covers for your server to gain access to the backplane jumpers and the card slots. Please refer to the Sun hardware installation manual supplied with your server for specific instructions

    Take the proper precautions to prevent board damage due to ESD (i.e., wear a wrist ground strip or other grounding device).

    d. Determine the slot in which the 4220SN board will reside. Slots 8 or 9 in Sun 400 or 600 machines are recommended. A slot recommended for a disk controller is advised. Refer to Sun Backplane Configuration Guide for your system. Remove the mounting screw, face plate and filler panel from the chosen slot.
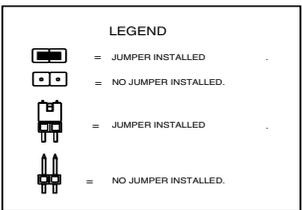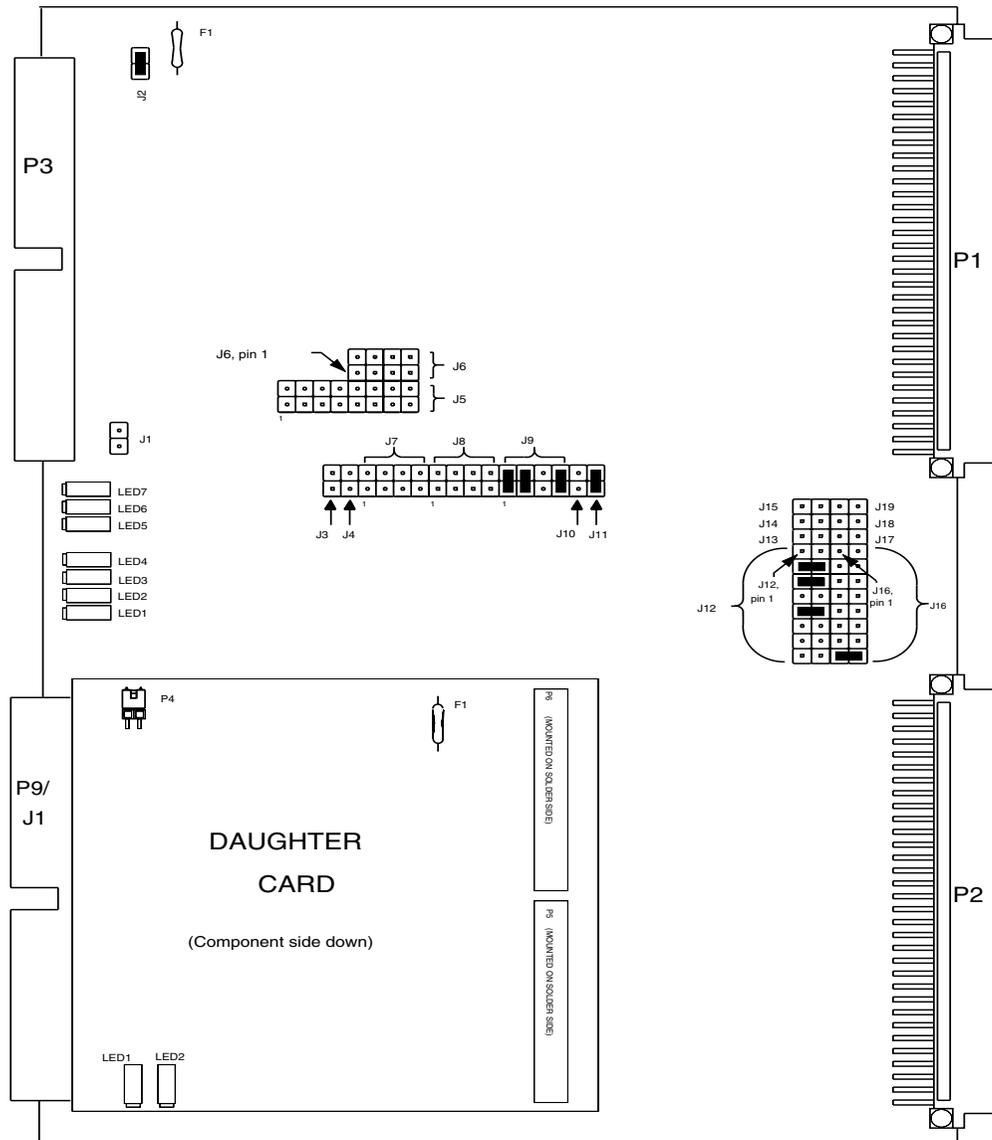
Figure 3-3. V/SCSI-2 4220SN Controller, Single-Ended Motherboard

4.   Inspect your 4220SN board(s) and check the strapping (i.e. jumper settings).

   a.   Remove the 4220SN from the anti-static bag, and visually inspect it to ensure no damage has occurred during shipment. A visual inspection usually is sufficient, since each board is thoroughly checked at Interphase just prior to shipment. If the board is undamaged and all parts are accounted for, proceed with the installation.

   b.   Ensure that the board is strapped according to the factory default configuration shown in Figure 3-3 or Figure 3-4. The default jumper settings in this figure are correct for most systems.

   It may be necessary to change your board's I/O address, which is strapped using jumper block J12. This is necessary if:

   • If you used the custom (**not** AUTO) software installation and specified an I/O address other than the default one of 0x9000. As previously noted, the I/O board addresses for the jumpers may be set when the kernel is configured during the software portion of the installation.

   • If you installed more than one 4220SN board, only one of the boards can have the default I/O address.

   If you do not need to change the default I/O address, refer to Step 5. Otherwise, strap J12 to the desired I/O address. The jumper settings for all possible I/O addresses are shown in Figure 3-3 or Figure 3-4.

5.   Carefully slide the 4220SN into the card slot. It should slide all the way in without any difficulty. Tighten the captive mounting screws on each end of the front panel.
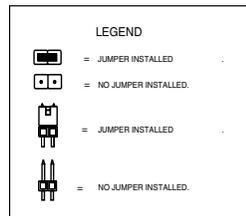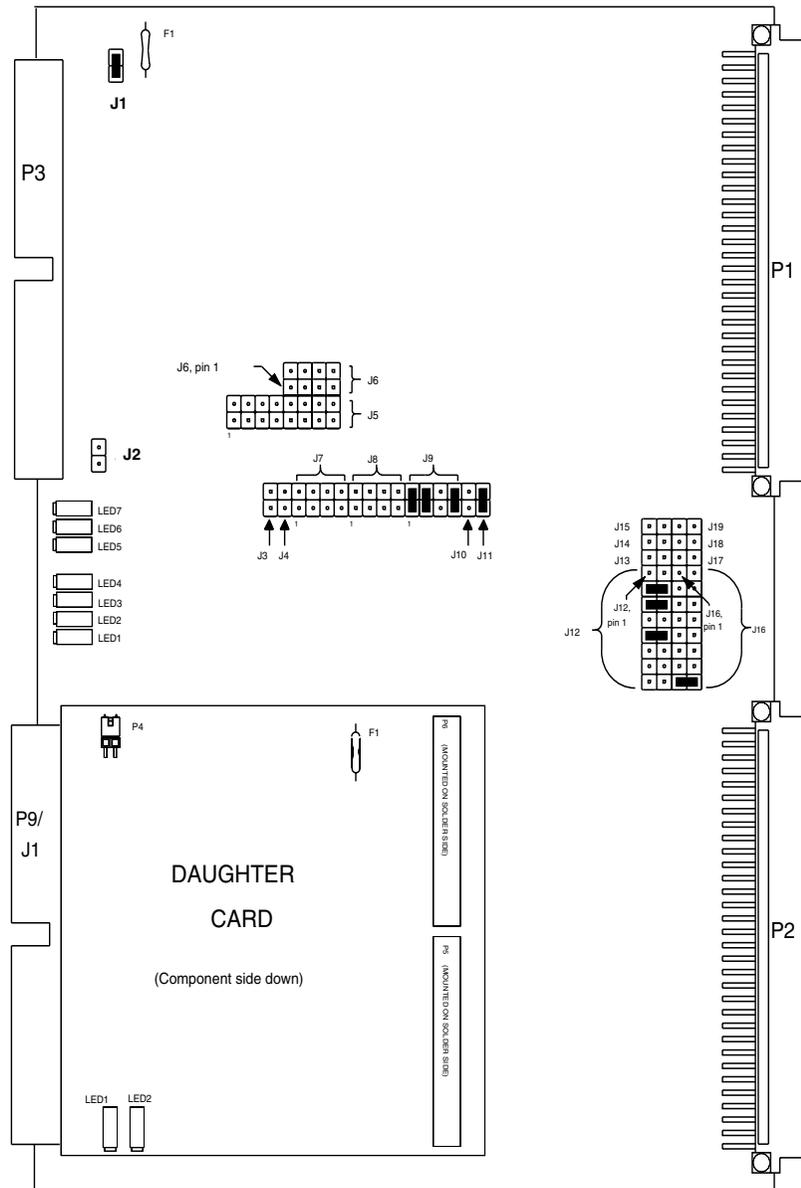
Figure 3-4. V/SCSI 4220SN Controller, Differential Motherboard

Table 3-4. Jumper Settings for I/O Addresses

Address (hex)	J12 Pin SettingS							
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16
0000	On	On	On	On	On	Off	Off	Off
0800	On	On	On	On	Off	Off	Off	Off
1000	On	On	On	Off	On	Off	Off	Off
1800	On	On	On	Off	Off	Off	Off	Off
2000	On	On	Off	On	On	Off	Off	Off
2800	On	On	Off	On	Off	Off	Off	Off
3000	On	On	Off	Off	On	Off	Off	Off
3800	On	On	Off	Off	Off	Off	Off	Off
4000	On	Off	On	On	On	Off	Off	Off
4800	On	Off	On	On	Off	Off	Off	Off
5000	On	Off	On	Off	On	Off	Off	Off
5800	On	Off	On	Off	Off	Off	Off	Off
6000	On	Off	Off	On	On	Off	Off	Off
6800	On	Off	Off	On	Off	Off	Off	Off
7000	On	Off	Off	Off	On	Off	Off	Off
7800	On	Off	Off	Off	Off	Off	Off	Off
8000	Off	On	On	On	On	Off	Off	Off
8800	Off	On	On	On	Off	Off	Off	Off
9000	Off	On	On	Off	On	Off	Off	Off
9800	Off	On	On	Off	Off	Off	Off	Off
A000	Off	On	Off	On	On	Off	Off	Off
A800	Off	On	Off	On	Off	Off	Off	Off
B000	Off	On	Off	Off	On	Off	Off	Off
B800	Off	On	Off	Off	Off	Off	Off	Off
C000	Off	Off	On	On	On	Off	Off	Off
C800	Off	Off	On	On	Off	Off	Off	Off

Table 3-4. Jumper Settings for I/O Addresses

D000	Off	Off	On	Off	On	Off	Off	Off
D800	Off	Off	On	Off	Off	Off	Off	Off
E000	Off	Off	Off	On	On	Off	Off	Off
E800	Off	Off	Off	On	Off	Off	Off	Off
F000	Off	Off	Off	Off	On	Off	Off	Off
F800	Off	Off	Off	Off	Off	Off	Off	Off

6. Connect the SCSI cables to the 4220SN(s) and its respective devices.

   P3 is the SCSI connector on the motherboard for channel 0. P9/J1 is the SCSI connector on the daughter card for channel 1. Be sure to connect the correct devices to the right cable (and board) if you are using

more than one SCSI cable. Refer to your device worksheet to see which device is assigned to each SCSI cable (and board, if installing more than one 4220SN).

Figure 3-5. 4220 Dual Channel Panel Kit Assembly

7. Double-check Cable Connections and SCSI IDs and Terminations

Most problems with SCSI devices result from poor cable connections, improper terminations or improper SCSI ID settings. Refer to your device worksheet to check which device is assigned to each SCSI cable (and board, if installing more than one 4220SN).

Configure Backplane Jumpers

Each slot on the card cage has jumpers on the backplane. These jumpers must be properly configured when installing 4220SN boards.

8. Configure the backplane jumpers for the boards you have added.

    The backplane jumper access panel is located in front of the server. Open the access panel. (Refer to the documentation received with your Sun system).

    Remove the interrupt acknowledge (IACK) and Bus Grant Level 3 (BG3) backplane jumpers for each slot in which an 4220SN board is installed.

    Save the jumpers for future use.

The figure below shows how the backplane jumpers should be configured for occupied and unoccupied slots (for the Cougar board).
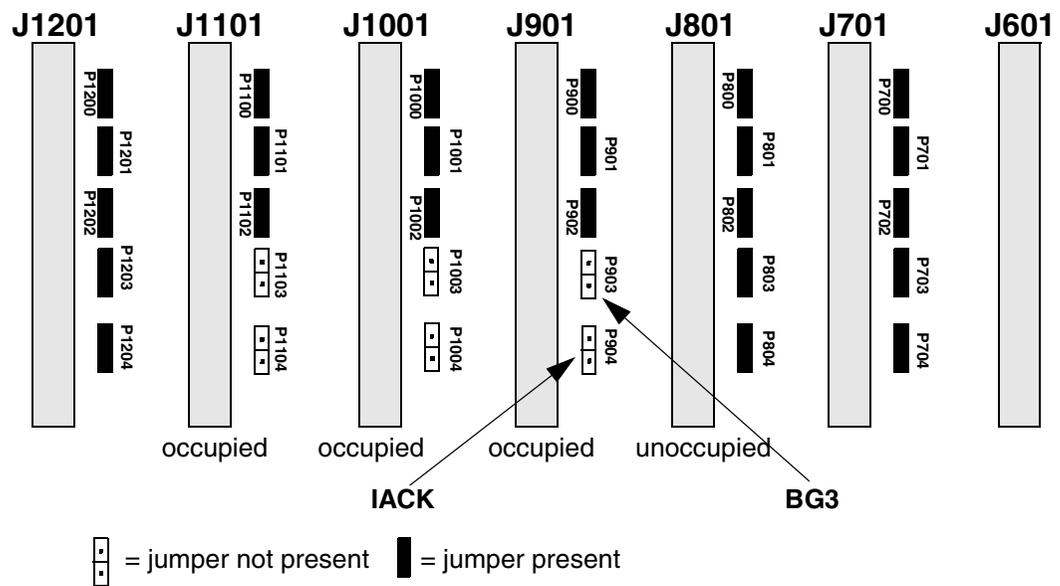
Figure 3-6. Setting Backplane Jumpers for Newly Occupied Slots

Reassembling Server Covers

9. Reassemble your server's covers as described in the Sun hardware installation manuals.

10. Connect your system to the power supply, and power up.

You have now completed the hardware installation portion for the 4220SN.

Verify Installation

11. Verify that the system is correctly configured and that installation is successful.

    a. Use the Unix *dmesg* utility to check if controller(s) and devices are listed in the booting routine as system is powered up.

        ```
        dmesg
        ```

A list of 4220 controllers and devices installed are displayed. The screen below is a sample listing produced via the *dmesg* utility.

```
Copyright (c) 1983-1991, Sun Microsystems, Inc.
cpu = Sun SPARCsystem 400
mem = 32768K (0x2000000)
avail mem = 30867456
Ethernet address = 8:0:20:a:bc:6a
isc0 at vme32d32 0x1080000 vec 0x4c
is0 at isc0 slave 0
idc0: ctlr message: 'F revision date = 8/28/90 , level = 254 '
id000: <CDC IPI 9722 cyl 1630 alt 1 hd 7 sec 156>
id000 at idc0 facility 0
idc0 at ipi 0xff
si0 at vme24d16 0x200000 vec 0x40
st0 at si0 slave 32
st1 at si0 slave 40
sr0 at si0 slave 48
sd0 at si0 slave 0
vcc0 Cougar 4220SN - Firmware <077-4   A13 04/20/1993>
vcc0             - Software <SH00043-A02 04/28/1993>
vcc0 at vme16d16 0x9000 vec 0xe0
vc0 at vcc0 slave 0
vc0: <SEAGATE ST41650        5092>  Transfer Rate  <5.0 MBytes/Second>
vc0: <WREN 8 cyl 2105 alt 2 hd 15 sec 89>
vc1 at vcc0 slave 8
vc1: <SEAGATE ST42400N       0111>  Transfer Rate  <10.0 MBytes/Second>
vc1: <ELITE II cyl 2625 alt 1 hd 19 sec 84>
vc2 at vcc0 slave 16
vc2: <HITACHI  DK515C         CP16>  Transfer Rate  <3.6 MBytes/Second>
vc2: <Hitachi DK515C         cyl 1359 alt 2 hd 14 sec 70>
vc3 at vcc0 slave 24
vc4 at vcc0 slave 32
vc4: <HP       HP35480A        A  >  Transfer Rate  <5.0 MBytes/Second>
vc8 at vcc0 slave 0
vc8: <SEAGATE ST4240N        0111>  Transfer Rate  <10.0 MBytes/Second>
vc8: <ELITE II cyl 2625 alt 1 hd 19 sec 84>
vc9 at vcc0 slave 8
vc9: <SEAGATE ST41650        5092>  Transfer Rate  <5.0 MBytes/Second>
vc9: <ELITE I cyl 2098 alt 1 hd 17 sec 75>
vc10 at vcc0 slave 16
vc10: <SEAGATE ST41650        5092>  Transfer Rate  <5.0 MBytes/Second>
vc10: <ELITE I cyl 2098 alt 1 hd 17 sec 75>
vc11 at vcc0 slave 24
vc12 at vcc0 slave 32
zs0 at obio 0xf1000000 pri 3
zs1 at obio 0xf0000000 pri 3
ie0 at obio 0xf6000000 pri 3
bwtwo0 at obio 0xfb300000 pri 4
bwtwo0: resolution 1152 x 900
ne0 at vme16d32 0x6000 vec 0xd4
```

    b. Run the *verify* utility to ensure that the software was successfully installed.

Tuning your Filesystem

12. Create and/or tune filesystems:

    Tune parameters should be set to optimize performance. The following tune parameters are recommended.

    Rotational Delay = 0 (zero)

    Contiguous Blocks = 7

    Either of two commands may be used to change or add filesystem tuning parameters. Please refer to the man pages for detailed information about these commands.

    newfs is used to create a filesystem. Data is destroyed using this command.

    ```
    newfs -d 0 -C 7 /dev/rvc0a
    ```

    tunefs is used to change the tuning parameters of the existing file system.

    ```
    tunefs -d 0 -a 7 /dev/rvc0a
    ```

4

Disk Maintenance Utility

The *scsi_util* utility allows you to perform a variety of system-level disk maintenance tasks. This utility is not compatible with the command Tool window. These include:

- Retrieving vendor related information such as the type of disk, the size of the disk, the firmware levels of various pieces of hardware, etc.

- Viewing the Label and partitioning information.

- Redefining the Label and partitioning information.

- Formatting disks.

- Performing a buffered disk surface scan for bad blocks.

- Performing a destructive disk surface scan for bad blocks.

- Reassigning bad blocks.

The first two options

```
[U] Unit Information


    Retrieving vendor related information


[V] View Label & Partitions


    Viewing label and partitioning information
```

do not destroy previously existing data on your disk.

On the other hand, the following options

```
[F] Format Disk


    Formatting disks.
```

```
[D] Destructive Surface Analysis


   A destructive disk surface scan for bad blocks.
```

will absolutely and irrevocably destroy any previous existing data on your disk. ***Perform a backup and/or move this data to another disk*** prior to performing this operation, if you wish to have a copy of the data from this disk.

Running the Utility

To start the program enter:

```
scsi_util <device-node>
```

where <device-node> is the character device node (*/dev/rvc0c* is partition "c" of the first disk on the first controller) or special device node (*/dev/rsvc0* for the first disk on the first controller) for the disk you wish to access.

Always use the special device entry (/dev/rsvc0) on drives that do not have a label. If the drive has a label, use */dev/rvc0c* which is the normal device entry for partition "c". To use the scan options, you must use partition "c" and partition "c" must include the entire disk.

The main menu is shown in Figure 4-1.

```
          Interphase Corporation V4220SN SCSI Disk Utility V1.0
                      Copyright(C) 1992


          *---------------------------------------------*
          |                 MAIN SELECTIONS             |
          |                                             |
          |   [U] Unit Information                      |
          |   [V] View Label & Partitions               |
          |   [M] Modify Label & Partitions             |
          |   [F] Format Disk                           |
          |   [B] Buffered Surface Analysis             |
          |   [D] Destructive Surface Analysis          |
          |   [R] Reassign Block                        |
          |                                             |
          |         [ Controller/Driver/Disk Info ]     |
          *---------------------------------------------*


            < Press '?' for Help, <ESC> to exit >
```

Figure 4-1. Main Menu of Disk Maintenance Utility

The options in the main menu are described separately in the following
subsections.

[U] Unit Information

This option displays information about the controller, disk type and device
driver.

```
        Interphase Corporation V4220SN SCSI Disk Utility V1.0
                        Copyright(C) 1992


Firmware Revision: 077-4-A03
     Date: 04301992
     Buffer Size in Kbytes: 0

Disk Vendor: CDC
     Product ID: 94171-9
     Revision: 6580
     Capacity (sectors): 640298


Driver Information: @(#)$Id: vc.c,v 1.4 1992/05/24 14:28:14 jdb Exp $




        < Press any key to continue >

```

Figure 4-2. Unit Information Menu of Disk Maintenance Utility

[V] View Label & Partitions

This option displays the existing label and partitioning information. This option should be used to validate the accessibility of the data on a disk moved from another SCSI controller to your controller.

```
            Disk Label & Partitions for Device: /dev/rsvc1


Ascii Label: Wren IV, SCSI-1 Cougar test disk cyl 1547  alt o hd sec46

Interleave Factor:  1                Part. A  start Cyl:         0
                                              no of Cyls:      100
No of Heads:  9                      Part. B  start Cyl:      100
                                              no of Cyls:      100
No of Data Cylinders: 1547           Part. C  start Cyl:         0
                                              no of Cyls:     1544
No of Sectors Per Track: 46          Part. D  start Cyl:      200
                                              no of Cyls:      200
No of Sectors Per Cylinder:  414     Part. E  start Cyl:      400
                                              no of Cyls:      200
                                     Part. F  start Cyl:      600
                                              no of Cyls:      200
                                     Part. G  start Cyl:      800
                                              no of Cyls:      700
                                     Part. H  start Cyl:     1500
                                              no of Cyls:       44


            < Press any key to continue >
```

Figure 4-3. Label and Partitions Menu of Disk Maintenance Utility

Some fields on this screen cannot be mofified. Use the Modify Label & Partition option to change the label or partitioning information.

[M] Modify Label & Partitions

Perform a backup and/or move this data to another disk prior to performing this operation if you wish to have a copy of the data from this disk.

This option allows you to modify your disk label or to re-partition your disk. This option should be used with a drive that does not have a valid label prior to making new file systems. It can also be used with an existing disk to repartition the disk (repartitioning will destroy existing data).

If your disk does not have a label, use the special device name.

```
 Disk Label & Partitions for Device: /dev/rsvc1



 The Disk Label is unreadable.  Make a new label? N



              < Press <ESC> to ABORT >
```

Figure 4-4. Modify Label and Partition Screen

To modify the label, type over the existing label. Any characters left on the screen from the old label is erased when you press **Return**. Some fields on this screen can not be modified. The software automatically makes inquiries of the device. Disk geometries (i.e., Interleave Factor, No of Heads, No of Data Cylinders, No of Sectors Per Track and No of Sectors Per Cylinder) are supplied by the device. The following shows an example of a modified screen.

```
        Disk Label & Partitions for Device: /dev/rsvc1


Ascii Label: Wren IV, SCSI-1 Cougar test disk cyl 1547  alt 3 hd sec 46
Interleave Factor:  1                    Part. A  start Cyl:         0
                                                  no of Cyls:       100
No of Heads:  9                          Part. B  start Cyl:       100
                                                  no of Cyls:       100
No of Data Cylinders: 1547               Part. C  start Cyl:         0
                                                  no of Cyls:      1547
No of Sectors Per Track: 46              Part. D  start Cyl:       200
                                                  no of Cyls:       200
No of Sectors Per Cylinder:  414         Part. E  start Cyl:       400
                                                  no of Cyls:       200
                                         Part. F  start Cyl:       600
                                                  no of Cyls:       200
                                         Part. G  start Cyl:       800
                                                  no of Cyls:       100
                                         Part. H  start Cyl:       900
                                                  no of Cyls:       644



                 < Press <ESC> to ABORT >
```

Figure 4-5. Example of Modified Label and Partitions Screen

If you don't wish to change the partitioning information, press **ESCape**. As shown below, existing data can be lost. (If the controller was able to read your existing label and you did not change any of the partitioning information, no data loss should occur.)

```
           Disk Label & Partitions for Device: /dev/rsvc1


Ascii Label: Wren IV, SCSI-1 Cougar test disk cyl 1547  alt o hd sec46
Interleave Factor:  1                    Part. A  start Cyl:        0
                                                  no of Cyls:     100
No of Heads:  9                          Part. B  start Cyl:      100
                                                  no of Cyls:     100
No of Data Cylinders: 1547               Part. C  start Cyl:        0
                                                  no of Cyls:    1544
No of Sectors Per Track: 46              Part. D  start Cyl:      200
                                                  no of Cyls:     200
No of Sectors Per Cylinder:  414         Part. E  start Cyl:      400
                                                  no of Cyls:     200
*** W A R N I N G ***                    Part. F  start Cyl:      600
Writing a new label will destroy                  no of Cyls:     200
any existing file systems and            Part. G  start Cyl:      800
DATA on your disk.                                no of Cyls:     100
                                         Part. H  start Cyl:      900
Write Label & Partitioning?: N                    no of Cyls:     644



                    < Press <ESC> to ABORT >
```

Figure 4-6. Label and Partitions Screen with Warning Message

Explicitly answer **Y** or **y** to write the new label. If **Return** is pressed without entering "Y" or "y", the default of "N" (no) is used and your label is not written to the disk.

```
          Disk Label & Partitions for Device: /dev/rsvc0


Ascii Label: Wren IV, SCSI-1 Cougar test disk cyl 1547  alt o hd sec46
Interleave Factor:  1                 Part. A  start Cyl:        0
                                               no of Cyls:     100
No of Heads:  9                       Part. B  start Cyl:      100
                                               no of Cyls:     100
No of Data Cylinders: 1547            Part. C  start Cyl:        0
                                               no of Cyls:    1544
No of Sectors Per Track: 46           Part. D  start Cyl:      200
                                               no of Cyls:     200
No of Sectors Per Cylinder:  414      Part. E  start Cyl:      400
                                               no of Cyls:     200
*** W A R N I N G ***                 Part. F  start Cyl:      600
Writing a new label will destroy               no of Cyls:     200
any existing file systems and         Part. G  start Cyl:      800
DATA on your disk.                             no of Cyls:     700
                                      Part. H  start Cyl:     1500
Write Label &   Partitioning?: N               no of Cyls:      44

                   < Press <ESC> to ABORT >
```

Figure 4-7. Label and Partitions Screen with Modified Partitions

To change the partitioning information, but not the label, press **Return** to skip over the label. The label is not changed.

To change the partition information, use **Return** to step through each partition on the disk and enter the starting sector and the number of sectors for that partition (use the "Partitioning Worksheet" in Appendix E to layout your partitions).

```
           Disk Label & Partitions for Device: /dev/rsvc0


Ascii Label: Wren IV, SCSI-1 Cougar test disk cyl 1547  alt 3 hd sec46

Interleave Factor:  1                    Part. A  start Cyl:        0
                                                  no of Cyls:       0
No of Heads:  9                          Part. B  start Cyl:        0
                                                  no of Cyls:       0
No of Data Cylinders: 1547               Part. C  start Cyl:        0
                                                  no of Cyls:    1544
No of Sectors Per Track: 46              Part. D  start Cyl:        0
                                                  no of Cyls:       0
No of Sectors Per Cylinder:  414         Part. E  start Cyl:        0
                                                  no of Cyls:       0
                                         Part. F  start Cyl:        0
                                                  no of Cyls:       0
                                         Part. G  start Cyl:        0
                                                  no of Cyls:    1544
                                         Part. H  start Cyl:        0
                                                  no of Cyls:       0

                    < Press <ESC> to ABORT >
```

Figure 4-8. Label and Partitions Screen (Default)

A default partitioning is provided if the label and partitioning information cannot be read. The default sets partition "c" to the entire disk. (By convention, partition "c" represents the entire disk and is used by scan and other utilities.) Partition "g" is set to the entire disk. The following is displayed once your label is typed and the disk is partitioned.

```
          Disk Label & Partitions for Device: /dev/rsvc0


Ascii Label: Wren IV, SCSI-1 Cougar test disk cyl 1547  alt 3 hd sec46

Interleave Factor:  1                  Part. A  start Cyl:        0
                                                no of Cyls:       0
No of Heads:  9                        Part. B  start Cyl:        0
                                                no of Cyls:       0
No of Data Cylinders: 1547             Part. C  start Cyl:        0
                                                no of Cyls:    1544
No of Sectors Per Track: 46            Part. D  start Cyl:        0
                                                no of Cyls:       0
No of Sectors Per Cylinder:  414       Part. E  start Cyl:        0
                                                no of Cyls:       0
*** W A R N I N G ***                  Part. F  start Cyl:        0
Writing a new label will destroy                no of Cyls:       0
any existing file systems and          Part. G  start Cyl:        0
DATA on your disk.                              no of Cyls:       0
                                       Part. H  start Cyl:     1544
Write Label & Partitioning?: N                  no of Cyls:       0


                < Press <ESC> to ABORT >
```

Figure 4-9.   Label and Partition Screen with New Label and Partitions

Explicitly answer **Y** or **y** to write the new label and partitioning. If **Return** is pressed without entering "Y" or "y", the default of "N" (no) is used and the label and partitioning information is not written to the disk.

If "Y" or "y" is entered, the utility requests confirmation before writing information to the disk, destroying existing data.

[F] Format Disk

Perform a backup and/or move this data to another disk prior to
performing this operation to guarantee the preservation of the data from
this disk.

This option allows the user to format a disk. New SCSI disks are usually
formatted by the manufacturer; therefore, it is not necessary to format
drives..

```
                   Disk Device: /dev/rsvc0
                 SCSI Port: 0    SCSI Id: 0



            Use Grown Defect List?
```
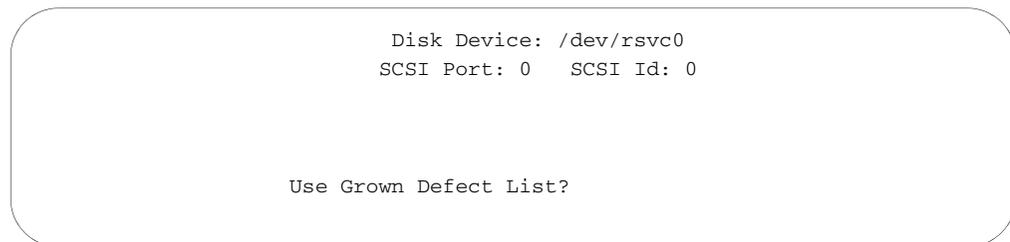
Figure 4-10. Format Screen

First a prompt asking if you want to use the G-list (e.g., a list of defects that have been reassigned after factory format is displayed. A "Y" or "y" response uses both the manufacturer's defects and the defects found from surface scans (and reassign block command). Otherwise only the manufacturer's original list is used.

```
                      Disk Device: /dev/rsvc0
                  SCSI Port: 0    SCSI Id: 0




           Use Grown Defect List? Y

        * Primary & Grown Defect lists will be used
        * Initiator defect list will NOT be supplied
        * Defect list format is in block format
        * Use default format data pattern
        * Use default interleave factor

      *** WARNING:  ABOUT TO DESTROY DISK DATA ***!!

           Ready to Format Disk? N

```

Figure 4-11. Format Screen with Defect List Options

Once the defect list(s) have been chosen, a prompt is displayed requesting if the user is ready to format the disk. A warning is displayed indicating any existing data will be lost. The default answer to this is "N" (no). Explicitly answer "Y" or "y" to continue with formatting. To continue the formatting, confirm once more.

```
                       Disk Device: /dev/rsvc0
                          SCSI Port: 0    SCSI Id: 0


   W A R N I N G ** ** ** W A R N I N G ** ** ** W A R N I N G


         Formatting the disk WILL DESTROY all data contained
       on your disk.  PERFORM A BACKUP AND/OR MOVE THIS DATA
        TO ANOTHER DISK prior to performing this operation,
               if you wish to have a copy of this data.


   W A R N I N G ** ** ** W A R N I N G ** ** ** W A R N I N G




                      Format the disk anyway? N
```

Figure 4-12. Format Screen with Warning and Request for Confirmation

Formatting is a slow process. The following screen is displayed during the formatting process:

```
                       Disk Device: /dev/rsvc0
                       SCSI Port: 0    SCSI Id: 0




                        FORMATTING DISK DRIVE
            This will take a while, please be patient.
```

Figure 4-13. Format Screen (Format in Progress)

[B] Buffered Scan

Perform a backup and/or move this data to another disk prior to performing this operation to guarantee the preservation of the data from this disk.

To use this option, start the program using the partition "c" device node (partition "c" must also contain the entire disk). To work with the first disk on the first controller, enter *scsi_util /dev/rvc0c*.

A warning of possible loss of data is displayed.

```
         Buffered Scan Disk for Defects: /dev/rvc1c



  W A R N I N G ** ** ** W A R N I N G ** ** ** W A R N I N G

     Although this option attempts to preserve your data,
       there is no guarantee it can.  Be sure you have
      PERFORMED A BACKUP AND/OR MOVED THIS DATA TO ANOTHER
      DISK prior to performing this operation, if you wish
        to guarantee you will have a copy of this data.

  W A R N I N G ** ** ** W A R N I N G ** ** ** W A R N I N G




             < Press any key to continue >
```

Figure 4-14. Warning Screen for Buffered Scan

Indicate the partition you wish to scan. If scanning the entire disk, use partition "c" (press **Return** to access partition "c").

```
                 Buffered Scan Disk for Defects: /dev/rvc1c

                           SCSI Port: 0    SCSI Id: 0


                        Enter partition to scan? (a - h) c



                             < Press <ESC> to ABORT >
```

Figure 4-15. Partition Screen

Next indicate the number of scanning passes to use (the default is 1).

```
                 Buffered Scan Disk for Defects: /dev/rvc1c

                            SCSI Port: 0    SCSI Id: 0


                        Enter partition to scan? (a - h) c

                    Enter number of passes ? (0 - 1000)    1

                             < Press <ESC> to ABORT >
```

Figure 4-16. Buffered Scan Screen (Number of Passes)

Finally you are asked if you wish to scan the entire partition.

```
   Buffered Scan Disk for Defects: /dev/rvc1c

                    SCSI Port: 0    SCSI Id: 0




           Enter partition to scan? (a - h) c

           Enter number of passes? (0 - 1000)      1

           Scan all of Partition? Y




                    < Press <ESC> to ABORT >
```

Figure 4-17. Buffered Scan Screen (with Option to Scan All of Partition)

To limit the scan to a certain range of sectors respond with "N" (if you press
Return the entire specified partition is scanned).

```
        Buffered Scan Disk for Defects: /dev/rvc1c

               SCSI Port: 0    SCSI Id: 0




      Enter partition to scan? (a - h) c

      Enter number of passes? (0 - 1000)       1

      Scan all of Partition? N

      Starting Sector Number? (0 - 1194179)        0


                 < Press <ESC> to ABORT >
```

Figure 4-18. Buffered Scan Screen (with Starting/Ending Sectors Option)

If the response is "N", a starting and ending sector number are requested. (The defaults are the first and last sectors of the partition.)

```
   Buffered Scan Disk for Defects: /dev/rvc1c


                     SCSI Port: 0    SCSI Id: 0




             Enter partition to scan? (a - h) c

             Enter number of passes? (0 - 1000)       1

             Scan all of Partition? N

             Starting Sector Number? (0 - 1194179)         0

             Ending Sector Number?   (0 - 1194179)  1194179


                  < Press <ESC> to ABORT >
```

Figure 4-19. Specifying Starting & Ending Sectors on Buffered Scan

Disk Maintenance Utility

Once the scan parameters are specified, the user is asked "Start disk scan". An "N" response (the default), causes the scan to abort.

```
          Buffered Scan Disk for Defects: /dev/rvc1c

                 SCSI Port: 0    SCSI Id: 1




          Enter partition to scan? (a - h) c

          Enter number of passes? (0 - 1000)       1

          Scan all of Partition? N

          Starting Sector Number? (0 - 1194179)        0

          Ending Sector Number?   (0 - 1194179)    12345

      ***WARNING***  This operation could destroy data.
            Start disk scan? N



                 < Press <ESC> to ABORT >
```

Figure 4-20. Screen to Start Buffered Scan

If the user answers "Y", a warning is displayed again and confirmation to continue with the scan is requested.

Once the scan has started, stop at any time by entering ctrl-c (press the control key and the "c" key at the same time).

```
                    Buffered Scan: /dev/rvc1c
                       Pass number: 1 of 1
                      Test pattern: 0x71c71c71


                  Completed sector 8960 of 12345



                      < Hit <^C> to ABORT >
```

Figure 4-21. Buffered Scan Screen (Scan in Progress)

If a bad sector is found it is reassigned.

The error messages are displayed when a sector is reassigned:

```
ERROR could not read and save sector SECTOR-ID
```

Data cannot be saved in this case. It could not be read to begin with.

```
WRITE ERROR in sector  SECTOR-ID
```

Data can be saved, unless an error occurs on the sector reassignment or the rewrite of the data.

```
READ ERROR in sector  SECTOR-ID
```

Data can be saved, unless an error occurs on the sector reassignment or the rewrite of the data.

```
COMPARE ERROR in sector  SECTOR-ID
```

Data can be saved, unless an error occurs on the sector reassignment or the rewrite of the data.

```
ERROR could not write saved sector SECTOR-ID
```

Data cannot be saved in this case. An error occurred in writing the saved data.

If no bad sectors are found, a message is displayed indicating scanning is complete.

```
                 Buffered Scan: /dev/rvc1c
                     Pass number: 1 of 1
                   Test pattern: 0x71c71c71


             Completed sector 12345 of 12345



      *---------------------------------------*
      | Scanning completed, found 0 bad sectors |
      *---------------------------------------*
```

Figure 4-22. Buffered Scan Screen (Scanning Complete)

[D] Destructive Scan

Perform a backup and/or move this data to another disk prior to performing this operation to preserve the data on this disk.

This option writes patterns to the disk and then tries to read those patterns. These blocks are placed into a list which can be used as input for bad block reassignment.

This option absolutely destroys data on your disk.

To use this option, start the program using the partition "c" device node (partition "c" must also contain the entire disk).

A warning of possible lost of data is displayed.

```
        Destructive Scan Disk for Defects: /dev/rvc1c




   W A R N I N G ** ** ** W A R N I N G ** ** ** W A R N I N G

      This option WILL ABSOLUTELY DESTROY DATA ON YOUR DISK.
     PERFORM A BACKUP AND/OR MOVE THIS DATA TO ANOTHER DISK
       prior to performing this operation, if you wish to have
                        a copy of this data.

   W A R N I N G ** ** ** W A R N I N G ** ** ** W A R N I N G




              < Press any key to continue >
```

Figure 4-23. Destructive Scan Screen with Warning

Indicate which partition is to be scanned. If you are scanning the entire disk, use partition "c" (press **Return** to get partition "c").

```
        Buffered Scan Disk for Defects: /dev/rvc1c

            SCSI Port: 0    SCSI Id: 0


        Enter partition to scan? (a - h) c



              < Press <ESC> to ABORT >
```

Figure 4-24. Select Partition for Destructive Scan

Next indicate the number of scanning passes to use (the default is 1).

```
            Buffered Scan Disk for Defects: /dev/rvc1c

                SCSI Port: 0    SCSI Id: 0




      Enter partition to scan? (a - h) c

      Enter number of passes? (0 - 1000)      1




                < Press <ESC> to ABORT >
```

Figure 4-25. Number of Passes for Destructive Scan

Finally you are asked if you wish to scan the entire partition.

```
                    Buffered Scan Disk for Defects: /dev/rvc1c

                         SCSI Port: 0    SCSI Id: 0




             Enter partition to scan? (a - h) c

             Enter number of passes? (0 - 1000)      1

             Scan all of Partition? Y



                         < Press <ESC> to ABORT >
```

Figure 4-26. Destructive Scan Screen with Option to Scan Entire
Partition

To limit the scan to a certain range of sectors, respond with "N". Press **Return** to scan the entire specified partition.

```
                Buffered Scan Disk for Defects: /dev/rvc1c

                      SCSI Port: 0    SCSI Id: 1



        Enter partition to scan? (a - h)  c

        Enter number of passes? (0 - 1000)  1

        Scan all of Partition?  N

        Starting Sector Number? (0 - 1194179)        0

        Ending Sector Number?   (0 - 1194179)    12345



                 < Press <ESC> to ABORT >
```

Figure 4-27. Specifying Starting & Ending Sectors on Destructive Scan

Once the scan parameters are specified, a prompt asking if you are ready to start is displayed. An "N" response (the default) causes the scan to be aborted.

```
                    Buffered Scan Disk for Defects: /dev/rvc1c

                         SCSI Port: 0    SCSI Id: 1



               Enter partition to scan? (a - h)  c

               Enter number of passes? (0 - 1000)  1

               Scan all of Partition?   N

               Starting Sector Number? (0 - 1194179)        0

               Ending Sector Number?   (0 - 1194179)    12345

           ***WARNING***  This operation will destroy data.
                Start disk scan? N




                    < Press <ESC> to ABORT >
```

Figure 4-28. Screen to Start Destructive Scan

If "Y" is entered, you are warned again and are requested to confirm continuation with the scan.

Once started, the scan may be stopped at any time by entering ctrl-c (press the control key and the "c" key simultaneously).

If a bad sector is found, it is reassigned. The following errors messages are displayed when a sector is reassigned. (Data is never saved. ***This is a destructive procedure***.)

```
  WRITE ERROR in sector   SECTOR-ID

  READ ERROR in sector   SECTOR-ID

  COMPARE ERROR in sector   SECTOR-ID
```

[R] Reassign Block

Perform a backup and/or move this data to another disk prior to performing this operation, if you wish guarantee the preservation of the data from this disk.

This option allows you to reassign bad blocks found in day to day operations.

```
              Reassign a Disk Defective Block on Device: /dev/rvc1c

                       SCSI Port: 0    SCSI Id: 0

       Reassign a Disk Defective Block on Device: /dev/rvc1c

                       SCSI Port: 0    SCSI Id: 0


              Defective Block Number?        99



              Reassign Defective Block 99? Y

              Cannot restore defective block data



       *---------------------------------------------*
       | Completed Reassigning Disk Block      99    |
       *---------------------------------------------*
```

Figure 4-29. Reassign Block Screen with Error Message

Once the block has been reassigned (whether the data was re-written or not) a message is displayed indicating completion of the reassignment process.

A

4220SN Man Pages

NAME

    vc - Interphase V/SCSI 4220SN Cougar driver

AVAILABILITY

The vc - Interphase V/SCSI 4220SN Cougar driver is available from
Interphase software distribution. This driver is specific to the 4220SN
product. The 4220SN is NOT a bootable Sun supported device.   For
information about installing the VC software distribution, refer to the
Interphase V/SCSI 4220SN Cougar Installation Guide.

#DEFINES

The following defines are user changable before the kernel is built,
they are located in the file /usr/sys/sundev/vcreg.h.

```
#define ADDRESS_M_TT_MT 0x020d
  Set address modifier/memory type transfer type
    0000 ttmm aaaa aaaa - binary value
         tt - transfer type 00 - normal type
                            01 - block mode
                            10 - reserved
                            11 - VME D64 block
           mm - memory type 00 - reserved
                            01 - 16-bit transfers
                            10 - 32-bit transfers
                            11 - scatter/gather list resides in short i/o
               aaaa aaaa - address modifier
```

```
#define BURST_CNT 8
  DMA burst count
    The number of VMEbus transfers performed in a single burst
    before releasing and re-requesting the bus.
    0     - Transfer data until there is no more data to be transferred.
    > 0   - Transfer data until there is no more data to be
    < 33    transferred, or 16 micro seconds has elapsed since
            being granted the bus, or one of the bus request lines
            on the VMEbus is asserted. (default)
    > 32  - Transfer data until there is no more data to be
    < 65    transferred, or 16 micro seconds has elapsed since
            being granted the bus.
    > 64  - Transfer data until there is no more data to be
    < 129   transferred, or 32 micro seconds has elapsed since
            being granted the bus.
    > 128 - Transfer data until there is no more data to be
    = max   transferred, or 64 micro seconds has elapsed since
            being granted the bus.

#define SCSI_RESET_SCSI_BUS 1
  SCSI bus reset on bus hang
    0 - do not reset SCSI bus on hang
    1 -         reset SCSI bus on hang

#define SCSI_SELECT_TIMEOUT 50
  SCSI selection timeout
    Timeout is 250 msec and cannot be changed.

#define WORKQUEUE_TIMEOUT 235
  Work Queue timeout
    0     - no timeout
    count - each count equals 256 msec

#define VMEBUS_TIMEOUT 0
  VME bus timeout
    0     - 100 msec
    count - each count equals 30 msec

#define RETRY_COUNT 3
  Number of times the command will be retryed
    1     - no retry
    count - number of retrys

#define RETRY_TIME  5
  Time between retrys
    0     - no time
    count - time in seconds
```

CONFIG

```
controller vcc0 at vme16d16 ? csr 0x9000 priority 2 vector vcintr 0xe0
disk      vc0  at vcc0 drive 0  flags 0    # device 0,  id 0, lun 0, bus 0
                                           # minor entries = 0 - 7
disk      vc1  at vcc0 drive 8  flags 0    # device 1,  id 1, lun 0, bus 0
                                           # minor entries = 8 - 15
disk      vc2  at vcc0 drive 16 flags 0    # device 2,  id 2, lun 0, bus 0
                                           # minor entries = 16 - 23
disk      vc3  at vcc0 drive 24 flags 0    # device 3,  id 3, lun 0, bus 0
                                           # minor entries = 24 - 31
tape      vc4  at vcc0 drive 32 flags 0    # device 4,  id 4, lun 0, bus 0
                                           # minor entries = 32 - 39
disk      vc8  at vcc0 drive 0  flags 0x01 # device 8,  id 0, lun 0, bus 1
                                           # minor entries = 64 - 71
disk      vc9  at vcc0 drive 8  flags 0x01 # device 9,  id 1, lun 0, bus 1
                                           # minor entries = 72 - 79
disk      vc10 at vcc0 drive 16 flags 0x01 # device 10, id 2, lun 0, bus 1
                                           # minor entries = 80 - 87
disk      vc11 at vcc0 drive 24 flags 0x01 # device 11, id 3, lun 0, bus 1
                                           # minor entries = 88 - 95
tape      vc12 at vcc0 drive 32 flags 0x01 # device 12, id 4, lun 0, bus 1
                                           # minor entries = 96 - 103


controller vcc1 at vme16d16 ? csr 0x9800 priority 2 vector vcintr 0xe1
disk      vc16 at vcc1 drive 0  flags 0    # device 16, id 0, lun 0, bus 0
                                           # minor entries = 0 - 7

disk      vc17 at vcc1 drive 8  flags 0    # device 17, id 1, lun 0, bus 0
                                           # minor entries = 8 - 15
disk      vc18 at vcc1 drive 16 flags 0    # device 18, id 2, lun 0, bus 0
                                           # minor entries = 16 - 23
disk      vc19 at vcc1 drive 24 flags 0    # device 19, id 3, lun 0, bus 0
                                           # minor entries = 24 - 31
tape      vc20 at vcc1 drive 32 flags 0    # device 20, id 4, lun 0, bus 0
                                           # minor entries = 32 - 39
disk      vc24 at vcc1 drive 0  flags 0x01 # device 24, id 0, lun 0, bus 1
                                           # minor entries = 64 - 71
disk      vc25 at vcc1 drive 8  flags 0x01 # device 25, id 1, lun 0, bus 1
                                           # minor entries = 72 - 79
disk      vc26 at vcc1 drive 16 flags 0x01 # device 26, id 2, lun 0, bus 1
                                           # minor entries = 80 - 87
disk      vc27 at vcc1 drive 24 flags 0x01 # device 27, id 3, lun 0, bus 1
                                           # minor entries = 88 - 95
tape      vc28 at vcc1 drive 32 flags 0x01 # device 28, id 4, lun 0, bus 1
                                           # minor entries = 96 - 103
```

The controller lines shown above specify the first and second
4220SN SCSI host adapter in a Sun system. Up to 7 host adapters
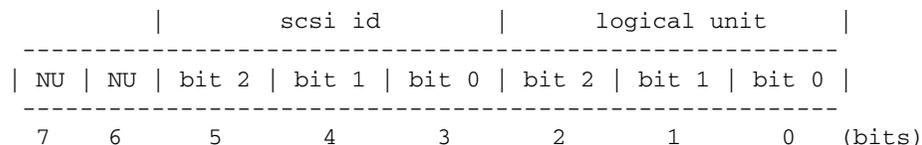are supported.

The disk and tape lines shown above specify the devices attached to
each host adapter. Up to 16 devices can be placed on each host adapter for
a total of 112 devices supported.

The first device on each host adapter must never be commented out and must
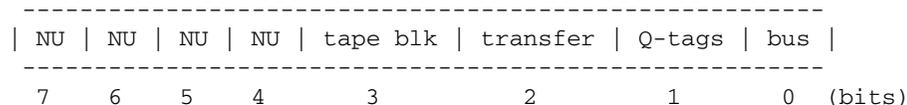always be the lowest device number on the host adapter.

The scsi id and logical unit numbers are specified in the drive
field:

scsi id   - Scsi id that is set on the device.
logical unit - Logical unit that is set on the device.

```
          |        scsi id        |       logical unit    |
  -------------------------------------------------------
| NU | NU | bit 2 | bit 1 | bit 0 | bit 2 | bit 1 | bit 0 |
  -------------------------------------------------------
   7    6     5       4       3       2       1       0   (bits)
```

The flags field is used to specify special device setups and are
defined as follows:

tape blk - Tape fixed block size - 512(0)/1024(1).
transfer - Transfer type - synchronous(0)/asynchronous(1).
Q-tags   - SCSI-2 Queue Tags - not enabled(0)/enabled(1).
bus   - SCSI bus - primary(0)/secondary(1).

```
  ---------------------------------------------------------
| NU | NU | NU | NU | tape blk | transfer | Q-tags | bus |
  ---------------------------------------------------------
   7    6    5    4       3          2         1      0   (bits)
```

Disk block device names are of the following format:
vc[device]a - vc[device]h. Disk character device names are of the
following format: rvc[device]a - rvc[device]h. CD-ROM device names have
the following format: vc[device] (block) and rvc[device] (charac-
ter). Unix File System CD-ROM should be mounted as follows:

mount -r /dev/vc17 /cdrom.

Hi-Sierra File System CD-ROM should
be mounted as follows:

mount -rt hsfs /dev/vc17 /cdrom

```
Minor device value:
special        - When set to (1) allows the following character entries:
                   function - (000) write label to unlabeled disk
                                     device entry for Sun format utility
                              (001) generic ioctl interface
                              (010) download Motorola S record flash firmware
                                     (example: cat SX00044.A07 > /dev/rsdfvcc0)
                             (011) download Motorola S record static firmware
                                     (example: cat sx00043.a07 > /dev/rsdsvcc0)
device number - Defined in configuration (example: vc10 equals
                   (1010) binary).
partition      - Device partition number a = (000) binary - h = (111)
                   binary.  CD-ROM device = (000).
```

```
          |            device number          | partition/function  |
 -----------------------------------------------------------------
| special | bit 3 | bit 2 | bit 1 | bit 0 | bit 2 | bit 1 | bit 0 |
 -----------------------------------------------------------------
     7       6       5       4       3       2       1       0   (bits)
```

```
Tape device names  are  of  the  following  format: rvc[device]v
(rewind  variable  block),  nrvc[device]v (no  rewind  variable
block), rvc[device]f (rewind fixed block), and nrvc[device]f  (no
rewind  fixed  block).  Exabyte compressed data mode device names
end with a "c" (example: rvc[device]vc).
```

```
Minor device value:
device number - Defined in configuration (example: vc4 equals
                   (0100) binary).
mode          - Exabyte mode - non compression(0)/compression(1)
record type   - Record type being used - variable(0)/fixed(1).
rewind        - On close - rewind device(0)/no rewind device(1).
```

```
     |            device number         |
 -----------------------------------------------------------------
| NU | bit 3 | bit 2 | bit 1 | bit 0 | mode | record type | rewind |
 -----------------------------------------------------------------
   7      6       5       4       3      2        1           0   (bits)
```

```
For more information on making device entries, refer to the Interphase
V/SCSI 4220SN Cougar Installation Guide.
```

PRESTO SERVE

The following are changes that need to be done if more then one
Cougar will be used with Presto Serve. These changes should be
incorporated in the presto_chango script and then it should be
executed.

Note - The Cougars must be in sequential order in the conf.c
        file (bdevsw/cdevsw tables).

```
Change From:
 optional_prefixes="id"
To:
 #optional_prefixes="id"
 optional_prefixes="id vc"
Change From:
       if [ X"${1}" = X"id" ]; then
To:
 # Add support for multiple 4220's
 #     if [ X"${1}" = X"id" ]; then
       if [ X"${1}" = X"id" -o X"${1}" = X"vc" ]; then

Change From:
       if [ X"${1}" = X"id" ]; then
To:
 # Add support for multiple 4220's
 #     if [ X"${1}" = X"id" ]; then
       if [ X"${1}" = X"id" -o X"${1}" = X"vc" ]; then

Change From:
       if [ "X${device_prefix}" != Xid ]; then
To:
 # Add support for multiple 4220's
 #     if [ "X${device_prefix}" != Xid ]; then
      if [ "X${device_prefix}" != Xid -a "X${device_prefix}" != Xvc ]; then

Change From:
       if [ $bflag = n -a $_prefix != xy -a $_prefix != xd -a $_prefix !=
id ];
 then
To:
 # Add support for 4220
 #     if [ $bflag = n -a $_prefix != xy -a $_prefix != xd -a $_prefix !=
id ];
 then
       if [ $bflag = n -a $_prefix != xy -a $_prefix != xd -a $_prefix != id
                 -a $_prefix != vc ]; then
```

KERNEL BUILDING

The following should be added to the /usr/sys/sun/conf.c file:

```
include "vc.h"
#if NVC > 0

extern int vcopen(), vcstrategy(), vcread(), vcwrite();
extern int vcdump(), vcioctl(), vcsize(), vcclose();
#else
#define vcopen          nodev
#define vcclose         nodev
#define vcstrategy      nodev
#define vcread          nodev
#define vcwrite         nodev
#define vcdump          nodev
#define vcioctl         nodev
#define vcsize          0
#endif
```

Add the following entries to the bdevsw table (one for each host adapter):

```
{ vcopen,     vcclose,       vcstrategy,     vcdump,  /*blk major*/
  vcsize,     0  },
```

Add the following entries to the cdevsw table (one for each host adapter):
```
{
  vcopen,    vcclose,       vcread,         vcwrite, /*chr major*/
  vcioctl,   nulldev,       seltrue,        0,
  0,
},
```
The following should be added to the end of the /usr/sys/sun[4|4m]/conf/files file:

```
sundev/vc_conf.c    optional vc device-driver
sundev/vc.c         optional vc device-driver
sundev/iscsi.c      optional vc device-driver
```

Cd to the directory which contains the Interphase object modules
and copy the following:

```
cp vc_conf.c /usr/sys/sundev
cp vcreg.h   /usr/sys/sundev
cp vc.o      /usr/sys/sun[4|4m]/OBJ
cp iscsi.o   /usr/sys/sun[4|4m]/OBJ
```

Configure and make the new kernal, then copie to /.

DESCRIPTION

vc is the device driver software that controls the Interphase V/SCSI
4220SN Cougar host adapter. The VC driver interfaces to SCSI-1 or SCSI-2
disk/tape/cd-rom devices.   This driver supports the following
tape types: 1/4" (tape fixed blk size = 512), Digital Audio Tape
(tape fixed blk size = 1024 or variable), and Exabyte (tape fixed
blk size = 1024 or variable).

FILES

```
/dev/vc[0-111]a - vc[0-111]h
                      vc disk block interfaces
/dev/rvc[0-111]a - rvc[0-111]h  vc  disk character interfaces
/dev/rvc/[0-111][vf][c] vc tape rewind interfaces
v - variable block size
f - fixed block size (512/1024 bytes)
c - Exabyte compressed mode

/dev/nrvc[0-111][vf][c] vc no rewind interfaces
v - variable block size
f - fixed block size (512/1024 bytes)
c - Exabyte compressed mode

/dev/vc[0-111]
             vc cd-rom block interface
/dev/rvc[0-111]
             vc cd-rom character interface
/dev/rsvc[0-111]  vc  special  device  entry used by scsi_util to write
label to unlabeled disk
/dev/rsvc[0-111]c
              vc special device entry used by Sun format utility
/dev/rsiovc[0-111]
               vc  special  SCSA ioctl interface
/dev/rsdfvcc[0-6]
               vc special download flash firmware interface
/dev/rsdsvcc[0-6]
               vc special download static firmware interface
/usr/sys/sundev/vc_conf.c
               vc  configuration  file.
/usr/sys/sundev/vcreg.h
               vc  driver  header file.
/usr/sys/sun[4|4m]/OBJ/vc.o
               vc driver upper level driver.
/usr/sys/sun[4|4m]/OBJ/iscsi.o
               vc driver lower level driver.
/usr/etc/scsi_util  binary file to format and partition disks.
```

SEE ALSO

For information about installing the VC software distribution, refer
to the *Interphase V/SCSI 4220SN Cougar Installation Guide*, *System and
Network Administration Manual*,or config(8)

B

Specifications

VMEbus Specifications

DTB Master	A16, A24, A32, D08 (EO), D16, D32: BLT, D64: BLT
DTB Slave	A16, D08 (EO), D16
Requester	Any of R(0-3), Static RWD, ROR
Interrupter	Any of I(1-7), Dynamic D08 (0)

SCSI Bus Specifications

Peripheral Data Rate	Up to 10Mbytes/sec synchronous
	Up to 5Mbytes/sec asynchronous

Power Requirements

Single-Ended Motherboard	6.00A typical @ +5V DC (+/- 5%)
	6.50A maximum @ +5V DC (+/- 5%)
	7.0ma maximum @ +12V DC (+/- 5%)
	30ma maximum @ -12V DC (+/- 5%)
Single-ended Daughter Card	.08A typical @ +5V DC (+/- 5%)
	.15A maximum @ +5V DC (+/- 5%)
Differential Motherboard	6.4A typical @ +5V DC (+/- 5%)
	7.00A maximum @ +5V DC (+/- 5%)
	7.0ma maximum @ +12V DC (+/- 5%)
	30ma maximum @ -12V DC (+/- 5%)
Differential Daughter Card	.65A typical @ +5V DC (+/- 5%)
	.90A maximum @ +5V DC (+/- 5%)

Mechanical (Nominal)

Length	233 mm
Width	160 mm
Thickness	20 mm
Weight	.45 Kg

Operating Environment

Temperature   0-55 degrees Centigrade
Relative Humidity   10% - 90% Noncondensing
Air Flow   250 LFM Minimum

Description of SCSI Cable

All possible SCSI bus configurations on the 4220SN (single-ended vs. differential, and routed off P3 or P9/J4) require the same standard SCSI cable. A standard SCSI cable is either a 50-conductor flat cable or a 25-signal twisted-pair cable. The cable is one-to-one, with 50-pin connectors on both ends. As per SCSI specifications, the cable can be up to 20 feet long (6 meters) for a single-ended SCSI bus and 82 feet long (25 meters) for a differential one.

Below is a list of sample part numbers which you may find to be useful in cabling your system. **Interphase assumes no responsibility regarding the functionality of the parts listed below. If you need more information concerning the parts, contact the manufacturer directly.**

Component   Sample part no.

Flat Cable   3M-3365-50

Connectors
• End of cable connector
 — Without strain relief; no center key 3M-3425-7000
 — With strain relief; no center key 3M-3425-7050
 — Without strain relief; with center key Dupont 66900-290
• Daisy Chain
 — Without strain relief; no center key 3M-3425-6000
 — With strain relief; no center key 3M-3425-6050
 — Without strain relief; with center key Dupont 66900-250

Fuse

The 4220SN and its optional daughter card each have a 1.5A fuse (F1). This fuse protects the SCSI terminator power when provided by the 4220SN (Channel 0) or daughter card (Channel 1). The part number of the fuse is LITTELFUSE 273-01.5. To determine the location of the fuses, refer to the board layout in Chapter 3.

LEDs

The 4220SN motherboard has seven LEDs and the optional daughter card has two. Refer to Figure 3-1 and 3-2 for an illustration that shows the location of the LEDs.

The function of the LED is the same for both single-ended and differential versions of the motherboard and daughter card. The following tables list the LEDs and their purpose.

Table C-1. LEDs on 4220SN Motherboard

Designator	Function
LED 1	Board Status 0 (LSB)
LED 2	Board Status 1
LED 3	Board Status 2
LED 4	Board Status 3 (MSB)
LED 5	Board OK (Red/Green) Green = Board OK
LED 6	Term Power (On = OK)
LED 7	SCSI Bus Busy (On = Busy)

Table C-2. LEDs on 4220SN Daughter Card

Designator	Function
LED1	When illuminated, indicates TERMPWR is OK
LED2	When illuminated, indicates BSY is asserted on the SCSI bus.

Specifications

C

4220SN Software Distribution

This section describes the contents of the 4220SN distribution tape or CD-ROM.

Files in the 4220SN Software Distribution

This file is an example of the contents of the perm.sun4.data file. (This list is correct as of this printing but is subject to change.)

```
./usr                                 ./usr                                 2755  root.wheel  directory
./usr/etc                             ./usr/etc                             2755  root.staff  directory
./usr/etc/VC                          ./usr/etc/VC                          2755  root.staff  directory
./usr/etc/scsi_util                   ./usr/etc/scsi_util                   0500  root.staff  private
./usr/etc/install                     ./usr/etc/install                     2755  root.staff  directory
./usr/etc/install/VC                  ./usr/etc/install/VC                  2755  root.staff  directory
./usr/etc/install/VC/VC               ./usr/etc/install/VC/VC               2755  root.staff  directory
./usr/etc/install/VC/VC/perm.sun4.data ./usr/etc/install/VC/VC/perm.sun4.data 0644  root.staff  private
./usr/etc/install/VC/VC/what.sun4.data ./usr/etc/install/VC/VC/what.sun4.data 0644  root.staff  private
./usr/etc/install/VC/PRODUCT          ./usr/etc/install/VC/PRODUCT          0755  root.staff  private
./usr/etc/install/VC/install_unbundled ./usr/etc/install/VC/install_unbundled 0755  root.staff  private
./usr/etc/install/VC/Prerequisites.sh ./usr/etc/install/VC/Prerequisites.sh 0755  root.staff  private
./usr/etc/install/VC/cdinstall        ./usr/etc/install/VC/cdinstall        0755  root.staff  private
./usr/etc/install/VC/vc.conf.c.sh     ./usr/etc/install/VC/vc.conf.c.sh     0755  root.staff  private
./usr/etc/install/VC/vc.config.sh     ./usr/etc/install/VC/vc.config.sh     0755  root.staff  private
./usr/etc/install/VC/vc.config.nvcc.sh ./usr/etc/install/VC/vc.config.nvcc.sh 0755  root.staff  private
./usr/etc/install/VC/vc.config.nvc.sh ./usr/etc/install/VC/vc.config.nvc.sh 0755  root.staff  private
./usr/etc/install/VC/vc.devices.sh    ./usr/etc/install/VC/vc.devices.sh    0755  root.staff  private
./usr/etc/install/VC/vc.files.sh      ./usr/etc/install/VC/vc.files.sh      0755  root.staff  private
./usr/etc/install/VC/vc.makedev.sh    ./usr/etc/install/VC/vc.makedev.sh    0755  root.staff  private
./usr/etc/install/VC/deinstall        ./usr/etc/install/VC/deinstall        0755  root.staff  private
./usr/etc/install/VC/install          ./usr/etc/install/VC/install          0755  root.staff  private
./usr/etc/install/VC/gen_script       ./usr/etc/install/VC/gen_script       0755  root.staff  private
./usr/etc/install/VC/reinstall        ./usr/etc/install/VC/reinstall        0755  root.staff  private
./usr/etc/install/VC/verify           ./usr/etc/install/VC/verify           0755  root.staff  private
./usr/etc/install/VC/upgrade          ./usr/etc/install/VC/upgrade          0755  root.staff  private
./usr/etc/install/VC/dh               ./usr/etc/install/VC/dh               0755  root.staff  private
./sys                                 ./sys                                 2775  root.staff  directory
./sys/sun                             ./sys/sun                             2775  root.staff  directory
./sys/sun/VC                          ./sys/sun/VC                          2775  root.staff  directory
./sys/sun/VC/conf.c.add.vc.a          ./sys/sun/VC/conf.c.add.vc.a          0644  root.staff  private
./sys/sun/VC/conf.c.add.vc.b          ./sys/sun/VC/conf.c.add.vc.b          0644  root.staff  private
./sys/sun/VC/conf.c.add.vc.c          ./sys/sun/VC/conf.c.add.vc.c          0644  root.staff  private
./sys/sun4                            ./sys/sun4                            2775  root.staff  directory
./sys/sun4/OBJ                        ./sys/sun4/OBJ                        2775  root.staff  directory
./sys/sun4/OBJ/VC                     ./sys/sun4/OBJ/VC                     2775  root.staff  directory
./sys/sun4/OBJ/vc.o                   ./sys/sun4/OBJ/vc.o                   0444  root.staff  new
./sys/sun4/OBJ/iscsi.o                ./sys/sun4/OBJ/iscsi.o                0444  root.staff  new
./sys/sun4/conf                       ./sys/sun4/conf                       2775  root.staff  directory
./sys/sun4/conf/VC                    ./sys/sun4/conf/VC                    2775  root.staff  directory
./sys/sun4/conf/VC/config.add.vc.a    ./sys/sun4/conf/VC/config.add.vc.a    0644  root.staff  private
./sys/sun4/conf/VC/config.add.vc.b    ./sys/sun4/conf/VC/config.add.vc.b    0644  root.staff  private
./sys/sun4/conf/VC/config.add.vc.c    ./sys/sun4/conf/VC/config.add.vc.c    0644  root.staff  private
./sys/sun4/conf/VC/config.add.vc.d    ./sys/sun4/conf/VC/config.add.vc.d    0644  root.staff  private
./sys/sun4/conf/VC/config.add.vc.e    ./sys/sun4/conf/VC/config.add.vc.e    0644  root.staff  private
./sys/sun4/conf/VC/devices.add.vc.a   ./sys/sun4/conf/VC/devices.add.vc.a   0644  root.staff  private
./sys/sun4/conf/VC/files.add.vc.a     ./sys/sun4/conf/VC/files.add.vc.a     0644  root.staff  private
./sys/sundev                          ./sys/sundev                          2775  root.staff  directory
./sys/sundev/VC                       ./sys/sundev/VC                       2775  root.staff  directory
./sys/sundev/vcreg.h                  ./sys/sundev/vcreg.h                  0444  root.staff  new
./sys/sundev/vc_conf.c                ./sys/sundev/vc_conf.c                0444  root.staff  new
./usr/man                             ./usr/man                             2755  bin.staff   directory
./usr/man/VC                          ./usr/man/VC                          2755  bin.staff   directory
./usr/man/VC/man4                     ./usr/man/VC/man4                     2755  bin.staff   directory
./usr/man/VC/man4/vc.4                ./usr/man/VC/man4/vc.4                0644  root.staff  private
```

D

Controller/Devices Worksheet

This worksheet can be used to record the hardware/software configuration for each 4220SN in your system. It is recommended that a worksheet be completed for each 4220SN in your system.

The following example shows the device parameters for a 4220SN installed using the AUTO software installation (as described in Chapter 2).

```
                         Controller/Devices Worksheet

                                         Interrupt
Controller        Name      Address(hex)   Vector      Status
----------        ----      ------------  ---------   ----------
    0             vcc0        0x9000        0xe0       Enabled
----------        ----      ------------  ---------   ----------

ADDRESS STRAPPING FOR J12              SCSI ID
                                      --------------

   15 13 11  9  7  5  3  1           Primary Channel = 7
    .  .  .  .  .  .  .  .
          |     |  |                 Secondary Channel = 7
    .  .  .  .  .  .  .  .
   16 14 12 10  8  6  4  2

                                 DEVICES

   Dev Type  Name      ID    LUN  CHN  Qtags   Xfer Type  Tape Type    Status
   ___ ____  _____     __    ___  ___  _____   _____  _____    _____
    0  disk  _vc0_     _0    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

    1  disk  _vc1_     _1    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

    2  disk  _vc2_     _2    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

    3  disk  _vc3_     _3    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

    4  tape  _vc4_     _4    _0_  Pri  Disabled   Sync     1/4" Cart.  Enabled

    5  ____  _____     __    ___  ___  _____     _____ _____   _____

    6  ____  _____     __    ___  ___  _____     _____ _____   _____

    7  ____  _____     __    ___  ___  _____     _____ _____   _____

    8  disk  _vc8_     _0    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

    9  disk  _vc9_     _1    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

   10  disk  vc10      _2    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

   11  disk  vc11      _3    _0_  Pri  Disabled   Sync     ___n/a___   Enabled

   12  tape  vc12      _4    _0_  Pri  Disabled   Sync     1/4" Cart.  Enabled

   13  ____  _____     __    ___  ___  _____     _____ _____   _____

   14  ____  _____     __    ___  ___  _____     _____ _____   _____

   15  ____  _____     __    ___  ___  _____     _____ _____   _____
```

Figure D-1. Completed Controller/Devices Worksheet

```
                   Controller/Devices Worksheet


                                  Interrupt
    Controller       Name      Address(hex)     Vector      Status
    ----------       ----      ------------    ---------    ----------

    ----------       ----      ------------    ---------    ----------
    ADDRESS STRAPPING FOR J12            SCSI ID

        15 13 11  9  7  5  3  1          Primary Channel = 7
         .   .   .   .   .   .   .   .
                                         Secondary Channel = 7
         .   .   .   .   .   .   .   .
        16 14 12 10  8  6  4  2
                                  DEVICES

    Dev Type  Name    ID  LUN  CHN  Qtags  Xfer Type  Tape Type  Status
    ___ ____  _____   __  ___  ___  _____  _____  _____   _____

     0  ____  _____   __  ___  ___  _____  _____  _____   _____

     1  ____  _____   __  ___  ___  _____  _____  _____   _____

     2  ____  _____   __  ___  ___  _____  _____  _____   _____

     3  ____  _____   __  ___  ___  _____  _____  _____   _____

     4  ____  _____   __  ___  ___  _____  _____  _____   _____

     5  ____  _____   __  ___  ___  _____  _____  _____   _____

     6  ____  _____   __  ___  ___  _____  _____  _____   _____

     7  ____  _____   __  ___  ___  _____  _____  _____   _____

     8  ____  _____   __  ___  ___  _____  _____  _____   _____

     9  ____  _____   __  ___  ___  _____  _____  _____   _____

    10  ____  _____   __  ___  ___  _____  _____  _____   _____

    11  ____  _____   __  ___  ___  _____  _____  _____   _____

    12  ____  _____   __  ___  ___  _____  _____  _____   _____

    13  ____  _____   __  ___  ___  _____  _____  _____   _____

    14  ____  _____   __  ___  ___  _____  _____  _____   _____

    15  ____  _____   __  ___  ___  _____  _____  _____   _____
```

Figure E-2. Blank Controller/Devices Worksheet

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