Netra™ ft 1800
Software Release Notes

Important – Read Before Installation

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Netra ft 1800
Software Release Notes

This document contains important release information for the software for the Netra ft 1800.

Caution – Read these Notes before attempting to install the system.

These Notes contain the following information:

Erratum

The second note on page 43 of the *Netra ft 1800 Installation Guide* should read:

Note – In NORWAY, this equipment must only be installed in areas where equipotential bonding has been applied, e.g. a telecommunication Central Office.

Electrical Supply Note

Note – The system will only power up if the input voltage is in the range –40 to –60 VDC.

Installation Media

The Netra ft 1800 software is supplied on two or more CD-ROMs:

- Netra ft 1800 Installation CD (Sun Part no. 704-6491-11), containing Solaris and the Netra ft 1800-specific software (refer to "To Install the Solaris Operating Environment and Netra ft 1800 Operating Software" on page 9)

- Netra ft 1800 Supplement CD (Sun Part no. 704-6573-11), containing SunVTS, SunSAI/P and SunHSI/P

- Sun StorEdge Volume Manager (SEVM) 2.5 (Sun Part no. 704-5967-10)

- SunATM/P Installation CD (Sun Part no. 704-6442-10), containing the SunATM/P software

- Optionally, a Patch CD (Sun Part no. 704-6823-12), containing:
  - 107369-17 (Netra ft 1800 software patch)
  - 108065-03 (Netra ft 1800 Bridge patch)
  - 106955-01 (Sun SAI/P PCI patch)
  - 106922-04 (Sun HSI/P PCI patch)
  - 107845-02 (Sun ATM/P PCI patch)
  - 106929-01 (SunOS 5.6 `/usr/sbin/uadmin` patch)
  - 105463-07 (Sun Enterprise Network Array `SUNWvxvm` patch)

  If this CD is not present it will be necessary to download the patches from the SunSolve web site at `http://sunsolve.sun.com`.

  There are two other patches which can be downloaded from the SunSolve website:
  - 107778-04 (Sun Quad FastEthernet patch)
  - 107926-04 (Netra ft 1800 OSdog patch)

Caution – You must follow the installation instructions in this document. The installation procedure for the patches involves special instructions. Installing the patches incorrectly can leave your system in an unusable state.

Software Installation

Caution – Read all the instructions *before* attempting the installation procedure to ensure that you understand them and have everything required to hand.

All operations must be performed at the OBP `ok` prompt or as `root`.

Netra ft 1800 release software occupies approximately 540 Mbytes of disk space.

Installation Summary

Installation of the Netra ft 1800 software consists of the following steps:

1. **Operating environment installation:**
   - Solaris 2.6 Netra ft 1800 Operating Environment
   - Mandatory Netra ft 1800 patches:
     - 107369-17 (Netra ft 1800 software patch)
     - 108065-03 (Netra ft 1800 Bridge patch)
     - 106929-01 (SunOS 5.6 `/usr/sbin/uadmin` patch)
     - 107926-04 (Netra ft 1800 OSdog patch)

2. **Hardware upgrade:**
   - CPUset PROMs
   - Motherboard FPGAs

3. **Sun StorEdge Volume Manager (SEVM) and patch.**
   - 105463-07 (Sun Enterprise Network Array `SUNWvxvm` patch)

4. **SunVTS installation.**

5. **PCI card software and patches.**
   - 106955-01 (Sun SAI/P PCI patch)
   - 106922-04 (Sun HSI/P PCI patch)
   - 107845-02 (Sun ATM/P PCI patch)
   - 107778-04 (Sun Quad FastEthernet patch)

A check box is provided with each individual step so you can ensure that all the required steps have been completed successfully.

Before You Start

Required Information

You will need to establish the following information before you attempt to install the software. Space is provided below for you to record these details.

■ The system's IP address (see your system administrator)

■ A Volume Manager License Key (obtainable using the License Key Request Card, Sun part no. 806-0926-11, which you can find in the System box)

■ The terminal type you will be using for the installation

■ The required subnet mask for your site

■ The name service (for example, NIS or NIS+; see your system administrator)

- The partition layout you require (refer to "Before You Start" on page 7 and FIGURE 1 on page 12).

Slice	Size (Kbytes)
/	
swap	
overlap	
/opt	
/var	

You must ensure that the initial layout that you specify while you install the operating environment meets the following requirements:

- There must be only one swap partition, with a minimum size of 512 Mbytes and a maximum size of 1.99 Gbytes.
- There must be two unused partitions for use by Volume Manager. The disk layout screen should not show any space allocated to these partitions.
- There must be 1 Mbyte that is not assigned to any partition. That is, the disk layout screen must show 1 Mbyte of free space.
- There must be a /var partition with a minimum size of 500 Mbytes.
- The boot disk cannot extend beyond one physical disk. That is, the file systems required for boot must all be contained in one disk.

Upgrading an Existing Installation

Installation of the mandatory Netra ft 1800 patch changes the behavior of the CMS with regard to modules which have a pre-existing fault. In some circumstances, these faults are 'spurious', that is, they are an manifestation of some other problem. A utility called cmsrepairfru is included in the patch to mark modules repaired where the previous fault indication is known to be spurious.

Prior to installation of this patch, previously-faulty modules can be successfully enabled and used, but once the system has been rebooted following the patch installation these modules will go to the enable_failed state. This can result in little of the system being available.

It is therefore necessary to identify spuriously-faulty modules before the system is rebooted. The CMS will be disabled during patch installation until the reboot, so the spuriously-faulty modules must be identified *before* the patch is installed. After patch installation, run the utility cmsrepairfru on each module marked as faulty. Refer to "Using cmsrepairfru" on page 44 for further details.

Operating Environment Installation

Note – It is recommended that you install Solaris on one hard disk only in order to optimize the performance of the Volume Manager.

▼ To Install the Solaris Operating Environment and Netra ft 1800 Operating Software

1. Disengage all the hard disk drive modules except the one in the location on which you wish to install the operating environment.

Refer to the *Netra ft 1800 Installation Guide* Chapter 2 "Hardware Installation". You do not need to remove the modules from their slots completely. This is the only way to ensure that the operating system is installed entirely on one known disk; this is a requirement for Sun StorEdge Volume Manager to function in a predictable manner.

2. If the system is powered down, power on the system and wait for the OBP ok **prompt to be displayed.**

Refer to the *Netra ft 1800 Installation Guide* Chapter 4 "Powering On the System".

If the system boots into an existing version of the software, type:

```
# init 0
```

to go to the OBP prompt.

3. Type:

```
ok setenv auto-boot? false
```

to prevent the system auto-booting when a reset is issued.

HDDs
disengaged

System powered
on and OBP
prompt displayed

Prevent auto-boot
on reset

OSdog disabled ☐

4. Disable OSdog.

OSdog is not supported in the unpatched base release of the Netra ft 1800 software. The patch to support OSdog is installed later in Step 18 on page 15. You *must* disable it before you install the Netra ft 1800 software (704-6491-11).

a. Check the PROM version installed on the system by typing:

```
ok .version
```

b. If the PROM version is 21 or earlier, at the ok prompt type:

```
ok reset-all
ok 0 set-conf-osdog-a
ok 0 set-conf-osdog-b
ok reset-all
```

If the PROM version is 22 or later, type:

```
ok reset-all
ok 0 set-conf-osdog
ok reset-all
```

⚠ **Caution –** The reset-all commands are required to prevent unpredictable behavior during boot-up.

There will be a pause of a few seconds before the system responds after each of these commands.

Re-enable auto-boot on reset ☐

c. Type:

```
ok setenv auto-boot? true
```

to re-enable auto-boot on reset.

5. Place the Netra ft 1800 Installation CD-ROM (part no. 704-6491-11) in the CD-ROM drive.

Boot from `a-cdrom` if the CD-ROM is in A-RMM (at the top of the system) or `b-cdrom` if the CD-ROM is in B-RMM (at the bottom of the system). Type:

```
ok boot a-cdrom0
```

if you inserted the CD in the CD-ROM drive on side A, or

```
ok boot b-cdrom0
```

if you inserted the CD in the CD-ROM drive on side B.

The *Target* LED on one CPUset will flash, and the *Diag* LED on the other CPUset will flash.

Wait for booting to complete. The Netra ft 1800 software installation program will then start.

6. Follow the instructions on the screen to install the Solaris operating environment (referring to the Solaris installation documentation accompanying the installation CD), but note the following:

■ Refer throughout to your preparation notes in "Required Information" on page 7.

■ It is recommended that you select 'Entire Distribution + OEM Support' when prompted for Installation Options.

■ When prompted for root disk layout options, follow the instructions in Step 7 on page 12 and Step 8 on page 13.

Manual disk
layout completed

!

7. **Select Manual Layout when prompted for root disk layout
options and refer to your preparation notes on page 8.**

Caution – To have space to save any system dumps that may
subsequently occur, select a separate /var partition and make sure
it is several hundred megabytes in size.

```
— Customize Disk: c2t0d0 ─────────────────────────────────────

  Entry:                              Recommended:    MB    Minimum:    MB
  ============================================================================
  Slice  Mount Point                 Size (MB)
    0    /                                3000
    1    swap                              513
    2    overlap                          8633
    3                                        0
    4                                        0
    5    /opt                             2000
    6    /var                             2000
    7    ███████████████████                 0
  ============================================================================
                        Capacity:       8633 MB
                       Allocated:       7513 MB
                   Rounding Error:         2 MB
                            Free:       1118 MB



      F2_OK    F4_Options    F5_Cancel    F6_Help
```

FIGURE 1   Example Disk Layout

- The sizes given here are a suggested minimum.
- The size of the overlap partition will vary slightly, depending on
  the manufacturer of the disk. This value should not be altered.
- You must leave at least two free slices for Sun StorEdge Volume
  Manager: that is, the screen should show zero disk space
  allocated to these slices.
- It is recommended that the free slices are slices 3 and 4, as the
  Volume Manager uses these to record encapsulation information.
- Ensure that there is a minimum of 1 Mbyte of unallocated disk
  space: that is, the screen should show at least 1 Mbyte unused
  disk space.
- Ignore rounding errors and warnings concerning unused disk
  space.

Manual reboot selected ☐

8. Choose to manually reboot the system after installation is complete.

Boot device set ☐

9. When installation has completed, set the default boot device.

If you have installed the operating software on A-DSK0, type:

```
# eeprom boot-device=a-dsk0 diag-device=a-dsk0
```

If you have installed the operating software on B-DSK0, type:

```
# eeprom boot-device=b-dsk0 diag-device=b-dsk0
```

HDDs reengaged ☐

10. Re-engage the HDD modules which you disengaged at the start of the installation procedure.

System rebooted ☐

11. Reboot the system by typing:

```
# reboot
```

Root passqword entered (twice) ☐

12. When requested, enter a root password.

Energy saving ☐

13. At the energy-saving prompt:

```
System identification is completed.

*******************************************************************
This system is configured to conserve energy.
After 30 minutes without activity, the system state will be
saved to disk and the system will be powered off automatically.

A system that has been suspended in this way can be restored
back to exactly where it was by pressing the power key.
The definition of inactivity and the timeout are user
configurable. The dtpower(1M) man page has more information.
*******************************************************************

Do you wish to accept this default configuration, allowing
your system to save its state then power off automatically
when it has been idle for 30 minutes?  (If this system is used
as a server, answer n. By default autoshutdown is
enabled.) [y,n,?] []
```

type **no** to prevent the system shutting down, then type **y** to confirm that the answer should be remembered.

14. Wait for the system to boot up and come into sync.

When requested, log on as root.

A few minutes after the system has rebooted to the system prompt, the *Sync* LEDs on the CPUsets will illuminate and remain steadily lit, indicating that the system is now running in synchronization.

Note – Ignore warnings concerning interrupt level 4.

If you do not have physical access to the system, you can check if the system is in sync as follows:

a. Start cmsconfig**:**

```
# cd /usr/platform/SUNW,Ultra-4FT/SUNWcms/sbin
# ./cmsconfig
```

b. Select the item number for ft_core**.**

c. Check that item 12 op_status **shows as** in_sync**.**

15. If you are upgrading an existing software installation, follow the procedure given in this step, otherwise proceed to Step 16.

a. Set the environment variable CMSHOME **to**
/usr/platform/SUNW,Ultra-4FT/SUNWcms**.**

For C shell users:

```
# setenv CMSHOME /usr/platform/SUNW,Ultra-4FT/SUNWcms
```

For Korn and Bourne shell users:

```
# CMSHOME=/usr/platform/SUNW,Ultra-4FT/SUNWcms
# export CMSHOME
```

b. Start cmsconfig**:**

```
# cmsconfig
```

c. **Using the instructions given in the** *Netra ft 1800 User's Guide* **Chapter 4 "Using the Configuration Management System", identify the spuriously-faulty modules and write down their locations for later reference.**

Installation CD ejected ☐

16. Eject the installation CD by typing:

```
# cd /
# eject
```

Patch CD inserted ☐

17. Insert the Netra ft 1800 Patch CD (Sun Part no. 704-6823-12).

Install the Netra ft 1800 software patch by typing:

```
# cd /cdrom/cd_patch_netra_ft1800/Patches/107369-17
# ./installpatch .
```

Install OSdog patch ☐

18. Install the Netra ft 1800 OSdog patch number 107926-04 (or the latest version, downloaded from SunSolve). This is a mandatory patch.

Copy the patch to /var/tmp, then type:

```
# cd /var/tmp
# zcat 107926-04.tar.Z | tar -xvf -
# cd 107926-04
# ./installpatch .
```

Upgrade only: Spurious faults cleared ☐

19. If you are installing an upgrade and need to clear reported faults on spuriously-faulty modules, run cmsrepairfru **on each module marked as faulty (refer to Step 15 on page 14). If this is a new installation, go to Step 20.**

For example:

```
# ./cmsrepairfru A-PCI3
# ./cmsrepairfru A-MBD
```

System rebooted ☐

20. Reboot the machine:

```
# init 6
```

Programmable Hardware Upgrade

PROM version
checked ▢

21. Check the PROM version by typing:

```
# prtconf -V
```

This results in the a display of the PROM version control information:

```
OBP 3.7.17.0 1999/04/01 16:36
```

The `OBP 3.7.17.0` part of the line indicates version 17.

If a CPUset does not have version 20 or later PROMs then it may be necessary to bring it up to this level first: consult a field service engineer to arrange this.

Note – The upgrade utilities cannot be run if the system was booted from a read-only device, such as a CD-ROM or a network: the system must be running from a writeable device such as a disk before this procedure can be performed. In particular, if the system has just been fully installed from CD-ROM, then it should be rebooted from disk before performing this procedure.

Patch CD still in
drive ▢

22. Ensure the Netra ft 1800 Patch CD is still in the CD-ROM drive.

▼ To Upgrade the FPGAs

23. Ensure the system is running in sync (refer to Step 11 on page 13).

FPGA upgrade
utility installed

24. Type:

```
# cd /cdrom/cd_patch_netra_ft1800/Patches/108065-03
# ./installpatch .
```

The FPGA upgrade utility will be delivered to the directory
/usr/platform/SUNW,Ultra-4FT/lib.

FPGAs upgraded
on one side

25. Type:

```
# cd /usr/platform/SUNW,Ultra-4FT/lib
# ./fwupdate.fpga.258-7134-08
```

You will be prompted:

```
WARNING: This firmware update can only be performed on:

1) The side which is executing this update utility.

2) The other side if its cpuset is powered off.

3) Either side if running in-sync.


Please enter the side of the system that you want to update A or B?
```

Type **A** to upgrade motherboard A or **B** to upgrade motherboard B,
then type **yes** to confirm.

Keep system up

26. When asked if you want to halt the system, answer no.

FPGAs upgraded
on other side

27. Repeat Step 25 and Step 26 for the other motherboard.

▼ To Upgrade the PROMs

You must disable each CPUset in turn in order to upgrade the remaining CPUset PROM.

cmsconfig
started

28. Start `cmsconfig`:

```
# cd /usr/platform/SUNW,Ultra-4FT/SUNWcms/sbin
# ./cmsconfig
```

29. Enter the item number for A-CPU, then select the `Action` **item.**

30. Press `0` **to disable A-CPU.**

A-CPU disabled

31. Wait for a few seconds, then press Return to redisplay the menu.

Repeat until the display shows that A-CPU is disabled, then press **q** twice to exit from `cmsconfig`.

Update the
PROM

32. Invoke the update program:

```
# cd /usr.platform/SUNW,Ultra-4FT/lib
# ./netra_ft_1800.flash.update-09
```

33. You will be asked if you wish to continue.

Answer **y** and then **yes** to upgrade.

NVRAM variables
noted

34. A list of NVRAM variables will be displayed for you to note, and reset later if different from the default values.

Note these for safety, although it should not be necessary to use them.

35. You will be asked if you wish to continue.

Answer **yes** to continue.

B-CPU upgrade
completed

36. The upgrade will proceed, and the success or failure of the upgrade will be reported.

If the update fails, note any error messages and contact your Sun Microsystems representative.

Keep system up

37. You will be asked `Do you wish to halt the system now`.

Answer **no**.

**cmsconfig
started** ☐

38. Start cmsconfig**:**

```
# cd /usr/platform/SUNW,Ultra-4FT/SUNWcms/sbin
# ./cmsconfig
```

39. Enter the item number for A-CPU, then select the Action **item.**

40. Press 1 **to enable A-CPU.**

**A-CPU
re-enabled** ☐

41. Wait for a few seconds, then press Return to redisplay the menu.

Repeat until the display shows that A-CPU is enabled, then press **q** twice to return to the prompt.

System in sync ☐

42. Wait for the system to come back into sync.

43. Enter the item number for B-CPU, then select the Action **item.**

44. Press 0 **to disable B-CPU.**

B-CPU disabled ☐

45. Wait for a few seconds, then press Return to redisplay the menu.

Repeat until the display shows that B-CPU is disabled, then press **q** twice to return to the prompt.

**Update the
PROM** ☐

46. Invoke the update program:

```
# cd /usr/platform/SUNW,Ultra-4FT/lib
# ./netra_ft_1800.flash.update-09
```

47. You will be asked if you wish to continue.

Answer **y** and then **yes** to upgrade.

48. A list of NVRAM variables will be displayed for you to note, and reset later if different from the default values.

Note these for safety, although it should not be necessary to use them.

49. You will be asked if you wish to continue.

Answer **yes** to continue.

**A-CPU upgrade
completed** ☐

50. The upgrade will proceed, and the success or failure of the upgrade will be reported.

If the update fails, note any error messages and contact your Sun Microsystems representative.

Keep system up ☐

51. You will be asked `Do you wish to halt the system now.` **Answer no.**

cmsconfig started ☐

52. Start `cmsconfig`**:**

```
# cd /usr/platform/SUNW,Ultra-4FT/SUNWcms/sbin
# ./cmsconfig
```

53. Enter the item number for B-CPU, then select the `Action` **item.**

54. Press `1` **to enable B-CPU.**

B-CPU re-enabled ☐

55. Wait for a few seconds, then press Return to redisplay the menu.
Repeat until the display shows that B-CPU is enabled, then press **q** twice to return to the main menu.

Patch CD ejected ☐

56. Type:

```
# cd /
# eject
```

to eject the Netra ft 1800 Patch CD.

▼ To Enable the OSdog

You must now enable the OSdog.

Go to the OBP prompt

57. Take the system to the OBP `ok` **prompt:**

```
# init 0
```

Enable the OSdog

58. Type:

```
ok setenv auto-boot? false
ok reset-all
ok h# 4f set-conf-osdog
ok setenv auto-boot? true
```

▼ To Reset the System with the FPGA Upgrades

System power-cycled

59. A full power cycle of the system is required in order for the FPGA upgrades to take effect.

a. Type:

```
# init 5
```

b. You *must* **now power-cycle the system.**

Press the black Standby button on each CAF.
Wait for 10 seconds.
Press the green On button on each CAF.

The system will boot up and come into sync.

Volume Manager Installation

▼ To Install the Sun StorEdge Volume Manager Software and Patches

60. Start `cmsconfig`:

```
# cd /usr/platform/SUNW,Ultra-4FT/SUNWcms/sbin
# ./cmsconfig
```

HDDs
located ☐

61. Locate the HDD modules in the list.

You can press **p** to page down to see second and subsequent pages, and **pp** to page up.

HDDs
noted ☐

62. For each HDD module in the list:

a. Enter the number next to the module.

The attributes of the module are displayed.

b. Note the `Disk` **attribute of the module.**

This is a normal Solaris device name, which you can note below.

Side	HDD0 / A-DSK0	HDD1 / A-DSK1	HDD2 / A-DSK2	HDD3 / A-DSK3	HDD4 / A-DSK4	HDD5 / A-DSK5
A						
B						
	HDD6 / B-DSK0	HDD7 / B-DSK1	HDD8 / B-DSK2	HDD9 / B-DSK3	HDD10 / B-DSK4	HDD11 / B-DSK5

c. Press `q` **to return to the list of modules.**

RMMs
noted ☐

63. For each RMM module in the list:

a. Enter the number next to the module.

The attributes of the module are displayed.

b. Note the `Funct_0` **attribute of the module.**

This is the device name of the CD-ROM drive. It is a normal Solaris device name.

If there is a second CD-ROM drive in the module, note the Funct_1 attribute. This is the device name of the second CD-ROM drive. It is a normal Solaris device name.

Side	RMM
A	
B	

c. Press q **twice to exit** cmsconfig**.**

You will need this information when you initialize the Volume Manager. It can be useful for other purposes, so you may wish to keep it.

Volume Manager installed

64. **Insert the SEVM 2.5 CD into the drive and type:**

```
# cd /cdrom/sun_sevm_2_5_sparc/Product
# pkgadd -d .
```

When prompted, select Heavy Install, and /opt for the AnswerBook home directory.

Volume Manager CD ejected

65. **Type:**

```
# cd /
# eject
```

to eject the SEVM 2.5 CD.

Volume Manager patches installed

66. **Insert the Netra ft 1800 Patch CD and type:**

```
# cd /cdrom/cd_patch_netra_ft1800/Patches/105463-07
# ./installpatch .
# cd /cdrom/cd_patch_netra_ft1800/Patches/106929-01
# ./installpatch .
# cd /
# eject
```

Recovery process completed ☐

67. Sun support engineers can recover a system in the very rare event of serious system failure if you create a backup copy of `vfstab` **and instruct the system in how to deal with stale boot plexes.**

Type:

```
# cp -p /etc/vfstab /etc/vfstab.prevm
# echo "mirror=yes" > /etc/default/vxassist
# mkdir -p /etc/vx/sbin
# echo '/sbin/uadmin 2 1 "stale"' > /etc/vx/sbin/vxaltstale
# chmod +x /etc/vx/sbin/vxaltstale
```

Recovery file modified ☐

68. Now edit the `/etc/rc2.d/S95vxvm-recover` **file and make the following changes:**

a. Comment out the line

```
vxrelocd root &
```

to enable the correct recovery behavior.

b. Add a line

```
/usr/platform/SUNW,Ultra-4FT/SUNWcms/lib/vxbootcheck &
```

to start the boot disk utility and enable boot disk detection.

Note – You must repeat these modifications after system upgrades.

System rebooted ☐

69. Reboot the system:

```
# init 6
```

▼ To Set Up and Mirror the Boot Disks

1. **Type:**

```
# vxinstall
```

When prompted enter each of the three Volume Manager keys, including spaces.

The vxinstall program then examines all controllers that it finds attached to the system and lists them:

```
Generating list of attached controllers....

Volume Manager Installation
Menu: VolumeManager/Install

The Volume Manager names disks on your system using the
controller and disk number of the disk, substituting them into
the following pattern:

    c<controller>t<disk>d<disk>

If the Multipathing driver is installed on the system then for the
disk devices with multiple access paths, the controller number
represents a multipath pseudo controller number. For example, if a
disk has 2 paths from controllers c0 and c1, then the Volume Manager
displays only one of them such as c0 to represent both the
controllers.

Some examples would be:

    c0t0d0 - first controller, first target, first disk
    c1t0d0 - second controller, first target, first disk
    c1t1d0 - second controller, second target, first disk

The Volume Manager has detected the following controllers on
your system:

    c0:

Hit RETURN to continue.
```

Press Return to continue.

Next, `vxinstall` displays a brief introduction to the installation process:

```
Volume Manager Installation
Menu: VolumeManager/Install

    You will now be asked if you wish to use Quick Installation or
    Custom Installation. Custom Installation allows you to select
    how the Volume Manager will handle the installation of each disk
    attached to your system.

    Quick Installation examines each disk attached to your system
    and attempts to create volumes to cover all disk partitions that
    might be used for file systems or for other similar purposes.

    If you do not wish to use some disks with the Volume Manager,
    or if you wish to reinitialize some disks, use the Custom
    Installation option. Otherwise, we suggest that you use the
    Quick Installation option.
Hit RETURN to continue.
```

Press Return to continue.

`vxinstall` then displays a menu with the following options:

```
1  Quick Installation
2  Custom Installation

?  Display help about menu
?? Display help about menuing system
q  Exit from menus

Select an operation to perform:
```

2. Select menu item 2 (Custom Installation).

`vxinstall` will ask you a series of questions for each controller and disk it finds connected to your system. When a default response is displayed in parentheses, you can simply press Return to accept that default. At any of the `vxinstall` prompts, you can type q to abandon the initialization completely and then start again.

Note – All disks are encapsulated or initialized (according to your instructions) at the end of the `vxinstall` procedure. If you quit `vxinstall` before it enters its final phase of actually initializing or encapsulating the disks, all disks will be left as they were before `vxinstall` started.

---

3. Information about the boot disk will now be displayed

```
The c0t0d0 disk is your Boot Disk. You can not add it as a new disk.
If you encapsulate it, you will make your root file system and other
system areas on the Boot Disk into volumes. This is required if you
wish to mirror your root file system or system swap area.

Encapsulate Boot Disk [y,n,q,?] (default: n) y
```

Type **y** to proceed with encapsulation. This example assumes your boot disk is named c0t0d0. Check that the name of the disk on which you installed the Netra ft 1800 software is displayed correctly.

4. You will be asked to name the boot disk:

```
Enter disk name for c0t0d0 [<name>,q,?] (default: rootdisk)
```

Press Return to accept the default disk name rootdisk.

vxinstall now encapsulates your root file system as a volume, along with your swap device and all other disk partitions found on your boot disk. /opt, /var and any other file systems on your boot disk are also encapsulated.

vxinstall now goes through each controller and asks you how to handle the disks contained on that controller. vxinstall begins this process for each controller by identifying the controller and generating a list of its disks:

```
Generating list of attached disks on c1....
The Volume Manager has detected the following disks on controller

c1t0d0

  Hit RETURN to continue.
```

Press Return to continue.

5. **The following prompt will appear a number of times:**

```
Installation options for controller c1
Menu: VolumeManager/Install/Custom/c1

 1  Install all disks as pre-existing disks. (encapsulate)
 2  Install all disks as new disks.(discards data on disks!)
 3  Install one disk at a time.
 4  Leave these disks alone.

 ? Display help about menu
 ?? Display help about the menuing system
 q  Exit from menus

Select an operation to perform:
```

At each prompt, type **4** to leave the disks alone.

No changes will be made to the disks and they will not be placed under Volume Manager control. When all of the disks on the current controller have been named, press Return to move on to the next controller if there is one.

When you have completed the vxinstall procedure for all controllers on your system, vxinstall displays a summary of the disks you have designated for initialization (New Disk) or encapsulation (Encapsulate) on each controller.

6. **A summary of your choices will be displayed:**

```
The following is a summary of your choices.

    c0t0d0  Encapsulate

Is this correct [y,n,q,?] (default: y)
```

Type **y** to confirm that it is correct.

vxinstall proceeds to encapsulate the disk listed with Encapsulate.

7. **You will now be asked if you want to shutdown and reboot the system:**

```
The system now must be shut down and rebooted in order to continue
the reconfiguration.

Shutdown and reboot now [y,n,q,?] (default: n)
```

Type **y** to confirm.

vxinstall begins an immediate shutdown.

Note – During the next one or more reboots, you may be asked several times if you wish to continue an operation. Press the Return key at all of these prompts to accept the default answer. If you select a different answer from the default for any of these prompts or press q, the initialization may fail.

When the vxinstall process is complete, use the vxdiskadm utility to make a new disk a mirror of the boot disk, for example, make b-dsk0 a mirror of a-dsk0, and bring other disks under Volume Manager control.

▼ To Add the Root Disk Mirror

1. **Insert the HDD module physically.**

   a. **Insert the HDD module in an empty HDD slot in the opposite disk chassis to the root disk.**

   Note the location of the disk from the label next to its slot on the chassis.

   b. **When the lever engages with the chassis, raise it to push the module fully home.**

   c. **Move the slide in the lever into the engaged position.**

2. **Start** cmsconfig:

```
# /usr/platform/SUNW,Ultra-4FT/SUNWcms/sbin
# ./cmsconfig
```

3. **Include a new HDD module:**

```
i HDD
```

4. **Configure the HDD module:**

   a. **Enter the number next to the module.**

    b. Enter the item number for the `location` attribute.

    c. Select the location of the disk by entering the corresponding item number.

5. Enable the disk:

    a. Enter the item number for the `action` attribute.

    cmsconfig displays the possible values for the action attribute.

    b. Select `enable` by entering the corresponding item number.

    c. Press `t` to return to the top level menu.

6. Press `q` to exit `cmsconfig`.

7. Check that the disk you have chosen to be the root disk mirror is visible to the Volume Manager:

```
# vxdisk list
```

If the disk is not present in the resulting list, type:

```
# vxdctl enable
```

8. Identify the disk to be used as the mirror, and note its location from the label next to its slot on the chassis. Start `vxdiskadm`:

```
# vxdiskadm
```

9. Select menu item 1 (Add or initialize one or more disks) from the `vxdiskadm` main menu.

10. The Add or Initialize Disks menu will be displayed:

```
Add or initialize disks
Menu: VolumeManager/Disk/AddDisks

Use this operation to add one or more disks to a disk group. You can add the
selected disks to an existing disk group or to a new disk group that will be
created as a part of the operation. The selected disks may also be added to a
disk group as spares. The selected disks may also be initialized without adding
them to a disk group leaving the disks available for use as replacement disks.

More than one disk or pattern may be entered at the prompt. Here are some disk
selection examples:

all:            all disks
c3 c4t2:        all disks on both controller 3 and controller 4, target 2
c3t4d0:         a single disk

Select disk devices to add:
[<pattern-list>,all,list,q,?] c1t0d0
```

Type the name of the disk to be added to Volume Manager control.

In this example, the disk c1t0d0 is added. It is now under the control of Volume Manager, and is available to be used as the mirror boot disk.

If you do not know the device name of the disk to be added, type **list** at the prompt for a complete listing of available disks. If you have followed this procedure as written, only the boot disk and the disk you have just inserted will be present.

11. You will be asked for confirmation:

```
Here are the disks selected.  Output format: [Device_Name]

c1t0d0

Continue operation? [y,n,q,?] (default: y) y
```

To continue the operation, type y or press Return.

12. You can now choose the group to which you want to add the disk:

```
You can choose to add these disks to an existing disk group, anew
disk group, or you can leave these disks available for use
by future add or replacement operations.  To create a new disk
group, select a disk group name that does not yet exist.  To
leave the disks available for future use, specify a disk group
name of "none".

Which disk group [<group>,none,list,q,?] (default: rootdg)
```

Press Return to add the disk to the default group `rootdg`.

13. You can now choose a name for the disk:

```
Use default disk names for these disks? [y,n,q,?] (default: y) n
```

Type **n** or Return to choose your own names, or press **y** to use the default names.

14. You can now decide whether you want the disks to be used as hot-relocation spares:

```
Add disks as spare disks for rootdg? [y,n,q,?] (default: n) n
```

Type **n** to indicate that the disk should not be used as a hot-relocation spare.

15. You will now be asked for confirmation:

```
The selected disks will be added to the disk group rootdg with
disk names that you will specify interactively.

c1t0d0

Continue with operation? [y,n,q,?] (default: y) y
```

To continue with the operation, type **y** or press Return.

16. **If the disk has been previously installed with Solaris, or used under Volume Manager control, you will be prompted as follows:**

```
The following disk has a valid VTOC encapsulate this device?
```

You should answer **n**. When asked if the disk should be initialized, answer **y**.

17. **You can now enter a name for the disk:**

```
Enter disk name for c1t0d0 [<name>,q,?] (default: disk01) root2disk

Adding disk device c1t0d0 to disk group rootdg with disk
name root2disk.
```

Type **root2disk**.

vxdiskadm now confirms those disks that are being initialized and added to Volume Manager control with messages similar to the following:

```
Initializing device c1t0d0.

Adding disk device c1t0d0 to disk group rootdg with disk
name root2disk.
```

18. **At the following prompt, type** n **to return to the** vxdiskadm **main menu:**

```
Add or initialize other disks? [y,n,q,?] (default: n)
```

19. **Select option 6, (Mirror volumes on a disk) from the** vxdiskadm **main menu.**

20. You will be asked for the name of the boot disk:

```
Mirror volumes on a disk
Menu: VolumeManager/Disk/Mirror

This operation can be used to mirror volumes on a disk. These
volumes can be mirrored onto another disk or onto any
available disk space. Volumes will not be mirrored if they are
already mirrored. Also, volumes that are comprised of more than
one subdisk will not be mirrored.

Mirroring volumes from the boot disk will produce a disk that can
be used as an alternate boot disk.

Enter disk name [<disk>,list,q,?] rootdisk
```

Type **rootdisk**.

21. Now you can specify the disk to which you want to mirror:

```
You can choose to mirror volumes from disk rootdg onto any
available disk space, or you can choose to mirror onto a specific
disk. To mirror to a specific disk, select the name of that disk.
To mirror to any available disk space, select "any".

Enter destination disk [<disk>,list,q,?] (default: any) root2disk
```

Type the target disk name. This is the name of the disk you have just inserted and intend to use as the mirror.

Note – Be sure always to specify the destination disk when you are creating an alternate root disk. Otherwise, the Volume Manager will select a disk to be the alternate root disk; however, your system may not be able to boot from that disk.

---

22. You will now be asked for confirmation:

```
The requested operation is to mirror all volumes on disk rootdisk
in disk group rootdg onto available disk space on disk root2disk.

NOTE: This operation can take a long time to complete.

Continue with operation? [y,n,q,?] (default: y)
```

Press Return to continue to make the mirror.

vxdiskadm displays the status of the mirroring operation:

```
Mirror volume rootvol ...
.
.
.
Mirroring of disk rootdisk is complete.
```

23. You will be asked if you want to repeat the process:

```
Mirror volumes on another disk? [y,n,q,?] (default: n)
```

Type **n** to exit.

SunVTS

The following procedure describes how to install the optional SunVTS diagnostic tools.

1. **Place the Supplement CD in the drive.**

2. **Type the following commands:**

```
# cd /cdrom/s2_6_598_netra_ft_1800_suppcd/Product
# pkgadd -d . SUNWvts SUNWvtsmn
```

Software for PCI Modules

The following sections describe how to install the software for the PCI Modules supported in this release.

For further information on installing PCI modules, refer to Chapter 4, "Using the Configuration Management System (CMS)" of the *Netra ft 1800 User's Guide* (Part Number 805-4529-xx).

PCI Carrier with 8-Port Async Card

Documentation Changes

The following changes apply to the *SunSAI/P User's Guide* (Part Number 805-6947-10) when the card is used in a Netra ft 1800 system.

Page 1, *Components*: The following items are shipped:

- SunSAI/P card mounted in a hotplug PCI carrier
- Connector assembly

Pages 3–4, *Installing the Board*: This section does not apply. Refer to the *Netra ft 1800 Installation Guide* (Part Number 805-4533-xx) and the *Netra ft 1800 User's Guide* (Part Number 805-4529-xx) for details of how to install the PCI card carrier.

Pages 19–22: The following sections do not apply:

- *Rebooting the System*
- *Automatic Configuration*
- *Manual Configuration*

Instructions for installing the SunSAI/P software are given in the procedure below.

Page 22, *Creating New Devices*: The device driver will support up to 16 SunSAI/P adapters.

▼ To Install the SunSAI/P Software

Once you have booted from disk, wait for the CMS to fully configure, then:

1. **Place the Supplement CD in the drive.**

2. **Type the following commands:**

```
# cd /cdrom/s2_6_598_netra_ft_1800_suppcd/Product
# pkgadd -d . SUNWsaip SUNWsaipu
# cd /
# eject
```

3. **Insert the Patch CD and type:**

```
# cd /cdrom/cd_patch_netra_ft1800/Patches/106955-01
# ./installpatch .
# cd /
# eject
```

4. **It is recommended that you run the card in non-interrupt mode. However, if you want to enable interrupt mode, wait for the prompt then type the following command:**

```
# /etc/opt/SUNWconn/bin/saipconfig
```

5. **Disable the PCI CMS objects for the SAI/P card(s), then re-enable them.**

For further information on using the SunSAI/P card see the *SunSAI/P User's Guide* (Part Number 805-6947-10) and the *SunSAI/P Release Notes* (Part Number 805-6948-10).

PCI Carrier with High Speed Serial Interface Card

Documentation Changes

The following changes apply to the *SunHSI/P User's Guide* (Part Number 805-6943-10) when the card is used in a Netra ft 1800 system.

Chapter 2, *Hardware Installation*: This chapter does not apply. Refer to the *Netra ft 1800 Installation Guide* (Part Number 805-4533-xx) and the *Netra ft 1800 User's Guide* (Part Number 805-4529-xx) for details of how to install the PCI card carrier.

Chapter 3, *Software Installation*: The instructions for installing the HSI/P software are given in the procedure below.

▼ To Install the HSI/P Software

Once you have booted from disk, wait for the CMS to fully configure, then:

1. **Place the Supplement CD in the drive.**

2. **Type the following commands:**

```
# cd /cdrom/s2_6_598_netra_ft_1800_suppcd/Product
# pkgadd -d . SUNWhsip SUNWhsipu SUNWhsipm
# cd /
# eject
```

3. **Insert the Patch CD and type:**

```
# cd /cdrom/cd_patch_netra_ft1800/Patches/106922-04
# ./installpatch .
# cd /
# eject
```

4. **Disable the PCI CMS objects for the HSI/P card(s), then re-enable them.**

PCI Carrier with ATM Card

Documentation Changes

The following changes apply to the *SunATM Installation and User's Guide* (Part Number 805-6522-10) when the card is used in a Netra ft 1800 system.

Chapter 3, *Software Installation*: The instructions for installing the ATM software are given in the procedure below.

Chapter 4, Section 4.1.2 *Required Patches*: This section, which describes patches required when operating under different operating environments does not apply. `a_dozerocopy` is automatically set to zero when SunATM is run on the Netra ft 1800.

▼ To Install the SunATM Software

Once you have booted from disk, wait for the CMS to configure fully, then:

1. **Place the SunATM CD in the drive.**

2. **Type the following commands:**

```
# cd /cdrom/atm_4.0_fcs/Product
# pkgadd -d .
```

When prompted, type `all` to install all the SunATM packages.

3. **Insert the Patch CD and type:**

```
# cd /cdrom/cd_patch_netra_ft1800/Patches/107845-02
# ./installpatch .
# cd /
# eject
```

For further information on using the SunATM card see the *SunATM 4.0 Release Notes* (Part Number 805-6553-10) and the *SunATM 4.0 Installation and User's Guide* (Part Number 805-6552-10).

PCI Carrier with Quad Fast Ethernet Card

Documentation Changes

The following changes apply to the *Sun Quad FastEthernet PCI Adapter Installation and User's Guide* (Part Number 805-1797-10) when the card is used in a Netra ft 1800 system.

Chapter 2, *Installing the Adapter*: This chapter does not apply. Refer to the *Netra ft 1800 Installation Guide* (Part Number 805-4533-xx) and the *Netra ft 1800 User's Guide* (Part Number 805-4529-xx) for details of how to install the PCI card carrier.

Chapter 3, *Configuring the Driver Software*: The instructions for installing the Quad FastEthernet software are given in the procedure below.

▼ To Install the Quad FastEthernet Mandatory Patch

The base QFE/P driver is installed with the Netra ft 1800 base software. The mandatory patch must be installed in order for the driver to function correctly.

Once you have booted from disk, wait for the CMS to fully configure, then:

1. **Download patch 107778-04 (or a later version, if available) from SunSolve and copy it to the target machine to** `/var/tmp`**.**

2. **Type:**

```
# cd /var/tmp
# zcat 107778-04.tar.Z | tar -xvf -
# cd 107778-04
# ./installpatch .
```

3. **Disable the PCI CMS objects for the Quad FastEthernet card(s), then re-enable them.**

CPUset Integration

In order to reduce the time during final CPUset integration in which the system is not performing system services ('stop-dead time'), it is necessary to alter the default setting using `cmsconfig`.

1. **Start** `cmsconfig`.

2. **Select the** `ft_core` **sub-system.**

3. **Select** `pri_stop_time_msecs` **(menu item 4).**

4. **Select** `200` **(menu item 1).**

5. **Quit from** `cmsconfig`.

From now on the system will use the lower value to achieve the lowest possible 'stop-dead' time during final CPUset integration.

Note – Although 200 mS is selected it is still not possible to achieve that time. However, it does play a significant role in deciding at what point to start final integration.

▼ To Enable a Failed CAF Following a Merge

If the CAF fails to enable after a merge operation, do the following:

1. **Use** `cmsconfig` **to disable the failed CAF.**

2. **If the error has been propagated to the corresponding motherboard, run** `cmsrepairfru` **to repair the motherboard and then re-enable it.**

3. **Re-enable the CAF.**

System Breaks

On the Netra ft 1800, the ability to break into a locked system with `^A^A` is disabled. To enable it, you can do the following:

1. **Edit `/kernel/drv/ttymux.conf.`**

   Change the line reading:

   ```
   sm-ctrla-abort-on      = 0;
   ```

   to read

   ```
   sm-ctrla-abort-on      = 1;
   ```

2. **Save the file.**

3. **Type the command**

   ```
   # /sbin/ttymuxadm -b on s
   ```

Using Man Pages

To see the Netra ft 1800 man pages, use the `man` command with the `-M` option to specify the pathname of the installed man pages.

For example, to see the `cmsconfig`(1M) man page, type:

```
# man -M /opt/SUNWftm/man/ cmsconfig
```

If you want to update the `.profile` file for the system you are using, you can add the following to the path list for the `MANPATH` variable:

```
/opt/SUNWftm/man
```

You can now use the `man` command without the `-M` option. For example:

```
# man cmsconfig
```

Using `cmsrepairfru`

Spuriously faulty modules should be identified using `cmsfix`, `xcmsfix` or `cmsconfig`, and examining the 'fault' column. Make a note of the locations of the spuriously-faulty modules.

For instance, using `cmsfix` (or `xcmsfix`):

```
#                               CMSFIX
Status: READY
Name      Location Description                    State               F  A
--------------------------------------------------------------------------------
HDD 5     A-DSK5   Hard Disk Drive FRU            disabled
··




--------------------------------------------------------------------------------
D - Disable          E - Enable        | Reason for fault:
A - Acknowledge      S - Scan Hardware | WARNING: power off command failed
N - Next             P - Previous      |
Q - Quit             ? - Help          |
```

Using `cmsconfig`:

```
Item Name          Fault Loc   State                    Page 1 of 2
--------------------------------------------------------------------------------
0    A-MBD 0        A-MBD   enabled
1    B-MBD 0        B-MBD   enabled
2    CAF  1         B-CAF   enabled
3    CPU  0         A-CPU   enabled
4    CPU  1         B-CPU   enabled
5    DSK  0         A-DSK   enabled
6    DSK  1         B-DSK   enabled
7    HDD  0         A-DSK0  enabled
8    HDD  1         A-DSK1  enabled
9    HDD  5         A-DSK5  disabled      WARNING: power off command faile
10   HDD  6         B-DSK0  enabled
11   HDD  7         B-DSK1  enabled
12   HDD  9         B-DSK3  enabled
13   HDD  11        B-DSK5  enabled
14   PSU  0         A-PSU0  enabled
15   PSU  1         A-PSU1  enabled
16   PSU  2         A-PSU2  enabled
17   PSU  3         B-PSU0  enabled
18   PSU  4         B-PSU1  enabled
19   PSU  5         B-PSU2  enabled

(H)elp, (I)nclude, (E)xclude, (S)elect, (P)age, (V)iew, (Q)uit or <Number> ? □
```

In both cases the faulty hard disk module is shown as being in location A-DSK5.

Before using `cmsrepairfru` you must set the environment variable CMSHOME to
/usr/platform/SUNW,Ultra-4FT/SUNWcms.

For C shell users:

```
# setenv CMSHOME /usr/platform/SUNW,Ultra-4FT/SUNWcms
```

For Korn and Bourne shell users:

```
# CMSHOME=/usr/platform/SUNW,Ultra-4FT/SUNWcms
# export CMSHOME
```

Run `cmsrepairfru` on each module marked as faulty before the system is rebooted.

For example:

```
# cmsrepairfru A-DSK5
# cmsrepairfru A-MBD
```

MAC Addresses

Note that each machine has 68 contiguous MAC addresses reserved. The MAC addresses are used as follows:

```
address          who uses it

sysbase+0:    a-net0 (hme3)
sysbase+1:    a-net1 (hme2)
sysbase+2:    pnet0 (combined or on side A of split machine)
.
.
sysbase+33:   pnet31 (combined or on side A of split machine)
sysbase+34:   b-net0 (hme1)
sysbase+35:   b-net1 (hme0)
sysbase+36:   pnet0 (on side B of split machine)
.
.
sysbase+67:   pnet31 (on side B of split machine)
```

You should also set your NIS ethers map set up as follows:

```
name             ether
----             ----
hostname         base
hostname         base+1
hostname         base+2
hostname-1       base+3
hostname-2       base+34
hostname-2       base+35
hostname-2       base+36
hostname-3       base+37
```

Notes on Split Mode

Restrictions on Volume Manager for Split Mode

If Volume Manager is installed, the following restrictions apply for split mode:

- The boot disk cannot extend beyond one physical disk (the swap, root, `/usr`, `/etc`, `/opt` file systems must be contained in one disk).

  See for example the suggested disk layout in Step 7 on page 12.

- The boot disk must be encapsulated.

- The boot disk must be mirrored. The two disks must reside in different disk chassis.

- Each plex on the boot disk must have a valid mirror on the other disk.

- The mirror of the boot disk must be bootable.

- Exactly two disks must belong to the rootdg group: the boot disk, and its mirror.

  All other disks must belong to other separate disk groups.

- Before you split the system, you must remove from Volume Manager control all disks in disk groups other than `rootdg` which will belong to the new side.

System Identity Issues

Since a Netra ft 1800 has the potential to be split, two hostids are reserved for the platform. In Combined Mode, one of the two hostid is used. When a new split side is created, it is assigned the alternative hostid, while the surviving side retains the hostid of the original combined system.

The same applies to the nodename. When a new split side is created, it must be assigned a nodename different from the nodename of the original combined system. The two nodenames are specified in the line *hostnames* in `splitd.conf`.

After merge, the hostid and hostname of the resulting combined system coincide with the hostid and hostname of the winner of the merge operation.

Depending on the circumstances, these hostid and hostname may or may not coincide with the hostid and hostname of the original combined system.

For example, if the original combined system had identity `hostid0`, `nodename0`, and the final merged system has identity `hostid1`, `nodename1`, you can:

- Accept the new identity and take no action
- Restore the original `nodename0`
- Restore the original `hostid0`
- Restore both the original `hostid0` and the original `nodename0`

Note – Changing the hostid and nodename of the system can degrade or stop the functionality of some applications, for example Volume Manager. If the application has a critical role (as for example Volume Manager), changing hostid or nodename can completely stop the functionality of your system.

Consider also that changing the system's hostid, nodename or both requires a reboot in order to become effective.

You are strongly advised to use secondary network interfaces to service client applications. Such interfaces can simply be disabled on one side, then transferred and enabled on the other side, without implications for the system identity or the need for reboots.

- If Volume Manager is *not* used:

  See the *Solaris 2.4 System Administration Answerbook* for instructions for changing the nodename.

  To change the hostid, the command `u4ft_change_hostid` must be used. This command switches the hostid from the present one to the alternative one. The change is not effective until the system is rebooted.

- If Volume Manager *is* used:

  You can restore both the original `hostid0` and the original `nodename0` together, but not either individually. You must split the system again, selecting the split winner as the side with `nodename1` and `hostid1`, then merge the two sides again, selecting the merge winner to be the side with `nodename0` and `hostid0`. These operations restore both `hostid0` and `nodename0` to the system.

▼ To Upgrade the Operating Environment

The following information must be added to Section 11.3, Step 4 in the *Netra ft 1800 User's Guide*:

Once the new operating environment has been installed, the `splitd` and `icn` configuration files must be edited as described in Section 11.1.1.

It is important that the `splitd.conf` is identical on both sides and that the `config.icn*` files on each side of the system are identical except for the lines that define the hostname to be used by each icn interface (that is, the lines that begin `HOSTNAME=`). These must reflect the name of each side as described in Section 11.4.

▼ To Set up Fault Tolerant Networks Before Splitting

The note at the top of page 11-6 of the *Netra ft 1800 User's Guide* should be read in the light of the following information.

It is important to ensure that two split sides do not claim identical hostnames for their network interfaces. The method of achieving this depends on the whether Volume Manager is installed:

■ If Volume Manager is not installed, you must install the operating environment on the new side once you have create it using `splitadm`. Take care to give a new nodename to the new side, and to assign new hostnames to all the network interfaces.

■ If Sun StorEdge Volume Manager is used, you must prepare as follows before splitting:

a. **Use** `cmsconfig` **to identify all the** `ft_network` **objects in the system**

b. **Identify the primary interface (usually** `ft_network 0`**).**

This interface has an hostname identical to the nodename. For this interface, verify that its state is `dual_redundant` (which means that both controllers are functioning).

c. **Identify any other** `ft_network` **interfaces.**

For all of them, use `cmsconfig` to set the `controllerX_FRU` and `controllerX_Funct` that will be owned by the new side to NULL. The result will be an `ft_network` in a `not_redundant` state.

This will prevent the new side from bringing on-line a network interface with a clashing hostname.

Restrictions on MBD Operations

In a split system you must not disable the other side's motherboard.

Restrictions on Split and Merge

After a split operation is issued, the loser of the split goes through a complete reset then stops in the `ok` prompt. Until this phase is completed, you should not issue a `merge` command.

Faulty Modules after Split

As a result of a successful split operation, the loser's boot disk module may end up marked as failed. This is not a real failure. You should simply repair it from the loser side by using the utility `cmsrepairfru`.

For example:

```
# cmsrepairfru B-DSK0
```

In some cases, if you are using Volume Manager, you must also use the appropriate `vxedit` command on the boot disk of the losing side to clear the spurious failure. For example, to clear the spurious failure on B-DSK0 you can type:

```
# vxedit -g rootdg set failing=off root2disk
```

If the force option is used for splitting, the loser's Motherboard may end up marked as failed. This is not a real failure. The motherboard should be repaired as follows:

1. **Wait until the new system has completed its boot sequence.**

2. **Log in.**

3. **Use** `cmsconfig` **to check if the motherboard is marked failed.**

   If this is the case, use `cmsrepairfru` to repair it. See Step 19 on page 15 for details.

4. **Use** `cmsconfig` **to enable the repaired Motherboard.**

   The CMS will automatically enable all the modules depending on that Motherboard.

Troubleshooting

In some cases when split mode operation do not behave as expected (for example if the command splitinfo returns an error), restarting the split daemon may cure the problem.

To restart the split daemon:

```
# /etc/init.d/u4ftsplit stop
# splitinfo
```

Fault Tolerant Ethernets

This section is intended to supplement the information in Chapter 7, "Fault Tolerant Network Subsystem", of the *Netra ft 1800 User's Guide*.

The Ethernet subsystem employed on the Netra ft 1800 has been designed to be fault tolerant and consequently is managed a little differently from Ethernets on other Sun products. The advantage of the fault tolerant Ethernet is that in the event of an Ethernet board failure a fast automatic switchover to a redundant board takes place. This switchover is done in such as way as to preserve the original network connections to minimize any loss of service.

Physical Connections

There are four default Ethernet ports on a Netra ft 1800. On the A-CAF there are Net0 and Net1. These ports are referred to as a-net0 and a-net1 respectively. Similarly, on the B-CAF there is a Net0 and a Net1 referred to as b-net0 and b-net1. Each of the CAF Ethernet ports has its own MAC address. Other Ethernet ports can be added via PCI carriers containing either single or quadruple ports. Such additional ports also have unique MAC addresses.

Network Booting

There is a limitation that network booting (including JumpStart) is only supported from `a-net0`. Hence, to network boot a system, a cable must be attached to A-CAF Net0, and the boot server must be informed of the `a-net0` MAC address. This restriction is shared by other Sun products that also specify that network booting must be performed using the system base MAC address.

In split mode each side of the system can boot from Net0 on its CAF.

As there is only a single connection, fault tolerant network booting is not supported.

Ethernet Port Configuration

The way in which Ethernets are manipulated on a Netra ft 1800 is via the CMS by using `cmsconfig`. This allows you to set up both single and redundant Ethernet interfaces. You must specify name and IP address mappings in `/etc/hosts` for use by the CMS. The CMS will automatically set up any other files it needs.

The CMS uses objects called `ft_networks` to model Ethernet interfaces. An `ft_network` can have either a single non fault tolerant implementation or a dual redundant implementation. You can specify which Ethernet ports are to be associated with which `ft_network`.

Implementation Details

On servers with non fault tolerant Ethernets there is an Ethernet driver such as `hme` which is configured into network interfaces with `ifconfig`. On the Netra ft 1800 there is a hardened version of the `hme` device driver which supports hot plugging, although this is not used directly. There is instead a multiplexing device driver, called `pnet`, which is used to link either one or two `hme` instances. If two `hme` instances are linked in the `pnet` then the `pnet` is fault tolerant. It is the `pnet` device driver that is configured by `ifconfig` to produce Ethernet interfaces.

These steps are managed by the CMS and do not require direct user invention.

Primary and Secondary Instances

Although a `pnet` can have two physical Ethernets boards, each with a connection port, only one of the ports is used to transmit data to the network at large. This active `hme` is termed the primary, while the other is termed the secondary. The primary instance in a `pnet` takes on the MAC address of the `pnet`. This means that the active instance in the `pnet` always uses the same MAC address.

In the event of a failure of the primary `hme`, the `pnet` will automatically promote the secondary `hme` to be the primary to avoid loss of service. If a secondary `hme` fails then the primary `hme` is unaffected. The primaryship of a `pnet` can be altered in an `ft_network` by changing the value of the `preferred_controller` attribute using `cmsconfig`.

CMS and Boot Time

When a system boots up, the CMS will automatically configure any network interfaces. It will look for files like `/etc/hostname.pnet0` (which were created earlier). The CMS carries out all the `pnet` interface connection using `ifconfig`, and prior to entry to multiuser mode all Ethernet interfaces specified in the CMS will be configured and up.

Latent Fault Checking

In order to exercise both Ethernet boards in a fault tolerant `pnet`, each board sends a packet to its companion every two seconds. If a packet is missed, this period is reduced to once a second in an attempt to quickly pin down the fault. If the fault goes away because it was congestion on the network the `pnet` returns to normal. If, however, the problem persists, the primary in the `pnet` requests that a system daemon called `pnetd` sends a multicast packet (224.0.0.1) using `ping`. The `pnetd` daemon switches the primaryship with each packet and if it sends 50 packets packets without response emit a message on the console. The `pnet` device driver will then re-attempt the cross `pings` and the whole cycle repeats.

Cabling Restrictions

Both ports in a fault tolerant pair need to be connected to the same hub (not router) so that MAC packets transmitted by either of the ports can be seen by the other. This requirement results from the latent fault checking. If there is no MAC level connection between the ports, the controlling `pnet` device driver will assume that there is a network fault and attempt fault tolerant recovery steps.

Similarly, connecting systems back to back via crossover cables will not work with the fault tolerant Ethernet because the latent fault checking packets will not be able to be exchanged between pairs of ports.

Netmasks and Private Networks

It is not possible to specify netmask information in the CMS. Instead, the CMS configures `pnets` using

`ifconfig pnetX netmask +`

which retrieves the appropriate netmasks from `/etc/netmasks` (or NIS as appropriate).

If private network address spaces are required, RFC 1918 should be followed, which recommends using addresses of the form of 192.160.0.0.

Fault Checking in `ft_network`

This section is intended to supplement the information in Chapter 7, "Fault Tolerant Network Subsystem", of the *Netra ft 1800 User's Guide*.

The failure of an Ethernet module or controller is normally detected by the hardened `hme` driver or by an `iofixup` event that is processed by the fault tolerant framework.

The removal of a cable is detected by the relevant transceiver which signals an error. The transceiver can also detect when the cable is replaced.

In order to detect a failure on the network (for example, a broken hub) the two `hme` driver instances referenced by an `ft_network` object exchange test MAC packets. By using the `snoop` utility to examine the traffic related to the `ft_network`, it is possible to observe the controllers send a packet `Ethertype=BASE (LLC/802.3)` to each other every two seconds. If the `hme` driver instances do not receive the test packets, the frequency of the test packet transmission is increased to two per second. If the packets are still not received, the controller that experiences the problem requests a daemon to transmit a multicast packet addressed to 224.0.0.1. The daemon attempts to make this transmission a number of times. If all attempts are unsuccessful, the `controller_in_use` field of the `ft_network` object is alternated.

The test packet model assumes that the two controllers of an `ft_network` object are connected by means of broadcast media.. If this is not the case, it is not possible to route test packets and the `ft_network` object assumes that the controller in use has failed and takes corrective action. This can mean that the `ft_network` object can enter a cycle of switching the value of the `controller_in_use` field in an unsuccessful attempt to obtain a working controller.