AIX 4.1 Embedded and Client Packages
on PowerStack™

AIX 4.1 Entry Server Package
on PowerStack™

Installing and Configuring NCDware

AXONCDA/IS1

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About This Guide

Purpose

This guide is designed to help you install, configure, and begin using Network Computing Devices (NCD) X terminals and NCDware on AIX 4.1 on PowerStack.

Scope

The chapters in this guide:

- describe how to install and remove NCDware, add additional fonts and servers, and configure the font server
- describe how to configure and boot X terminals
- offer troubleshooting information

Prerequisites

You should have a general understanding of the AIX operating system and the X Window System.

1

What are NCD X Terminals and NCDware?

NCD X Terminals

Network Computing Devices (NCD) X terminals work in conjunction with a network of computers running AIXwindows, which provides a graphical windowing environment based upon the X Window System and OSF/Motif.

NCDware

NCDware is the X server and related software provided with your NCD X terminal. Based on the X Window System, NCDware:

- provides an X server that contains local clients such as a local serial session, a local `telnet` client, and a local window manager
- includes several built-in fonts

  Other fonts can be dynamically loaded from hosts over the network.
- includes a console interface for each X terminal
- includes a method for system-wide configuration

Where to Find Information

Overview

This section lists common tasks involved in using NCD X terminals and tells you where to find information to accomplish each task. The documentation consists of:

- chapters in this guide
- other Motorola documents
- NCDware documents provided by NCD
- AIXwindows documents provided by IBM

Where to Find Information

The following table can help you find information for accomplishing specific tasks.

Note Some tasks described in this guide are also covered in *NCDware Advanced User's Guide for UNIX Systems* (available from NCD). In these cases, the information in this guide takes precedence.

To accomplish these tasks...	refer to...	produced by...
Set up and install the NCD X terminal hardware	Installation foldout sheet or booklet for the specific X terminal model	NCD
Find release-specific information on Motorola's NCDware product	*AIX 4.1 on PowerStack Release Notes*	Motorola
Install NCDware	"NCDware Installation" chapter of this guide	Motorola
Configure NCD X terminals	"Configuring X Terminals" chapter of this guide	Motorola

To accomplish these tasks...	refer to...	produced by...
Configure the font server	"Configuring and Accessing the Font Server" chapter of this guide	Motorola
Boot NCD X terminals	"Booting an X Terminal" chapter of this guide	Motorola
Remove NCDware	"NCDware Removal" chapter of this guide	Motorola
Find solutions to common X terminal problems	• "Troubleshooting" chapter of this guide • troubleshooting appendix in *NCDware Advanced User's Guide for UNIX Systems*	Motorola and NCD
Learn how to use the console interface and become more familiar with NCDware features	*Getting Started with NCD X Terminals*	NCD
Perform advanced operations using NCD X terminals, such as: • interactively customizing X terminals • configuring local clients • using the PEX server • using serial ports • use XRemote	*NCDware Advanced User's Guide for UNIX Systems*	NCD

To accomplish these tasks...	refer to...	produced by...
Find information on advanced NCDware topics such as: • the `boot` monitor • NVRAM contents and utility • remote configuration language and parameters • detailed parameters and cross-references for the console interface • NCDware server messages • manual pages for NCDware clients	• *NCDware Reference Manual* • *NCDware Release Notes*	NCD
Find out how to: • use AIXwindows, a graphical user interface based upon the X Window System (AIXwindows runs on a variety of X terminals, including NCD models.) • use the AIXwindows Desktop, which is based upon the Common Desktop Environment (CDE) and invoked by `dtlogin`	*AIX 4.1 on PowerStack Getting Started*	Motorola
Find out how to switch between two login methods: `dtlogin` (the default) and `xdm`	"NCDware Installation" chapter of this guide	Motorola

Notation Conventions

The following notation conventions are used throughout this guide:

The type style...	Is used to show...
Italic	• variables that need to be replaced with specific values • titles of guides and standards specifications
`monospace`	• commands and screen messages • declarations and code examples

Gathering Information 2

Introduction

Before you can install NCDware using the procedures in chapter 3, "NCDware Installation," you need to know:

- which servers your site will be using
- disk space requirements

When you configure your X terminals in chapter 4, "Configuring X Terminals," you will provide values for adding, modifying, and deleting X terminals. You will also need many of these values for procedures described in later chapters of this guide.

This chapter describes these requirements, and tells you how to obtain the appropriate values. You should collect all of the values for your system and for each X terminal now—before beginning the installation and configuration procedures.

When you collect these values, record them on copies of the work sheets in appendix A, "Work Sheets for Gathering Values."

2

Gathering Installation Information

During the installation procedure in chapter 3, "NCDware Installation," you will be asked which X servers you would like to install and you will verify that sufficient disk space is available.

Using a photocopy of the "Work Sheet for X Servers" in appendix A, "Work Sheets for Gathering Values," follow the procedures below to gather the necessary information.

X Servers for X Terminal Models

Complete the following procedure to determine which X servers to install:

Step	Action
1	Survey which models of NCD X terminals are used at your site.
2	Select the NCD X server(s) on the work sheet that correspond to each available model of X terminal. Place a check mark by your selections on the work sheet under the column "Select server?"

Disk Space Requirements

Complete the following procedure to determine disk space requirements on your system:

Step	Action
1	For each selected X server that you previously specified on the work sheet, record its required disk space in the right-most column.

Step	Action
2	Calculate the total required disk space in the work sheet by adding the required disk space for: • the selected servers • fonts (all fonts must be installed) • system executables • manual pages (optional, see step 3) Record the total in the bottom right-most column. You will use this total figure in chapter 3, "NCDware Installation."
3	If you plan to install manual pages, then include the disk space requirement for the manual pages in the total figure of the work sheet *if* the following are both true: • `/usr/share/man` is not a separate disk partition from `/usr` • `/usr/share/man` is not NFS-mounted

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Gathering Configuration Information

In chapter 4, “Configuring X Terminals,” you will be asked to provide the following types of configuration information:

- values for adding X terminals
- customized values for an X terminal, if needed
- the boot server address

This section describes how to obtain these values.

Values for Adding X Terminals

The following table describes unique values for each X terminal. At this time, determine these values and record them for each X terminal on a photocopy of the “Work Sheet for Gathering X Terminal Values” in appendix A, “Work Sheets for Gathering Values.”

During the procedure “Configuring X Terminals” in chapter 4, “Configuring X Terminals,” you will be asked to provide these values in their order of presentation on the work sheet.

Configuration Value	Description	How to Obtain
NCD X terminal model (server boot file)	The NCD X terminal model, also known as the server boot file, is the NCDware server image that the X terminal loads when it boots.	To determine the appropriate server for the specific model of the X terminal, refer to the “Work Sheet for X Servers” in appendix A, “Work Sheets for Gathering Values” that you just completed. **Example**: `Xncd14c`

Configuration Value	Description	How to Obtain
X terminal Internet address	This Internet address for the X terminal is the logical network address for the display.	Obtain the Internet address from the line in `/etc/hosts` corresponding to the X terminal's display name. If the display name and the corresponding Internet address are not in `/etc/hosts`, then you must create a unique number with the format: *n.n.n.n* where *n* is an integer between 0 and 255. See your system administrator for more specifications. **Example**: `129.11.8.2`

Ethernet address	The Ethernet address is the hardware address of the X terminal. Each X terminal at your site should have a unique hardware address. This address is used when booting the X terminal and also for routing packets to and from the X terminal.	You can obtain the Ethernet address from three places:
		• on a label on the bottom of the X terminal base
		• from the message that appears when powering up
		Look for a message similar to:
		`Network controller passed 00:00:A7:00:32:25`
		• in the option:
		`Statistics/Show Version`
		in the X terminal's console menu (if the X terminal was previously booted—for example, from PROM)
		Example: 0000A7003225

Configuration Value	Description	How to Obtain
X terminal host name	A host name is a user- or administrator-specified string that uniquely identifies the X terminal.	The X terminal host name must conform to the following rules: • It must consist of alpha-numeric characters, beginning with an alphabetic character. • The name must be unique. **Example**: `myterm`

<table>
<tr><th>Configuration Value</th><th>Description</th><th>How to Obtain</th></tr>
<tr><td>Subnet mask</td><td>The X terminal uses the subnet mask to determine the network number from an Internet address.</td><td>Log in as <code>root</code> on the system you are configuring and obtain the subnet mask by performing the following steps:
• Enter:
<code>netstat -i</code>
Example Result:
<pre>Name Mtu Network Address   Ipkts Ierrs Opkts Oerrs Coll
lo0 1689 127   loclhost.com 5884 0   58840 0   0
en0 1500 129.11.8 host.com   95823 0   64851 0   0</pre>• Now, enter:
<code>ifconfig</code> ethernet_interface
where ethernet_interface is the value shown in the first column of output from the <code>netstat</code> command. Typically, this value is <code>en0</code>. (Ignore the value <code>lo0</code>, if it is present in the output.)
Example Command: <code>ifconfig en0</code>
Example Result:
<pre>en0:flags=8080863<UP,BROADCAST,NOTRAILERS,RUNNING,SIMPLEX, MULTICAST>
inet 129.11.8.212 netmask 0xffffff00 broadcast 129.11.8.255</pre>• Use the following table to convert the hexadecimal address displayed in the output above to decimal:
<table><tr><th>Hexadecimal Value</th><th>Decimal Value</th></tr><tr><td>ff000000</td><td>255.0.0.0</td></tr><tr><td>ffff0000</td><td>255.255.0.0</td></tr><tr><td>ffffff00</td><td>255.255.255.0</td></tr></table></td></tr>
</table>

Configuration Value	Description	How to Obtain

Gateway address	This Internet (IP) address specifies the default gateway that the X terminal uses to route packets to other subnets.
	
	It is used if the destination Internet address is not on the same subnet as the X terminal.
		A reasonable choice for the gateway is the boot host system or a host from the boot host system's route table. (This assumes that the X terminal and the boot host are on the same subnet.)
		
		Obtain this information by performing the following steps on the system you are configuring:
		
		• Enter:
		
		`netstat -r | grep default`
		
		Example output:
		
		`default bigmig.smallville.com UG  10  382455 en0`
		
		• Search for the gateway name, for example `bigmig.smallville.com`, in `/etc/hosts`, and obtain the Internet address associated with the name.
		
		Example: `129.11.8.1`
		
		• If the gateway name is *not* in `/etc/hosts`, or if the X terminal is *not* on the same subnet as the boot host, then see your system administrator.

Customized Values for an X Terminal

During the installation process, a standard configuration file and a configuration file for each X terminal are created. The individual X terminal files read in the contents of the standard configuration file.

In most cases the original values in the standard file are sufficient to handle the needs of most, if not all, X terminals on a site. However, sometimes you may want to customize values in an X terminal's configuration file to add parameters that were not originally defined.

This section discusses:

- how to determine the X terminal's configuration file name, in case you plan to modify it
- how to determine customized values for the X terminal's configuration file

In the section "Adding Customized Values for an X Terminal" in chapter 4, "Configuring X Terminals" you will have the opportunity to make the changes and additions to the X terminal's configuration file.

The Configuration File Name

If you plan to add parameters to an X terminal's configuration file by following the instructions in the section "Adding Customized Values for an X Terminal" in chapter 4, "Configuring X Terminals," then you must know the name of the X terminal's configuration file.

This file name is the hexadecimal value of the X terminal's Internet (IP) address. You can determine this value now, during the gathering phase, or you can obtain the value during the procedure to add an X terminal to the system.

Determining the Name Now

If you would like to record the configuration file name during this gathering phase, then you can follow this procedure to determine the hexadecimal value of the Internet address:

Step	Action

1	Use the AIX bc utility to convert the X terminal's Internet address to hexadecimal. For example, to convert the IP address 192.40.154.4, at the shell prompt enter:
	`bc`
	`obase=16`
	`192;40;154;4`
	Result: The following is displayed:
	`C0`
	`28`
	`9A`
	`4`

2	Concatenate these numbers. Pad any single-digit results from bc with a preceding 0. **Result**: The resulting value, C0289A04, becomes the name of the X terminal's configuration file. The full pathname is: `/usr/ncd/terminals/usr/lib/X11/ncd/configs/C0289A04`
3	Record this file name in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."

Determining the Name During Configuration

When you add an X terminal to the system, as described in the section "Adding Each New X Terminal" in chapter 4, "Configuring X Terminals," the name of the X terminal's configuration file is presented after you provide all values for the X terminal.

You can record this file name during this procedure in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."

Determining Customized Parameter Values

The standard configuration file that is created during installation includes some basic parameter values. Many additional parameters are available for customizing the configuration file for an X terminal.

You may want to modify the X terminal's configuration file to define values for some of these parameters. If you decide to do so, then record the name of the parameter and the value for the X terminal on the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."

Examples of additional parameters are:

- `exec-startup-commands ={ { "login -net tcpip` *x.x.x.x*`" } }`

  where *x.x.x.x* is the Internet (IP) address or name specifying the default system to provide login service for the X terminal. Examples are `129.11.8.27` and `bigmig`.

  This parameter instructs the X terminal to display a login window other than the one defined in the X terminal's original configuration file. You should only specify this parameter if you decide to boot the specific X terminal from one system and receive a login window from another.

- `exec-startup-commands ={{"login -net tcpip"}}`

  instructs the X terminal to display a `login-chooser` during the login process. The `login-chooser` presents a list of available systems for login.

- `login-xdm-action-on-disconnect = logout`

  immediately logs out when the host `login` program exits, bypassing the NCD logout confirmation prompt.

- `xserver-keyboard-type=` *type*

  where *type* is the type of keyboard. Only include this line if the keyboard type (usually the model number located on the bottom of the keyboard) does not match the default, which the X terminal determines at boot time.

For example, the German keyboard value `German` would replace the default `n-101` type.

- `pref-screensaver-time =` *seconds*

  specifies how long (in seconds) the terminal is idle before the screen saver activates, where *seconds* equals the number of seconds (for example, 300)

- `pref-screen-background-color =` *color*

  specifies the solid color used if the screen background is `Solid Color`, where *color* is the solid color (for example, yellow)

To investigate more details regarding these parameters and what other configuration parameters you can define, refer to the section "Remote Configuration Languages and Parameters" in the *NCDware Reference Manual.*

Boot Server Address

In addition to gathering information for adding and customizing each X terminal, you need to determine the boot server address for your system. Frequently this address is the same for all X terminals. The following table describes this address and explains how to obtain it.

Record the boot server address in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."

You will use this value during the procedures in chapter 5, "Configuring and Accessing the Font Server," and chapter 6, "Booting an X Terminal."

Configuration Value	Description	How to Obtain

Boot server address	This Internet (IP) address specifies the default system that provides boot service for login for all terminals that boot off of the configured system.	Complete the following steps:
		• To obtain the host system's name, log onto the system on which you will install NCDware, and enter:
		`uname -n`
		Result: The name is displayed.
		Example: `systemA`
		• To obtain the host system's Internet (IP) address, from the shell command line, enter:
		`grep` *host_name* `/etc/hosts`
		Result: The host system's file entry is displayed. The number preceding the system name is the Internet (IP) address.
		Example: `129.11.8.2 systemA`
		• If an `/etc/hosts` entry was *not* displayed in the above step, then your site may be using Domain Name Service (DNS). In this case, from the shell command line, enter:
		`nslookup` *host_name*
		Result: If DNS is running, the Internet address will be displayed.
		Example:
		`Name: systemA.smallville.super.com`
		`Address: 129.11.8.2`
		If no address is displayed, then contact your system administrator to obtain the correct Internet address.

NCDware Installation 3

Introduction

This chapter provides information for:

- installing and accessing `dtlogin` and `xdm` login methods
- installing NCDware Release 3.2 on AIX 4.1 on PowerStack
- preparing system services

The following prerequisites should be met:

- You are superuser.
- The system console is available to perform the procedures in this chapter.
- All X terminals have been set up correctly and are connected to the network on which your system is connected. For instructions on setting up X terminals, refer to the installation foldout sheet or booklet for the specific X terminal model.
- You are running the installation program at run level 2 (multi-user) or higher.

Verifying the AIX Release and Fileset Installations

3

Before installing NCDware, you should verify the installation of:

- the current release of the AIX operating system
- the installation of X11 font filesets needed for such applications as the Common Desktop Environment (CDE)

This section provides information for these verification and installation procedures.

Verifying the Release of AIX

The following procedure describes how to verify the current AIX release:

Step	Action
1	Verify that your system's console displays the following prompt: `Console Login:`
2	Log in as `root`.

3	Verify that the AIX 4.1 on PowerStack base operating system (BOS) is installed on your system. Enter:
	`uname -a`
	Result: A listing similar to the following will be displayed:
	`AIX engineering 1 4 000007167500`
	where `AIX` is the operating system, `engineering` is the host name, and `1 4` are the release and version numbers of the operating system.

Step	Action
4	Verify that the release number is 1 or greater, and that the version number is 4. • If the release and version numbers meet the above criteria, then the correct version is installed. Proceed to the next sub-procedure, "Verifying X11 Font Filesets." • If the release and version numbers do *not* meet the above criteria, then see your system administrator to determine the exact release of AIX installed on your system. If the administrator determines that the correct version is not installed, then now is the time to install the proper version of the AIX base operating system. Refer to the *AIX 4.1 on PowerStack Installation Guide.* Afterwards, proceed to the next sub-procedure, "Verifying X11 Font Filesets."

Verifying X11 Font Filesets

The following procedure describes how to verify that the necessary X11 font filesets are available:

Step	Action

1	List the X11 font filesets by entering:
	`lslpp -l | grep X11.fnt`
	Result: The output must include the following lines:
	`X11.fnt.coreX 4.1.0.0 COMMITTED AIXwindows X Consortium Fonts`
	`X11.fnt.defaultFonts 4.1.0.0 COMMITTED AIXwindows Default Fonts`

2	If the necessary filesets are not listed, then you should install them now. Refer to the *AIX 4.1 on PowerStack Installation Guide.*
3	Proceed to the next sub-procedure.

Installing and Accessing dtlogin and xdm

The available login methods on AIX systems are:

`dtlogin`	an enhanced desktop login method—the AIX default and recommended method
`xdm`	the standard login method from the X Consortium

This section describes various procedures for verifying and obtaining necessary filesets, setting color resources, and switching between `dtlogin` and `xdm` login methods, if necessary.

Verifying the dtlogin Filesets

The following procedure describes how to verify that the `dtlogin` filesets are available on your system:

Step	Action

1	List the `dtlogin` filesets by entering:
	`lslpp -l | grep X11.Dt`
	Result: The output must include the following lines:
	`X11.Dt.ToolTalk 4.1.0.0 COMMITTED AIXwindows Desktop ToolTalk`
	`X11.Dt.bitmaps 4.1.0.0 COMMITTED AIXwindows Desktop Bitmap`
	`X11.Dt.helpinfo 4.1.0.0 COMMITTED AIXwindows Desktop Help Files`
	`X11.Dt.helpmin 4.1.0.0 COMMITTED AIXwindows Desktop Minimum`
	`X11.Dt.helprun 4.1.0.0 COMMITTED AIXwindows Desktop Runtime`
	`X11.Dt.lib 4.1.0.0 COMMITTED AIXwindow Desktop Runtime`
	`X11.Dt.rte 4.1.0.0 COMMITTED AIXwindows Desktop Runtime`

2	If the necessary filesets are not listed, then you should install them now from the Personal Productivity bundle located on the AIX installation CD-ROM. Refer to the *AIX 4.1 on PowerStack Installation Guide*. **Note** When the `dtlogin` filesets are installed, `dtlogin` will automatically be configured as the default login method.
3	Proceed to the next sub-procedure.

Installing the xdm Fileset

If you would like to use `xdm` as a login method, then you must install the `X11.apps.xdm` fileset from the AIX 4.1 on PowerStack installation CD-ROM and remove references to `xinitrc` files. Complete the following steps.

If you do not plan to use `xdm`, then proceed to the section, "Verifying Disk Space" on page 3-8.

Step	Action
1	Verify that your system's console displays the following prompt: `Console Login:`
2	Log in as `root`.
3	Go to the SMIT installation menu by entering: `smit install_selectable_all`
4	Insert the AIX 4.1 on PowerStack installation CD-ROM into the CD drive.
5	Enter the device name of the CD-ROM that contains the AIX installation files. **Example**: `/dev/cd0`
6	Respond to the inquiry `Software to Install` by entering: `X11.apps.xdm` **Result**: The `xdm` fileset is installed.

Step	Action

7	Using the editor of your choice, add a pound sign (#) to the first column of the following lines in the file `/usr/lib/X11/xdm/Xsession` to comment out references to the `xinitrc` file:
	
	`failsafe)`
	`#  if [ -f "/usr/lib/X11/$LANG/xinitrc" ]; then`
	`#     /bin/ksh /usr/lib/X11/$LANG/xinitrc`
	`#  elif [ -f "/usr/lpp/X11/defaults/$LANG/xinitrc" ];then`
	`#     /bin/ksh /usr/lpp/X11/defaults/$LANG/xinitrc`
	`#  elif [ -f "/usr/lpp/X11/defaults/xinitrc" ]; then`
	`#     /bin/ksh /usr/lpp/X11/defaults/xinitrc`
	`#  else`
	`      (mwm &)`
	`      exec aixterm -geometry 80x35+0-0 -ls`
	`#  fi`
	`   exit`
	
	`.`
	`.`
	`.`
	
	`# if [ -f "/usr/lib/X11/$LANG/xinitrc" ]; then`
	`#    /bin/ksh /usr/lib/X11/$LANG/xinitrc`
	`# elif [ -f "/usr/lpp/X11/defaults/$LANG/xinitrc" ]; then`
	`#    /bin/ksh /usr/lpp/X11/defaults/$LANG/xinitrc`
	`# elif [ -f "/usr/lpp/X11/defaults/xinitrc" ]; then`
	`#    /bin/ksh /usr/lpp/X11/defaults/xinitrc`
	`# else`
	`     (mwm &)`
	`     exec aixterm -geometry 80x35+0-0 -ls`
	`# fi`

8	Using the editor of your choice, add a pound sign (#) to the first column of the following line in the file `/usr/bin/X11/startx` to comment out references to the `xinitrc` file: `#SYSXINITRC="/usr/lpp/X11/defaults/xinitrc"`

Switching Between dtlogin and xdm Login Methods

Because `dtlogin` is the default login method, if you would like to set up set up `xdm` as the default on a system-wide basis, you must switch to `xdm`. On occasion you may want to revert back to `dtlogin`.

Follow this procedure for switching back and forth between the two login methods.

Note As `root`, you can complete this procedure at any time.

To switch to...	Complete the following...
`xdm`	• Enter: `/usr/lib/X11/xdm/xdmconf` • Reboot the system. **Result**: A `dtlogin` startup entry is removed from `/etc/inittab` (if present), and a startup entry is added for `xdm`.
`dtlogin`	• Enter: `/usr/dt/bin/dtconfig -e` • Reboot the system. **Result**: An `xdm` startup entry is removed from `/etc/inittab` (if present), and a startup entry is added for `dtlogin`.

Verifying Disk Space

Before you invoke the NCDware installation program, you should complete these procedures to verify that sufficient disk space is available for NCDware and, optionally, for its manual pages.

Verifying Disk Space for NCDware

Verify that sufficient disk space is available for NCDware by completing these steps:

Step	Action
1	If necessary, verify that your system's console displays the following prompt: `Console Login:` and log in as `root`.
2	Create the destination directory for installing NCDware by entering: `mkdir /usr/ncd`

3	Verify how much disk space is available under the specified mount point for installing NCDware. Enter:
	`df /usr/ncd`
	Result: Output similar to the following will be displayed:
	`Filesystem 512-blocks Free %Used Iused %Iused Mounted on`
	`/dev/hd2 700416 42200 93% 22363 12% /usr`

4	Compare the result of step 3 with the total disk space calculated in the "Work Sheet for X Servers" in appendix A, "Work Sheets for Gathering Values." • If the free disk space specified in the results of step 3 is *greater* than the total figure in the work sheet, then proceed to the sub-procedure "Verifying Disk Space for Manual Pages" on page 3-9. • If the free disk space specified in step 3 is *less* than the total figure in the work sheet, then free up sufficient disk space before continuing with the next sub-procedure.

Verifying Disk Space for Manual Pages

If `/usr/share/man` is a separate mount or is NFS-mounted, then complete these steps to verify that sufficient disk space is available for the NCDware manual pages.

Step	Action

1	Verify how much disk space is available under the location for storing NCDware manual pages. Enter:
	`df /usr/share/man`
	Result: Output similar to the following will be displayed:
	`Filesystem 512-blocks Free %Used Iused %Iused Mounted on`
	`/dev/hd2 700416 42200 93% 22363 12% /usr/share`

2	• If the total free blocks is greater than 900, then you have sufficient space. Proceed to the section "Installing NCDware" on page 3-10. • If not, then free up sufficient disk space if you want to install manual pages for NCDware.
3	Proceed to the section "Installing NCDware" on page 3-10.

Installing NCDware

You are now ready to install NCDware Release 3.2. This section consists of a series of sub-procedures, which must be completed in sequential order. To install NCDware successfully, complete all of these sub-procedures.

Preparing for the Installation

Now you will prepare for the installation:

Step	Action
1	If necessary, verify that your system's console displays the following prompt: `Console Login:` and log in as `root`.
2	Because you will run the installation program in multi-user mode, you should inform current users of the system, perhaps with a `wall` message that: • NCDware now will be installed. • Users should refrain from consuming large amounts of disk space in `/usr` during the installation.
3	Insert the NCDware CD-ROM in the CD drive.

4	Provide the mount point for the contents of the CD-ROM by entering:
	`mkdir /cdrom`
	`mount -v cdrfs -o ro /dev/cd0 /cdrom`

5	Go to the destination directory in which the contents of the NCDware CD-ROM will be installed. Enter: `cd /usr/ncd`

Step	Action

6	Invoke the NCDware installation/configuration program. At the shell prompt enter:
	`/cdrom/ncdinstall`
	After some preliminary messages are displayed, the following main menu is presented:
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`
	Throughout this chapter and the next you will use this NCDware installation/configuration program to perform the three major activities listed in this main menu.
	When you complete a major activity, you will return to the main menu, where you can decide to continue with another activity or quit.
	Now continue with the next sub-procedure.

Answering Questions

Answer the series of questions in this sub-procedure:

Step	Action
1	Now that you are at the main menu, enter `1` to request the procedure to install NCDware. Press the Return key after this response and after all subsequent responses.

Step	Action

2	The following is displayed:
	`Checking system setup . . . . . .`
	`Install NCDware`
	`---`
	`What media are you using to install NCDware:`
	`1 CD-ROM`
	`2 Disk`
	`Enter a number or q to quit:`
	Enter `1` to request the CD-ROM medium.

3	The following is displayed: `Please enter the name of the CD mount-point [/cdrom]:` where the directory name within the brackets—the default value—is the name of the CD mount point. To select the default value, press Return.

4	You are now asked:
	`What file groups do you want to install now?`
	`1 X Servers`
	`2 System Executables`
	`3 Fonts`
	`4 Man Pages`
	`All Install All File Groups`
	`Enter the numbers of the file groups to install, separated by spaces:`
	Enter `All`.

Step	Action

5	Now you have an opportunity to verify your selection(s) and make changes if needed:
	`You selected to install the following file groups:`
	`1 X Servers`
	`2 System Executables`
	`3 Fonts`
	`4 Man Pages`
	`Do you want to change your selection? [n]:`
	Press Return.

6	After some messages, you are prompted to select the X servers:
	`Now select the NCD terminal models you want to install.`
	`1 NCD14c servers`
	`2 NCD15b servers`
	`3 NCD17c servers`
	`4 NCD17cr/19c/19g/19cp/21c/MCX servers`
	`5 NCD19 servers`
	`6 NCD15r/19r servers`
	`7 ECX servers`
	`All Install All Models`
	`Enter the numbers of the NCD terminal models to install, separated by spaces:`
	Enter the selections that you recorded in the ““Work Sheet for X Servers” in appendix A, “Work Sheets for Gathering Values.”

7	You have the opportunity now to verify your selection(s) and make changes if needed. An example screen display with user responses follows:
	`You selected to install servers for the following models:`
	`1 Model NCD14c`
	`Do you want to change your selections? [n]: n`
	Note If you are unsure about installing a particular server, you can invoke the `ncdinstall` program at a later time and request additional servers.

Step	Action

8	Earlier you selected system executables as one of the file groups to install. The program now specifies that it will install this selection:
	`You selected to install system executables.`
	`Executable files will be installed for the following system:`
	`AIX`
	`Would you like to install executable files for a different system? [n]:`
	Enter n or press Return.

9	Earlier you selected manual pages as one of the file groups to install. The program now specifies that it will install this selection:
	`You selected to install manual pages.`
	`Manual Pages will be installed in "/usr/man"`
	`Would you like to use a different directory [n]:`
	Enter n or press Return.

Verifying Disk Space

Now the program verifies disk space availability:

Step	Action

1	The program verifies that adequate disk space is available under your installation mount point.
	
	Since you verified your disk space requirements before executing the NCD installation program, you shouldn't have a disk space shortage. Therefore, you should see the following type of messages. These messages specify where the file groups will be installed:
	
	`Calculating disk space requirements . . . .`
	
	`Checking for available disk space in "/usr/ncd."`
	
	`Checking for available disk space in "/usr/man."`
	
	`ncdinstall installs the software in:`
	
	`File Group Directory`
	`---------- ---------`
	
	`1. X Servers /usr/ncd/terminals/ncd/servers.3.2.1`
	`2. System Executables /usr/ncd/hostside/AIX`
	`3. Fonts /usr/ncd/terminals/usr/lib/X11/ncd/fonts`
	`4. Man Pages /usr/man`
	
	`If any directory does not exist, ncdinstall creates it.`
	
	If you see these messages, proceed to the next sub-procedure, "Installing NCDware."

Step	Action

2	In the event that there *is* a disk space shortage, the following messages will be displayed:
	
	`Calculating disk space requirements . . . . .`
	
	`Checking for available disk space in "/usr/ncd."`
	
	`ERROR: "/usr/ncd" is not large enough to install the files that you have chosen.`
	`35971 KB of space is needed and only 6144 KB is available.`
	`Checking for available disk space in "/usr/man."`
	
	`You may either:`
	`- Continue, in which case, your installation will probably fail.`
	`- Go Back to the top of the "Install NCDware" menu and choose to install fewer file groups.`
	`- Quit now and rerun "/cdrom/ncdinstall" after creating more disk space.`
	
	`Enter c to continue, b to go back, or q to quit [q]:`
	
	Exit the installation procedure now by entering q.

3	Free up sufficient disk space and repeat the installation procedure described in this section, “Installing NCDware,” starting on page 3-10.

Installing NCDware

Now the actual installation takes place:

Step	Action

1	As shown in the following example, respond `y` or press Return when you are prompted to continue:
	
	`Beginning installation of the following file groups:`
	
	`X Servers`
	`System Executables`
	`Fonts`
	`Man Pages`
	
	`Continue? [y]: y`
	
	`Installing X Servers . . . . . .`
	
	`Installing System Executables . . . . . .`
	`. . . . . .`
	
	`Installing Fonts . . . . . .`
	`. . . . . .`
	`. . . . . .`
	`. . . . . .`
	
	`Installing Man Pages . . . . . .`
	`. . . . . .`
	
	`Manual Page Installation Complete.`
	
	A series of messages, followed by the main menu, is displayed:
	
	`------------ Main Menu -------------`
	
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	
	`Enter a number or q to quit:`

Step	Action
2	You have just completed the first main menu option: install NCDware. Exit the installation procedure by entering `q`.
3	Unmount the CD-ROM by entering: `umount /cdrom`
4	Remove the CD-ROM from the CD drive.
5	Continue with the sub-procedure “Preparing System Services” on page 3-19.

Preparing System Services

Completing the System Services Sub-Procedure

Complete this sub-procedure to prepare system services for booting X terminals:

Step	Action

1	Create the file `/etc/tftpaccess.ctl` by entering:
	`touch /etc/tftpaccess.ctl`
	`chmod 644 /etc/tftpaccess.ctl`

2	Invoke the `ncdinstall` program. Enter:
	`cd /usr/ncd`
	`/usr/ncd/ncdinstall`
	A series of messages, followed by the main menu, is displayed:
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`

3	Enter `2` to prepare system services.
	A series of messages is now displayed, ending with:
	`System Service Preparation completed.`
	`Returning to main menu.`
	Now the main menu is displayed again:
	`Welcome to ncdinstall`
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`

Step	Action
4	Go to the sub-procedure “Where to Go Next” on page 3-20.

Where to Go Next

You have just completed the second main menu option: prepare system services. Now you can decide which procedure to complete next.

Because you can request more than one option from the main menu during a single invocation of the program, you can continue using the NCDware installation/configuration program now, or you can exit and perform other procedures.

Use the following table to determine where to go:

If you plan to...	Then complete the following...
quit using the program now and continue work at a later time	• Exit the installation procedure by entering q. • When you are ready to resume work, continue with the next chapter, “Configuring X Terminals.”
continue using the program now to configure X terminals	Continue with the next chapter, “Configuring X Terminals.”

Configuring X Terminals 4

Introduction

Overview

This chapter describes the procedures for adding, modifying, and deleting X terminals.

After you install NCDware, you must complete the procedure for adding X terminals. Depending upon your requirements, you can also modify and / or delete X terminals anytime after you add them, plus you can add additional X terminals at any time. The NCDware installation and configuration program provides much flexibility in the order in which you can perform these procedures.

After you initially configure the X terminals, you should continue with chapter 5, “Configuring and Accessing the Font Server.”

Prerequisites

It is assumed that:

- You have completed all procedures prior to this chapter.
- You are superuser.
- The system console is available to perform the procedures in this chapter.
- You have gathered information specific to each X terminal. Refer to chapter 2, “Gathering Information,” for further information.

Adding Each New X Terminal

After NCDware is installed on your system, you are ready to define and add each X terminal to the system by completing the following procedure.

When you install NCDware the first time, the X terminals at your site are not yet recognized by NCDware. Before you boot and begin using an X terminal, you must add it to the system by completing this procedure.

A common approach is to complete this procedure to add *all* existing X terminals during a single invocation of the program, after installing NCDware. Subsequently, you can use this procedure to add additional new X terminals.

Complete this procedure to add each X terminal to the system:

Step	Action
1	If you are not logged in yet, verify that your system's console displays the following prompt: `Console Login:` and log in as `root`.

2	If you are already using the NCDware installation/configuration program, then continue with Step 3.
	Otherwise, invoke the program now. At the shell prompt enter:
	`cd /usr/ncd`
	`/usr/ncd/ncdinstall`
	A series of messages, followed by the main menu, is displayed:
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`

Step	Action

3	Enter 3 to configure NCD terminals.
	
	A menu will be displayed for configuring NCD X terminals:
	
	`Configure NCD Terminals`
	`------------------------`
	`1  Add NCD Terminal`
	`2  Delete NCD Terminal`
	`3  Modify NCD Terminal`
	
	`Enter a number, q to quit, or m to return to the main menu:`

4	Enter 1 to add an NCD X terminal.

5	Depending upon which NCD terminal model(s) you selected during the installation procedure, output similar to the following is now displayed:
	
	`You can add one of the following terminal models:`
	
	`1  Model NCD14c terminal`
	`2  Model NCD17c terminal`
	
	`Enter the number of the NCD Terminal model that you want to add:`
	
	Enter the number of the X terminal model that you now plan to add, for example, 1.

Step	Action

6	The system responds with messages similar to:
	`Enter addresses and hostname for the "NCD14c" terminal`
	`IP Address:`
	`Ethernet Address: 0000A7`
	`Terminal Hostname:`
	`Subnet mask [255.255.255.0]`
	`Gateway IP Address [129.11.8.1]`
	Carefully enter the addresses and the X terminal host name that you recorded for the specific X terminal in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."
	• If the first 6 digits of the Ethernet address are displayed, then only enter the remaining digits.
	• Make sure that you add a valid X terminal host name, as the program does not verify this field.
	• In most cases the gateway IP address and subnet mask provided within the brackets are acceptable defaults. If so, press Return. Otherwise, provide different values.
	Example: Following is an example screen that shows properly entered values:
	`IP Address: 129.11.8.133`
	`Ethernet Address: 0000A7123456`
	`Terminal Hostname: myterm`
	`Subnet mask [255.255.255.0]`
	`Gateway IP Address [129.11.8.1]: 129.11.8.14`

Step	Action

7	The following type of verification is displayed:
	`You entered the following information:`
	`Terminal Model: NCD14c`
	`Terminal Internet Address: 129.11.8.133`
	`Terminal Ethernet Address: 0000A7123456`
	`Terminal Name: myterm`
	`Terminal Subnet Mask: 255.255.255.0`
	`Terminal Gateway: 129.11.8.14`
	`Is this information correct? [y]:`
	At this time, you have the opportunity to reenter values, if one or more values displayed is not correct.
	• If one or more values are incorrect, then, enter `n` and reenter the values.
	• If the values are correct, enter `y`. Information is displayed, including:
	`Terminal "myterm" has been added.`
	`Updating "/etc/bootptab" file.`
	`Updating "/etc/hosts" file.`
	`Making terminal configuration file: /usr/ncd/terminals/usr/lib/X11/ncd/configs/810B0885`
	`Using existing ncd-std file found at: /usr/ncd/terminals/usr/lib/X11/ncd/configs/ncd_std`

8	In the screen output above, the file name displayed after the line `Making terminal configuration file` specifies the name of the X terminal's configuration file—the hexadecimal value of its Internet address. Record this value in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values," if you have not determined the file name earlier.

Step	Action

9	You are now asked:
	`Do you want to add another terminal? [n]:`
	• If you want to add another X terminal now, respond `y`, and repeat this procedure, beginning with step 5 for each X terminal you plan to add to the system.
	• If you do not plan to add another X terminal now, respond `n`.
	Several messages are now displayed, followed by the main menu:
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`

10	You have just added X terminals to the system and the main menu is displayed. Now you can select one of several procedures to complete next. To make your selection, go to the section “Where to Go Next” on page 4-15.

Modifying an X Terminal

After you have added an X terminal's configuration to the system, you may need to modify its values. This section describes how to make these changes.

Complete this procedure to modify the X terminal values:

Step	Action

1	• If you are already using the NCDware installation/configuration program, then continue with Step 2.
	• Otherwise, invoke the program now. At the shell prompt enter:
	`cd /usr/ncd`
	`/usr/ncd/ncdinstall`
	After some preliminary messages are displayed, the following main menu is presented:
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`

2	Enter 3 to configure NCD terminals.
	A menu will be displayed for configuring NCD X terminals:
	`Configure NCD Terminals`
	`-----------------------`
	`1 Add NCD Terminal`
	`2 Delete NCD Terminal`
	`3 Modify NCD Terminal`
	`Enter a number, q to quit, or m to return to the main menu:`

3	Enter 3 to modify an NCD X terminal.

Step	Action

4	The following is displayed:
	`Modifying NCD Terminals`
	`Do you want to view a list of installed NCD Terminals? [y]:`
	Respond `y`.
	Result: A list of installed NCD X terminals is now displayed. An example list is:
	`myterm  yourterm  histerm`

5	The following message appears: `Enter the hostname of the terminal you would like to modify:` Respond with the name of the X terminal that you plan to modify, for example, `myterm`.

6	You are now asked to verify the name:
	`You have chosen to modify the following NCD Terminal:`
	`myterm`
	`Is this correct? [y]:`
	Respond `y` or Return.

7	Output similar to the following is displayed:
	`You may modify the following values:`
	`Terminal Model: NCD14c`
	`Terminal Internet Address: 129.11.8.133`
	`Terminal Ethernet Address: 0000A7123456`
	`Terminal Name: myterm`
	`Terminal Subnet Mask: 255.255.255.0`
	`Terminal Gateway: 129.11.8.14`
	`Do you want to change terminal models? [n]:`
	Respond `y` or `n`. If you respond `y`, then provide the new model.

Step	Action

8	Now enter the modified addresses or name. For example:
	`New IP Address [129.11.8.133]:` **`129.11.8.212`**
	`New Ethernet Address [0000A7123456]:`
	`New Terminal Hostname [myterm]:`
	`New Terminal Subnet Mask: [255.255.255.0]`
	`New Terminal Gateway [129.11.8.14]:`

9	After you enter new values, you are asked to verify the modified information:
	`You have entered the following information:`
	`Terminal Model: NCD14c`
	`Terminal Internet Address: 129.11.8.212`
	`Terminal Ethernet Address: 0000A7123456`
	`Terminal Hostname: myterm`
	`Terminal Subnet Mask: 255.255.255.0`
	`Terminal Gateway: 129.11.8.14`
	`Is this information correct? [y]:`
	• If you want to add more changes, respond `n` and repeat the steps for modifying values.
	• If you are finished modifying the values, enter `y`.

10	Several messages are now displayed indicating that the values are being modified in several files. Afterwards, you are asked: `Do you want to modify another terminal? [n]:` If you want to modify another X terminal now, respond `y`, and repeat this procedure for each X terminal you plan to modify.

11	If you do not plan to modify another X terminal now, respond `n`.
	The main menu is now displayed:
	`Welcome to ncdinstall`
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`

Step	Action
12	You have just modified X terminals to the system and the main menu is displayed. Now you can select one of several procedures to complete next. To make your selection, go to the section “Where to Go Next” on page 4-15.

Deleting an X Terminal

This section describes how to delete an X terminal from your system. When an X terminal is deleted, the system deletes the definition of an existing X terminal from the host's configuration files. Although no immediate effect takes place, the host no longer can make any new connection to that X terminal or provide boot service.

Complete this procedure to remove an X terminal:

Step	Action

1	• If you are already using the NCDware installation/configuration program, then continue with Step 2.
	• Otherwise, invoke the program now. At the shell prompt enter:
	`cd /usr/ncd`
	`/usr/ncd/ncdinstall`
	After some preliminary messages are displayed, the following main menu is presented:
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`

2	Enter 3 to configure NCD terminals.
	A menu will be displayed for configuring NCD X terminals:
	`Configure NCD Terminals`
	`------------------------`
	`1 Add NCD Terminal`
	`2 Delete NCD Terminal`
	`3 Modify NCD Terminal`
	`Enter a number, q to quit, or m to return to the main menu:`

3	Enter 2 to delete an NCD X terminal.

Step	Action

4	You are now prompted to view the installed X terminals:
	`Deleting NCD Terminals`
	`Do you want to view a list of installed NCD Terminals? [y]:`
	Respond `y` or Return.

5	A list of installed NCD X terminals followed by a prompt to enter host names is now displayed. Example output follows:
	`myterm  yourterm  histerm`
	`Enter the hostnames of terminals you would like to delete separated by spaces:`
	Now provide a complete list of all X terminals that you want to delete. For example:
	`myterm`

6	You can now verify your selection(s):
	`You have chosen to delete the following NCD Terminals:`
	`myterm`
	`Is this correct? [y]:`
	• Respond `y` or Return if it is correct.
	• Otherwise, respond `n` and re-enter the X terminal host name(s).

7	Messages are displayed indicating that X terminal entries are being deleted from several files. Then the main menu is displayed:
	`Welcome to ncdinstall`
	`------------ Main Menu -------------`
	`1 Install NCDware`
	`2 Prepare System Services`
	`3 Configure NCD Terminals`
	`Enter a number or q to quit:`
	Now you can select one of several procedures to complete next. To make your selection, go to the section “Where to Go Next” on page 4-15.

Adding Customized Values for an X Terminal

In chapter 2, “Gathering Information,” you had the opportunity to determine if any X terminals required additional customized parameter value(s), and you should have recorded the name and value of the parameter for each X terminal in the “Work Sheet for Gathering X Terminal Values” in appendix A, “Work Sheets for Gathering Values.”

If you recorded any customized values, then at this time you can make the changes and additions to the specific X terminal configuration files.

Complete this procedure to add customized values to an X terminal’s configuration file:

Step	Action
1	If you are not logged in yet, verify that your system’s console displays the following prompt: `Console Login:` and log in as `root`.
2	Go to the directory that contains the customized configuration files for X terminals. Enter: `cd /usr/ncd/terminals/usr/lib/X11/ncd/configs`
3	Locate the configuration file of the X terminal for which you are customizing values, for example, `C0289A04`. (You should have recorded this file name in appendix A, “Work Sheets for Gathering Values.”)
4	Use the editor of your choice to edit the X terminal’s configuration file. Add the additional parameters that you specified in appendix A, “Work Sheets for Gathering Values” to the *end* of the configuration file.

Step	Action
5	Repeat steps 3 and 4 for each X terminal for which you plan to add customized values. You can repeat this procedure at any time that you decide to customize values for an X terminal.
6	Now that you have customized values for one or more X terminals on the system, you can select one of the following procedures to complete next. • Add more X terminals by continuing with the section "Adding Each New X Terminal" on page 4-2. • Modify one or more X terminals by continuing with the section "Modifying an X Terminal" on page 4-7. • Delete one or more X terminals by continuing with the section "Deleting an X Terminal" on page 4-11. • If you have finished all of the configuration procedures in this chapter for now, then continue with chapter 5, "Configuring and Accessing the Font Server."

Where to Go Next

You have referred to this section because you have just completed one of the configuration procedures and want to select another procedure. The main menu should now be displayed on your screen.

Because you can request more than one option from the main menu during a single invocation of the program, you can continue using the NCDware installation and configuration program now, or you can exit and perform other procedures.

Note Remember that you have already completed options 1 and 2 to install NCDware and prepare system services in chapter 3, "NCDware Installation."

Use this decision table to determine where to go next.

If you plan to...	Then complete the following...
continue with configuration tasks to add additional X terminals	• Enter 3 at the main menu. • Go to the section "Adding Each New X Terminal" on page 4-2.
continue with configuration tasks to modify X terminals	• Enter 3 at the main menu. • Go to the section "Modifying an X Terminal" on page 4-7.
continue with configuration tasks to delete X terminals	• Enter 3 at the main menu. • Go to the section "Deleting an X Terminal" on page 4-11.
add customized values in an X terminal's configuration file	• Exit the NCDware installation and configuration program by entering q. • Go to the section "Adding Customized Values for an X Terminal" on page 4-13.

If you plan to...	Then complete the following...
temporarily stop using the NCDware installation and configuration program	• Exit the NCDware installation and configuration program now by entering q. • Resume using the program later by continuing with the appropriate section in this chapter for configuring X terminals.
stop using the program because you have completed all necessary configuration tasks described in this chapter **Note** You can return to configuration procedures in this chapter at a later time, if needed.	• Exit the NCDware installation and configuration program now by entering q. • Go to chapter 5, "Configuring and Accessing the Font Server."

Configuring and Accessing the Font Server 5

Introduction

This chapter presents the procedures for configuring the font servers for NCDware. It describes how to create the font server startup file, add font server support, and access the font server once it is configured.

The following prerequisites should be met:

- You have completed all procedures (with the possible exceptions of modifying and deleting X terminals) prior to this chapter.
- You are superuser.
- The system console is available to perform the procedures in this chapter.
- The font servers and NCD fonts are available on the same system from which the X terminal is booted.
- The necessary X11 font filesets are installed. Refer to the section “Verifying the AIX Release and Fileset Installations” in chapter 3, “NCDware Installation.”

Creating the Font Server Startup File

You must create the file `/etc/rc.ncdfs`, a shell script that starts the font servers. In the section "Adding Font Server Support" on page 5-3, you will configure the system to automatically execute this file at system startup.

Creating the Startup File

As `root`, use the editor of your choice to create `/etc/rc.ncdfs`. Enter the lines exactly as listed below.

```
#!/bin/sh

NCDFS=/usr/bin/X11/ncd/ncdfs
CONFIG100=/usr/lib/X11/ncd/fs/config.100
CONFIG75=/usr/lib/X11/ncd/fs/config.75

if [ -x $NCDFS -a -f $CONFIG100 ]
then
   $NCDFS -config $CONFIG100 -port 7100
fi

if [ -x $NCDFS -a -f $CONFIG75 ]
then
   $NCDFS -config $CONFIG75 -port 7101
fi
```

Setting Correct Modes

Enter these commands to set the correct modes for the font server startup file:

```
chown root /etc/rc.ncdfs
chgrp system /etc/rc.ncdfs
chmod 774 /etc/rc.ncdfs
```

Adding Font Server Support

Now that you have created the font server startup file, you are ready to add font server support to your system. This procedure consists of:

- adding an entry to `/etc/inittab`
- starting the font servers
- setting the font path

Adding an Entry to /etc/inittab

As `root`, enter the following command at the shell prompt:

```
mkitab "rcncdfs:2:once:/etc/rc.ncdfs > /dev/console 2>&1"
```

Now, whenever the system is rebooted and the new run-level is 2 or higher, the font servers will start automatically.

Starting the Font Servers From the Command Line

To immediately start the font servers, as `root`, enter:

```
sh /etc/rc.ncdfs > /dev/console 2>&1
```

Result: The font servers are started.

Setting the Default Font Path

By default, the file `/usr/lib/X11/ncd/configs/ncd_std` provides a minimal default font path. However, this path is not sufficient for using many AIX applications.

To solve this deficiency, replace the current default font path entry in the `ncd_std` file (and possibly in the configuration file for individual X terminals) with the pathname for the font servers. Complete this procedure:

Step	Action
1	If you are not logged in yet, verify that your system's console displays the following prompt: `Console Login:` and log in as `root`.
2	Use the editor of your choice to edit the file: `/usr/lib/X11/ncd/configs/ncd_std`

3	Insert the # character in the first column of the lines that define the current `xserver-default-font-path` setting. As a result, the current default font path entry is commented out.
	Example:
	`#xserver-default-font-path = {`
	`#{ "built-ins" }`
	`#{ "/usr/lib/X11/ncd/fonts/pcf/misc/" }`
	`#{ "/usr/lib/X11/ncd/fonts/pcf/75dpi/" }`
	`#{ "/usr/lib/X11/ncd/fonts/pcf/100dpi/" }`
	`#{ "/usr/lib/X11/ncd/fonts/pcf/dw75dpi/" }`
	`#{ "/usr/lib/X11/ncd/fonts/pcf/dw100dpi/" }`
	`#{ "/usr/lib/X11/ncd/fonts/pcf/Xol" }`
	`#}`

4	Add the following `xserver-default-font-path` line to the end of the `ncd_std` file:
	`xserver-default-font-path = {`
	`{ "built-ins" }`
	`{ "tcp/`*`boot_server_address`*`:7100" }`
	`}`
	where *boot_server_address* is the boot server address that you recorded in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."

Step	Action
5	Check whether any 75dpi X terminals are available at your site. Examples are: • the NCD17c X terminal • the NCD MCX base with a 75dpi terminal

6	Edit the X terminal configuration files for each of the X terminals identified in Step 5. Add the following lines to the end of each file:
	`xserver-default-font-path = {`
	`{ "built-ins" }`
	`{ "tcp/`*boot_server_address*`:7101" }`
	`}`
	where *boot_server_address* is the boot server address that you recorded in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."

7	If you would like to add other fonts to the font path, refer to the *NCDware Advanced User's Guide for UNIX Systems.*

Accessing the Font Server from Another Host

So far the procedures in this chapter have dealt with configuring the font server for NCDware on AIX systems. Sometimes, however, X terminals are configured and running off another system—sometimes one that is not running AIX.

If users of these X terminals want to access the NCDware fonts on the AIX system that you have just configured, then add the NCDware font server to the X terminal's font path by either:

- modifying the `ncd_std` files on the other systems with NCDware boot servers
- modifying users' `$HOME/.xsession` startup scripts

This section discusses both approaches.

Modifying the ncd_std File on the NCDware Boot Server

Note This procedure requires that the NCDware boot server uses NCDware Release 3.1 or later.

Modify the `ncd_std` file on any host system acting as an NCDware boot server by completing the procedure in the section "Setting the Default Font Path" on page 5-3. Make sure that you edit the `ncd_std` file on the correct system.

Then, tell users who boot from one of these NCD boot servers to reboot their X terminal to obtain the new font path.

Modifying the .xsession Startup Script

Modify users' `$HOME/.xsession` startup scripts to include the font server by following this procedure on each system where users initiate their session:

Step	Action
1	Use the editor of your choice to edit or create the file `$HOME/.xsession` for each user who wants to access the NCDware fonts.

2	Add one of the following lines somewhere *before* the last command line in the file:
	`/usr/bin/X11/xset fp+ tcp/`*boot_server_address*`:7100`
	or
	`/usr/bin/X11/xset fp+ tcp/`*boot_server_address*`:7101`
	where:
	• *boot_server_address* is the boot server address for the AIX host system that you recorded in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values"
	• `7100` is used for X terminals that access 100dpi fonts (most X terminals)
	• `7101` is used for X terminals that access 75dpi fonts (the NCD17c X terminal and the NCD MCX base with a 75dpi terminal)

3	Tell users with modified `.xsession` files to restart their X sessions (log out and log back in) to obtain the new font path.

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Booting an X Terminal 6

Introduction

This chapter describes how to verify that sufficient memory is available for each X terminal and then how to boot X terminals from the configured system. The available methods for booting an X terminal are:

- auto-booting
- booting manually (both initially and subsequently)
- booting an X terminal with server PROMS

It is assumed that you have completed the procedures prior to this chapter.

Verifying Memory Requirements for X Terminals

Before you boot an X terminal, you should verify that it contains sufficient memory. To do so, complete this procedure:

Step	Action
1	When you determined disk space requirements in chapter 2, "Gathering Information," you specified the type(s) of X servers that met your needs on the "Work Sheet for X Servers" in appendix A, "Work Sheets for Gathering Values." Locate this information.
2	On the work sheet, examine the minimum X terminal memory requirements specified for your selected servers.
3	Power on each NCD X terminal at your site and press `Esc` on each one.
4	Examine the memory installed for each X terminal.
5	Power off each X terminal.
6	Compare the minimum memory requirements for the selected servers and the current memory installed for each X terminal. Verify that each NCD X terminal contains enough memory to run the servers that you've selected. Keep in mind the following: • Some servers require significantly more memory than servers on previous releases. • Additional memory may be required for X terminals for users planning to run an unusually large number of applications.
7	If you determine that additional memory is required for some NCD X terminals, then add the memory. Refer to the user's manual for the specific X terminal for instructions on adding memory.
8	Now you can boot your X terminal.

Auto-booting the X Terminal

In most cases, users should simply auto-boot their X terminals. To auto-boot an X terminal, users should complete this procedure:

Step	Action
1	Power on the X terminal.
2	If the boot monitor prompt (>) is displayed, enter `bt` on the command line. If the prompt is not displayed, then no action is required. **Result**: The X terminal auto-boots from the system that is configured and accesses fonts from the boot server.
3	Continue with the section "Accessing NCDware Host Binaries" on page 6-11.

Manually Booting the X Terminal—Initial Time

You should manually boot an X terminal if all of the following conditions are true:

- The X terminal is not on the same subnet as the boot server host.
- The site doesn't support booting across a gateway.
- Server PROMs are not installed on the X terminal.

The first time you manually boot an X terminal, complete this procedure:

Step	Action
1	Power on the X terminal.
2	Press `Esc` to enter the boot monitor. **Note** You may have to press `Esc` more than once. **Result**: The boot monitor prompt (>) is displayed.
3	Boot the X terminal manually by entering the following command on one line: `/usr/ncd/terminals/ncd/servers.3.2.1/Xncd`*xx* *X_terminal_address boot_server_address gateway_address* where: • `Xncd`*xx* is the server boot file for the X terminal that is recorded in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values" • the addresses are the ones recorded on the same work sheet **Result**: The server image is downloaded to the X terminal, and the X terminal is booted.
4	Press the `Setup` key.
5	Select `Setup`.
6	Select `Change Setup Parameters`.

Step	Action
7	Select `IP` from the menu. **Result**: The IP form is displayed. You are now ready to make changes to several of the NVRAM values for the X terminal.
8	Provide values for the following IP entries: Parameter Name: — Value: `IP Address at Next Boot` — *X_terminal_address* `Initial Default Gateway 1` — *gateway_address* `Initial Default Gateway 2` — *gateway_address* where: • the X terminal address is the one recorded on the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values" • the `Gateway 1` address is the gateway address recorded on the same work sheet • the `Gateway 2` address is the secondary gateway address recorded on the work sheet If none is available, then use the value 0.0.0.0.
9	After entering all values, click on the `Apply` button at the bottom of the window.
10	Close the IP form by clicking on the `IP` entry.
11	Select `File Service` from the menu. **Result**: The file service form is displayed. You are now ready to zero out the file service entries.
12	Enter the value 0.0.0.0 for `Initial File Server 1` and `Initial File Server 2`.
13	Set `Initial Protocol 1` and `Initial Protocol 2` to `tftp`.
14	Click on the `Apply` and then the `Cancel` buttons. **Result**: The values are saved in NVRAM. These values will be used by the X terminal on subsequent boots.

Step	Action
15	Power off the X terminal, and complete the steps in the section "Manually Booting the X Terminal—Subsequent Times" on page 6-7.

Manually Booting the X Terminal—Subsequent Times

After completing the manual boot procedure the first time, complete this procedure to boot the X terminal subsequent times:

Step	Action
1	Power on the X terminal.
2	Press Esc to enter the boot monitor. **Result**: The boot monitor prompt (>) is displayed.
3	Boot the X terminal manually by entering the following command on one line: **b** /usr/ncd/terminals/ncd/servers.3.2.1/Xncd*xx* *X_terminal_address boot_server_address* where: • Xncd*xx* is the server boot file for the X terminal recorded on the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values" • the addresses are the ones recorded on the same work sheet **Result**: The X terminal should now boot from the network and access fonts from the boot server.
4	Continue with the section, "Accessing NCDware Host Binaries" on page 6-11.

Booting an X Terminal with PROMs

To boot an X terminal with server PROMs for the first time, complete the following procedure. Subsequently, you only need to power on the X terminal to boot.

Note Server PROMs must be version 3.1 or later.

Step	Action
1	Power on the X terminal.
2	If the boot monitor prompt (>) is displayed, enter `bp` on the command line. If the prompt is not displayed, then no action is required. **Result**: The X terminal loads the server image from PROM.
3	Press the Setup key.
4	Select `Setup`.
5	Select `Change Setup Parameters`.
6	Select `Booting` from the menu. **Result**: The booting form is displayed. You are now ready to make changes to some NVRAM values for booting the X terminal.
7	Provide values for the following boot entries: **Parameter Name:** — **Value:** `Desired Source` — `Local` `Default Server when PROM Booting` — *boot_server_address* where the *boot_server_address* is the one recorded in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."
8	Click on the `Apply` button at the bottom of the window. **Result**: The values are saved in NVRAM.
9	Close the Booting form by clicking on the `Booting` entry.
10	Select `IP` from the menu. **Result**: The IP form is displayed. You are now ready to make changes to some NVRAM values for the X terminal.

Step	Action
11	Provide values for the following IP entries: **Parameter Name:** **Value:** `IP Address at Next Boot` *X_terminal_address* `Initial Default Gateway 1` *gateway_address* `Initial Default Gateway 2` *gateway_address* where: • the X terminal address is the one recorded on the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values" • the `Gateway 1` address is the gateway address recorded on the same work sheet If none is available, then use the value 0.0.0.0. • the `Gateway 2` address is the secondary gateway address recorded on the same work sheet If none is available, then use the value 0.0.0.0
12	After entering all values, click on the `Apply` button.
13	Close the IP form by clicking on the `IP` entry.
14	Select `File Service` from the menu. **Result**: The file service form is displayed. You are now ready to zero out the file service entries.
15	Enter the value `0.0.0.0` for `Initial File Server 1` and `Initial File Server 2`.
16	Set `Initial Protocol 1` and `Initial Protocol 2` to `tftp`.
17	Click on the `Apply` and then the `Cancel` buttons. **Result**: The IP values are saved in NVRAM. These values will be used by the X terminal on subsequent boots.
18	Power off and on the X terminal.

Step	Action
19	For subsequent boots: • If the boot monitor prompt (>) is displayed, enter bp on the command line. • If the prompt is not displayed, then the X terminal will boot automatically.
20	Continue with the section "Accessing NCDware Host Binaries" on page 6-11.

Accessing NCDware Host Binaries

When to Access the Binaries

You should access the NCDware host binaries if you plan to:

- add new fonts
- examine font server statistics
- use Simple Network Management Protocol (SNMP) binaries provided by NCD
- use XRemote

How to Access the Binaries

To access the correct NCDware host binaries, follow this procedure:

Step	Action
1	Log in to your system using the login method you have selected (`dtlogin` or `xdm`).

2	Set your path to access the binaries by adding the following lines to your `.profile` or by entering it on the command line:
	`PATH=$PATH:/usr/bin/X11/ncd`
	`export PATH`

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NCDware Removal 7

Introduction

This chapter provides information for removing NCDware Release 3.2 on AIX 4.1 on PowerStack.

The following prerequisites should be met:

- You are superuser.
- The system console is available to perform the procedures in this chapter.
- NCDware Release 3.2 has already been installed on AIX 4.1 on PowerStack.

Removing NCDware

To remove the NCDware files and directories, complete the following procedure:

Step	Action
1	Log in as `root`.
2	Confirm that no NCD binaries (including font servers) are currently running. Use the `ps` and `kill` commands as needed.

3	Enter:
	`rm /usr/bin/X11/ncd*`
	`rm /usr/lib/X11/ncd*`
	`rm -rf /usr/ncd`
	`rm -f /etc/rc.ncdfs`
	`rmitab rcncdfs`

4	Edit the file `/etc/tftpaccess.ctl` and remove the lines:
	`allow:/usr/ncd/terminals`
	`allow:/usr/lib/X11/ncd`
	If the file is now empty, remove it from the system with the command:
	`rm -f /etc/tftpaccess.ctl`

Step	Action

5	Remove all ncd manual pages. Enter:
	`rm -f /usr/share/man/`*manual_page*
	where *manual_page* includes all of the following:
	`man1/Xremote.1`
	`man1/cd_copy.1`
	`man1/keymap_editor.1`
	`man1/makepsres.1`
	`man1/mwm.1`
	`man1/ncd3270.1`
	`man1/ncdbdftopcf.1`
	`man1/ncdcfgcvt.1`
	`man1/ncdconsole.1`
	`man1/ncdfs.1`
	`man1/ncdfsinfo.1`
	`man1/ncdfslsfonts.1`
	`man1/ncdfstobdf.1`
	`man1/ncdlauncher.1`
	`man1/ncdloadprefs.1`
	`man1/ncdlockscreen.1`
	`man1/ncdlogin.1`
	`man1/ncdlogout.1`
	`man1/ncdmkfontdir.1`
	`man1/ncdpref.1`
	`man1/ncdquery.1`
	`man1/ncdreset.1`
	`man1/ncdrestartwm.1`
	`man1/ncdrunwm.1`
	`man1/ncdsetup.1`
	`man1/ncdshow.1`
	`man1/ncdshowfont.1`
	`man1/ncdstats.1`
	`man1/ncdterm.1`
	`man1/ncdtestnet.1`
	`man1/ncdwm.1`
	`man1/resize.1`
	`man1/xdm.1`
	`man1/xinitremote.1`
	`man8/bootpd.8`
	`man8/ncdmkboot.1`

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Troubleshooting 8

Introduction

This chapter provides solutions to some common problems related to X terminal system administration. Each section in this chapter:

- discusses an X terminal problem
- gives background information, if helpful
- provides a possible solution to the problem

If you have a problem that is not referenced in this chapter, refer to the *AIX 4.1 on PowerStack Release Notes* or the troubleshooting appendix in the *NCDware Advanced User's Guide for UNIX Systems*.

X Terminal Fails to Auto-Boot

Sometimes an X terminal fails to auto-boot. This section describes:

- the method used for booting an X terminal
- some approaches for troubleshooting boot failures

How an X Terminal is Auto-Booted

The standard method for booting an X terminal is via the BOOTP protocol, which is an Internet standard defined by RFC951 and RFC1084. BOOTP allows the X terminal to boot only *after* you follow the configuration instructions given in the previous sections of this guide.

Following is a description of the auto-booting procedure:

Stage	Description
1	An X terminal is configured to determine its address from the network and to boot using `tftp`. When the X terminal attempts to boot, it displays: `Searching for IP address...`
2	The X terminal broadcasts *bootrequest* packets on the network. In order to receive a *bootreply,* at least one boot host system on the network must have X terminal support installed and have the X terminal's information added. **Note** NCD firmware version 2.1.0 transmits only one *bootrequest* packet and does not retry if it does not get a *bootreply.* Because the *bootrequest* is a datagram, it can get lost. However, this is unlikely to happen on a local Ethernet. NCD firmware versions 2.2.1 or higher retry up to 10 times. The time out between *bootrequest* broadcasts begins at one second and doubles with each retry.

Stage	Description
3	The boot host system receives the *bootrequest*, verifies that it has data for the Ethernet address, and then sends a *bootreply* containing: • the X terminal's Internet (IP) address • the boot host's Internet address • the absolute path of the boot file • the subnet mask • the gateway address
4	When the X terminal receives the *bootreply*, it issues an Address Resolution Protocol (ARP) broadcast, which determines if the address is currently being used by another node on the network.
5	If the address is not in use, the X terminal displays: `Using IP address` *x.x.x.x* where *x.x.x.x* is the Internet address assigned to the X terminal.
6	The X terminal makes TFTP requests to read the boot file from the boot host. While the X terminal is reading the file, it displays a series of dots.

Troubleshooting Approaches

Each step in the following procedure checks the possible source of a problem that can result in an X terminal failing to boot. Complete each step, and fix whatever problems you encounter:

Step	Action
1	Verify that the Ethernet cable is firmly connected to the back of the X terminal.
2	Verify that your X terminal is configured for the appropriate type of Ethernet (thick or thin).

Step	Action
3	Verify both of the following: • `/etc/bootptab` contains the X terminal's Ethernet address. • `/etc/hosts` contains the X terminal's host name and Internet address. The X terminal's name must be unique, and it must consist of alphanumeric characters, beginning with an alphabetic character.

4	Verify that the following lines are included in the file `/etc/services` on the boot host:
	`bootps 67/udp # BOOTP server`
	`bootpc 68/udp # BOOTP client`

5	Verify that the following lines are included in the file `/etc/inet/inetd.conf`:
	`bootps dgram udp wait root /usr/sbin/bootpd bootpd`
	`tftp dgram udp wait nobody /usr/sbin/tftpd tftpd -n`

6	Verify that the following lines are included in the file `/etc/tftpaccess.ctl`:
	`allow:/usr/ncd/terminals`
	`allow:/usr/lib/X11/ncd`

7	Verify that the file `/etc/tftpaccess.ctl` is owned by root and has permissions 644.
8	Ensure that the `bootpd` process reads in the most current version of the `bootptab` database. As `root`, enter: `touch /etc/bootptab`
9	Verify that the X terminal and the boot host system are on the same network. Booting through a gateway is available with 2.3.0 boot PROMs or higher.

X Terminal Cannot Load the Configuration File

Sometimes an X terminal cannot load its configuration file. This section describes:

- how an X terminal loads the file
- some troubleshooting approaches for configuration file failures

How the Configuration File is Loaded

The following is a description of how an X terminal loads the configuration file:

Stage	Description
1	The X server is loaded into the X terminal.
2	The Internet addresses of the `Initial File Server 1` and `Initial File Server 2` parameters determine *how* and *where* the configuration file is loaded. • If the addresses are 0.0.0.0, then one of the following conditions occurs: - The configuration file is loaded from the system that supplied the download if the X terminal was booted from the network. - The configuration file is not loaded if the X terminal was booted from PROM. • If the addresses are *not* 0.0.0.0, then the configuration file is loaded from the system specified by the Internet address in either the `Initial File Server 1` or `Initial File Server 2` parameter.

Troubleshooting Approaches

If the X terminal boots but cannot load the configuration files, complete each step in the following table, and fix whatever problems you encounter:

Step	Action
1	At the system console, log into the system acting as the boot server, that is, the system where NCDware is installed.
2	Go to the directory that contains the X terminal configuration files. Enter: `cd /usr/ncd/usr/lib/X11/ncd/configs`
3	In this directory, verify that the file `ncd_std` exists and has read permission for all (mode 444).
4	Locate the file name for the configuration file for the X terminal in question. You should have determined this information in chapter 2, "Gathering Information," and recorded it on the "Work Sheet for Gathering X Terminal Values" in appendix A," "Work Sheets for Gathering Values."
5	Verify that the configuration file for the X terminal in question exists.
6	Verify that the symbolic link: `/usr/lib/X11/ncd` exists and contains the `configs` subdirectory.

7	Verify that the lines:
	`allow:/usr/ncd/terminals`
	`allow:/usr/lib/X11/ncd`
	are present in `/etc/tftpaccess.ctl`, with owner `root` and permissions set to 644.

8	Verify that the following lines are included in the file `/etc/inet/inetd.conf`:
	`bootps dgram udp wait root /usr/sbin/bootpd bootpd`
	`tftp dgram udp wait nobody /usr/sbin/tftpd tftpd -n`

Step	Action
9	Verify that the X terminal has been added to the system by searching for the X terminal's display name in `/etc/bootptab`. If the display name is not present, then add the X terminal. Complete the procedure "Adding Each New X Terminal" in chapter 4, "Configuring X Terminals."
10	Confirm that NCDware 3.2 was installed by verifying that NCDware files are present. Enter: `ls /usr/lib/X11/ncd*` If the NCDware files are not present, then install NCDware. Refer to chapter 3, "NCDware Installation."

X Terminal Loads Incorrect Configuration File

Sometimes an X terminal can load an incorrect configuration file. This section explains how an incorrect file can be selected and how to obtain the correct one.

Determining Which Configuration File to Use

Several file-server parameters determine which host provides the configuration file that your X terminal uses. It is possible that the file server parameters are stored in the X terminal's NVRAM; these values remain intact after powerdown and reboot.

When your X terminal is booted, the file server parameters are used, and the X terminal attempts to obtain the configuration file and fonts from the system whose Internet address is stored in the file server parameters.

When Can Problems Occur?

Normally, the initial file server parameters have the value 0.0.0.0, indicating that the X terminal will attempt to read configuration files on the system from which it was booted.

If you decide to boot from a system other than the one you normally use, it is possible that you may get the correct boot server file, but the fonts and configuration files may be coming from the system from which you previously booted. If this happens, you are likely to run into font, configuration file, and login problems.

Troubleshooting Procedure

If you *suspect* that the X terminal loaded the incorrect configuration file, then you should determine if the correct file was loaded. Follow this procedure:

Step	Action
1	Boot the X terminal to load the server image.
2	Press the Setup key.
3	Select `Setup/Change Setup Parameters/File Service`.
4	Read the value of the file service Internet addresses. They correspond to `Initial File Server 1` and `Initial File Server 2`.
5	If the values are not 0.0.0.0, then change the value(s) to `0.0.0.0`.
6	Set the `Initial Protocol 1` and `Initial Protocol 2` parameters to `TFTP`.
7	Click on the `Apply` button to save the changes.
8	Reboot the X terminal.

Booting an X Terminal Changes Setup Parameters

You can change X terminal parameters interactively with the `console` menu or by directly modifying values in the X terminal's configuration file.

When you reboot an X terminal, the parameter values set in the configuration file override any prior, temporary value you may have set via the `console` menu.

To make your changes permanent, complete one of the following:

- Change the parameters directly in the X terminal's configuration file.

  Refer to "Adding Customized Values for an X Terminal" in chapter 4, "Configuring X Terminals."

- Write the parameters that are set in the console menu directly to the configuration file.

  Refer to the section "Using Remote Configuration Files" in the *NCDware Advanced User's Guide for UNIX Systems*.

Keyboard Generates Incorrect Characters

If your keyboard generates incorrect characters on an X terminal, and if the login method is `xdm`, then probably the keyboard was remapped because references to the `xinitrc` scripts were not removed during `xdm` setup.

Modify the specified files by completing Steps 8 and 9 in the procedure “Installing the xdm Fileset” in chapter 3, “NCDware Installation.” Then, restart your `xdm` session.

Client Cannot Open Display

If a client application outputs the message:

```
cannot open display:
```

then complete each step in the following table, and fix whatever problems you encounter.

Step	Action
1	Log into the system running the application.
2	Verify that the X terminal's display name and Internet address are listed in `/etc/hosts` on the system running the application. If you cannot find the name and address, then the X terminal hasn't been added. Complete the procedure "Adding Each New X Terminal" in chapter 4, "Configuring X Terminals."

3	Verify that the DISPLAY environment variable for the X terminal is set and exported by entering:
	
	`echo $DISPLAY`
	
	If nothing is displayed, then enter:
	
	`DISPLAY=`*`display_name`*`:0`
	`export DISPLAY`

4	Verify that the host has permission to connect to the display by entering:
	
	`xhost`
	
	Result: A message similar to the following is displayed:
	
	`# xhost`
	`access control disabled, clients can connect from any host`

Step	Action
5	If access control is enabled, then: • Disable access control by setting the `Enable X Access Control` button in the `Setup/Change Setup Parameters/Access Control` menu of the X terminal's `Console` menu to `off` • Click on `Apply` to save changes.
6	Use `ping` to verify the basic connectivity to the X terminal. **Result**: If no echoes are produced, verify the routing information on the host and X terminal. See the `ping`(1M) manual page for details.

X Terminal Cannot Connect to Some Hosts

If your network is divided into subnets, then the `Initial Gateway 1`, `Initial Gateway 2`, and the `Subnet Mask` parameters of your X terminal must be set correctly. Otherwise, your X terminal will not be able to talk to hosts on other subnets.

Ask the site network administrator to determine the correct gateways and subnet mask and, if necessary, to set the parameters correctly in your X terminal's configuration file.

No Login Window

Sometimes the login window fails to appear. This section first describes the login process, which can help explain how and why problems can develop. Then the most common troubleshooting approach is presented.

The Login Process

After the configuration files are loaded, the X terminal displays either a login window or a `Login Chooser` window.

- If the login window is displayed, the user logs into the window.
- If a `Login Chooser` window is displayed, the user selects a system to connect to. This results in the following:
  - The X terminal requests login service from the selected system by using the X Display Manager Control Protocol (XDMCP).
  - A login process running on the boot host system accepts the X terminal's request and presents the login window.

Troubleshooting Procedure

One likely cause for not receiving a login window is that the login program is not running on the host. If you think this may be the case, then follow this procedure:

Step	Action
1	From the console, log into the system from which you expected to receive the login window.

Step	Action
2	Confirm that NCDware 3.2 was installed by verifying that NCDware files are present. Enter: `ls /usr/lib/X11/ncd` If the files are not present, then install NCDware now. See chapter 3, "NCDware Installation."
3	Execute: `ps -ef | grep` *login* where *login* is the login method, either `dtlogin` (the default) or `xdm`.
4	If the expected login method is not running, then you must start it. Refer to "Installing and Accessing dtlogin and xdm" in chapter 3, "NCDware Installation."

Login Window from an Unexpected Host

If an X terminal cannot load its configuration file, or if you boot an X terminal and cannot receive fonts, then multiple systems may have BOOTP entries for the X terminal. To confirm this and resolve the problem, after the X terminal is booted, use the following procedure:

Step	Action
1	Select `Statistics/Show Version` from the console menu.
2	Examine the Internet address after the `Booted From` field.
3	Does this address match the value you expect? • If yes, then your problem is probably *not* multiple systems with BOOTP entries for your X terminal. Complete Step 4. • If no, then it is likely that you have a BOOTP entry in another system's `bootptab` file. Complete Steps 5 and 6.
4	Check the following files: • `/usr/lib/X11/ncd/configs/ncd_std` • the X terminal's configuration file on the system from which you booted for an entry: `exec-startup-commands` If the login field under this entry contains a host Internet address, make sure its value matches the host Internet address of the system on which you want to receive the login window.
5	Confirm that you have a BOOTP entry in another system's `bootptab` file by logging into the system in question and entering: `grep` *X_terminal_name bootptab_file* where *bootptab_file* is `/etc/bootptab` or `/etc/inet/bootptab`, depending upon which system you performed the verification.
6	If an entry is present, then manually edit the *bootptab_file* to remove the BOOTP entry.

Clients Do Not Start, Do Not Use Default Fonts, or Produce Warning Messages

If a client cannot find a font it needs, it will often display a warning message, or at times may not start at all. In these cases, the font server may not be running on the system where fonts are installed.

Enter one of the following commands on a system with NCDware 3.2 installed to determine if the font server is running:

- For the `Xncd17c` 75dpi font server, enter:

  `/usr/bin/X11/ncd/ncdfsinfo -server \`
  `tcp/`*`boot_server_address`*`:7101`

- For the 100dpi font server, enter:

  `/usr/bin/X11/ncd/ncdfsinfo -server \`
  `tcp/`*`boot_server_address`*`:7100`

where in both cases *boot_server_address* is the address recorded in the "Work Sheet for Gathering X Terminal Values" in appendix A, "Work Sheets for Gathering Values."

Then, try one of the following troubleshooting approaches:

If...	Then...

you see a message similar to:
`ncdfsinfo: unable to open font server "tcp/boot_server_address:7101"`
or:
`ncdfsinfo: unable to open font server "tcp/boot_server_address:7100"`
	log in to the boot server system and enter:
	`ps -deaf | grep ncdfs`
	to verify that the font server is running.

there is no `ncdfs` process	on a system acting as the boot server, become `root` and enter: `sh /etc/rc.ncdfs > \ /dev/console 2>&1` to start the font servers.

If...	Then...

the font server is running, and the fonts you expect to receive still cannot be accessed	your font path may be set incorrectly. Perform the following steps:
	• Set your DISPLAY environment variable correctly and enter:
	`xset -q`
	to examine the font path.
	• Confirm that the font server is in the font path, and that any font directories your startup scripts may have added to the font search path are present.
	If they are not, examine the directories:
	`/usr/lib/X11/ncd/fonts`
	`/usr/lib/X11/fonts`
	on the system acting as the boot server. Modify your startup scripts to reflect the new font directories, if needed.

Font Server Displays Startup Error Message

If the system configured to use the font server is missing fonts, then you are likely to see font server startup error messages on the console, similar to:

```
Error: Font path element "/usr/lib/X11/fonts/i18n" is bad.
Error: Failed to set all elements of font path
"/usr/lib/X11/ncd/fonts/pcf/misc,
/usr/lib/X11/ncd/fonts/pcf/wrongregistry/misc,
/usr/lib/X11/ncd/fonts/pcf/100dpi,
/usr/lib/X11/ncd/fonts/pcf/dw100dpi,
/usr/lib/X11/ncd/fonts/pcf/Xol,
/usr/lib/X11/ncd/fonts/misc,
/usr/lib/X11/ncd/fonts/Speedo,
/usr/lib/X11/ncd/fonts/i18n,
/usr/lib/X11/ncd/fonts/Type1
```

To correct this problem, perform the following steps:

- Install the correct font filesets from the AIX 4.1 on PowerStack installation CD-ROM (if they are not already installed).

  Refer to:

  – "Verifying the AIX Release and Fileset Installations" in chapter 3, "NCDware Installation," for a list of required font filesets

  – the *AIX 4.1 on PowerStack Installation Guide* for installation instructions

- Install the NCD fonts (if they are not already installed).

  Refer to "Installing NCDware" in chapter 3, "NCDware Installation," for instructions.

- Verify that the `fonts.dir` file exists in the font directory, and run `ncdmkfontdir` if the file is missing.

Font Server Doesn’t Recognize Wildcards for Fonts

The NCD font server can fail to recognize wildcards when it is parsing a font definition. If you are using the NCD font server, you are likely to see warning messages upon starting up an application, such as:

```
Warning: Cannot convert string "-dt-interface user-medium-r-
normal-s*-*-*-*-*-*-*-*-*" to type FontStruct
```

Correct the problem by completing the following procedure:

Step	Action
1	Edit or create the file `/etc/tftpaccess.ctl` and add the line: `allow:/usr/lib/X11/fonts`
2	Set the modes on the file to 644.

3	Add font directories to your font path, either in a startup file, or from the shell, by entering:
	`/usr/bin/X11/xset fp+ /usr/lib/X11/fonts`
	`/usr/bin/X11/xset fp+ /usr/lib/X11/fonts/misc`
	Note You may have to add more font directories, depending upon the application font and where it is located.

Login Chooser Window Does Not Display Host Names

If you have selected the login chooser instead of a login method, and if the login chooser either:

- does not display any host names in the login chooser window
- does not accept host names at the prompt

then the `nameserver` parameters may not have been configured in the default configuration file. Complete the following procedure to confirm if the `nameserver` parameters are set for your X terminal, and to configure them if needed.

Step	Action

1	Determine the current domain name and nameserver address on the system running NCDware 3.2. Enter:
	`lsnamsv -S "domain nameserver"`
	Result:
	`domain` *domain_name*
	`nameserver` *nameserver_address*
	Example output:
	`domain smallville.com`
	`nameserver 129.11.18.101`

2	Press the Setup key.
3	Select `Setup/Change Setup Parameters`.
4	Click on `TCP/IP Name Service.`

Step	Action
5	Answer each of the following questions: • Is the `Name Server Protocol` set to `DNS`? • Does the `Name Servers` box contains the Internet address(es) for your `nameserver`(s) as displayed in the `lsnamsv` output? • Does `DNS Default Domain` contain the domain name suffix for your site as displayed in the `lsnamsv` output? If you answered no to one or more of the above questions, go to Step 6. Do *not* correct the values on this screen. If you answered yes to all of the above questions, then your `nameserver` may be configured incorrectly. See your system administrator for assistance on setting up a `nameserver`.
6	Edit the file `/usr/lib/X11/ncd/configs/ncd_std` on the system running NCDware 3.2. Verify that the following parameters are set correctly: `tcpip-dns-default-domain =` *domain_name* `tcpip-name-servers =` *nameserver_address* `tcpip-name-server-protocol = dns` where *domain_name* and *nameserver_address* are the values displayed in the `lsnamsv` output.
7	If the above parameters are *not* set correctly, it is possible that your site has reconfigured its `nameserver` setup. Enter the correct values in the `ncd_std` file.
8	Inform all users who currently use the `login-chooser` to reboot their X terminals from the configured system.

Clients Do Not Recognize New Fonts

The `mkfontdir` command generates a `fonts.dir` file for each of the fonts in a specified directory. If you add fonts to the system acting as your boot server, you may inadvertently omit one of several steps that must be performed before the X terminal recognizes the new fonts. Consequently, you will not obtain the fonts that your application(s) need.

Use the following procedure, which uses the `ncdmkfontdir` command on the new fonts.

Step	Action
1	Log in to the system that currently is supplying fonts to your X terminal.
2	If the line: `allow:/usr/lib/X11/fonts` isn't included in the file `/etc/tftpaccess.ctl`, then add it.
3	Set the owner of the file `/etc/tftpaccess.ctl` to `root` and the permissions to 644.
4	Enter: `mkdir -p /usr/lib/X11/fonts/`*newfonts* `cd /usr/lib/X11/fonts/`*newfonts* where *newfonts* is the name of the directory that contains your new fonts.
5	Copy all of the new fonts to the directory *newfonts*.
6	Enter: `/usr/bin/X11/ncd/ncdmkfontdir` `/usr/bin/X11/xset fp+ /usr/lib/X11/fonts/`*newfonts*
7	Restart your application.

No Text Appears in Dialog Windows

If you are using a monochromatic X terminal display and have selected the `dtlogin` method, then the foreground and background colors can be identical. Consequently, text will not be displayed in the dialog windows.

To correct this problem, complete the following procedure:

Step	Action
1	Log into the Common Desktop Environment (CDE).
2	Select the `Style Manager` menu by clicking on the icon with the mouse, fonts, and paint colors.
3	Select the `Color` icon from the `Style Manager` menu.
4	Under `Palettes`, select `BlackWhite`.
5	Click on `OK` to save changes.
6	Log out, and then log back into your CDE.

Exit Icon from the Common Desktop Environment (CDE) Sometimes Fails

Sometimes when you log out of a CDE session, your X terminal may not reset its session. When this happens, you will not see the NCD logout prompt or the CDE login window.

Manually reset your NCD session by performing the following steps:

Step	Action
1	Press the Setup key on the X terminal keyboard to bring up the NCD `Console Menu`.
2	Select `Logout...` from the `Login` menu.
3	If an NCD logout confirmation box is presented, click on `Yes` to logout.

Work Sheets for Gathering Values A

This appendix provides work sheets for recording:

- X server and disk space requirements
- specific values for each X terminal

It is strongly recommended that you photocopy the following work sheets. When you determine the various requirements and values in chapter 2, “Gathering Information,” you should record the values on copies of these sheets.

Work Sheet for X Servers

NCD X terminal models	Corresponding NCD Minimal X server	Select server?	Required memory in Mbytes for the X terminal	Required disk space for the X servers in 512-byte blocks	Calculation of required disk space
NCD14c	Xncd14c		4	3200	
NCD15b	Xncd15b		4	3200	
NCD17c	Xncd17c		4	3200	
NCD17cr, NCD19c, NCD19g, NCD19cp, NCD21c, and NCD MCX	Xncd19c		2 (code) and 4 (data)	5000	
NCD19	Xncd19		5	3000	
NCD 15r and NCD19r	Xncd19r		5	4800	
NCD ECX	Xncdecx		4	3200	
Required disk space for fonts					36000
Required disk space for system executables					9800
Optional disk space for manual pages					900
Total disk space (sum of entries in right-most column)					

Notes The NCD16, NCD16e, and NCD19b are no longer supported.

Work Sheet for Gathering X Terminal Values

X terminal host name_____		
Values for adding the X terminal	NCD X terminal model (server boot file)	
	X terminal Internet address	
	Ethernet address	0000A7_ _ _ _ _ _
	X terminal host name	
	Subnet mask	
	Gateway address	
Parameter values for modifying the X terminal's configuration file **Note** Specify values if needed.	Name of the configuration file (hexadecimal value of X terminal address) located in the directory: `/usr/ncd/terminals/usr/lib/X11/ncd/configs`	
Boot server address (frequently the same for all X terminals)		

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