Netstation Software 7.1
Technical Reference

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About This Manual

Important Information About HP Netstation Software 7.1 and ENWARE 7.0

This manual replaces the *HP ENWARE X Station Software 7.0 Technical Reference*. The functionality of the netstation software 7.1 has not changed from the ENWARE software version 7.0. However, this new release incorporates the following changes throughout the manual:

- "HP Netstation Software" replaces "ENWARE X Station Software".
- Version 7.1 replaces version 7.0
- "Version 7.1", "the netstation software", and "the software" are used interchangeably to refer to HP Netstation Software 7.1
- "Netstation" replaces "X station".

Who This Manual Is For

This manual is intended for technical users and system administrators responsible for:

- Using Hewlett-Packard netstations on a network
- Setting up the netstation user's environment.

Conventions Used in This Manual

This manual uses the following typographical conventions:

If you see ...	**It represents ...**
`computer text`	Text displayed on a netstation screen or the name of a file or a program.
italic text	■ a manual title ■ an important point, or ■ a variable.

	For example, *path1* could be a path such as `/usr/lib/X11`.
basepath	For HP-UX 9.*x*, IBM, Sun/Solaris, and SCO systems, the variable **basepath** translates to `/usr/lib/X11/700X`. For HP-UX 10.*x* systems, **basepath** translates to `/opt/hpxt/enware/xthome`.
Text	Represents a key or on-screen button you select. For example, CTRL, depending on the context, refers to the keyboard key or on-screen button labeled CTRL.
F12	This is the key to press *and hold down* to access the netstation's configuration screens. Note that on 46021A HP-HIL keyboards, the notation F12 refers to the fourth unlabeled key above the numeric keypad. On the LK201-layout keyboard, the notation F12 refers to the key labeled F3.

Assumptions about Your System Setup

The instructions in this manual assume that your system has a link between directories such as `/usr/lib/X11/700X` and the actual installation directory:

- On HP-UX 9.*x* systems: `/usr/tftpdir/usr/lib/X11/700X`
- On HP-UX 10.*x* systems: `/opt/hpxt/enware/xthome`
- On IBM AIX systems: `/usr/lpp/HPXT/lib/X11/700X`

- On SCO UNIX systems, the installation directory will be `/opt/enware/usr/lib/X11/700X` if the `/opt` directory already exists, otherwise it will be `/u/enware/usr/lib/X11/700X`
- On SunOS 4.1.x, typically: `/usr/enware/usr/lib/X11/700X`
- On Solaris 2.x, typically: `/opt/enware/usr/lib/X11/700X`

This link should be created automatically when you install the HP Netstation Software. If not, you or your system administrator may need to add this link manually, or use the appropriate path (listed above) instead of the usual basepath. For details, refer to the explanation for the error message `File not found` in Appendix F.

For More Information

This *Technical Reference* contains user and administration information to answer most questions about HP Netstation Software.

Software Installation Information

The software installation booklet shipped with the software media contains instructions for installing the software on your HP, IBM, Sun, or SCO host.

Printing Copies of the Technical Reference Book

If you require additional copies of this book, you can print off extra copies yourself. You can print a copy of the book from the HP Netstation Software CD-ROM as follows:

`lp -oraw /cdrom/`*filename*

where *filename* is one of the following:

`TECHREF7.LJ*` - PCL format, HP-UX
`techref7.lj` - PCL format, IBM, Sun, or SCO

`TECHREF7.PS*` - PostScript format, HP-UX
`techref7.ps` - PostScript format, IBM, Sun, or SCO

If you are printing the *ENWARE 6.0 Technical Reference* (which applies to HP 700/RX netstations), *filename* is one of the following:

`TECHREF6.LJ*` - PCL format, HP-UX
`techref6.lj` - PCL format, IBM, Sun, or SCO
`TECHREF6.PS*` - PostScript format, HP-UX
`techref6.ps` - PostScript format, IBM, Sun, or SCO

During version 7.1 software installation, these files are compressed and written to the **basepath/**`doc` directory. The file names are:

```
TECHREF7.LJ.Z
TECHREF7.PS.Z
TECHREF6.LJ.Z
TECHREF6.PS.Z
```

After the software is installed, you can decompress and print any of these files as follows:
`zcat` *filename* `| lp -oraw`

Online Information

If you are running HP VUE, you can access this manual online through the HP VUE Help Browser. Just click on the library icon on the HP VUE front panel:

Scroll through the list of online manuals available, and select *HP Netstation Software 7.1 Technical Reference*.

If you have HP VUE installed, but would rather invoke the online manual from the command line, type:
`helpview -h tecref`

If you are using CDE, you can invoke the online manual from the front panel or by typing either of the following commands:

```
dthelpview -h tecref
enhelp tecref
```

Hardware Assembly Information

The hardware assembly booklet shipped with every HP netstation explains how to install memory and how to assemble the netstation's basic components. Additional assembly instructions are shipped with any accessory option you purchase.

Man Pages

In addition, all users can access help screens and man pages for the software. Frequently used man pages include:

Man Page	Description
hpxt.hpterm	Local hpterm client
hpxt.xterm	Local xterm client
hpxt.xlock	Local xlock client
hpxt.xclock	Local xclock client
hpxt.xflash	Local xflash client
hpxt.format	Local client to format floppy disks
hpxt.twm	Local twm window manager (unsupported)
hpxt.mwm	Local mwm window manager
vuerx	HP Netstation Software VUE/RX
vuerxrc	HP Netstation Software VUE/RX resource file
hpxt.dtwmlite	CDE Lite local client
hpxt.whiteboard	Local WhiteBoard graphics application

hpxt.SharedX	Local SharedX application

On Sun systems, the following man pages are also available:

hpxt.olwm	Local OpenLook window manager
hpxt.clock	Local OpenLook clock
hpxt.cmdtool	Local cmdtool
hpxt.shelltool	Local shelltool

If you ordered the HP Netstation Software CDE optional product, the following man pages are also available:

hpxt.dtwm	Local OpenLook window manager
hpxt.dtterm	Local OpenLook clock

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Glossary

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1

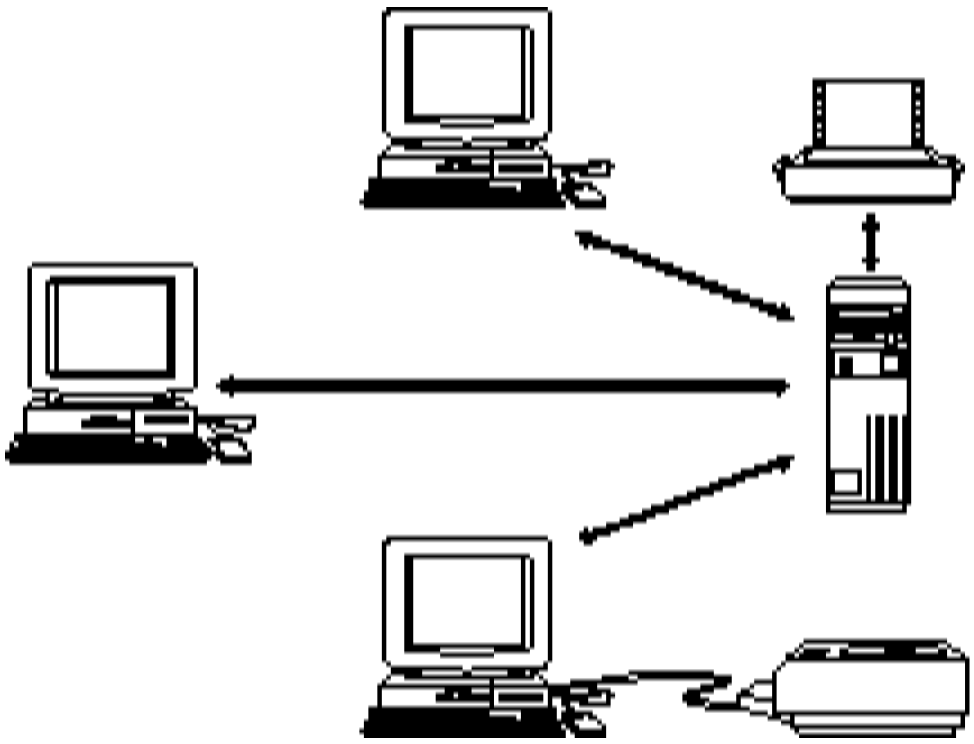
Introducing Hewlett-Packard Netstations

This chapter introduces the Hewlett-Packard family of netstations. It describes how you can use HP netstations to take full advantage of all of your network's computing capabilities. Topics in this chapter include:

- "What Exactly Is a Netstation?"
- "How Does a Netstation Operate on the Network?"
- "What Hardware Accessories Can I Add to My Netstation?"
- "How Does the Netstation Start Up?"
- "Where Should I Go from Here?".

What Exactly Is a Netstation?

A netstation is a terminal that allows you to use the X Window System in a networked environment. With netstations, all users share central host facilities such as CPU, disk space, and backup storage units. Some HP netstations also include advanced workstation features such as audio, scanner support and a local floppy drive.



Netstations In a Network

The Hewlett-Packard family of netstations includes:

- HP ENVIZEX II netstations
- HP ENVIZEX netstations
- HP ENTRIA netstations
- HP 700/RX netstations
- HP Aptrex netstations.

With all types of Hewlett-Packard netstations, you can view and interact with programs running on remote hosts as if they were running locally. Programs that are written specifically for use with the X Window System and execute on the host computer are called **clients** or X clients. You can also download and run selected clients directly on the netstation. These programs are called **local clients**. For more information about running local clients, refer to Chapter 5.

How Does a Netstation Operate on the Network?

When you network your HP netstations together with the host servers on your network, you give all users access to all of the devices and processing power on the network.

Users of HP netstations can access any application on any host that is compliant with the X Window System.

A typical network environment consists of the following components:

- Netstations
- Host file servers (running HP-UX, SunOS/Solaris, IBM AIX, or SCO)
- Additional devices (printers, plotters, scanners).

Depending upon your processing requirements, you can have any number of host servers on your network. HP netstations may use several different servers. For example:

Server	Function
File Server	The **file server** is the computer that provides the netstation with the files it requires (for example, the fonts and the X server file).
Name Server	The **name server** (or "domain name server") is the computer that resolves host names into their corresponding IP (Internet Protocol) addresses.
Boot Server	The **boot server** is the computer that responds to the netstation's **BOOTP** or **DHCP** request and sends the netstation its configuration information. By default, the boot server is also the file server.
Login Server	The **login server** is a computer that runs an X session manager such as XDM, HP VUE, dtlogin or scologin. By default, the file server is also the login server.
Font Server	A **font server** is not a computer, but is a program running on the host computer. It creates fonts as needed, rather than having the netstation store the various font styles, sizes, and weights in separate bitmap files.

What Hardware Accessories Can I Add to My Netstation?

With Hewlett-Packard netstations, you can add various accessories to your base unit as you need them.

Floppy Drive

If you have an HP ENVIZEX netstation, you may already have an optional floppy drive installed, or you can order the HP ENVIZEX floppy kit and install one later. With the floppy drive, you can transfer files quickly and easily between the DOS and UNIX environments. For details, refer to "Using the Floppy Drive" in Chapter 6.

Audio

For both HP ENVIZEX netstations and HP ENTRIA netstations, you can also install an audio kit that allows you to use the audio components available in many applications. For details, refer to "Using Audio" in Chapter 6.

MPEG Accelerator Card

If you have an MPEG accelerator card and an audio card installed on your HP ENVIZEX "p" series or ENTRIA^{Plus} netstation, you can view MPEG video. For details, refer to "Using the MPEG Video Player" in Chapter 6.

Scanner

For HP ENVIZEX netstations, you can add the SCSI/ROM kit, which enables you to use a scanner (if you have an HP host that is running DeskScan/UX). For details, refer to "Using a Scanner" in Chapter 6.

Flash ROM Card

The flash ROM server card allows you to use an HP netstation over a serial line without having to download files from the host. If you have a flash ROM card, you can use a local client called `xflash` to re-program the card. For details, refer to "Using a ROM Server Card" in Chapter 6.

To use a ROM card, you need a ROM card adapter as follows:

Netstation	Accessory Card Required
ENTRIA	PCMCIA Adapter Card
ENVIZEX	*One* of the following: ■ SCSI/ROM Adapter Card ■ Token Ring Adapter Card ■ 100VG Adapter Card.

Network Cards

For HP ENVIZEX netstations, you can add one of two accessory network cards:

- Token Ring Adapter Card
- 100VG Adapter Card.

You can access an Ethernet network and either a token ring or 100VG network simultaneously.

Additional Devices

You can also attach some devices directly to your netstation, including serial or parallel printers or plotters. For details, refer to Chapter 7. For information about serial devices, refer to Chapter 12.

How Does the Netstation Start Up?

When you power on your netstation, a number of events occur before you can log in to your host computer. When you power on, the first screen you see is the bootup screen. Depending upon the type of netstation you have, the bootup screen may look similar to this:

The icons on this screen present important information about your netstation's available memory, accessories installed, and networking capabilities. If any of these icons is marked through with a large red "X" and your system cannot boot, this indicates a problem that you should refer to your system administrator, or investigate yourself using the troubleshooting section of this manual.

While the bootup screen is displayed, the netstation is performing phase 1 of its startup procedure. For more information, see "Startup Phases".

Startup Phases

The startup procedure has the following phases.

Phase 1: Initializing

During this initialization phase, the netstation:

- Initializes hardware
- Performs power-on self-tests.

When the netstation is finished initializing, you will notice the slider bar moving from left to right. This slider bar indicates that the netstation is receiving setup files from the network.

Phase 2: Loading the Base System

During the loading phase, the netstation:

- Uses **BOOTP** (or **DHCP**) to set up networking parameters (optional)
- Downloads the base system from the **file server** over the network.
- Re-initializes some of the hardware, including the video subsystem
- Re-initializes the network parameters
- Downloads the remote configuration file (optional)
- Downloads the base system extensions
- Downloads the base system's X server and its optional extensions
- Starts the X server.

Phase 3: Configuring the X Server

Once the X server is running, the netstation:

- Downloads information about colors (e.g., the `rgb.txt` file)

- Initializes font paths
- Downloads the fixed font
- Downloads the cursor font.

Phase 4: Starting an X Session

During the final phase of startup, the bootup screen disappears and the netstation:

- By default, enables you to log in to a host computer through a session manager. For example:
  - VUE login
  - XDM login
  - scologin
  - dtlogin.

  If you see one of these login screens, enter your login account and password.
- Alternatively, presents the `Select Session Manager` screen. If you see this screen, highlight the host you wish to log into and press Enter.
- Starts the X session by executing the application that was specified by the user.

If your netstation does not start up successfully, refer to Appendix C.

Where Should I Go from Here?

If you have not yet installed Version 7.1 software on your host system, review the installation guide that came with the CD-ROM or tape media.

If you have new netstations to add to your network and you have already installed the software, refer directly to Chapter 2.

If you want to customize existing netstations, refer directly to Chapter 3.

2

Adding HP Netstations to Your Network

If you have not already installed version 7.1 software on your file server, follow the instructions that came with your CD-ROM or tape media. When you have finished installing the software, follow the steps in this chapter to add your netstation to the network.

Topics in this chapter include:

- "Introducing Netstation Administration"
- "Before You Add Your First Netstation"
- "Adding a Netstation to HP-UX or Sun Systems"
- "Adding a Netstation to IBM AIX Systems"
- "Adding a Netstation to SCO UNIX Systems"
- "Starting Up the Netstation".

Introducing Netstation Administration

This section introduces the netstation administration scripts. It includes the following topics:

- "Information that You Need"
- "Running the Netstation Administration Scripts"

Information that You Need

Before you run the netstation administration scripts, you need to know the following information:

- The **terminal name** of the netstation you want to add (you can choose any name provided that it is unique on all networks your netstation accesses)
- The netstation's **Ethernet address** which is the unique factory-assigned identifier for each network device. The Ethernet address appears on the netstation's boot screen, under the HP ENVIZEX II logo, beginning with `080009`.
- The netstation's **IP address**. The IP address must be unique to the system and in the format xx.xx.xx.xx (for example, 192.168.100.1).

Note

Your netstation's IP address is an important network identifier for your netstation. Obtain the appropriate address from your site system administrator.

- The **subnet mask** and **gateway** for the netstation, if applicable.

Running the Netstation Administration Scripts

Note

To perform netstation administration, you must be superuser.

On HP-UX 9.*x* systems, you can invoke the administration scripts in two ways:

- Type: `/usr/bin/X11/700X/admin/xtadm`
- Use sam, as follows:

  1. Type: `sam`
  2. Choose: Other Utilities-->.
  3. Choose: X Station Administration.

On HP-UX 10.*x* systems, you can invoke the administration scripts in two ways:

- Type: `/opt/hpxt/enware/bin/xtadm`
- Use sam, as follows:

1. As superuser, type: `sam`
2. Double-click on: X Station Administration.

On SCO systems, you can invoke the administration scripts in two ways:

- Type: `/usr/bin/X11/700X/admin/xtadm`
- Use sysadmsh, as follows:

  1. Start `sysadmsh`. (For SCO OpenServer Release 5.0 systems, you can access the `sysadmsh` facility through `scoadmin` by choosing `sysadmsh legacy`.)
  2. Choose: `System`
  3. Choose: `Hardware`
  4. Choose: `HP X Station Admin`

On Sun systems, invoke the administration scripts as follows:

- Type: `/usr/bin/X11/700X/admin/xtadm`

On IBM systems, use smit as follows:

1. Type: `smit`
2. Choose: `Devices`
3. Choose: `HP X Station Configuration`

The netstation administration menu is similar to the following.

```
HP X STATION ADMINISTRATIVE TASKS
          MAIN MENU
    1) Add an X station
    2) Remove an X station
    3) Printers, plotters
    4) Installation testing
    5) XDM Administration
    6) Manage software versions
       ?) Help         x) exit
Please enter selection (default=1):
```

For information about the various options on this menu, type `?` to access the online help.

Before You Add Your First Netstation

If you are new to netstations, you may be surprised at the number of parameters that you can configure. In general terms, the long list of parameters can be divided into two categories:

- Network parameters (such as your IP Address and Subnet Mask)
- Netstation parameters (such as your monitor type, beep volume, and fonts).

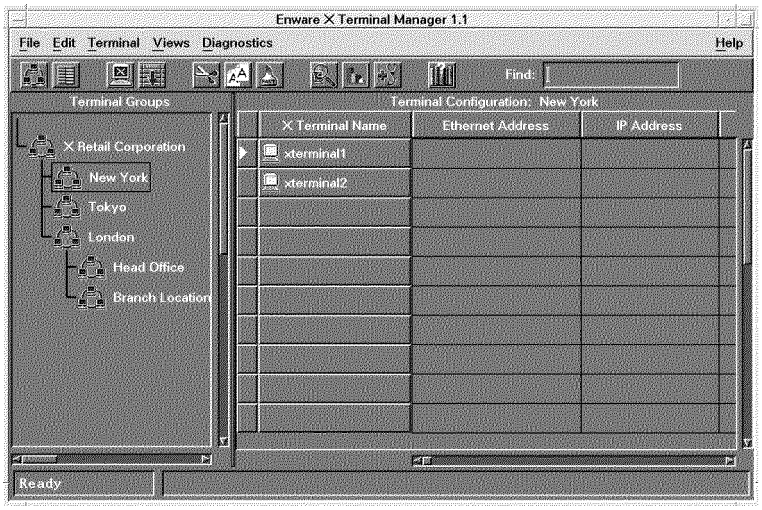
You can configure many of the netstation's parameters from the configuration screens, or you can use a combination of standard boot protocols (**BOOTP** or **DHCP**) and the netstation's remote configuration file to download the parameters from a host computer.

Note

If you plan to use remote configuration to supply the netstation parameters, you should first customize the `sample.cfg` file so that your parameter values will become the new defaults for each new netstation added. For more information about editing the remote configuration file, refer to "Using Remote Configuration" in Appendix A. For details on specific remote configuration parameters, see Appendix B.

If you have many HP netstations to configure, you may want to purchase the ENWARE X Terminal Manager (HP Part Number B3670BA) to ease the task of administering your network.

ENWARE X Terminal Manager presents all configuration parameters in a familiar spreadsheet display. For example:



If you have purchased the ENWARE X Terminal Manager, refer to its documentation instead of this chapter.

Adding a Netstation to HP-UX or Sun Systems

To add a netstation to an HP-UX or Sun system, refer to the following sections:

- "Adding the Netstation"
- "Creating Users' Startup Scripts"

Adding the Netstation

To add a netstation, do the following:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts".
2. Choose `Add an X station` from the main menu.

The netstation is automatically added to the required places, depending on the conditions below:

- If you are not running NIS, it adds the netstation to the `/etc/hosts` table.
- If you are running NIS, and the current host is the master server, it adds the netstation to the `/etc/hosts` table and updates the host database.
- If you are running NIS, and the current host is not the master server, it tells you to go to the master server and add the netstation to the host map.

It also:

- Creates an entry in the BOOTP file `bootptab`, or updates the NIS database (or instructs you to do so). (BOOTP, which can download the netstation's network configuration data when the netstation is switched on, is described in Appendix A. Use BOOTP even if you are installing only one netstation.)
- Creates a remote configuration file called **basepath**`/config/`*terminalname*`.cfg`

Note

- For HP-UX 9.*x*, IBM, Sun/Solaris, and SCO systems, the variable **basepath** translates to `/usr/lib/X11/700X`.
- For HP-UX 10.*x* systems, **basepath** translates to `/opt/hpxt/enware/xthome`.

- Prompts you to start up XDM, if no X session manager is already running.

- Updates the NFS file `/etc/exports` with assignments for the netstation (or instructs you to do so).

Once you have added the netstation to the system files, you can:

- Proceed to "Creating Users' Startup Scripts" to create startup scripts for your users (optional)
- Proceed to "Starting Up the Netstation" to start up each netstation and ensure that it boots successfully.

Creating Users' Startup Scripts

To create startup scripts for your users, do the following:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts".
2. Choose `XDM Administration` from the main menu.
3. Choose `Create .xsession script in user's home directory` from the XDM administration menu.
4. Follow the instructions provided.

Adding a Netstation to IBM AIX Systems

To add a netstation to an IBM AIX system, refer to the following sections:

- "Adding a Device to the Network"
- "Enabling the Netstation to Use NFS"
- "Using a DNS Name Server"
- "Adding the Netstation to the System Files"

Adding a Device to the Network

You need to add all of your netstations to `/etc/hosts` to have them recognized as devices on your network. You can edit `/etc/hosts` directly, or you can use `smit` as follows:

1. As superuser, type: `smit mkhostent`
2. Fill in the INTERNET ADDRESS (the IP address of your netstation) and the HOST NAME (the terminal name of your netstation) in the screen that appears.
3. To save the entry, click on Do.
4. When you are done, click on Cancel.

Enabling the Netstation to Use NFS

If you want your netstations to boot using NFS, you need to add them to `/etc/exports`. You can edit `/etc/exports` directly, or you can use `smit` as follows:

1. As superuser, type: `smit mknfsexp`
2. Fill in the PATHNAME and any other fields appropriate for your network (for example, `/usr`).
3. To save the entry, click on Do.
4. When you are done, click on Cancel.

Using a DNS Name Server

If your system uses a DNS name server, you need to update the BIND database on the name server.

Adding the Netstation to the System Files

To add your netstation to the appropriate system files:

1. Run `smit` as superuser.
2. Choose: `Devices`
3. Choose: `HP X Station Configuration`
4. Choose: `Add an HP X Station`

The `Add an HP X Station` script available on the HP X Station Configuration menu automatically does the following:

- Creates an entry in the BOOTP file `/etc/bootptab` (BOOTP is described in Appendix A.) You should use BOOTP even if you are installing only one netstation.
- Creates a remote configuration file called *terminalname*`.cfg` in path `/usr/lpp/HPXT/lib/X11/700X/config/` (Remote configuration is described in Appendix A.)

Once you have added the netstations to the system files, you can start up each netstation and ensure that it boots successfully. Refer to "Starting Up the Netstation".

Adding a Netstation to SCO UNIX Systems

To add a netstation, do the following:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts".
2. Choose `Add an X station` from the main menu.

This selection automatically does the following:

1. Adds a netstation to the required places, depending on the conditions below:

- If you are not running NIS, it adds the netstation to the `/etc/hosts` table.
- If you are running NIS, and the current host is the master server, it adds the netstation to the `/etc/hosts` table and updates the host database.
- If you are running NIS, and the current host is not the master server, it tells you to go to the master server and add the netstation to the host map.

2. Creates an entry in the BOOTP file `bootptab` (BOOTP is described in Appendix A.)
3. If NFS is installed on your system but is not exported to the netstation or "world", the installation script, at your request, updates the `/etc/exports` file with assignments for the netstation you are installing.
4. Creates a remote configuration file called `/usr/lib/X11/700X/config/`*terminalname*`.cfg`. (Remote configuration is described in Appendix A.)

Once you have added the netstations to the system files, you can start up each netstation and ensure that it boots successfully. Refer to "Starting Up the Netstation".

Starting Up the Netstation

After you have added the netstations to the system files, you can start up each netstation and ensure that it boots successfully. Topics in this section include:

- "Switching On the Netstation"
- "Understanding the Bootup Sequence"
- "Logging Out from XDM".

Switching On the Netstation

The power button is located on the front of the base unit. After you press the power button the netstation beeps and, after several seconds, the boot screen appears. (If the boot screen doesn't appear, you may have to set your monitor type as described in "Setting Your Monitor Type" in Chapter 3).

If you are booting using the recommended configuration (that is, using BOOTP to download network configuration data and an X session manager (for example XDM, `vuelogin`, `dtlogin` or `scologin`) to open an X Window session) your netstation follows the bootup sequence described in "Understanding the Bootup Sequence".

If you are supplying network configuration data manually or using TELNET, additional configuration of the netstation is necessary. You can find the information you need in Chapter 13.

Understanding the Bootup Sequence

When the netstation is switched on:

- The netstation broadcasts a boot request on its subnet.
- The BOOTP/DHCP server responds by sending the netstation the network parameters it needs.

Note

The default netstation configuration assumes that you have a USASCII PS/2 keyboard. If you have another keyboard type, refer to "Setting Your Keyboard Type" in Chapter 3.

- Once the netstation has its network parameters, it makes a connection with the file server and attempts to download its base system and fonts by using NFS.

If this fails, the netstation automatically attempts to download the files by using TFTP.

By default, the base system file is:
basepath/`bin/C`*xxxx*`A`

(with a `TR` or `VG` appended if a token ring or 100VG network card is installed), where *xxxx* is the 4-digit model number on the back of the netstation. You would not normally change this value. (If you need to change it, change the value in the X Server File field of the Server configuration screen, or change the X Server File remote configuration variable.)

The following X servers are defined for use with the base system:

`XEnvizex`	For ENVIZEX netstations
`XEntria`	For ENTRIA and Aptrex netstations
`XEntriaM`	For monochrome ENTRIA and Aptrex netstations

To change the X server that you use, update the `modules.ld` file.

- The netstation downloads its remote configuration file and several other files including fonts.
- The netstation then directs an XDMCP request to the file server.
- After about 10 seconds, a login window appears. If you have a user account on the X session manager host, you can now log in.

When you are satisfied that the netstation boots successfully, you can log out as described in "Logging Out from XDM".

Logging Out from XDM

There are two ways to log out from XDM:

1. Log out or exit from your window manager in the usual way. For example, HP VUE users can click on the `Exit` icon on the control panel.
2. You can close the last task in the `.xsession` startup script (the foreground task). If the foreground task is a terminal emulator, type: `exit`

   This method terminates only those clients started by the `.xsession` script. However, clients not under the control of XDM will still be notified when you log out from XDM and will usually terminate.

3

Customizing Your Netstations

Before you begin configuring your netstations, you may want to review the section "Local versus Remote Configuration" for a brief overview on configuring netstations remotely or locally. For more information, see Appendix A.

Optional customization topics in this chapter include the following:

- "Setting Your Monitor Type"
- "Using Energy Star Monitors"
- "Setting Your Keyboard Type"
- "Communicating through a Gateway"
- "Using Downloadable Extensions"
- "Filtering Log Messages"
- "Using Multiple Versions of the Software"
- "Customizing Your Keyboard".

Local versus Remote Configuration

You can configure your HP netstations remotely (from the host) or locally (from each netstation's configuration screens).

For most customers, the best way to make users productive quickly is to configure the netstations from the host using either **BOOTP** or **DHCP**, and remote configuration. For details, see "Using Remote Configuration".

However, other customers find that the flexibility to change configuration values from the netstation's configuration screens is an important feature. For details, see "Using the Configuration Screens".

Using Remote Configuration

You can use BOOTP/DHCP and remote configuration to configure the netstation completely, and automatically. By default, at start up the netstation requests that BOOTP or DHCP send the netstation its network configuration information. After this has been received, the netstation searches for its remote configuration file, which you can use to change any of the netstation's configuration parameters.

The remote configuration file is created automatically when you install netstations (as described in Chapter 2). The remote configuration file (**basepath**`/config/sample.cfg`) is copied to *terminalname*`.cfg` for each netstation you install. If you need to customize the remote configuration file, you should do so before the master file gets copied for each netstation.

For specific values and syntax of remote configuration parameters, refer to Appendix B.

Caution

If remote configuration is enabled, any configuration parameters set in the netstation's *terminalname*`.cfg` file overwrite the netstation's configuration at every power on. If you change the netstation's configuration from the configuration screens, you may need to disable Remote Configuration. To do so:

1. Press and hold (F12) to access the configuration screens.
2. Select (Network).
3. Select (General).
4. Set the `Network Parameters` field to: `From Fields Below`
5. Select the (Terminal) configuration screen.
6. Click beside the `Remote Config` field to disable the download.
7. Click on (OK).

By default, remote configuration is re-enabled by BOOTP or DHCP each time you power up the netstation.

Using the Variables in the Remote Configuration File

The default remote configuration file contains variables of the form `$(`*variablename*`)`. Variables can include other variables—the server expands each variable until it derives a unique parameter. Alternative values for variables are specified as comma-separated lists.

The X server supports the following variables:

`$(BasePath)`
: All downloadable netstation files have this path in common. Normally it is: `/usr/lib/X11/700X`. For HP-UX 10.*x* systems, this path is: `/opt/hpxt/enware/xthome`.

`$(FileServerList)`
: This is the list of potential file servers and their access mechanisms. Elements are separated by commas. For example: `/nfs/`*fileserver1* `,/tftp/`*fileserver2*

`$(SearchPath)`
: This is a variable that allows you to search for files on the current host and on other hosts you specify. Thus, for example, setting `$(SearchPath)` to `$(BasePath), $(FileServerList)$(BasePath)` could cause it to expand to `/usr/lib/X11/700X` and `/nfs/`*fileserver*`/usr/lib/X11/700X`.

`$(LANG)`
: This is the language of the netstation.

`$(TerminalName)`
: This is the variable form of the `Terminal Name` parameter.

`$(NodeNameList)`
: This is a list of the netstation terminal names and IP addresses for each of the netstation's network interfaces. Entries are separated by commas.

`$(Personality)`
: By default, this is the `$(NodeNameList)` variable followed by a period and by nothing: `$(NodeNameList).,` In the case of `$(Personality)snmpdrc` for a netstation that has an IP address of 125.4.5.6 and a terminal name of `xterm1`, this expands to `xterm1.snmpdrc`, `125.4.5.6.snmpdrc`, and `snmpdrc`

`$(RGBClass)`

This names a version of the `rgb.txt` file that has been customized to work with `98xxx` or `A10xx` monitors. The X server determines the correct value automatically.

Using the Configuration Screens

Depending on your specific software installation, you may be able to modify many netstation parameters from the configuration screens. To access the configuration screens:

- Press and hold F12 or equivalent key on your keyboard.
- When the configuration screen appears, click on any of the buttons at the top of the screen:
  - Preferences, Terminal, Server, Network, Diagnostics or Utilities
- For information on any specific parameter, click using the right mouse button on that field. If Help has not been enabled for your system, refer to the configuration parameter reference in Appendix B.

Note

You can access the configuration screens during the initial phase of bootup. Depending upon the type of netstation you have, you can:

- Select the Setup icon, or
- Choose To Config, or
- Press the space bar.

Once the netstation has started to download its server file from the host, you cannot access the configuration screens until the download is complete.

Setting Your Monitor Type

Most monitor types synchronize automatically when you power on the netstation:

- DDC (Display Data Channel) monitors automatically synchronize to the best possible resolution. Note that the monitor must be switched on *before* the netstation.
- Other HP-supplied monitors synchronize to the maximum resolution supported by the netstation.

If your monitor does not synchronize to the desired resolution, refer to the following sections.

Setting the Monitor Type Manually for an HP Monitor

1. Switch the netstation off and on.
2. At the sound of the second beep, press and release the space bar. To set up your monitor:
   a. Hold down the left Alt (or Extend Char) key.
   b. Using the numeric keypad keys, type the numbers from the monitor's model number (for example, type Alt 2 7 4 5 for a monitor type of C2745A).
   c. Release the Alt (or Extend Char) key.

Note

For some recently-introduced monitors, you may need to type in the model number of the monitor it replaced. If this applies to your unit, the monitor's box contains a sheet that tells you which model number to use.

Adjusting Your Monitor's Resolution

If your monitor synchronizes, but you want to adjust the monitor's resolution:

1. Access the configuration screens by selecting To Config or the Setup icon.

2. Click on [Terminal].
3. Click on the [Monitor] button to view the list of supported monitors and resolutions.
4. Click to highlight the resolution you would prefer.
5. Click on [OK].

Alternatively, you can find an acceptable resolution by following these steps:

1. Power the monitor OFF and ON again.
2. Switch the netstation OFF and ON.
3. When the netstation beeps twice, press and release the space bar.
4. Hold down the left [Alt] (or [Extend Char]) key.
5. Using the numeric keypad, type 0
6. Release the [Alt] (or [Extend Char]) key.
7. Repeat steps 4, 5 and 6 using:

   [Alt] [1]
   [Alt] [2]
   [Alt] [3]
   (etc ...)

   until you find an appropriate resolution setting for your monitor type.

Using Energy Star Monitors

If you have an Energy Star monitor, your netstation sets your monitor to run in "suspend" mode when the screen saver timeout occurs. Suspend mode reduces the monitor's energy consumption. To exit suspend mode, simply move the mouse or press a keyboard key.

If the netstation stays in suspend mode for more than an hour, the netstation sets the monitor into "off" mode, in which the monitor uses the least amount of power. To leave "off" mode, again you simply move the mouse or press a keyboard key.

Depending upon the length of time the monitor has been in suspend mode, it may take a few seconds to warm up again.

Setting Your Keyboard Type

The default keyboard is USASCII PC 101/102. If you have a different PS/2 keyboard, you have to set up the keyboard language either by modifying the netstation's remote configuration file (see "Modifying the Remote Configuration File" in Appendix A), or by using the configuration screens as follows:

1. After your netstation has booted, press and hold down F12 to access the configuration screens.
2. Select the Terminal screen.
3. On the Terminal screen, click on the Configure button to the right of the current keyboard window.
4. Click to highlight the entry that matches your keyboard.
5. Click on OK to exit the popup window.
6. Click on OK to exit the configuration screens.

7. Click on (Reset) to make your change take effect.

Communicating through a Gateway

The netstation uses the subnet mask, its own IP address, and the destination IP address to determine whether the computers you want to access are on the local subnet or past a gateway.

If your netstation has to go through gateways or routers to access computers, you need to set up the netstation's gateway table.

For details, refer to the following sections:

- "How the Netstation Uses the Gateway Table"
- "Setting the Default Gateway"
- "Using Proxy ARP"
- "Using the Netstation as a Router".

How the Netstation Uses the Gateway Table

The netstation looks at its gateway table to find which gateway to use to reach a particular network or host. Each line of the gateway table has a "Gateway" entry and a corresponding "Route to" entry.

You can access the netstation's gateway table through the (General Network) configuration screen.

For more information about setting the gateway table entries and networking in general, refer to:

- "Setting the Gateway Entry"
- "Setting the "Route to" Entry"
- "Understanding Subnetworks"
- "Understanding Routing".

Setting the Gateway Entry

The "Gateway" entry contains the IP address of the gateway. If your subnet has a name resolver, you can specify the name of a gateway instead of its IP address.

Setting the "Route to" Entry

The "Route to" entry describes the destination you want to access through the associated gateway. The destination can be described in terms of:

- Network number. The network number is the network ID part of the IP address and all 0's for the subnet part and host ID part. For example, if the destination computer's IP address is `25.6.6.1`, the network ID is `25.0.0.0`.
- Subnetwork number. The subnetwork number is described by the network ID part and the subnet ID part of the IP address and all 0's for the host ID part. For example, if the destination computer's IP address is `205.130.22.9`, the subnetwork ID is `205.130.22.0`.
- Host name.

Understanding Subnetworks

Many large networks are subdivided into subnetworks to ease the task of network administration. When subnets are used, the netstation uses the subnet mask to determine whether a particular device is on the same subnetwork, the same network, or needs to be directed via the routing table.

For example, before attempting to establish a communication link to a destination computer (for example, a file server), the netstation logically ANDs the entry in the `Subnet Mask` field with the IP address of the netstation and the IP address of the file server. If the resulting numbers differ, this indicates that the netstation is on a different subnet than the file server.

The netstation will then use the entries in the routing table to establish communications.

The subnet masks for the various classes of IP addresses are as follows:

Class A: 255.0.0.0
Class B: 255.255.0.0
Class C: 255.255.255.0

When used for routing, the subnet mask is applied only to the destination on the netstation's own network (see "Understanding Routing" below).

Understanding Routing

The netstation decides whether the destination IP address is:

1. Within its own subnet, or
2. Within a different subnet of its own network, or
3. On a different network altogether.

If the destination is *not* on the netstation's own subnet, the netstation uses its gateway table to determine if there is a match, for example:

- A matched IP address, or
- A matched subnet on its own network, or
- A matched other network.

If there is a match, the X server routes to the associated Gateway entry. If there is no match, the X server routes to the default gateway. If there is still no match, there is no available route to the destination.

Setting the Default Gateway

If the netstation is unable to route through a specified gateway, it attempts to route through the "default" gateway. Designate the default gateway with a `Route to` of "`0.0.0.0`". Set only one `Route to` entry to "0.0.0.0", otherwise one of the entries (the second) will not be used.

`Route to` entries must not specify two paths to the same network. If you have two gateways that can connect a netstation to a computer, only one can be given the default `Route to` entry (0.0.0.0).

Using Proxy ARP

With the X server, you can use proxy ARP (Address Resolution Protocol) to route data to an otherwise unspecified subnet.

By using proxy ARP, you do not need to configure the netstation to have a specified default gateway on the network. Instead, the netstation relies on other devices on the network (such as routers and gateways) to have the routing information the netstation needs. When the netstation determines that it has data to send to a destination outside the local subnet and not serviced by any of the configured "Route to" entries, it broadcasts an ARP. The router that can transfer the packet to the correct subnet responds, giving the netstation an initial destination for its data. The netstation then sends its data to the router that can move the data towards its final destination.

To set the netstation to use Proxy ARP, configure the gateway table so that the netstation's address is the address of the default gateway:

Gateway	**Route to**
terminal_ipaddress	`0.0.0.0`

Using the Netstation as a Router

Using a netstation as a router is not supported and not recommended. If you use the netstation as a router between two networks (for example, between a Token Ring or 100VG and an Ethernet network), do NOT put the netstation itself in the gateway table unless you are using Proxy ARP.

Using Downloadable Extensions

You can use downloadable extensions to add additional capabilities to the netstation when it boots up. There are two types of extensions:

- Base extensions, which are hardware-dependent and specific to your ENTRIA, ENVIZEX or Aptrex base system
- X Server extensions, which are enhancements to the X Server.

You can configure a netstation to download an X server with extensions at the next reboot as follows:

1. Log into an X session.
2. Press and hold F12 to access the configuration screens.
3. Click on Server.
4. Click on Extensions....
5. Double-click the desired extensions so that the word `Load` appears under `Next Reboot`, click OK, then click OK again.
6. Switch the netstation off and on again.

Once loaded in, the downloadable extensions remain until you disable them and reboot the netstation.

The software includes the following base extensions:

Aserver (audio server)
Floppy
Log2File
Makemap
MPEG
NFSServer
PPP
ScanServer
Snmpd
SnmpdV2
Telnet
XTouch, at, it, and mt (for touch screens)

and the following X server extensions:

DEC_XTRAP
MultiBuf
SXext (SharedX extension)
Sync (synchronization extension)
XIdle
XIE (X image extension)
XTest

Note

- Downloadable base extensions that are hardware-dependent are loaded automatically if the netstation detects the hardware option when it boots. For example, the Floppy extension is automatically loaded by ENVIZEX netstations with the optional floppy drive installed.
- If the `noshow` parameter is specified for an extension in the `modules.ld` file, that extension will not appear in the Extensions list.

- 700/RX terminals use HP Netstation Software 6.0 extensions, which are noted in the `modules.ld` file.

Controlling Downloadable Extensions with modules.ld

You can edit the **modules.ld** file to do the following:

- Automatically load (`autoload`) an extension when each netstation is booted.
- Remove an extension from the Extensions list (`noshow`).

The `modules.ld` file can be found in **basepath/bin/modules.ld**. Within the file, you will find a description of each extension and instructions for how to edit the file.

For example, to download the SXext (SharedX) extension automatically, include the autoload parameter as follows:

```
# DOWNLOADABLE X EXTENSIONS
# SharedX requires that your HP-UX has SharedX installed and running
SXext  "Ext xext autoload"  SharedX  "Shared X Extension"
```

Filtering Log Messages

Each netstation can generate a variety of status and error messages. All of these messages are written to a log. You can also:

- Display some or all of these messages on the netstation's Log screen. (By default, all messages are displayed.)
- Send some or all of these messages to one or more hosts. This can simplify network administration and

help you to integrate with HP OpenView Operations Center. (By default, no messages are sent.)

The following sections contain additional information:

- "Syslog Message Classes"
- "Displaying Messages on Your Netstation's Log Screen"
- "Sending Messages to a Host".

Syslog Message Classes

Each message is tagged internally with a syslog message class. Although this class is not displayed to you directly, it has the following effects:

- It determines how the message is displayed in the Log screen. For example, `<ERROR>` messages are displayed in bold text.
- You can use it to control whether the message is displayed in the log screen, and also whether the message is sent to another host or hosts.

The following syslog message classes are defined:

Message Class	Description
`<EMERGENCY>`	Not currently used in version 7.1.
`<ALERT>`	Not currently used in version 7.1.
`<CRITICAL>`	(reverse bold text) The system has failed.
`<ERROR>`	(bold text) A function or action has failed.
`<WARNING>`	(reverse text) The system, a function, or an action has possibly failed.
`<NOTICE>`	(normal text) A situation requires attention.
`<INFO>`	(normal text) An informational update.

`<DEBUG>`	Not currently used in version 7.1.
`<CLIENTERR>`	(normal text) An error from a local client.
`<CLIENT>`	(normal text) Normal output from a local client.

For a list of the software messages, see Appendix F.

Displaying Messages on Your Netstation's Log Screen

You can specify which message classes are displayed in your Log screen in either of the following ways:

- Using the configuration screens
- Using the remote configuration file.

Using the Configuration Screens

1. Press and hold F12 to access the configuration screens.
2. Click on Diagnostics, then on Log Screen.
3. Click on the Report button to choose which message classes to display:

Errors Only	Displays message class `<ERROR>` or higher
Errors/Warnings	Displays message class `<WARNING>` or higher
All Messages	Displays all message classes.

Using the Remote Configuration File

1. Edit your remote configuration file (**basepath/**`config/`*terminalname*`.cfg`)
2. Change the `Report` variable to one of the following values:

Errors Only	Displays message class `<ERROR>` or higher
Errors/Warnings	Displays message class `<WARNING>` or higher
All Messages	Displays all message classes.

3. When you are finished, save and quit the file.
4. Press and hold F12 to access the configuration screens.
5. Select Terminal.
6. For the `Remote Config` option, select Download.
7. You are prompted to reboot your netstation.

Sending Messages to a Host

If you want to send log messages to one or more hosts, set the values of two remote configuration parameters:

- `syslog Class Mask` determines which message classes are sent
- `syslog Host List` determines which host or hosts the messages are sent to

Follow these steps:

1. Edit your remote configuration file (**basepath/**`config/`*terminalname*`.cfg`)
2. Find the `syslog Class Mask` variable.
3. List the message classes that you want to send. You can optionally use a delimiter, such as a comma, to separate the classes. For example:

```
syslog Class Mask = <ALERT>,<ERROR>,<WARNING>
```

4. Look for `syslog Host List`.

5. Add the hosts that you want to send the messages to, using either names or dotted decimal IP addresses. For example:

   ```
   syslog Host List = hosta, 10.4.1.21
   ```

   Each name or address is optionally followed by a colon (:) and a syslog facility name, optionally followed by a colon (:) and a port number. The default facility name is logLocal0.

   Examples:

   ```
   syslog Host List = hosta:logLpr:2000
   syslog Host List = hosta:logLocal7
   syslog Host List = hosta::2000
   ```

6. Save and quit the file.
7. Press and hold F12 to access the configuration screens.
8. Select Terminal.
9. For the `Remote Config` option, select Download.
10. You are prompted to reboot your netstation.
11. If you want to test that syslog is working correctly, generate a test message for each message class. For example, if you specified:

    ```
    syslog Class Mask = <ALERT>, <ERROR>
    syslog Host List  = 10.4.1.21
    ```

    type the following commands on the command line:
    `remsh` *terminalname* `putlog "<ALERT> ALERT test"`
    `remsh` *terminalname* `putlog "<ERROR> ERROR test"`
    (On Sun systems, use `rsh` instead of `remsh`.)

    If syslog is working, these messages will appear in the syslog file that you configured on host 10.4.1.21.

Using Multiple Versions of the Software

If you want some netstations to run the latest version of the software while other netstations stay with a previous version, you can operate multiple versions of software from the same host.

Note

This section assumes you have completed the preliminary procedures to set up multiple versioning, as described in the accompanying *Installation Guide*. This section does not apply to IBM AIX systems; refer to your AIX documentation for alternate approaches using `smit`.

If the file server for the netstations is the same server you use to run the administration scripts (`xtadm`), you can modify the software version as follows:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts" in Chapter 2.
2. Choose `Manage software versions` from the main menu.
3. The Versioning menu appears:

```
HP X STATION ADMINISTRATIVE TASKS
       VERSIONING MENU
*NOTE*: this host must be the file server for the X station(s)
   1) Show installed versions
   2) Change default version site-wide
   3) Show/Change active version for an X station
   4) Remove a version
       ?) Help                p) previous menu
Please enter selection (default=1)
```

a. Select `3) Show/Change active version for an X station.`

b. When prompted, enter the **terminal name** of the netstation whose version you want to modify.

c. When prompted, select 'y' to reboot the netstation.

4. At a later time when you are ready to switch all remaining netstations to the new version, select:
   `2)Change default version site-wide`

   At this time, you may wish to delete the previous version by selecting:
   `4) Remove a version.`

Customizing Your Keyboard

This section describes how you can use various features of the software to customize your keyboard. For example, you can:

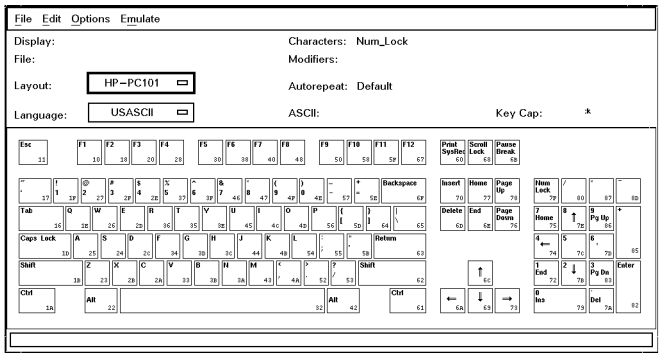
- Use the HP Netstation Software Keyboard Mapper to change the operation of some of the keys on your keyboard (see "Remapping Your Keyboard") (this program requires an HP-UX system). For suggestions about which keys you might want to redefine, refer to "Choosing Which Keys to Map".
- Customize how your keyboard operates with different clients you use by using the dynamic keyboard mapping client (see "Customizing Keyboard Operation for Clients").
- Use a predefined keyboard map that allows your PS/2 keyboard to work with HP clients (see "Using a PS/2 Keyboard with HP Clients").

In addition, if you want to use national language characters:

- "Using NLS Characters on Sun Systems" describes changes you may need to make to your environment on Sun systems.
- "Using NLS Characters on SCO Systems" describes changes you may need to make to your environment on SCO systems.

Remapping Your Keyboard

If you cannot generate the characters you need with your keyboard or if you want to change the layout of your keyboard, HP-UX users can use the HP Netstation Software Keyboard Mapper to change the characters their keyboards produce.



HP Netstation Software Keyboard Mapper

With the HP Netstation Software Keyboard Mapper, you can:

- See the hidden characters available on your keyboard.
- Redefine your keyboard's operation, including:

- Changing which characters (and character sets) keys produce
- Swapping the positions of keys
- Disabling keys
- Changing whether or not particular keys autorepeat.

- Create customized key maps for use with dynamic keyboard mapping (see "Customizing Keyboard Operation for Clients").

Note

The Keyboard Mapper is intended to remap a few keys for your convenience. To set your keyboard's layout and language, use the Terminal configuration screen.

Starting the Keyboard Mapper

To start the Keyboard Mapper, type:
`/usr/bin/X11/700X/xkeymap &`
or, for HP-UX 10.*x* systems, type:
`/opt/hpxt/enware/bin/xkeymap &`

A display of a USASCII PC-101 keyboard appears.

Selecting the Keyboard to Modify

To modify the keyboard of your netstation:

1. Click on File.
2. Select Read Keyboard.
3. From the "Read Keyboard" window, specify the *ipaddress*`:0.0` or the *terminalname*`:0.0` of your netstation.
4. Click on OK.

A display of your netstation's keyboard appears.

Note

To modify the keyboard of a different netstation, specify that netstation's IP address in the "Read Keyboard" window.

To modify a keyboard that is not associated with a particular netstation:

1. Click on File.
2. Select New.
3. From the "Language/Layout" window, choose the layout and language of the keyboard you want to modify.

Modifying the Keyboard

There are two ways to change the operation of your keyboard. If there are relatively few changes you wish to make, you can edit the current keyboard's keys directly. If there are many changes you wish to make, you probably want to make your keyboard emulate a particular type of keyboard. In this case, you can display the desired keyboard and copy its keys to your current keyboard.

Editing a Key Directly

To edit a key directly:

1. Move the cursor to the desired key.
2. Click on the right mouse button. From the popup you can modify a key in a number of ways, including:
   - Edit the characters a key produces
   - Enable modifiers for a key
   - Disable a key
   - Show a key's default settings
   - Restore a key's default settings
   - Control whether a key autorepeats.

Emulating a Different Keyboard

If there is a particular kind of keyboard you want to emulate:

1. With the left mouse button, click on Options.
2. Select Emulate Keyboard.
3. From the "Language/Layout" window, choose the layout and the language of that keyboard.
4. Click on OK to display that keyboard.

Copying a Key from the "Emulate Keyboard" Window

1. Move the cursor to the desired key.
2. Holding the middle mouse button, drag the key to the desired key on the current keyboard.
3. Release the mouse button.

The displayed key cap does not change, but its functions (shown beside the word "Characters:") update.

Saving the Changes

You can apply the changes immediately or not until you switch the netstation off and on:

- To apply the changes immediately:
  1. Select File, then Write Keyboard.

Note

Be sure to save the entire keyboard and NOT just the changed keys.

  2. In the "Write Keyboard" popup, specify the display name of your netstation.
  3. Click on OK.

     The changes stay in effect until you power the netstation off and on.

- To apply the changes after you reboot the netstation:

  1. Select File, then Save.
  2. In the "Save Changes to File" window, specify *terminalname*`.kbd` in the Selection field.
  3. Click on OK.
  4. In a terminal emulator window, edit the "Xkeymap File" parameter in your remote configuration file (**basepath/**`config/`*terminalname*`.cfg`) as follows:

     ```
     Xkeymap File  = $HOME/terminalname.kbd
     ```

  5. Save your remote configuration file.

  If you have remote configuration enabled, the netstation applies the changes you made to its keyboard the next time you switch the netstation off and on.

Choosing Which Keys to Map

There are certain changes you might want to make if you have a PC 101/102 layout keyboard:

- If you want to use Num Lock on a PC 101/102 keyboard, use the instructions in "To Edit A Key Directly" to use the "Enable Modifiers" menu. Map "Mod5" to Num Lock.
- If you want to emulate a Sun Type 4 keyboard's operation on a PC 101/102 keyboard, you should consider mapping the following functions:
  - hpmute_acute to acute
  - hpmute_asciitilde to asciitilde
  - hpmute_asciicircum to asciicircum
  - hpmute_diaeresis to diaeresis
  - hpmute_grave to grave
  - hpbacktab to backtab

- SunFront to F5
- SunOpen to F7
- SunCut to F10
- Compose to F11 (map the Multi_key character to F11).

- If you want to emulate an IBM 3270 keyboard's operation on a PC 101/102 keyboard, you should consider mapping the following functions:
  - hpmute_acute to dead_acute
  - hpmute_asciitilde to dead_asciitilde
  - hpmute_asciicircum to dead_asciicircum
  - hpmute_diaeresis to dead_diaeresis
  - hpmute_grave to dead_grave
  - hpbacktab to backtab

Customizing Keyboard Operation for Clients

In environments where you run clients on different types of hosts, you may want to have different keyboard functions available depending on which client you are using. This capability, called dynamic keyboard mapping, is the process of assigning a predefined keyboard map to a particular client. To use dynamic keyboard mapping:

1. Define a keyboard map for each client that needs a non-standard keyboard map. Typically you would do this by using the Keyboard Mapper (see "Remapping Your Keyboard").
2. Modify your `$HOME/.xsession` or `$HOME/.vueprofile` file to start your clients with customized keyboard maps the next time you log in.
3. Log out and log in again.

Setting Up Dynamic Keyboard Mapping

If you need to set up a predefined keyboard map for a particular client, edit your `$HOME/.xsession` or `$HOME/.vueprofile` file.

For example, in the `$HOME/.xsession` file, after the line that reads:

```
###  Add client commands below, one command per line.
```

add lines similar to the following (replacing `terminalname` with the name of your netstation and `client1` and `client2` with the name of the clients you want to remap your keyboard for):

```
/usr/bin/X11/700X/hpxt.dkmserver -port 2 &
xmodmap -display terminalname:0.0 -pke > terminalname.kbd
xmodmap -display terminalname:2.0 - < terminalname.kbd
xmodmap -display terminalname:2.0 - < client1.kbd
client1 -display terminalname:2.0 &
xmodmap -display terminalname:2.0 - < terminalname.kbd
xmodmap -display terminalname:2.0 - < client2.kbd
client2 -display terminalname:2.0 &
```

These example lines do the following:

- Start the dynamic-keyboard-mapping local client. The initial keyboard map has no keys defined.
- Output the current keyboard map to a file.
- Apply the current keyboard map to the keyboard mapping client.
- Apply the file that contains the keyboard modifications required by your first client to the keyboard mapping client.
- Start the first client.
- Apply the current keyboard map to the keyboard mapping client.

- Apply the file that contains the keyboard modifications required by your second client to the keyboard mapping client.
- Start the second client.

Note

You cannot remap "modifiers" (Shift, Control, Lock, Mod1 to Mod5) using this client.

Using a PS/2 Keyboard with HP Clients

If you are primarily running HP clients and have a PS/2 keyboard, you can re-map your PS/2 keyboard to provide the missing functions required by some HP clients.

To re-map your PS/2 keyboard:

- XDM users need to uncomment the following line in their `.xsession` file:
  `xmodmap` **`basepath/examples/hpemulation`**
- HP VUE users need to add the following line to their `.vueprofile` file:
  `xmodmap` **`basepath/examples/hpemulation`**

Note

The `hpemulation` line that maps Delete Char to Delete also makes it impossible to use Ctrl Alt Delete to reset the netstation.

If this is unacceptable, you could use a line similar to the following to permit the reset key-combination to work and to map Delete Char to Shift+Delete and Shift+Delete line to Alt+Delete:

```
keycode 109 = Delete DeleteChar DeleteLine
```

The HP-HIL keyboard emulation on a PS/2 keyboard provides the following key mappings:

46021A Keys	Emulation on PS/2
Stop	Scroll Lock
Reset/Break	Pause/Break
Delete Char	Delete
Shift+Delete line	Shift+Delete
Delete line	Alt+End
Insert Char	Insert
Shift+Insert line	Shift+Insert
Insert line	Alt+Home
Menu	Alt+Num Lock
Shift+Menu	Shift+Num Lock
User	Shift+Numkpd /
System	Alt+Numkpd /
Enter	Shift+Numkpd -
Select	Alt+Numkpd -
Clear line	Alt+Numkpd +
Shift+Clear line	Shift+Numkpd *
Clear display	Alt+Numkpd *
f1 ... f8	F1 ... F8
Blank 1 ... Blank 4	F9 ... F12
Numkpd Enter	Numkpd Enter
right Extend Char	right Alt
Numkpd Tab	

Using NLS Characters on Sun Systems

If you want to activate national language characters on your keyboard, you need to set the character type.

For applications to access the 8-bit Latin-1 character set (ISO 8859.1), add the following lines to the `.cshrc` file in your home directory:

- For Solaris 1.*x* ...

```
setenv LC_CTYPE iso_8859_1
```

```
stty pass8
```

- For Solaris 2.*x* with .cshrc/csh ...

```
stty cs8 -istrip -parenb
setenv LANG C              # "C" or your "LOCALE"
setenv CTYPE iso_8859_1
```

- For Solaris 2.*x* with .profile/sh/ksh ...

```
stty cs8 -istrip -parenb
LANG=C                     # "C" or your "LOCALE"
CTYPE=iso_8859_1
export LANG CTYPE
```

You can now invoke an application using an 8-bit font, typically from the `iso_8859.1` font directory. For example:
`cmdtool -ls -fn timR10 &`

Using NLS Characters on SCO Systems

Before you start applications that access 8-bit character sets on SCO systems, type the following lines in the terminal emulator window where you plan to run the application:

```
LANG=english_us.8859
export LANG
stty cs8
```

Then, start the application, for example:

```
/usr/bin/X11/xterm -ls -fn courr10
```

Note

You can add these lines to `.xsession`, to `.profile`, or to `.cshrc` in the user's home directory, as long as the X client calls that file. (With xterm, the `-ls` option ensures that `.profile` or `.cshrc` is called.)

For information on using non-U.S. English keyboards, "dead" keys, and compose keys, refer to the appropriate SCO Open Desktop manual.

4

Configuring an X Session Manager

An X session manager controls the login process. It accepts your login account and pathname, checks the password file, selects a system shell, and sets up the user's environment. The X session manager starts clients automatically when users log in and closes sessions automatically when users log out.

This chapter discusses how you configure a session manager. Topics include:

- "Your Default X Session Manager"
  - "Customizing Colors, Fonts and Other Application Defaults"
- "Selecting an X Session Server"
- "Configuring Dtlogin or Vuelogin on HP-UX Systems"
- "Configuring XDM on HP-UX, Sun, and IBM Systems"
- "Configuring scologin on SCO Systems".

Your Default X Session Manager

If you have CDE installed on your host, you can use `dtlogin` as your X session manager. Otherwise, use whichever X session manager is available to you:

- HP-UX systems can use XDM (X Display Manager) or `vuelogin`. These products use similar processes; for example, both communicate with netstations by using XDMCP (X Display Manager Control Protocol).

  Dtlogin or vuelogin can run either an HP VUE environment, or an XDM mode in which it runs a user's `.xsession` script. If you are upgrading from a previous version of the software and were running XDM, the default is XDM mode. If you still wish to run XDM instead, the 7.1 software contains the X11R5 version of XDM. For more information, refer to "Starting XDM".

- IBM AIX systems can use XDM. For details, refer to "Configuring XDM on HP-UX, Sun, and IBM Systems".

- SCO UNIX systems use `scologin` as their session manager. Refer to "Configuring scologin on SCO Systems".

- Sun systems typically use XDM. Note, however, that the XDM that Sun currently provides with OpenWindows 3.1 is known to have problems working with netstations. The Sun OpenWindows Version 3 XDM resets the Sun console when the netstation ends its session. The HP netstation's XDM does not. We recommend that you use the XDM provided with the software.

Customizing Colors, Fonts and Other Application Defaults

You can specify colors, fonts, and other application defaults in the `.Xdefaults` file. If you do not have an `.Xdefaults` file in your home directory, copy one of the following files:

- If you will use mostly Motif or MIT X11 clients, use the following command:

```
cp  /usr/lib/X11/sys.Xdefaults  $HOME/.Xdefaults
```

- If you will use mostly CDE clients, use the following command:

```
cp /etc/dt/appconfig/C/sys.resources  $HOME/.Xdefaults
```

- If you will use mostly OpenLook clients, use the following command:

```
cp  /usr/openwin/lib/Xdefaults  $HOME/.Xdefaults
```

The values that you specify in the `.Xdefaults` file override the values specified in the `/usr/lib/X11/app-defaults` directory.

Selecting an X Session Server

No matter which X session management program is available on your system, XDMCP is the underlying mechanism that makes the login process automatic.

By default, HP netstations are configured to use (XDMCP Direct) as their startup mode, and the default X session server is the file server. However, you can configure the netstation to any of four types of XDMCP operation:

- XDMCP Direct to *host(s)*

- XDMCP Broadcast
- XDMCP Indirect to *host* (with XDM or `dtlogin`; not available with some versions of `vuelogin`)
- XDMCP Broadcast Auto.

You can change the default X session server in the remote configuration file or from the Server configuration screen.

If you choose XDMCP Direct to *host(s)* or Indirect, you must also specify the host name or IP address of the X session server.

XDMCP Direct to *host(s)*

The netstation sends a request to the specified host computer (if no host is specified, the request is sent to the file server). This is the default configuration and is preferred if you always want a particular netstation to use the same host.

If there are several hosts that the netstation could use, you can specify these host names in the Login Host field as a comma-separated list. If the first host on the list times out or does not respond, the request will be sent to each host in sequence until a connection can be made.

If you want to log into a remote host (one that is outside of a gateway), follow these steps:

1. From the Server configuration screen, select XDMCP Direct.
2. Type in the name of the host in the field `Login Host`
3. Click on OK.
4. Exit from your current session.

Alternatively, you can specify a remote host from the Select Session Manager screen:

1. From the `Select Session Manager` screen, click on the Direct button.
2. Fill in the `Host Address (Name)` field with the IP address or host name of the host you want to log into.
3. Click on Connect.

XDMCP Broadcast

The netstation sends a request to all the hosts on the local subnet and the hosts that are willing to supply X session manager services respond. The netstation displays these hosts on the `Select Session Manager` screen along with the number of users logged in and the host load for each computer over the last 1, 5, and 15 minute periods. (If the host is running HP VUE Version 2, only the computer's hostname is displayed, not the host load.) To choose the host, click on the host name, then on OK.

If you want to shorten the list of hosts displayed, list the hosts to which you normally connect in the Login Host field.

If you want to log in to a host that is across a gateway, follow these steps:

1. From the `Select Session Manager` screen, click on the Direct button.
2. Fill in the `Host Address (Name)` field with the IP address or the host name of the host you want to log into.
3. Click on Connect.

XDMCP Indirect to *host*

The netstation sends a request to the specified host computer (known as the primary manager). This computer can respond directly or it can choose another computer (a secondary manager) to provide the XDM

services to the netstation. Using this method, you can direct the primary manager to assign which computer should provide XDM services based on factors such as relative host loading, the netstation making the XDM request, which computers the user has accounts on, and so on. For information on how to configure the host computer to respond to an indirect request, see "Controlling Access to the Host through XDM".

Note that the indirect request applies to XDM and `dtlogin`, and is not available with some versions of `vuelogin`.

XDMCP Broadcast Auto

The netstation automatically sends a request to the host computer listed in the `Login Host` field on the Server configuration screen. If no host is specified in the `Login Host` field, the request is sent to all hosts listed on the Select Session Manager screen. The *first* host to respond automatically gets the connection. This feature helps to balance the load across all available hosts (if your system administrator has set up the hosts to do so).

Configuring Dtlogin or Vuelogin on HP-UX Systems

This section contains the following topics:

- "Running Dtlogin in XDM Mode"
- "Running Vuelogin in XDM Mode"
- "Bypassing the Login Screen under Vuelogin"
- "Controlling Access to the Host through Dtlogin or Vuelogin"

Running Dtlogin in XDM Mode

Dtlogin can run in XDM mode, which gives users an XDM session. By default, users get a dtlogin session.

If you want dtlogin to run in XDM mode for some users, complete the following steps:

1. Locate the file `/etc/dt/config/Xconfig`.
2. To direct `dtlogin` to read users' `.xsession` file, as superuser, edit the `Xconfig` file.
3. At the line:

   ```
   Dtlogin*xdmMode:        True
   ```

   You can choose to run XDM-style X sessions for selected displays by replacing the `*` with *.terminalname*`_0.`) for the netstations:
   `Dtlogin.`*terminalname*`_0.xdmMode:     True`

   For example, the netstation in the accounting department that has the terminal name `acctsmith` would be listed as:

   ```
   Dtlogin.acctsmith_0.xdmMode:        True
   ```

Note

If your account has been set up to run `dtlogin` in XDM-mode, you can override this option at login time.

Running Vuelogin in XDM Mode

Vuelogin can run in XDM mode, which gives users an XDM session. By default, users get an HP VUE session.

If you want vuelogin to run in XDM mode for some users, complete the following steps:

1. Locate the file `/usr/vue/config/Xconfig`.
2. To direct `vuelogin` to read users' `.xsession` file, as superuser, edit the `Xconfig` file.

3. At the line:

   ```
   Vuelogin*xdmMode:        True
   ```

   You can choose to run XDM-style X sessions for selected displays by replacing the * with *.terminalname*_0.) for the netstations: `Vuelogin.`*terminalname*`_0.xdmMode:` `True`

   For example, the netstation in the accounting department that has the terminal name `acctsmith` would be listed as:

   ```
   Vuelogin.acctsmith_0.xdmMode:        True
   ```

Note

If your account has been set up to run `vuelogin` in XDM-mode, you can override this option at login time.

Bypassing the Login Screen under Vuelogin

With `vuelogin`, you can bypass the login screen and automatically start a specified user's X session at login. To do this, complete the following steps:

1. Locate the `Xaccess file`: `/usr/vue/config/Xaccess`.
2. As superuser, add to `Xaccess` lines similar to the following:

   display `BYPASS_LOGIN` *loginname*.

   For example:

   ```
   xterm1      BYPASS_LOGIN        ksmith
   ```

3. Reboot the netstation. After `xterm1` reboots or resets, it automatically runs an X session for user `ksmith`.

Controlling Access to the Host through Dtlogin or Vuelogin

`Dtlogin` and `vuelogin` provide an access control list (Xaccess) that prevents a netstation or a range of netstations from receiving X session management services from the host computer.

The access control list is in `/usr/vue/config/Xaccess` for `vuelogin`, or `/etc/dt/config/Xaccess` for `dtlogin`.

The host computer can receive a direct or a broadcast request for X session management from netstations. To set up Xaccess to control direct and broadcast requests from netstations, use the following syntax:

- *terminalname* to agree to manage a netstation
- `!`*terminalname* to refuse to manage a netstation
- or use wildcards and search patterns:
  - `?` to represent any single character
  - `*` to represent any number of characters.

Examples: Using Xaccess to Manage Netstations

- To set up a computer to respond to all requests for X session management, put the following line in `Xaccess`:

```
*
```

- To set up a computer to respond to only `xterm1` and `xterm2`, put the following lines in `Xaccess`:

```
xterm1
xterm2
```

- To set up a computer to respond to all requests for X session management *except* those from `xterm8`, put the following lines in `Xaccess`:

```
!xterm8
*
```

Configuring XDM on HP-UX, Sun, and IBM Systems

For information about running XDM, refer to the following sections:

- "Starting XDM"
- "XDM Administration"
- "Controlling Access to the Host through XDM"
- "Bypassing the Login Screen under XDM"
- "Setting XDM Resources for a Particular Class of Netstation"
- "Using Restricted Shells".

Starting XDM

To run XDM as the session manager (instead of vuelogin or dtlogin), do the following:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts" in Chapter 2.
2. Choose `XDM Administration` from the main menu.
3. Choose `Start XDM` from the XDM administration menu.

On HP-UX systems, if you prefer to update files manually, you can set up XDM as follows:

1. As superuser, add the following line to `/etc/inittab`:

```
xd:234:respawn:/usr/bin/X11/xdm -nodaemon < /dev/null > /dev/null 2>&1
```

   For HP-UX 10.*x*, replace `/usr/bin/X11/xdm` with `/opt/hpxt/enware/xdm/xdm`.

2. Find the line that begins `dt:` (for `dtlogin`) or `vue` (for `vuelogin`), and use the # character to comment it out. For example:

```
#vue :34:respawn:/etc/vuerc        # VUE validation and invocation
```

Starting XDM on Diskless Workstations

On HP-UX 9.*x* systems, the `xdm` directory is context-dependent. To use XDM on a diskless workstation, you need to edit the files in this directory so that they have appropriate context. The files are located in:
`/usr/lib/X11/xdm`

To each node's `/etc/inittab` file, add the following line:

```
xd:234:respawn:/usr/bin/X11/xdm -nodaemon < /dev/null > /dev/null 2>&1
```

XDM Administration

You get to the XDM administration menu as follows:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts" in Chapter 2.
2. Choose `XDM Administration` from the main menu.

The XDM administration menu contains options such as:

- Check operation of XDM
- Start XDM
- Create .xsession script in user's home directory
- Stop XDM
- Enable/disable XDM password aging

  This script modifies the Xsession file.
- Enable/disable XDM root login

  XDM bypasses `/etc/securetty`, a file which you can create to limit the netstations where a root login can occur.
- Trim XDM logfile

Use this option periodically to trim the `xdm-errors` file. For HP-UX 10.*x* systems, the error log is a temporary file `/tmp/xdm-errors`, but you may still want to trim it periodically.

Controlling Access to the Host through XDM

The X11R5 version of XDM provides an access control list (`Xaccess`) that prevents a netstation or a range of netstations from receiving X session management services from the host computer.

For the host computer, there are two types of X session management requests: a request for the host to manage a particular netstation (which could be either a direct or a broadcast request) and a request for the host to provide the netstation with a list of willing hosts (which is an indirect request).

- To set up Xaccess to control direct and broadcast requests from netstations, use the following syntax:
  - *terminalname* to agree to manage the netstation called *terminalname*
  - `!`*terminalname* to refuse to manage that netstation
  - or use wildcards and search patterns:
    - `?` to represent any single character
    - `*` to represent any number of characters.
- To set up Xaccess to service indirect requests from netstations, you can define a macro of the form:

  `CHOOSER %`*hostlist* list of host computers

  and use the "chooser" process to relay the netstation's request to the appropriate hosts.

Examples: Using Xaccess to Manage Netstations

- To set up a computer to respond to all requests for X session management, put the following line in `Xaccess`:

  ```
  *
  ```

- To set up a computer to respond to only `xterm1` and `xterm2`, put the following lines in `Xaccess`:

  ```
  xterm1
  xterm2
  ```

- To set up a computer to respond to all requests for X session management *except* those from `xterm8`, put the following lines in `Xaccess`:

  ```
  !xterm8
  *
  ```

- To set up a computer to respond to indirect requests for X session management from `xterm1` through `xterm9` (as represented by the `?` wildcard) but *not* from `xterm6`, put the following lines in `Xaccess`:

  ```
  %hosts          hp720_1 hp720_3 hp750
  !xterm6         dummy
  xterm?          CHOOSER %hosts
  *
  ```

Bypassing the Login Screen under XDM

If you want XDM to bypass the login screen and automatically start a specified user's X session at login, complete the following steps:

1. Locate the Xaccess file:
   `/usr/lib/X11/xdm/Xaccess`

   For HP-UX 10.*x* systems:
   `/opt/hpxt/enware/xdm/Xaccess`

2. As superuser, add to `Xaccess` lines similar to the following:

   display `BYPASS_LOGIN` *loginname*

   For example:

   ```
   xterm1      BYPASS_LOGIN        ksmith
   ```

3. Reboot the netstation. After `xterm1` reboots or resets, it automatically runs `$HOME/.xsession` for user ksmith.

Setting XDM Resources for a Particular Class of Netstation

The X server classname is used by XDM as part of the `XDMCP` protocol. By adding the X server classname to a resource listed in the `Xconfig` file, you can set a resource to affect a specific class of netstations.

The `Xconfig` file is usually: `/usr/lib/X11/xdm/Xconfig`

For HP-UX 10.*x* systems, the file is:
`/opt/hpxt/enware/xdm/Xconfig`

The X server classname is:
`Hewlett_Packard_Company-C`*xxxx*`A`
where `C`*xxxx*`A` is the netstation hardware model number.

You can find the hardware model number by accessing the configuration screens and selecting (Diagnostics) and then `Installed Configuration`. Insert the classname between the resource name and the final resource name segment. For example:

```
DisplayManager.Hewlett_Packard_Company-C2731A.startup
```

Note

For more information, please consult the XDM man page (the Resources section).

Using Restricted Shells

If you are using the Korn shell or the Bourne shell and you wish to set up a restricted shell environment for your users, refer to the comments and code in the following files:

```
/usr/vue/config/Xsession
/usr/lib/X11/xdm/Xsession
```

For HP-UX 10.*x* systems, refer to:

```
/opt/hpxt/enware/xdm/Xsession
```

Configuring scologin on SCO Systems

The X session manager available on SCO UNIX systems is called **scologin**. This section describes:

- "Starting scologin"
- "Using scologin to Control Clients"
- "Logging Out from scologin".

Starting scologin

To run scologin as the session manager, do the following:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts" in Chapter 2.
2. Choose `scologin Administration` from the main menu.
3. Choose: `scologin` , or a startup method appropriate for your system.

Using scologin to Control Clients

The script `scologin` begins by running `/usr/lib/X11/scologin/Xsession`. `Xsession` attempts to run the `.xsession` script in the user's home directory. Unedited, `.xsession` starts an `scoterm` window, the `mwm` window manager, and an `X.desktop` or Desktop window. `.xsession` can be customized for each user.

If `.xsession` is not found, `Xsession` attempts to run the `.startxrc` script in the user's home directory; otherwise, it defaults to `/usr/lib/X11/sys.startxrc`, which starts an `odtterm` window and an `icon manager` window. If you type `xdt3 &` in the terminal emulator window, you get an `X.desktop` or Desktop window.

Note

We recommend that you have an `.xsession` file in the user's home directory. However, if there is an `.xsession` file in the user's home directory, logging in through `scologin` on the console may cause unwanted results, since `Xsession` bypasses the `startx` routine which configures the console. From the console, either log in as another user (root) or disable `scologin`.

Logging Out from scologin

`scologin` logs out the user when `$HOME/.xsession`, `$HOME/.startxrc` or `/usr/lib/X11/sys.startxrc` runs to completion. The foreground task, that is, the first client that does not have a `&` at the end of its command line, is the last client started by the startup script. Therefore when the user closes the foreground task, `mwm` in the default `.startxrc` script and `scoterm` in the `.xsession` script, `scologin` logs the user out.

5

Understanding and Using Local Clients

Local clients are applications that run directly on the netstation rather than on the host. This chapter explains what kinds of local clients are available and how you can set up local clients on your HP netstations.

Topics include:

- "Understanding Local Clients"
  - "What Are Local Clients?"
  - "About Peer Processes and Local Clients"
  - "Why Use Local Clients?"
- "Using a Local Window Manager"
- "Using VUE/RX"
- "Using CDE Lite Local Window Manager"
- "Using a Local Terminal Emulator"
- "Controlling Which Local Terminal Emulators Are Available"
- "Starting Local Clients Automatically"
- "Using Local Applications".

Understanding Local Clients

If you have not used local clients before, you may want to review the following sections for a brief summary of local clients and the benefits of using them.

- "What Are Local Clients?"
- "About Peer Processes and Local Clients"
- "Why Use Local Clients?".

What Are Local Clients?

Local clients are programs that are downloaded from the file server and run on the netstation. (In comparison, host-based clients run on the login host computer and just display on the netstation.)

Provided that your netstation has sufficient memory installed, you can use any of the following types of local clients:

- Local window managers, which allow you to move, resize, and iconify windows and to start applications from pull-down menus. These include:
  - VUE/RX
  - Local vuewm
  - CDE Lite
  - mwm
  - twm
  - olwm (for Sun systems)
  - dtwm (available with the HP Netstation Software CDE optional product).

  For more information, refer to "Using a Local Window Manager".
- Local terminal emulators, which allow non-X-client programs to run on their favorite terminal. These include:

- xterm
- hpterm
- vt320
- dtterm (available with the HP Netstation Software CDE optional product)
- cmdtool (for Sun systems)
- shelltool (for Sun systems).

See "Using a Local Window Manager" for more details.

- Local applications, which include a variety of applications that you can run locally from your netstation. These include:

  - xflash
  - dkmserver
  - xclock
  - clock (OpenLook clock for Sun systems)
  - xlock
  - WhiteBoard
  - SharedX
  - format

  For more information, see "Using Local Applications".

About Peer Processes and Local Clients

You can start local clients by an intermediate process, `hpxt.*`, which is known as a **peer**. A peer process seeks out specific information in your $HOME directory about your netstation, and passes it along to the local client.

For instance, when used to start a local window manager, a peer process such as `hpxt.vuerx` searches in your home directory for any customized window-manager resource file and provides this information to the local window manager's executable portion.

Note

We recommend you start all local clients using their peer process.

Why Use Local Clients?

You may choose to use local clients for a variety of reasons including:

- Improving interactive performance
- Freeing up host memory
- Reducing the load on the network and host computer
- Displaying diagnostic information.

Using Local Clients to Free Up Host Memory

If your host computer's performance is suffering due to the number of users, you can free host memory by running a window manager and terminal emulators on each netstation. (You must ensure that the netstations have enough memory to run the local clients. For specific resource requirements, refer to "Using Local Clients and Netstation Memory Effectively" in Chapter 9).

You can use local clients to save host memory *effectively* only if you are aware that host-based clients can share resources, as can local clients.

For example, terminal emulators have a "code" component, which is sharable, and a "data" component, which is unique to each invocation of the client. When you run a terminal emulator on the host, shared resources make it possible to start more copies of the terminal emulator while increasing the host memory usage by only the data component of the client. When running terminal emulators as local clients, the memory advantage of local terminal emulators is diminished if *any* user starts a host-based version of the terminal emulator. And because multiple copies of local terminal

emulators can share resources, it is a good idea to standardize on one terminal emulator at your site.

If your system has sufficient memory on both the host and on the netstations, it is most memory-efficient to run clients on the host. For example, say that a particular terminal emulator requires 1000 KB for the first invocation, then 300 KB for each subsequent invocation whether running on the host or on a netstation. If you have ten netstation users, each of whom wants to have two terminal emulators, the total memory used would be as follows:

- Running on the host:
  1000 KB + 19 (300 KB) = 6,700 KB
- Running on the netstations:
  10 (1000 KB) + 10 (300 KB) = 13,000 KB

On the other hand, if your host is fully loaded with memory and performance is inadequate because there are too many demands on the system, it makes sense to offload clients to the netstations.

Using Local Clients to Improve Interactive Performance

Running a local window manager can make significant improvements to operations of moving, resizing and re-arranging windows. The performance boost occurs because data round-trips on the LAN are eliminated for window manager operations.

Using Local Clients to Reduce the Network Load

Many netstation users choose local clients to reduce the network load. While this can be a benefit, the network load savings are not likely to be noticeable until you reach at least 25% of the LAN's capacity. In general, local window managers provide better network-traffic savings than local terminal emulators.

Using Local Clients for Diagnostic Purposes

You can also use local clients to run terminal emulators that communicate to the netstation's serial port or Log Screen. You can use these terminal emulators to display diagnostic messages without the need to go into the configuration screens.

Using a Local Window Manager

You can use a local window manager to control the size, placement and operation of windows on the root window. The local window managers provided with version 7.1 software include the following:

- *VUE/RX* - is a local window manager designed specifically for HP netstations. With this local window manager, you have workspaces and a control panel, in addition to the mwm functionality.
- *Local vuewm* - with local vuewm, the netstation provides the HP VUE 3.0 window manager, the workspaces, and the control panel for operation with the HP VUE 3.0 processes running on the host. To use local vuewm, HP VUE 3.0 must be running on the host computer.
- *CDE Lite* - is a local window manager that provides the look and feel of the full CDE (Common Desktop Environment) Desktop with lower memory requirements. CDE Lite gives you workspaces (which can be thought of as virtual screens), and a control panel (which displays and can launch applications).
- *mwm* - provides all the functionality of host-based mwm.
- *twm* - twm is provided as a convenience, but is not supported.

- *olwm* - is a local window manager for Sun systems that provides all the functionality of the host-based olwm.

This section covers the following topics:

- "Starting Local Window Managers"
- "Local Window Managers and Their Peer Processes"
- "After You Start a Local Window Manager".

Starting Local Window Managers

How you start a local window manager depends on which X session manager the host computer runs:

If You Are Running XDM (or Dtlogin/Vuelogin in XDM-Mode)

If you are running XDM (or dtlogin or vuelogin in XDM-mode), complete the following steps.

1. Edit the `.xsession` file (or the `sys.xsession` file)
2. Change the host-based window manager to the local window manager you want the user to run. Refer to "Local Window Managers and Their Peer Processes" as necessary.

If You Are Not Running XDM

- If you want to use a local VUE/RX, CDE Lite, mwm, twm, or dtwmlite window manager, do the following:

  1. Edit the `.xsession` file (or the `sys.xsession` file). Change the file so that it starts the local window manager that you want. Refer to "Local Window Managers and Their Peer Processes" and the comments within the file as necessary.
  2. If you are using vuelogin (HP VUE) or dtlogin (CDE), edit the `Xconfig` file. The file has one of the following locations:

     `/usr/vue/config/Xconfig` (for vuelogin)

`/etc/dt/config/Xconfig` (for dtlogin)

Within this file, the XDM mode is set globally, for example:

```
Vuelogin*xdmMode:              True
```

You can override the global setting for a specific terminal with a line like this:
`Vuelogin.`*terminalname*`_0.xdmMode:    False`

Set XDM mode for your terminal to True (or, if the global XDM mode is True make sure that there is no False setting for your terminal).

3. Log out and then back into the system to have your changes take effect.

- You can run vuewm either locally or from the host. In general, they work the same, except:
  - When you run vuewm locally, the Root Menu automatically displays the local clients that you can start.
  - When you run vuewm locally, HP MPower is not available.

  If you want to run vuewm locally, do the following:

  1. Log into an HP VUE session (*not* an HP VUE Lite session).
  2. Pull up the Tools icon.
  3. Click on the "General" toolbox.
  4. Double-click on "X_Terminals".
  5. Double-click on "Utilities".
  6. Double-click on the "SelectVUEwm" icon.
  7. When asked, "You are currently configured to execute VUEWM on your workstation. Do you want to run VUEWM as a local client on your terminal instead?" click on OK.

     To change back to running vuewm from the host, repeat these instructions. The prompt will be

reversed: "You are currently configured to execute VUEWM as a local client on your terminal. Do you want to run VUEWM on your workstation instead?" click on OK.

8. Log out and then back into the system to have your changes take effect. On the login screen, you can select either an HP VUE session or an HP VUE Lite session.

Local Window Managers and Their Peer Processes

The local window managers and their peer processes are as follows:

VUE/RX:	`/usr/bin/X11/700X/hpxt.vuerx`
CDE Lite:	`/usr/bin/X11/700X/hpxt.dtwmlite`
mwm:	`/usr/bin/X11/700X/hpxt.mwm`
twm:	`/usr/bin/X11/700X/hpxt.twm`
olwm (Sun):	`/usr/bin/X11/700Xhpxt.olwm`

For HP-UX 10.*x* systems, the local window managers and their peer processes are:

VUE/RX:	`/opt/hpxt/enware/bin/hpxt.vuerx`
CDE Lite:	`/opt/hpxt/enware/bin/hpxt.dtwmlite`
mwm:	`/opt/hpxt/enware/bin/hpxt.mwm`
twm:	`/opt/hpxt/enware/bin/hpxt.twm`

Note

If you log in from an X display which is not an HP netstation or if the netstation does not have enough memory to run the local window manager, the peer will start a host-based window manager of the same name. This means there is a fallback for hpxt.mwm, hpxt.twm, and hpxt.vuewm.

After You Start a Local Window Manager

When you log on, your `.xsession` file starts a peer process that invokes the local window manager. When the peer process starts the local window manager, the window manager searches in the user's home directory for any customized window-manager resource file (for example, `$HOME/.twmrc`, `$HOME/.mwmrc`, `$HOME/.vuerxrc`, or `$HOME/.vue/vuewmrc`).

If these files do not exist, the local window manager uses system default files on the host—the same system default files that the host-based version would use:

```
/usr/lib/X11/twm/system.twmrc
/usr/lib/X11/system.mwmrc
basepath/vuerx/sys.vuerxrc
/usr/vue/config/sys.vuewmrc
```

For HP-UX 10.*x* systems, the path for `sys.vuewmrc` is:

`/etc/vue/config/sys.vuewmrc`.

Note

- Only a local window manager started by the peer process can access customized resource files on the host.
- On startup, the netstation reads the `modules.ld` file (**basepath**`/bin/modules.ld`) and any window manager listed there is available to the user from the Preferences configuration screen.

  If you configure the X session manager to start without a window manager, you *could* start a local window manager from the Preferences screen, but this is not recommended. When started this way, a window manager does not know your home directory (because there is no peer present). Consequently, the window manager would use the system default colors and operation, which may not suit your requirements.

About mwm and twm

Local versions of mwm and twm behave similarly to their host-based equivalents. However, there are some parameter restrictions that apply to the local versions. Refer to the appropriate man page for details (e.g., `man hpxt.mwm` or `man hpxt.twm`.)

About Local vuewm

For information on using local vuewm, consult your HP VUE documentation. You should see no difference in operation between running vuewm on the netstation and running a VUE session completely on the host.

About olwm

olwm behaves similarly to its Sun host-based equivalent. Refer to the appropriate man page for details (`man hpxt.olwm`).

About VUE/RX

For information about using this local window manager, refer to "Using VUE/RX".

About CDE Lite

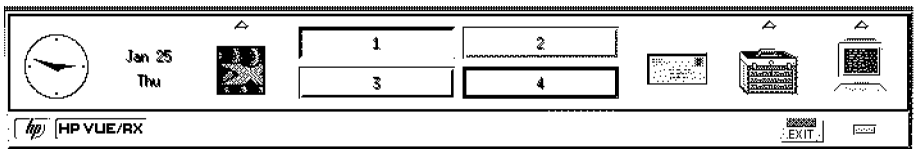
CDE Lite (dtwmlite window manager) is a local window manager that has been designed to give the look and feel of the full CDE Desktop in a local client version. For more information on this local window manager, refer to "Using CDE Lite Local Window Manager".

Using VUE/RX

VUE/RX is a local window manager that has been specifically designed for HP netstations.

The default control panel contains:

- A clock
- The date
- An MPower Lite icon
- A workspace control panel
- A mail icon
- A toolbox icon
- A terminal-launcher icon
- An exit/busy-light icon.



VUE/RX Control Panel

Two files define the control panel:

- `$HOME/.vuerxrc`
  The `$HOME/.vuerxrc` file defines the default control panel to have the functions listed above. Controls for a screen lock and a terminal launcher are commented out, but can be activated easily.
- `$HOME/.Xdefaults`.
  The `$HOME/.Xdefaults` file defines the colors and fonts used. See the man page for `vuerx` for resource descriptions. For more information about this file, see "Customizing Colors, Fonts and Other Application Defaults" in Chapter 4.

If you want to customize the appearance of VUE/RX, do the following:

1. Copy **basepath/vuerx/sys.vuerxrc** to your `$HOME/.vuerxrc` file.
2. Append **basepath/lib/app-defaults/Vuerx** to your `$HOME/.Xdefaults` file.
3. Update these files in your home directory.

The remainder of this section describes modifications you can make to customize the VUE/RX interface. Topics include:

- "Controlling Windows in the Workspaces"
- "Renaming (and Adding to) the Workspaces"
- "Changing the Color Palette"
- "Adding a Client to the Tool Box"
- "Launching a Terminal Emulator in HP Netstation Software VUE/RX"
- "Setting the Control Panel Clock for Use with XDM"

Accessing Additional Information

For further information on VUE/RX, you can refer to its online man page by typing:

```
man vuerx
```

For information on the VUE/RX resource file, you can refer to its online man page by typing:

```
man vuerxrc
```

Controlling Windows in the Workspaces

In general, clients started by an `.xsession` file appear in workspace one and the clients you start manually appear in the workspace in which you start them. However, some clients are so useful that you may want them to appear in more than one workspace.

To control the workspaces in which a client appears, click and hold on the square in the upper-left corner of the window (that is, the portion of the window's title bar that contains a long rectangle). You will see the following entries:

- `Occupy Workspace ...` provides a Workspace Presence menu.

  To add the window to new workspaces:

  1. Click on the desired workspace names to highlight the target workspaces.
  2. Click on OK.

  To remove the window from workspaces:

  1. Click on the desired workspace names to turn off the highlight.
  2. Click on OK.

- `Occupy All Workspaces` is a quick way to add the window to all of your workspaces.
- `Unoccupy Workspace` removes the window from the current workspace.

Note

To prevent an accidental loss of a window, you cannot use these menu options to remove a window from all of the workspaces.

Renaming (and Adding to) the Workspaces

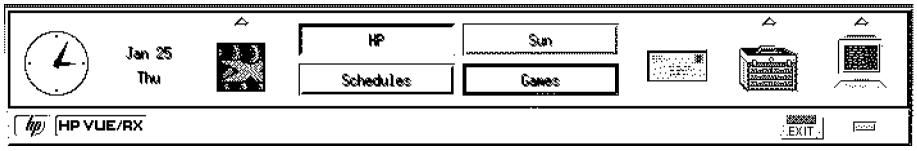
The control panel offers four workspaces named 1, 2, 3, and 4. If you want to take advantage of the "virtual displays" offered by workspaces you will probably want to make the workspace names more meaningful. To do this, edit your `.Xdefaults` file as follows:

1. If you do not have a `.Xdefaults` file, refer to "Customizing Colors, Fonts and Other Application Defaults" in Chapter 4.
2. If you have not already appended `Vuerx` to your `.Xdefaults` file, type:
   `cat` **basepath**`/lib/app-defaults/Vuerx >>.Xdefaults`
3. Find the line that reads:
   `Vuerx*workspaceList: 1 2 3 4`

   and change the workspace names (1, 2, 3, and 4) to the names that you want. You will see the changes the next time you log in.

For example:
`Vuerx*workspaceList: HP Sun Schedules Games`
creates four workspaces called HP, Sun, Schedules, and Games as shown in the following figure.

You can add two more workspaces just by specifying two additional names in the `workspaceList` line.



Modified VUE/RX Control Panel

Changing the Color Palette

VUE/RX uses approximately 32 different colors. To help you customize these colors, 28 complete color palettes are provided. To change from one palette to another, edit your `.Xdefaults` file as follows:

1. If you do not have a `.Xdefaults` file, refer to "Customizing Colors, Fonts and Other Application Defaults" in Chapter 4.
2. If you have not already appended `Vuerx` to your `.Xdefaults` file, open `$HOME/.Xdefaults` and append to it **basepath**`/lib/app-defaults/Vuerx`
3. Find the line that reads:

   ```
   *colorPalette:              Broica.vp
   ```

   and change the color palette name as desired. The color palettes you can choose are listed in `app-defaults/Vuerx` as *palette*`.vp`. (For example, you can choose `Ashley.vp` or `Orchid.vp`.)
4. To load your changes into the X server, type:
   `xrdb -merge .Xdefaults`
5. To see the changes, log out and log back in again.

Note

On HP-UX 9.0 and later systems, you can test color schemes by running `/usr/vue/bin/vuestyle`.

If You Have a Color Monitor ...

Change the `*colorPalette:` line to read:
`*colorPalette:  Dalla.vp`

The resulting color scheme is similar to Broica, but the control panel is more blue in color. Try other palettes as well; some of the color schemes are more vibrant than Broica and Dalla.

If You Have a Grayscale Netstation ...

For the best grayscale display, change the
`*colorPalette:` line to read:
`*colorPalette:  GrayScale.vp`

If You Have a Monochrome Netstation ...

For the best monochrome display, change the
`*colorPalette:` line to read:
`*colorPalette:  BlackWhite.vp`

Adding a Client to the Tool Box

The default tool box contains :

- a load viewer
- a digital clock
- an HP calculator
- xflash.

To add a client to the tool box, follow these steps:

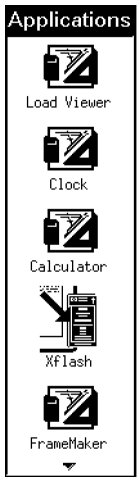
1. Open your `$HOME/.vuerxrc` file.
2. Find the section named `BOX LiteToolsSubpanel` and define a new control by adding the line:

   ```
   CONTROL        litetool5
   ```

3. Underneath the `CONTROL litetool4` section, add lines similar to the following:

```
CONTROL litetool5
{
  TYPE             button
  IMAGE            tools
  LABEL            "FrameMaker"
  PUSH_ACTION      f.exec "/usr/frame/bin/maker"
  PUSH_RECALL      True
  CLIENT_NAME      FrameMaker
}
```

When you restart VUE/RX, your tool box slide-up will be similar to this:



Modified Tool Box

Launching a Terminal Emulator in HP Netstation Software VUE/RX

To launch a local terminal emulator:

1. Click on the arrow over the terminal icon.
2. Click on an icon labeled "HP Netstation Software xterm," "HP Netstation Software vt320," or "HP Netstation Software hpterm."

Note

The vt320 terminal emulator requires that your font path includes:
basepath/fonts/vt340
or one of its sub-directories:
`xsmall`, `small`, `large`, or `xlarge`.

If the terminal emulator fails to appear, the problem could be that:

- The login server does not have the peers it needs to start local clients.
- The terminal does not have sufficient memory.
- The device (e.g., serial) is not accessible.

You could install the local client peer programs on every host running an X session manager, but a simpler solution is to edit your `$HOME/.vuerxrc` file as follows:

1. Find the section of `.vuerxrc` that contains the line:
   ```
   PUSH_ACTION    f.exec \
   /usr/bin/X11/700X/hpxt.xterm
   ```
   This line directs VUE/RX to download a local xterm from the current X session manager.
2. Change the line to download the local xterm from the file server. The path depends on your system, but the line may be similar to:
   ```
   PUSH_ACTION    f.exec \
   /nfs/hp720/usr/bin/X11/700X/hpxt.xterm
   ```
   For HP-UX 10.*x* systems:
   ```
   /nfs/hp720/opt/hpxt/enware/bin/hpxt.xterm
   ```

Setting the Control Panel Clock for Use with XDM

If your system uses XDM, the control panel clock defaults to Greenwich Mean Time. If you don't live in the Greenwich time zone, you'll need to set your clock by following these steps:

1. To learn the syntax for your time zone, type: `env`
2. Look for the line that reports your time zone (`TZ`).
3. In your `.xsession` file, look for the section where environment variables are set.
   - If a commented line that sets your timezone exists, uncomment that line.

- If a `set -a` line exists, add the line that sets your timezone *after* the `set -a` line. For example:

```
set -a                  # turn on auto export
TZ=EST5EDT
```

Note

You can also set the time zone in the remote configuration file. See Appendix B for details.

Using CDE Lite Local Window Manager

CDE Lite (dtwmlite window manager) is a local window manager that has been designed to give the look and feel of the full CDE Desktop with lower memory requirements.

Note

If you want the full functionality of host-based CDE, you can order the HP Netstation Software CDE optional product. This product gives you a local CDE window manager (dtwm) and a local CDE terminal emulator (dtterm).

To invoke CDE Lite:

1. As superuser, edit the `/usr/vue/config/Xconfig` file.

   For HP-UX 10.*x* systems, edit the `/etc/dt/config/Xconfig` file.

2. Set `Vuelogin*xdmMode` to `True`.
3. Save and then quit the file.
4. Copy the `sys.xsession` file to `$HOME/.xsession`

   A sample `sys.xsession` file is located in:

   - On HP-UX 9.*x* systems: `/usr/lib/X11/xdm`

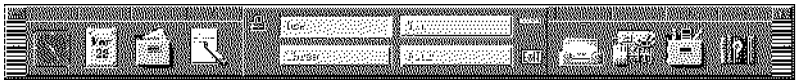
- On HP-UX 10.*x* systems: `/opt/hpxt/enware/xdm`
- On SunOS systems: `/usr/enware/usr/lib/X11/xdm`
- On Solaris 2.x systems: *installdir*`/usr/lib/X11/xdm`
- On SCO systems: `/u/enware/usr/lib/X11/700X/examples`

5. Edit the `.xsession` file.
6. Remove the # from the following line:

```
WM="$XTBINDIR/hpxt.dtwmlite"
```

7. Save and then quit the file.
8. Log out and then log back into the system.

The CDE Lite panel appears, similar to the following:



CDE Lite Control Panel

The default control panel contains:

- Move bar
- System menu
- Clock
- Date
- File Manager
- dtpad invoke
- Personal Application icon
- Workstation Lock
- Workspace buttons
- Busy-light icon
- Exit icon
- Mail icon
- dtstyle manager icon

- Local client icon
- Help icon

For further information, review the following sections:

- "CDE Lite Host and Memory Requirements"
- "Customizing CDE Lite".

CDE Lite Host and Memory Requirements

In order to have the full functionality of CDE Lite, the following conditions must be met:

- CDE Lite must be installed on the login or XDM server.
- CDE Lite (dtwmlite window manager) must run with a peer.
- CDE Lite normally requires approximately 3.5 MB of memory to run. However, this amount may change depending on the number of windows managed and the fonts used.

Customizing CDE Lite

For detailed information on customizing your CDE Lite control panel, you can refer to its various online man pages by typing:

```
man hpxt.dtwmlite
man hpxt.dtfpfile
man hpxt.dtdtfile
```

The man pages describe in detail the many different customization options available, including:

- Adding new icons, fields and new pullups
- Changing the backdrop style and color
- Modifying the font style and size used.

Note

Any changes you make to CDE Lite are kept in `$HOME/.dt` in your home directory.

Using a Local Terminal Emulator

A terminal emulator is a window that emulates a complete display terminal. Some common terminal emulators are hpterm, vt320 and xterm. The software contains versions of these terminal emulators that run on the netstation instead of the host.

Note

For 3270 emulation, you can purchase HP Netstation Software 3270. This local terminal emulation program gives you access to most of the standard features of an IBM 3270 Information Display System including most IBM 3278 and 3279 terminal models.

There are several ways you can start a local terminal emulator:

- From the Preferences configuration screen
- From a Local Window Manager
- From The Root Menu Of A Host-Based Window Manager
- From A Command Line

Starting from the Preferences Configuration Screen

On startup, the netstation reads the `modules.ld` file and any local terminal emulators listed there become available from the Preferences configuration screen.

To start a local terminal emulator from the Preferences screen, follow these steps:

1. Press and hold F12 to access the configuration screens.
2. Click on Preferences to display the Preferences screen.
3. In the Local Clients area, click on the desired terminal emulator to highlight it.
4. Click on Execute.

5. Click on OK. The terminal emulator appears on your screen.

Starting from a Local Window Manager

When you start a local window manager, it reads the `modules.ld` file and automatically adds any local clients to its root menu. To start a local terminal emulator from a local window manager:

1. Move the mouse cursor to the screen's background.
2. Hold down the left mouse button.
3. Drag the cursor to the Local Clients entry, then move the cursor out of the right side of that entry. A sub-menu appears.
4. Drag the cursor to the local terminal emulator you want to start, then release the left mouse button. The terminal emulator appears on your screen.

Starting from the Root Menu of a Host-Based Window Manager

If you use a host-based window manager, you can add local terminal emulators to its root menu by editing the window manager's resource file (for example, `$HOME/.mwmrc`). The resource field entry will be similar to the following:

```
"Local HPterm"   f.exec "remsh terminalname hpterm &"
```

(The `hpterm` accepts the `/dev` options documented in the `modules.ld` file. For example:
`hpterm -dev /dev/serial`

Starting from a Command Line

You can start a local terminal emulator from a command line by invoking the terminal emulator's script. To start a local xterm, type: `/usr/bin/X11/700X/hpxt.xterm`

For HP-UX 10.*x* systems, type:
`/opt/hpxt/enware/bin/hpxt.xterm`

To specify a particular type of operation for a local terminal emulator (either telnet, serial1, serial2, or log operation), use a `-dev /dev/` option. For example, if you want to specify a second serial port, use `-dev /dev/serial2`. The default operation for a local terminal emulator is: `-dev /dev/rlogin`.

Other examples include:
```
/usr/bin/X11/700X/hpxt.xterm -dev /dev/log
/usr/bin/X11/700X/hpxt.xterm -dev /dev/rlogin
/usr/bin/X11/700X/hpxt.xterm -dev /dev/telnet
/usr/bin/X11/700X/hpxt.xterm -dev /dev/serial
```

Controlling Which Local Terminal Emulators Are Available

The `modules.ld` file lists the local clients available on your file server. When you power on the netstation, it reads `modules.ld` and lists the local clients on the (Preferences) configuration screen. When you start a local window manager, the local window manager also reads `modules.ld` and lists the local clients in the root menu. To control which local terminal emulators are available, you need to edit the `modules.ld` file.

The `modules.ld` file (**basepath**`/bin/modules.ld`) contains instructions that show you how to make available local clients that can:

- Operate much as its host-based equivalent (with the exception of the following parameters that are not implemented:
  - `-e` *command* [*argument*] (execute a command)
  - `-S` (slave mode)
  - `-C` (console messages).

- Communicate on the LAN port and require that you log in (by using the option `-dev /dev/telnet[/hostname]`)
- Communicate on the netstation's serial port (by using the option `-dev /dev/serial`, or `-dev /dev/serial2` if you have a second serial port.)
- Display the error messages that would otherwise go to the netstation's Log Screen (by using the option `-dev /dev/log`).

For more information, refer to the man page for your local window manager. For example, type: `man hpxt.hpterm` or `man hpxt.xterm`

Note

For any terminal emulator window—local or host-based—the TERM type needs to be set. Set the local xterm to `TERM=xterm`.

Starting Local Clients Automatically

The Server configuration screen's Login Host field has an option called Local Command. By using Local Command, you can start local clients automatically at startup *without* using an X session manager.

With Login Host set to Local Command, type in the Login Host field the names of the local clients you want to start, separated by semicolons. For a complete list of the clients that are available, see the **modules.ld** file. Note that the following aliases are defined:

xterm	xterm (rlogin)
txterm	xterm (TELNET)
sxterm	xterm (serial)
xlog	xterm (log screen)

hpterm	hpterm (rlogin)
thpterm	hpterm (TELNET)
shpterm	hpterm (serial)
loghp	hpterm (log screen)
vt320	vt320 (rlogin)
tvt320	vt320 (TELNET)
svt320	vt320 (serial)

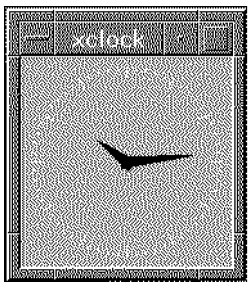
Using Local Applications

The software contains the following local applications:

- xflash, which is used to reprogram flash ROM cards ("Programming a ROM Card with xflash" in Chapter 6 has details).
- dkmserver, which enables you to map your keyboard dynamically for the different clients you run. Refer to "Customizing Your Keyboard" in Chapter 3 for details.
- format
- xclock. See "Starting Local xclock" for details.
- clock. See "Starting Local clock" for details.
- xlock. See "Starting Local xlock" for details.
- WhiteBoard. See "Starting WhiteBoard" for details.
- SharedX. See "Starting SharedX" for details.

Starting Local xclock

Local xclock is a version of xclock that runs on the netstation. You can run the clock in digital or analog form:



To start local xclock from a terminal emulator window, start its peer process by typing:
`/usr/bin/X11/700X/hpxt.xclock`

For HP-UX 10.*x* systems:
`/opt/hpxt/enware/bin/hpxt.xclock`

Accessing Additional Information

For more xclock options, type:

```
man hpxt.xclock
```

Starting Local clock

Local clock is an OpenLook clock that runs on Sun netstations.

To start local clock from a terminal emulator window, type the full path name:
`/usr/bin/X11/700X/hpxt.clock`

Accessing Additional Information

For more clock options, type:

```
man hpxt.clock
```

Starting Local xlock

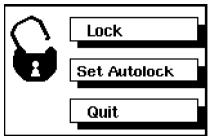
Local xlock is a version of xlock that runs on the netstation. You can use xlock to:

- manually lock your display until you type in your password
- automatically lock your display after a specified amount of time
- automatically log out after a specified amount of time.

To start local xlock from a terminal emulator window, start up its peer process by typing:
`/usr/bin/X11/700X/hpxt.xlock`

For HP-UX 10.*x* systems:
`/opt/hpxt/enware/bin/hpxt.xlock`

The following icon appears on your screen:



Note

To lock your terminal automatically after 15 minutes, click on the `Set Autolock` button. To change the time limit, you can use the `-autolock` option, as described below.

You can add several options to the above command line, including the following:

`-password` *password* — specifies the password you need to type to unlock the display. The default is the password of the user who invoked xlock.

`-autolock` *seconds* — specifies the time in seconds before your display locks automatically. Note that if you

	choose this option, there will be no `Set Autolock` button on the xlock screen icon.
`-autologout` *seconds*	specifies the time in seconds before you are automatically logged out. You can use this option only for your own display.
`-nowindow`	If this option is set along with the autolock and/or the autologout options, the xlock icon will not appear on the screen.
`-mode` *pattern*	specifies the pattern that covers the display. You can specify the following patterns: ■ *blank* ■ *decay* ■ *flame* ■ *hop* ■ *image* ■ *life* ■ *message* ■ *pyro* ■ *qix* ■ *random* ■ *rocks* ■ *rotor* ■ *slide* ■ *swarm* ■ *worm* For a description of these modes, see the man page.

Examples using xlock

- To leave a scrolling message across your screen while you are away, type:

```
hpxt.xlock -mode message -message "Gone For Lunch"
```

- To lock your screen automatically after 15 minutes, type:

```
hpxt.xlock -autolock 900
```

- To log out automatically after 15 minutes, type:

```
hpxt.xlock -autologout 900
```

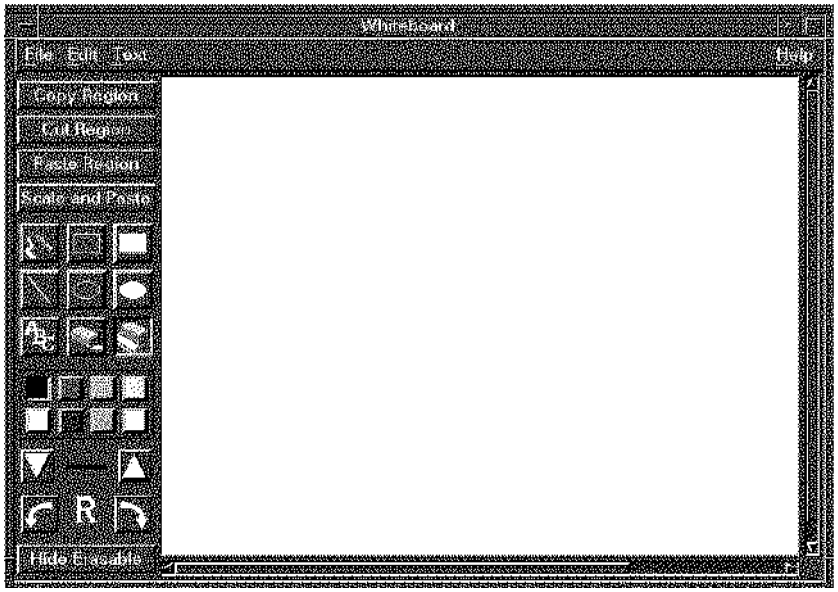
Accessing Additional Information

For more xlock options and information, type:

```
man hpxt.xlock
```

Starting WhiteBoard

WhiteBoard is an X Window System graphics application that you can run as a local application on your netstation:



You can use local WhiteBoard to:

- Draw geometric shapes, lines and text
- Cut, copy and paste
- Rotate images 90, 180 and 270 degrees
- Copy areas from outside the window and place them in the WhiteBoard window
- Manipulate colors, line thicknesses and fonts
- Save and read images in TIFF, JPEG and XPM formats
- Print files.

There are three ways to start WhiteBoard:

- To start WhiteBoard from a local terminal emulator window, start up its peer process by typing:

  ```
  hpxt.whiteboard
  ```

- If you are using HP Netstation Software VUE/RX, select the MPower Lite icon on the control panel, then select the WhiteBoard icon.
- Drag and drop a file onto the WhiteBoard icon.

Accessing Additional Information

For detailed information on using WhiteBoard as a local client, type:
`man hpxt.whiteboard`

Configuring WhiteBoard to Run Locally in MPower

If you are using MPower, you can run WhiteBoard either locally or from the host. To switch from one to the other, do the following:

1. Log into an MPower session.
2. Pull up the Tools icon.
3. Click on the "General" toolbox.
4. Double-click on the "X_Terminals" icon.
5. Double-click on the "Utilities" icon.
6. Double-click on the "SelectMPower" icon.
7. For each MPower application, a dialog box appears. It says where you are currently running the application (from the host or from the netstation), and asks if you want to change this. Select Yes or No for each application.

Starting SharedX

You can use the local client version of SharedX to share X protocol-based applications between two or more netstations. You (the sender) on one system can send a selected window or windows to a user (the receiver) on another system. You can send one or more windows to several receivers simultaneously.

Note

The sender must have the SXext extension loaded. The receiver does not need SXext to receive a window.

As the sender, you can:

- Decide who may input to a shared window
- Control whether the receiver can input into the shared window
- Allow the receiver to forward the window to another receiver, (termed "daisy chaining").

During a SharedX session, you can also choose to use a shared pointing device, called a "telepointer", which can be manipulated by both the sender and all receivers. SharedX also includes a sample address book, font aliases and user preferences.

Before you start SharedX as a local client, make sure you disable the Client Authorize and Access Control parameters from the configuration screens.

There are two ways to start SharedX:

- To start SharedX from a local terminal emulator window, start up its peer process by typing:

  ```
  hpxt.SharedX
  ```

- If you are using HP Netstation Software VUE/RX, select the MPower Lite icon on the control panel, then select the SharedX icon.

Note

User preferences and address books will only be available if SharedX is running with a peer.

Accessing Additional Information

For detailed information on using SharedX as a local client, type:

```
man hpxt.SharedX
```

Configuring SharedX to Run Locally in MPower

If you are using MPower, you can run SharedX either locally or from the host. To switch from one to the other, do the following:

1. Log into an MPower session.
2. Pull up the Tools icon.
3. Click on the "General" toolbox.
4. Double-click on the "X_Terminals" icon.
5. Double-click on the "Utilities" icon.
6. Double-click on the "SelectMPower" icon.
7. For each MPower application, a dialog box appears. It says where you are currently running the application (from the host or from the netstation), and asks if you want to change this. Select Yes or No for each application.

6

Using the Netstation's Hardware Accessories

This chapter describes how to use the various accessories that you can add to your base unit. Topics include:

- "Using the Floppy Drive"
- "Using Audio"
- "Using the MPEG Video Player"
- "Using a Scanner"
- "Using a ROM Server Card".

You can also install one of the network accessory cards to connect your ENVIZEX netstation to various types of networks, including:

- Token Ring
- 100VG.

For network troubleshooting information, refer to:

- "Solving Problems Related to Token Ring" in Appendix C
- "Solving Problems Related to 100VG" in Appendix C.

If you have not yet installed your accessories, you can find installation instructions in the box for each accessory kit.

Using the Floppy Drive

If you have an HP ENVIZEX netstation, you can install a floppy drive that allows you to transfer files between DOS and UNIX. The floppy system currently supports DOS versions up to and including DOS 6.0.

Topics in this section include:

- "Formatting a Floppy"
- "Reading and Writing to a Floppy Disk"
- "Logging Out When You Have a Floppy Drive"
- "Troubleshooting the Floppy Drive"
- "Changing How the Floppy Drive Is Mounted".

Formatting a Floppy

You can format a floppy disk from the configuration screens, or from the command line as described below.

Note

Be sure to use the correct density of disk corresponding to the formatting used. High-density disks have holes in two corners. Low-density disks have only one write-protect hole.

Formatting from the Command Line

To format a high-density (1.44 MB) disk, type:
`remsh` *terminal_name* `format -h`
(On Sun systems, use `rsh` instead of `remsh`.)

To format a low-density (720 K) disk, type:
`remsh` *terminal_name* `format -l`

Refer to the man page for `hpxt.format` for more information.

Formatting from the Configuration Screens

To format a floppy disk, follow these steps:

1. Insert the floppy disk into the drive.

2. Press and hold F12 to access the configuration screens.
3. Click on Utilities.
4. Click on Format Floppy.
5. Click twice on the format button that matches your media density.

Reading and Writing to a Floppy Disk

When you log into a computer that has the HP ENVIZEX software installed, the floppy drive is automatically mounted and accessible as `$HOME/floppy` (or if you prefer, `$HOME/a:`).

You can proceed to read from and write to the floppy drive as if it were a directory on your UNIX system, with one exception: if you are working within an application program, you must save the file to the UNIX filesystem before you copy it to the floppy.

For example, to save a file from a spreadsheet program, the user `Smith` first needs to save the file to the UNIX filesystem. To write the file `data.tmp` to the floppy drive, `Smith` types:

```
cp data.tmp $HOME/floppy/data.tmp
```
or
```
cp data.tmp ~/a:
```

The floppy's DOS-based file system does not support UNIX hard links. If your application tries to perform a hard link operation on the floppy drive, you will see an error message.

A Word about File Naming Conventions . . .

When you transfer files back and forth between DOS and UNIX, select file names that suit DOS naming conventions. With DOS, a file name can be eight characters with a three-character extension (for example, *acctdata.wrk*) If your file name is too long, the system uses the last eight characters of the name and the first three characters of the extension.

Logging Out When You Have a Floppy Drive

If you use a session mount, which is the default, you need only to log out from your X session before you switch off the netstation.

If instead you use the optional mounting methods described in "Changing How the Floppy Drive Is Mounted", you need to unmount the floppy before switching off the HP ENVIZEX. Failure to do so may result in "hung" mounts until the floppy is remounted.

Troubleshooting the Floppy Drive

If you have problems with the floppy drive, confirm that the drive has been installed properly and that the netstation has loaded the "Floppy" module.

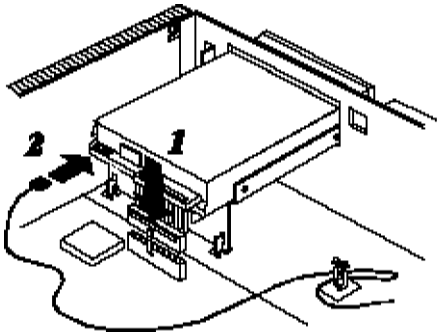
To Confirm that the Floppy Drive Is Properly Installed

1. Press and hold (F12) to access the configuration screens.
2. Click on (Utilities). A `Format Floppy` option should appear. If this option does not appear, the floppy has probably not been installed correctly. Follow these steps:
   a. Power off the netstation.
   b. Open the chassis.

c. Confirm that the connectors are seated properly.

d. *Important*: Confirm that the floppy drive has a two-wire connection to the power supply and a 34-pin connection to the main board.

The following diagram illustrates both connections:



To Confirm that the Netstation Loaded the Floppy Module

When you switch on the netstation, it automatically detects the floppy drive and attempts to download the "Floppy" module, which contains the NFSServer and DOSServer extensions.

To confirm that the netstation loaded the Floppy module:

1. Press and hold F12 to access the configuration screens.
2. Click on Diagnostics.
3. Click on Installed Configuration.

Under `Other Peripheral Devices`, you should see:

```
Floppy Drive installed
```

Under `Downloadable Extensions`, you should see:

```
NFSServer
```

```
DOSServer
```

If these lines do not appear, you or your system administrator needs to reinstall the HP ENVIZEX HPXT-FLOPPY fileset.

Changing How the Floppy Drive Is Mounted

When you log into a computer that has the version 7.1 installed, lines added to `Xstartup` and `Xreset` by the software installation scripts automatically NFS-mount the floppy drive and create a symbolic link to `$HOME/floppy`. If you are using CDE, use the instructions in "Using an Automount Daemon" as an example.

With this mount and symbolic link in place, you can use the floppy drive as if it were a directory on your UNIX system.

To change the way NFS mounts the drive, refer to the following sections:

- "Changing the Automatic NFS Mounting"
- "Using a Session Mount"
- "Using an Automount Daemon"
- "Mounting from the Command Line"
- "Using Floppy Drives in a Single-Account, Multi-User Environment"
- "Mounting using Your Own XDM (or scologin)".

Changing the Automatic NFS Mounting

In a default environment, the netstation floppy drive is automatically NFS-mounted when you log in through XDM, dtlogin, or vuelogin. If you want to change this behavior, you can set an option so that:

- The netstation *never* NFS-mounts the floppy drive, or
- The netstation always prompts you when you log in (through XDM, dtlogin, or vuelogin).

If you prefer to use either of these options, follow these steps:

1. Copy the sample file **basepath**`/examples/hpxt_floppy` to your home directory.
2. Uncomment the option you wish to activate (remove the comment character). The options are:

MOUNT	Always auto-mount floppy
NOMOUNT	Never auto-mount floppy
PROMPT	Prompt user at login

3. Save your changes as `$HOME/.hpxt_floppy`. The next time you log in, the floppy mount behavior will be changed accordingly.

Using a Session Mount

By default, the HP ENVIZEX uses session mounts set up in:

path`/Xstartup`, and
path`/Xreset`

where *path* is:

`/usr/lib/X11/xdm`	with XDM
`/usr/vue/config`	with HP VUE
`/opt/hpxt/enware/xdm`	HP-UX 10.*x* with XDM
`/etc/vue/config`	HP-UX 10.*x* with HP VUE

These files mount the floppy drive and create a symbolic link to `$HOME/floppy` when users log in and unmount the drive when users log out.

Using an Automount Daemon

If you use applications that require access to the floppy drive, you may want to set up automount daemons so that your application servers can mount the floppy as required.

For example, if you use an application that runs on a server other than your login server, you can use an automount daemon to enable that host to access your floppy drive.

Once you have set up the automount daemons, whenever you access one of these servers, the daemon:

- Mounts the floppy drive
- Creates a symbolic link to `$HOME/floppy`.
- Unmounts the floppy drive when it has not been accessed for the timeout period (by default, this is 5 minutes).

To set up an automount daemon, perform the following steps on each computer you access:

1. Remove the lines from `Xstartup` and `Xreset` that mount and unmount the floppy.
2. As superuser, create the file `/etc/auto.hpxtfd` and put the following line in it:

   ```
   *       -soft,timeo=50  &:/hpxtfd
   ```

3. Tell the automounter to run the file that you just created.
   - For HP-UX 9.*x* systems, do the following:
     a. Edit the file `/etc/netnfsrc2` and find the two occurrences of the line that starts the

automounter. By default, it is:
`/usr/etc/automount`
If you have HP MPower installed, it is:
`/usr/etc/automount /nfs -hosts`

b. To both occurrences of the line, add
`/hpxtfd /etc/auto.hpxtfd`
immediately after the automount command. For example:

```
/usr/etc/automount /hpxtfd /etc/auto.hpxtfd /nfs -hosts
```

- For HP-UX 10.*x* systems, do the following:

  a. Edit the file `/etc/rc.config.d/nfsconf` and set variables to reasonable values such as:

  ```
  AUTOMOUNT=1
  AUTO_MASTER="/etc/auto_master"
  AUTO_OPTIONS="-f $AUTO_MASTER"
  ```

  b. Edit the file `/etc/auto_master` and add a line like:

  ```
  /hpxtfd /etc/auto.hpxtfd
  ```

- For Solaris 1 systems, do the following:

  a. Edit the file `/etc/rc.local` and add the following line:

  ```
  automount -f /etc/auto.hpxtfd
  ```

4. Create the link between the user's `/floppy` directory and the automounter's mount point. Type:
`ln -s /hpxtfd/`*terminalname* `$HOME/floppy`

Mounting from the Command Line

If you have superuser privileges, you can mount and unmount the floppy as required:

1. Remove the lines from `Xstartup` and `Xreset` that mount and unmount the floppy.

2. To mount the floppy, use the command:

```
/etc/mount terminalname:/hpxtfd /users/username/floppy -o soft,timeo=50
```

For HP-UX 10.*x* systems, mount the floppy with the command:

```
/sbin/mount terminalname:/hpxtfd /users/username/floppy -o soft,timeo=50
```

3. To unmount the floppy, type:

```
/etc/umount /users/username/floppy
```

For HP-UX 10.*x* systems, unmount the floppy by typing:

```
/sbin/umount /users/username/floppy
```

Note

If you encounter difficulties on Sun, SCO, or IBM systems, refer to `/usr/bin/X11/700X/admin/mountfloppy`.

Using Floppy Drives in a Single-Account, Multi-User Environment

When you log in from an HP ENVIZEX that has a floppy drive, a line in the `Xstartup` file automatically NFS-mounts your floppy drive. To enable other HP ENVIZEX netstation users to log into the same account and access their floppy drives, modify `Xstartup` as follows:

1. Log into the account and create the directory: `$HOME/floppy`
2. As superuser, edit the X session manager's `Xstartup` file:
   - For XDM users, this is: `/usr/lib/X11/xdm/Xstartup`

On HP-UX 10.*x* systems, this file is:
`/opt/hpxt/enware/xdm/Xstartup`

- For HP VUE users, this is:
  `/usr/vue/config/Xstartup`

  On HP-UX 10.*x* systems, this file is:
  `/etc/vue/config/Xstartup`

3. Find the line that mounts the floppy:

   ```
   .../mountfloppy $DISPLAY $USER $HOME/floppy
   ```

   and add `/$DISPLAY` to the end.

4. Save the changed file.
5. Again as superuser, edit the X session manager's `Xreset` file.
6. Find the line that unmounts the floppy:

   ```
   .../unmountfloppy $DISPLAY $USER $HOME/floppy
   ```

   and add `/$DISPLAY` to the end.

7. Save the changed file.

At log in, users can access their floppy drive as `$HOME/floppy/$DISPLAY`

For example, the user of the netstation called `xterm12` accesses the floppy drive as:

```
$HOME/floppy/xterm12
```

Mounting using Your Own XDM (or scologin)

If you use an HP version of XDM (including dtlogin or vuelogin), the floppy drive is mounted automatically. If you choose to use your own version of XDM (or if you have an SCO system running scologin), you will need to modify some files so that the floppy can be mounted automatically.

For an example of how to mount and unmount the floppy drive automatically, refer to the following files:

```
/usr/lib/X11/xdm/Xstartup
/usr/lib/X11/xdm/Xreset
```

For HP-UX 10.*x* systems, refer to the following files:

```
/opt/hpxt/enware/xdm/Xstartup
/opt/hpxt/enware/xdm/Xreset
```

For AIX (If You Use IBM's XDM):

You can make similar modifications to your own XDM files. These files will normally be found in `/usr/lib/X11/xdm` with filenames `Xstartup` and `Xreset`. Under some versions of AIX, these files have been renamed to `GiveConsole` and `TakeConsole`.

For SCO:

You can make these modifications to your own XDM files. These files are normally found in `/usr/lib/X11/scologin` with filenames `Xstartup` and `Xreset`.

Using Audio

With the HP ENVIZEX and HP ENTRIA audio accessory kits, you can build or use multi-media applications that incorporate audio components.

Topics in this section include:

- "System Prerequisites for Audio Support"
- "Audio Specifications"
- "Starting Audio"
- "Directing the Audio Data to the Netstation"
- "Directing the Audio Data within the Netstation"
- "Playing a Sample Audio File"
- "Troubleshooting the Audio Card".

System Prerequisites for Audio Support

You can use the netstation audio kit with any application that has been compiled with the HP audio libraries.

However, if you wish to use the full suite of audio tools, you require access to an HP audio server running on an HP 9000 Series 700 or Series 800 workstation. The host must be running HP-UX 9.03 (or greater) or HP MPower 1.2 (or greater).

Audio Specifications

The following audio specifications apply to both ENVIZEX netstations and ENTRIA netstations with audio capabilities.

Frequency Response

25 - 20,000 Hz

Input Sensitivity/Impedance at 1 kHz (Typical)

Line In	42.0 V(p-p) 47 kohms
Microphone	44 mV(p-p) 1 kohms

Output Impedance (Nominal)

Line Out	619 ohms
Headphone	118 ohms

Max. Output Level/Impedance at 1 kHz (Typical)

Line Out	2.8 V (p-p) 47 kohms
Headphone	2.75 V (p-p) 50 ohms
	8.5 V (p-p) 600 ohms

Signal to Noise (Typical)

Line In	61 dB
Line Out	65 dB
Microphone	57 dB

Headphone	61 dB

Total Harmonic Distortion at Nominal Load (Typical)

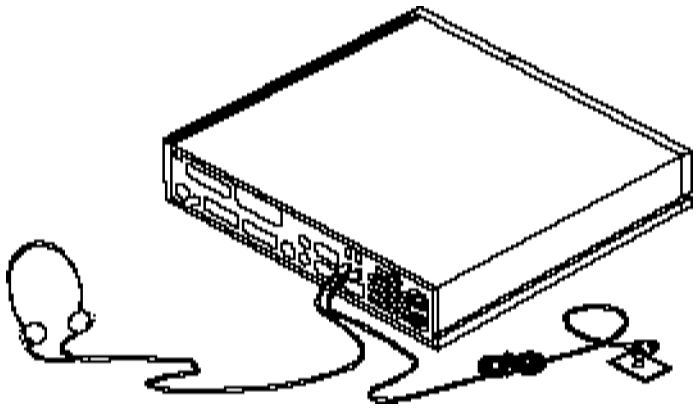
Line In	-75 dB
Line Out	-73 dB
Microphone	-73 dB
Headphone	-70 dB

Starting Audio

Before you begin:

- Ensure that the microphone is plugged into the microphone connector. Supported microphones include the microphone that is shipped with the Audio Kit (HP Part Number C3220A) and the Stereo Headset with built-in microphone (HP Part Number B1196-60001).
- Ensure the headphones are plugged into the headphones connector.

For example, on the ENVIZEX 'p' series, connect the audio jacks as follows:



If you have external speakers, ensure they are plugged into the line out connector. Note that external speakers must be amplified.

At power up, HP ENVIZEX and HP ENTRIA netstations automatically detect that you have installed an audio card and configure the netstation accordingly. The audio data goes to the device specified by the `DISPLAY` environment variable or to the device specified by the `AUDIO` environment variable. If the audio server cannot find these values, the audio data goes to the workstation, not the netstation.

If your audio plays on the host instead of your netstation, you need to set your `AUDIO` environment variable as described in "Directing the Audio Data to the Netstation". If your audio plays on the netstation but you need to change where it plays (the internal speaker or your headphones), refer to "Directing the Audio Data within the Netstation".

Directing the Audio Data to the Netstation

If your audio plays on the host instead of your netstation, you need to set your `AUDIO` environment variable. To do this, put the following line in your `$HOME/.xsession` file or, for HP VUE users, in your `$HOME/.vueprofile` file:

- For Bourne or Korn shell:
  `AUDIO=`*terminalname*`:0`
  `export AUDIO`
- For C shell: `setenv AUDIO` *terminalname*`:0`

Directing the Audio Data within the Netstation

You may need to control whether your audio plays to the internal speaker or to your headphones. You can do this by setting the `SPEAKER` environment variable or, for the Audio Editor, by using the audio control panel, as follows:

Setting the SPEAKER Environment Variable

To set the `SPEAKER` environment variable, put the following lines in your `$HOME/.xsession` file or, for HP VUE users, in your `$HOME/.vueprofile` file:

- To send the audio to your headphones, use:
  - For Bourne or Korn shell:

    ```
    SPEAKER=EXTERNAL
    export SPEAKER
    ```

  - For C shell: `setenv SPEAKER external`
- To send the audio to the netstation's internal speaker (which is the default), use:
  - For Bourne or Korn shell:

    ```
    SPEAKER=INTERNAL
    export SPEAKER
    ```

  - For C shell: `setenv SPEAKER internal`

Using the Audio Editor's Control Panel

To access the audio editor's control panel, type the following from a terminal emulator window:
`/usr/audio/bin/AudioCP &`
For HP-UX 10.*x* systems, type:
`/opt/audio/bin/AudioCP &`

You control where the audio goes by selecting the "Output" pulldown, then choosing "Speaker" and/or "Headphones."

Playing a Sample Audio File

To load a sample audio file:

- Invoke the audio editor (`/usr/audio/bin/audio_editor` or `/opt/audio/bin/audio_editor`)
- Click on the audio editor's "File" pulldown
- Choose "Load File ... ".

The "Select File to Load" window appears. You can find sample audio files in `/usr/audio/sounds` (`/opt/audio/sounds` for HP-UX 10.*x*). To choose one of these samples, do the following:

1. In the "Select File to Load" window, set the filter to `/usr/audio/sounds/*` or `/opt/audio/sounds/*`
2. Click on (Filter).
3. Click on a sample file.
4. Click on (OK).

To play the sample file, click on (Play). You can control the volume of the sound by using the audio editor's control panel.

Troubleshooting the Audio Card

To confirm that the audio card was installed correctly and its software loaded, follow these steps:

1. Press and hold (F12) to access the configuration screens.
2. Click on (Diagnostics).
3. Click on (Installed Configuration). You should see a display similar to the following:

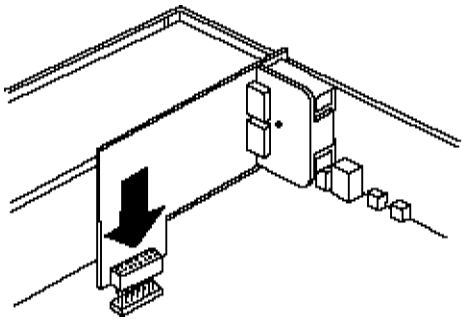
```
Other Peripheral Devices
 Audio Board installed.
Downloadable Extensions
/usr/lib/X11/700X/bin/Aserver
```

If you do not see any references to the audio board, check that it was installed correctly:

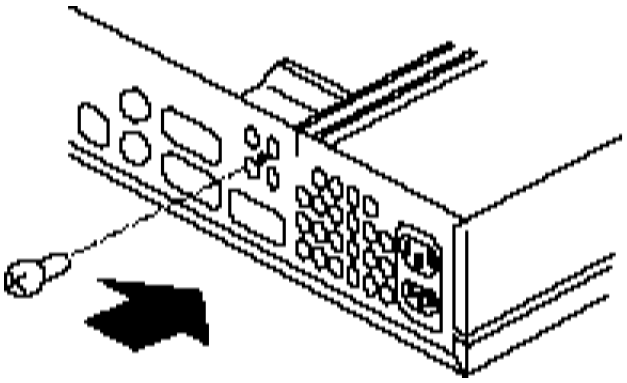
a. Power off the netstation

b. Open the chassis

c. Confirm that the connector is aligned properly and pushed down so that no pins are visible:



d. *Important*: Ensure that the grounding screw was replaced:



If the audio board is installed correctly, but you do not see the Aserver extension, the system administrator needs to install the HPXT-AUDIO fileset.

Using the MPEG Video Player

With the optional HP Netstation Software MPEG accelerator card (HP Part Number C5208A), you can view full-motion digital video movies with synchronized CD-quality sound (with the optional audio accessory kit). By using the HP Netstation Software Video Player local client, you can play and manipulate MPEG movies directly on the netstation without significantly loading the network or the host.

Topics in this section include:

- "System Prerequisites for the Video Player"
- "Video Player Specifications"
- "Configuring the Video Player if You Are Running MPower"
- "Playing Videos".

System Prerequisites for the Video Player

- The HP Netstation Software Video Player is supported on HP ENVIZEX "p" series and ENTRIA^{Plus} netstations. For information about using it on other HP ENVIZEX or ENTRIA platforms, contact your HP representative.
- Before you begin, you must install the MPEG accelerator card in an available SIMM (memory) slot. See the instructions provided with the MPEG accelerator card.
- If you want to view and hear digital video files that contain audio tracks, you must also install the audio card.

Note

You cannot simultaneously play a digital video that contains an audio track and play another file through the audio server.

Video Player Specifications

Input

- The HP Netstation Software Video Player can play both constrained MPEG-1 system stream and raw MPEG-1 video files.
- The average network throughput is 1.8 Mbits per second.

Output

- 352x240 pixels at up to 30 frames per second
- 256, 128, or 64 colors
- CD-quality audio.

Configuring the Video Player if You Are Running MPower

You can access the HP Netstation Software Video Player either as a standard local client or through MPower. Before you can access it through MPower, you must configure MPower as follows:

1. Log into an MPower session.
2. Pull up the Tools icon.
3. Click on the "General" toolbox.
4. Double-click on the "X_Terminals" icon.
5. Double-click on the "Utilities" icon.
6. Double-click on the "SelectMPower" icon.
7. For each MPower application, a dialog box appears. It says where you are currently running the application (from the host or from the netstation), and asks if you want to change this.

   To use the MPEG accelerator card, you must run the HP Netstation Software Video Player from the netstation. If you are currently running the Video Player from the host, select (Yes).

Playing Videos

There are three ways to play a video:

- To start the Video Player from a local terminal emulator window, start up its peer process by typing: `hpxt.Video_Play [-f` *filename*`]`

  for example:

```
hpxt.Video_Play -f /usr/lib/X11/700X/examples/video/sample.mpg
```

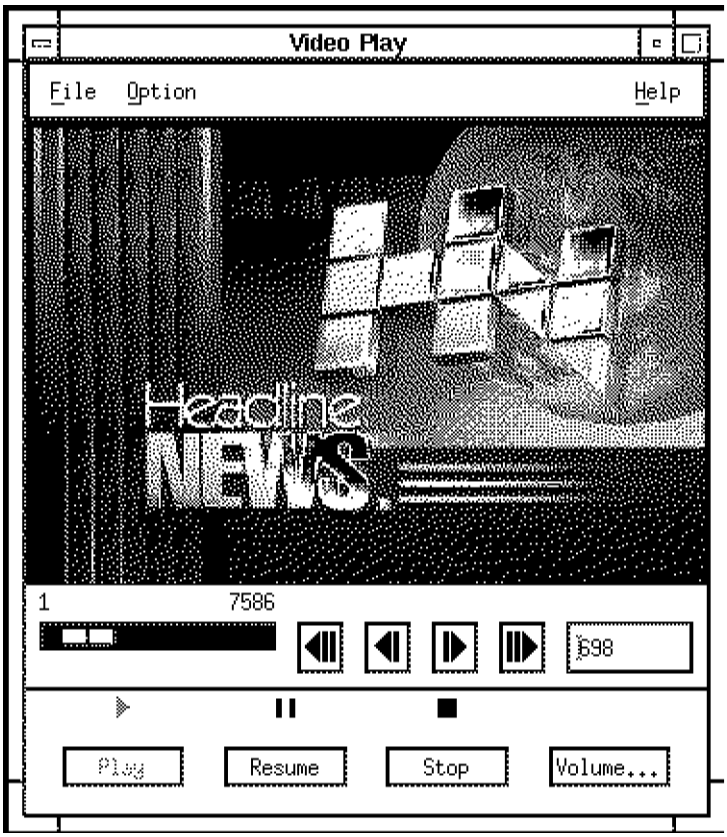
  For a complete list of the command line options, type:

```
man hpxt.Video_Play
```

- If you are using HP Netstation Software VUE/RX, select the MPower Lite icon on the control panel, then select the Video Player icon.
- Drag and drop an MPEG file onto the Video Player icon in MPower Lite.

Working with the Video Player Window

When you start the Video Player, the following window appears:



Video Play Window

The Video Play window has the following elements (from top to bottom):

- A menu bar
- A main window, where the video is displayed
- A set of controls to select which frame of the video is displayed

- A set of action buttons:
  - (Play) starts playing the video (and audio if present) from the currently displayed frame to the end.
  - (Pause) suspends the video and audio at the next available frame. Select this button again to (Resume) the video.
  - (Stop) stops playing the video and rewinds the file to the beginning.
  - (Volume) lets you control the audio output (if the video contains an audio track and an audio card is installed).

The File pulldown contains the following options:

New	Unloads the current file and resets the player to its default state.
File	Lets you select which file you want to load.
File Information	Displays detailed information about the current file.

The Options pulldown contains the following options:

Frames	Displays the frame number (not the number of seconds) for each frame.
Seconds	Displays the number of seconds (not the frame number) for each frame.
Hide Controls	Lets you remove the frame controls, or remove all of the controls and the menu bar leaving only the main window. To recreate the menu bar, click the right mouse button in the main window.
Loop Play	If this is set, the video starts again from the beginning when it reaches the end.

Play on Open	If this is set, the video starts playing immediately after it is loaded. (By default, it waits for you to select the Play button.)
General Setup	Lets you set various options, as described below.

The following General Setup options are available:

- Whether the color map is shared or private.

  With a private color map, the video player uses a palette of 256 colors for the video. This may cause other windows to change color whenever the Video Player window has the input focus.

  To avoid color changes whenever the input focus changes, you can use a shared color map. In this case, the Video Player uses a palette of 128 colors. If 128 colors are not available, it issues a warning message and uses 64. To get the full 128 colors, you may need to exit other applications.

- The number of frames that the forward and backward buttons should step.
- The number of frames that the large forward and backward buttons should step.
- The video output frame rate. By default, the optimal frame rate for your type of netstation is selected. For smoother video playback, you can increase the frame rate. For better netstation performance, you can decrease the frame rate.

  The frame rate does not affect the audio and video synchronization. It also does not affect the amount of data transferred into the netstation through the network.

Using a Scanner

With the SCSI/ROM accessory kit, you can attach an HP ScanJet IIc or IIcx scanner to your HP ENVIZEX netstation.

Topics in this section include:

- "System Prerequisites for Scanner Support"
- "Starting the Scanner Software"
- "Selecting the Scanner"
- "Troubleshooting the Scanner Installation".

System Prerequisites for Scanner Support

To use the scanner, you require an HP 9000 Series 700/800 workstation that is running DeskScan/UX. (You must purchase DeskScan/UX separately and install the scan license to run the scanner in the HP MPower environment.)

Before you power on your netstation, ensure that the scanner cable is connected securely to the SCSI port at the back of the chassis.

Starting the Scanner Software

To start the scanner software:

- Through HP MPower, click on the Scanner icon in the HP MPower slide-up
- From a terminal emulator window, type:
  `/usr/scan/deskscan &`
  or, for HP-UX 10.*x* systems, type:
  `/opt/scan/deskscan &`

Selecting the Scanner

You can use a scanner that is connected to your host computer or one that is connected to your netstation. The netstation automatically detects a local scanner. If you want to use another scanner, you need to change the `SCANNER` environment variable by putting the following lines in your `$HOME/.vueprofile`, `.xsession`, or `.profile` file:

- For Bourne or Korn shell:
  `SCANNER=`*terminalname*
  `export SCANNER`
- For C shell: `setenv SCANNER` *terminalname*

Once you have made these additions, restart HP VUE to use the updated `.vueprofile` file.

Troubleshooting the Scanner Installation

To confirm that the scanner card was installed correctly, follow these steps:

1. Press and hold F12 to access the configuration screens.
2. Click on Diagnostics.
3. Click on Installed Configuration.
   You should see a display similar to the following:

```
                    SCSI Devices
Vendor ID: HP  --  Product ID: C1750A   --  Revision 3226
                Downloadable Extensions
            /usr/lib/X11/700X/bin/ScanServer
```

Note

The HP ENVIZEX automatically detects a scanner attached to the SCSI connector. No user-specified SCSI address is required.

Using a ROM Server Card

By installing a ROM server in your HP netstation, you can:

- Boot the netstation locally and connect to a remote host over a serial line (using SLIP or PPP)
- Operate the netstation without downloading any files from the host
- Use the fonts and local clients available in the ROM server.

Note

If you plan to boot your netstations from ROM cards, you should ensure that someone at your site also orders the host-based version 7.1 software. You will need access to the host-based software for your netstation if you want to:

- Print from the UNIX system to the netstation's serial or parallel port.
- Reprogram your flash ROM card using the `xflash` local client.
- Update to a newer release of the software.

You can use a ROM card with all types of HP netstations:

- For HP ENVIZEX netstations, you require a ROM card and one of the following:
  - SCSI/ROM adapter kit
  - Token Ring adapter kit
  - 100VG adapter kit.

  (Each of these options includes the ROM card adapter.)

- For HP ENTRIA netstations, you require a PCMCIA adapter kit and a ROM card.

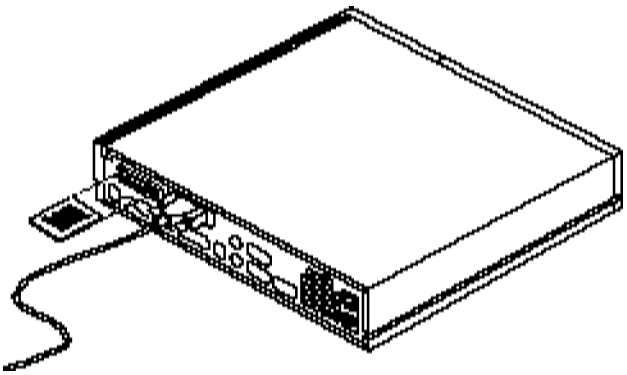
If you have an ENVIZEX netstation with a Token Ring or 100VG adapter card and want to use a ROM card (for example, if you do not have access to a file server), you will need to reprogram the ROM card using xflash. When you reprogram the card, select the appropriate image (C*xxxx*AVG or C*xxxx*ATR). For more information about using ROM cards, refer to:

- "Using a ROM Card with a Netstation"
- "Programming a ROM Card with xflash"
- "Booting One HP Netstation from Another".

Inserting the ROM Card

To install a ROM card into a netstation:

- Power off the netstation
- Insert the ROM card as shown below. Note that the label is always facing up.



- Power on the netstation.

Note

You must insert the flash ROM card into the netstation before you switch on the unit.

Using a ROM Card with a Netstation

Once you have set up your netstation in the host files (by using `xtadm` or equivalent), you need to configure your netstation to use the ROM card.

To configure the netstation to boot from its ROM card the next time it is switched on:

1. Press and hold F12 to access the configuration screens.
2. Click on Server.
3. Enable ROM Fonts. (If the ROM card is not properly installed, you will see a warning popup window. If you see this warning, check the installation of the ROM adaptor board and the ROM card.)
4. Select `X Server from` ROM and `RGB file from` ROM.
5. Click on Network, then click on Ethernet, Token Ring, 100VG, SLIP1, SLIP2, PPP1, or PPP2 as appropriate.
6. Click on the `IP Address` field and enter your IP address.
7. Click on the `File Server` field and enter the IP address of a computer on which you will be running applications.
8. Click on `Subnet Mask` and enter a suitable subnet mask if the default is not appropriate.
9. Click on OK.

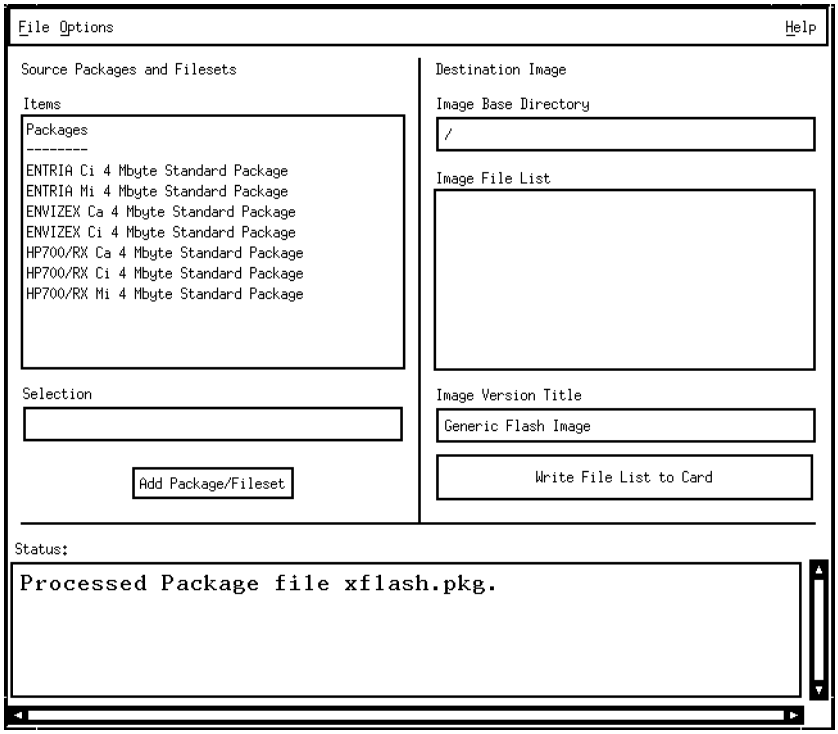
Programming a ROM Card with xflash

This section explains how you can use the local client xflash to reprogram a flash ROM card. Topics in this section include:

- "Starting xflash"
- "Selecting Files for the ROM Card"

Note

The amount of local memory required depends upon whether you are running other local clients. If you are not running any other local clients, you need approximately 2.5 MB of netstation memory for `xflash`. If you are running other local clients, the incremental memory will be considerably less. For example, if you are running HP Netstation Software VUE/RX, you need only 1.5 MB of additional memory to run `xflash`.



xflash Main Screen

Starting xflash

To start xflash from a command line in a terminal emulator window, type:
`/usr/bin/X11/700X/hpxt.xflash &`

For HP-UX 10.*x* systems, type:
`/opt/hpxt/enware/bin/hpxt.xflash &`

Starting xflash from mwm

To start xflash from mwm or local mwm, you may need to add the following line to your `.mwmrc` file, under the "Root Menu Description":
`xflash  f.exec /usr/bin/X11/700X/hpxt.xflash &`

For HP-UX 10.*x*, add:
`xflash  f.exec /opt/hpxt/enware/bin/hpxt.xflash &`

When you restart mwm, xflash will be available on your root menu.

Starting xflash from VUE/RX

To start xflash from VUE/RX click on the xflash icon on the "tool box" slide-up.

Starting xflash from HP VUE 3.0

To start xflash from HP VUE 3.0:

1. Click on the Toolbox arrow.
2. Click on General.
3. Double-click on X_Terminals.
4. Double-click on Local_Clients.
5. Double-click on HpxtXflash.

Selecting Files for the ROM Card

To program a ROM card, you need to create an **image**, a set of files that can boot and run a netstation. When you choose files to include on the ROM card, you need to ensure that you have included all the files the netstation requires to boot and that the files you have chosen fit on the ROM card.

Upgrading the X Server

To create an image with the 7.1 version of the X server, do the following:

1. Click on a Package name.
2. Click on (Add Package/Fileset). The contents of the package appear in the "Image File List" window.
3. If you do not want to change any files, click on (Write File List To Card). xflash automatically erases and reprograms the ROM card. The time required for erasing and reprogramming depends upon the type of ROM card:

For 4 MB Series I Cards:	10 minutes
For 10 MB Series I Cards:	27 minutes
For 4 MB Series II Cards:	2 minutes
For 10 MB Series II Cards:	6 minutes

Customizing the File List

You can customize your image file by adding additional files such as font files. To add new files:

1. From the File pulldown, click on (Custom File Chooser).
2. On the "Custom File Chooser" menu, use the "Filter" field to go to the directory you want.
3. To choose a file, highlight it in the "Files" list, then click on (Add File). The file appears in the "Image File List" on the main menu.

4. If you add files, you may need to remove files so that the image will fit onto the ROM card. A 4-MB ROM card's capacity is about 4,190,000 bytes. You can remove a file by double-clicking on the file in the "Image File List" window.
5. To determine whether your image file will fit on the ROM card, click on File and choose Write List To Image File. Use this menu to write the image to a temporary location and watch the main menu's "Status" window to determine the image file size. If the image file will fit on the ROM card:
   a. Click on File.
   b. Click on Write Image File To Card. xflash reprograms the ROM card.

Note

If you see the message:
`Warning: File xxxx already exists. File not added.`
it means you have selected a file, fileset, or package that is already in the current Image File List. To prevent this message from occurring, from the Options pulldown, click on Replace Duplicate Files. This causes xflash to overwrite any existing files with the corresponding new file.

Customizing the xflash.pkg File

If you want to make significant changes to the File List, you can use a text editor to edit xflash.pkg, the file that generates the File List. To customize the xflash.pkg file, follow these steps:

1. Copy **basepath**`/config/xflash.pkg` to `$HOME/xflash.pkg`
2. Edit `$HOME/xflash.pkg` by following the instructions contained within.

Other xflash Options

From the File pulldown, you have the following options:

- Read Image File From Card enables you to read the image file currently on your ROM card and store it as an image file on the host computer. By doing this, you can temporarily use the ROM card to store other data. (See below).
- The Read Raw Data From Card and Write Raw Data To Card options enable you to store any type of data on the ROM card. These options bypass the xflash data compression routines that are automatically applied to image files.

From the Options pulldown, you have the following options:

- The Generate fonts.dir and Generate modules.ld options control whether or not xflash automatically generates **fonts.dir** and **modules.ld** files. Disable these options if you want to provide your own version of these files.
- The List Filesets option controls whether or not xflash displays the filesets that are in packages.

For More Information

For more information about xflash, refer to the man page. Type:

```
man hpxt.xflash
```

Booting One HP Netstation from Another

When you switch on a netstation it downloads its base system, X server file, rgb.txt file, and fonts from a file server. In most cases, the netstation receives these files from a host computer (the file server) or from a ROM-based server card installed in the netstation. However, you can also set up an HP netstation with a

ROM-based server card to boot any number of similar netstations. In this case, the netstation with the ROM card functions as the file server.

Step 1: Program the ROM Card

Use xflash to program the ROM card with an image file. The image file must match the netstation you are attempting to boot, *not necessarily* the netstation with the ROM card. For instructions, refer to "Selecting Files for the ROM Card".

Step 2: On the Netstation with the ROM Card

1. Install the ROM card in the netstation you will be booting from.
2. Power on the netstation
3. Press and hold F12 to access the configuration screens.
4. Select the Server configuration screen.
5. Click on Extensions.
6. If the NFSServer line says "Current State - Loaded", exit the configuration screens and proceed to Step 3. If the NFSServer line says anything else, follow these steps:
   a. Double-click on the NFSServer line so that it now says "Next Reboot - Load".
   b. Click on OK
   c. Click on OK
   d. Reboot your netstation.

Note

The netstation must be completely up and running before you attempt to boot the other netstations. You

may wish to discourage users from turning off this netstation since it may affect other users.

Step 3: On the Netstation You Want to Boot

1. Power on the netstation
2. Press and hold (F12) to access the configuration screens.
3. Select the (Network) configuration screen.
4. Locate the (File Server) field and enter the IP address of the *other* netstation (the one with the ROM card installed).
5. Set the access method to (NFS).
6. Select the (Server) configuration screen.
7. In the (X Server file) field, enter the following:
   - If you have an HP 700/RX or ENVIZEX netstation, enter: `C27XXA`
   - If you have an HP ENTRIA netstation, enter: `C32XXA`.
8. Make sure the (Base path) field is set to: `/usr/lib/X11/700X`.

   For HP-UX 10.*x* systems, the base path is: `/opt/hpxt/enware/xthome`.
9. Click on (OK)
10. Click on (Start) to initiate the download.

The netstation should successfully boot from the other netstation with the ROM card installed.

7

Using a Local Printer or Plotter

This chapter describes how you can attach a printer or plotter to an HP netstation. Topics include:

- "Which Devices Can I Connect?"
- "Connecting a Printer or Plotter to the Netstation"
- "Setting Up the Host for the Netstation's Printer"
- "Printing a File"
- "Monitoring the Status of a Local Printer".

If you have problems with the printer installation, refer to Appendix D.

Which Devices Can I Connect?

Which devices you can connect depends largely on your host computer. In general, all HP printers are supported on any multi-vendor system. Other printers that can plug into the netstation and have their own model scripts are also supported.

- On HP-UX systems, HP netstations support any printer or plotter that can plug into the netstation and has a model script in `/usr/spool/lp/model`

  For HP-UX 10.*x* systems: `/var/spool/lp/model`

  Note that HP plotters with model numbers HP 7440a, HP 7475a, HP 7550a, HP 7570a, HP 7595a, or HP 7596a require a different setup method from other printers or plotters.

  Printer and plotter types that do not have a model script may work with the `dumb` and `dumbplot` scripts respectively.

- On Sun systems, HP netstations support the following printers and plotters:
  - LaserJet IIISi/4/4M/4Si/4SiMX printers
  - LaserJet II/IID/III/IIID printers
  - LaserJet III/IIID printers with HP C2089A PostScript Plus
  - LaserJet II/IID/III/IIID printers with HP 33439P/Q PostScript
  - DesignJet Series plotters
  - DesignJet Series plotters with PostScript
  - PaintJet XL300 printers.

Connecting a Printer or Plotter to the Netstation

This section explains how to connect a printer or plotter to the netstation and how to test the connection.

Connecting to the Parallel Port

To connect a parallel printer to the netstation, use a Centronics-style cable (HP 24542D).

Connecting to the Serial Port

To connect a serial printer to the netstation, use an HP 24542G cable. If your netstation has two serial ports, you can connect the printer to either serial port. To configure the Serial Port to work with the printer:

1. Press and hold F12 to access the configuration screens.
2. Click on Terminal.
3. For the serial port that has the printer cable connected: Set the serial port use to `General`.

   (The printer's documentation describes the baud rate, stop bits, data bits, parity, and pacing you must set.)
4. Click on OK to exit.

Testing the Netstation-Printer Connection

HP netstations have print tests you can use with non-PostScript printers to test the netstation-to-printer connection.

1. Press and hold F12 to access the configuration screens.
2. Click on Terminal.
3. Click on the Print Test button.
4. Click on Serial 1, Serial 2, or Parallel.

If your printer does not print the netstation's configuration, check the cable and the printer for problems.

Setting Up the Host for the Netstation's Printer

How you set up the host for the netstation's printer depends upon what host you have. All supported systems use print spoolers, but you configure the spooler using different host-side tools. In addition, SCO UNIX systems make use of a printer daemon. Refer to the section appropriate for your system:

- "Setting Up an HP-UX, Sun, or SCO UNIX System"

  If you have HP 7440a, HP 7475a, HP 7550a, HP 7570a, HP 7595a, or HP 7596a plotters on an HP-UX system, refer to "Using HP Plotters on HP-UX Systems".

- "Setting Up an IBM AIX System".

Setting Up an HP-UX, Sun, or SCO UNIX System

The administration script (`xtadm`) makes it easy for you to add a netstation's printer or plotter to the print spooler and provides a script to test the operation of the printer or plotter.

The "Printers, plotters" section of the administration script prompts you for all the information required to set up a printer or plotter on the print spooler.

Before you begin, you need to know the following:

- The **terminal name** of the printer's netstation
- The type of connection (serial or parallel)

- The name you wish to assign to the printer (the default is the netstation's terminal name)
- The printer type (laserjet, quietjet, etc.).

To begin:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts" in Chapter 2.
2. Choose `Printers, plotters` from the main menu.
3. Choose `Check operation of a printer or plotter`.

   The administration script uses `ping` to verify that the netstation is connected to the network, then sends a test file to the printer. This test bypasses the print spooler. If the test fails, check that the netstation and the printer are properly connected and configured.
4. Choose `Add a printer or plotter`. The script prompts you as necessary. To access the online help, at the prompt, type: `?`

To learn how to print a file, see "Printing a File".

Using HP Plotters on HP-UX Systems

To use HP 7440A, HP 7475A, HP 7550A, HP 7570A, HP 7595A, or HP 7596A plotters with HP netstations, you must use a **pseudo-terminal driver** as follows:

1. Assign the master side of the pseudo-terminal driver. You do this when you set up a daemon that directs data from a pseudo-terminal driver to the netstation.
2. Assign the slave side of the pseudo-terminal driver. You do this when you add the plotter to the print spooler.

Assigning the Master Side of the Pseudo-Terminal Driver

To assign the plotter daemon to the master side of the pseudo-terminal driver, edit the file `/etc/rc` and add:

```
/usr/lib/hpnp/hpnptyd -m /dev/ptym/ptyr8 -x xterm2 -p 9100
```

Or, for HP-UX 10.*x* systems, add:

```
/opt/hpxt/enware/hpnp/hpnptyd -m /dev/ptym/ptyr8 -x xterm2 -p 9100
```

In this example:

- `/dev/ptym/ptyr8` specifies the master side of the pseudo-terminal driver `ptyr8`. The name you choose should be as high as possible to reduce the likelihood that another program will grab the pty. Also, you will need it to set up the slave side of the pseudo-terminal driver.
- The `-x` specifies the terminal name or IP address of the netstation to which the printer is attached (`xterm2` in this example).
- The `-p` identifies the serial or the parallel port on the netstation:
  - Choose `9100` to send the data to the serial port.
  - Choose `9102` to send the data to the second serial port (if present).
  - Choose `9101` to send the data to the parallel port.

Assigning the Slave Side of the Pseudo-Terminal Driver

To assign the slave side of the pseudo-terminal driver, use `sam` as follows:

1. On the root server as superuser, type: `sam`
2. Select Printers and Plotters.
3. From the Actions pulldown, choose: "Add Printer/Plotter Requiring Nonstandard Device File ... "

4. Fill in the resulting menu as follows:
   - For `Printer name`, choose a unique name. You may use the netstation's terminal name.
   - For `Printer Model/Interface`, use hp7440a, hp7475a, hp7550a, hp7570a, hp7595a, or hp7596a.
   - For `Printer Device File Name`, type in the name of the slave side of the pseudo-terminal driver. For example, if the `/etc/rc` entry has `/dev/ptym/ptyr8`, the printer device file name is `/dev/pty/ttyr8`.

Note

Type over the default `Printer device file name`. This default name is incorrect.

   - Enter `Printer Class` to suit your system or leave it blank.

Setting Up an IBM AIX System

Before you begin you need to know the following:

- The **terminal name** of the netstation to which the printer is connected.
- The type of connection (serial or parallel).
- The name you wish to assign to the printer (the default is formed from the netstation's terminal name).
- The printer type (laserjet, etc.).

To begin:

1. As superuser, type: `smit`
2. Choose: `Devices`
3. Choose: `Printer/Plotter`
4. Choose: `Print Spooling`
5. Choose: `Add a Print Queue`
6. Choose: `Printer or Plotter Attached to an HP X Station`

7. `smit` prompts you for all the necessary information.

To learn how to print a file, see "Printing a File".

Printing a File

You can print a file to a printer connected to a netstation using much the same commands as you would on any UNIX system.

On HP-UX, AIX, or SCO UNIX Systems

To print a file, use: `lp -d`*printername filename*

For example: `lp -dxterm1par data.output`

Note

To eliminate the `-d` option, make the local printer the default by typing one of the following command lines in the VUE users, in `.vueprofile`:

- For C shell, use: `set lpdest=`*printername*
- For Korn shell and Bourne shell, use:
  `LPDEST=`*printername*
  `export LPDEST`

On a Sun System

To print a file, use:

- `lpr -P`*printcap_name*
- `lp -d`*printcap_name*

Examples:

- `lpr -P700xpr data.output`
- `lp -d700xpr data.output`

To print PostScript files, you can use:
`lpr -P`*printcap_name* `-h` *file*
For example: `lpr -P700xpr -h data.ps`

How the Print Command Works

When you issue a print command using the print spooler, the **hpnpf** utility completes the print request. On SCO UNIX systems, a print command causes the printer daemon to start a child daemon for the printer.

Monitoring the Status of a Local Printer

Version 7.1 software uses SNMP to identify a parallel printer attached to a netstation and to report back whether the printer is out of paper, jammed or offline.

You can query the configuration and status of your parallel printer using any SNMP-supported printer utility (for example, JetAdmin). For more information on SNMP, refer to Chapter 10.

8

Working with Fonts

This chapter explains how the HP netstation accesses fonts and explains how you can configure the netstation to download fonts using several different access mechanisms.

Topics in this chapter include:

- "Which Fonts Are Available?"
- "Understanding How the X Server Finds and Downloads Fonts"
- "Understanding How the Netstation Stores and Recalls Fonts"
- "Using Fonts from the Software"
- "Using the Workstation's Fonts"
- "Using Fonts from Different Computers"
- "Using Fonts from a Font Server"
- "Adding and Deleting Fonts"
- "Solving Font-Related Problems".

If you experience any font problems, refer to "Solving Font-Related Problems" at the end of this chapter.

Which Fonts Are Available?

For a font to be available to the X server:

- The font needs to exist on a computer on the network. Typically, this will be the file server, but this is not necessarily the case. See "Using Fonts from Different Computers".
- The font directory needs to be in the X server's font path, which is found on the netstation's Server configuration screen. By default, the font path includes only fonts installed with the netstation's software. These are fonts that the X server can download using the "secure TFTP" access mechanism. To download other fonts, you need to change the X server's font path either by editing it on the netstation's Server configuration screen or in the remote configuration file.
- The font needs to be in a format the X server can read. Your HP netstation can use most `.snf` and `.pcf` format fonts (in compressed or uncompressed format). "Adding Fonts from Other Sources" describes how to convert other types of fonts into a format the X server can use.
- The X server needs to be able to download the font. The netstation can automatically download the fonts installed from the software. However, if you want to download fonts from other locations, your workstation may need to be set up to allow the netstation to access these fonts.

Understanding How the X Server Finds and Downloads Fonts

When switched on, the netstation searches for fonts on its **font path**. Later, when specific fonts are requested, the X server knows where they are located and downloads the fonts using the preferred font access mechanism.

For information about changing your default font path, refer to "Changing Your Default Font Path".

The netstation can use any of three font access mechanisms:

- TFTP
- NFS
- TCP

TFTP (Trivial File Transfer Protocol)

TFTP is present on any system on which the software has been installed. All Hewlett-Packard netstations can access fonts under **basepath/fonts** using TFTP.

NFS (Network File System)

If NFS was running on your system when you installed your netstation, your netstation can use NFS to download fonts. NFS can also access workstation fonts, which are found under `/usr/lib/X11/fonts`, and can download all fonts more quickly than TFTP.

TCP

TCP is a communication protocol that lets you access fonts from a **font server** on your network. A font server is shipped standard with all HP-UX 9.*x* and 10.*x* systems.

Understanding How the Netstation Stores and Recalls Fonts

Topics in this section include:

- "Understanding Font Caching"
- "Understanding Glyph Caching"

Understanding Font Caching

Font caching is a performance feature that allows the netstation to store frequently accessed fonts in memory rather than reload them each time they are requested. Reloading fonts can cause performance problems in certain environments, particularly if applications request large fonts (such as Japanese fonts).

If font caching is enabled (and this is the default behavior), previously requested fonts are kept in netstation memory. If you need to reclaim the memory, you can clear all cached fonts by following these steps:

1. Press and hold F12 to access the configuration screens.
2. Select the Server button.
3. Click on the Free Cached Fonts button.
4. Click on OK.

If the netstation needs more memory to satisfy a request, cached fonts are automatically released until the memory request succeeds.

Enabling/Disabling Font Caching

There are two ways you can enable or disable font caching:

1. On the Server configuration screen, click on the Font Caching button.

2. Edit the `Font Caching` variable in the remote configuration file.

Note that if you change the font caching behavior, you need to reset or reboot your netstation before your change takes effect.

Understanding Glyph Caching

Glyph caching is another performance feature that increases the performance of applications that use scaled bitmap fonts or fonts from font servers. When glyph caching is enabled in the remote configuration file, the glyphs (character bitmaps) for each desired character are allocated separately as they are requested (the whole font is not read in, only the requested glyphs). Subsequent requests for glyphs in the cache can then use the same glyphs.

The default behavior enables glyph caching for 16-bit fonts only.

Controlling Glyph Caching

To control glyph caching behavior, edit the `GlyphCacheMode` variable in the remote configuration file. By default, the variable is set to:

`GlyphCacheMode = 16` (the terminal enables glyph caching for 16-bit fonts only).

Other options include:

- `GlyphCacheMode = 0` (glyph caching is disabled. The entire font will be rendered every time it is loaded.)
- `GlyphCacheMode = 8` (the terminal enables glyph caching for 8-bit and 16-bit fonts.)

Glyph Caching and Netstation Memory . . .

The memory used for cached glyphs is automatically reclaimed when:

- A font is finally closed (all associated glyphs are released).
- The netstation needs more memory to satisfy a request. (Glyphs are released until the memory request succeeds.)

Using Fonts from the Software

By default, the netstation can download the fonts installed from the software by using TFTP (trivial file transfer protocol). When you installed the software, you installed the following font directories:

- Standard font directories:

  basepath`/fonts/iso_8859.1/75dpi`
  basepath`/fonts/iso_8859.1/100dpi`
  basepath`/fonts/hp_roman8/75dpi`
  basepath`/fonts/misc`

- On Sun systems, also:

  basepath`/fonts/Xol`

- On Japanese systems, also:

  basepath`/fonts/hp_japanese/100dpi`
  basepath`/fonts/hp_japanese/75dpi`

  For Sun systems, the Japanese fonts are actually installed; for other systems, only a pointer to the workstation fonts is installed.

Note

Do *not* remove `misc` or `hp_roman8` from the font path as these directories contain fonts required by the X server and by many HP clients.

Using the Workstation's Fonts

Rather than install the fonts from the netstation's software, you may decide to set up the netstation to use fonts already installed on the workstation. By using workstation fonts, you can save a considerable amount of disk space.

Workstation fonts are installed in the following directories:

`/usr/lib/X11/fonts`
`/usr/lib/X11/fonts/iso_8859.1` (HP-UX only)
`/usr/openwin/lib/X11/fonts` (Sun only)
`/usr/dt/config/xfonts/$LANG` (with CDE installed)

Some SCO workstations have fonts that are in an `.snf` format that the netstation cannot use. However, you can compile SCO fonts in `.bdf` (bitmap distribution) format into the `.snf` format the netstation uses. See "Adding Fonts from Other Sources".

To use the workstation's fonts, you need to ensure:

- The X server's font path contains those fonts. Refer to "Setting the Font Path".
- The X server can use a file access mechanism that can download those fonts. Refer to "Accessing the Workstation Fonts: NFS and TFTP".

Setting the Font Path

You can set the X server's font path from the host or from the netstation's configuration screens:

Setting the Font Path from the Host

To use remote configuration to set the netstation's font path:

1. Make sure that the `Remote Config Download` parameter is ON (check the Terminal configuration screen).
2. Edit the file **basepath**`/config/`*terminalname*`.cfg` for each netstation.
3. Uncomment the line that has the `Font Path` keywords and edit the font path to show the new directories.

Note

You can also change the font path by using the `xset` command. Refer to the man page for `xset` for details.

Setting the Font Path from the Configuration Screens

To set the font path from the configuration screens:

1. Press and hold F12 to access the configuration screens.
2. Click on Server to access the Default Font Path.
3. Edit the path, then click on OK.
4. Click on Reset so that your changes take effect.

Whichever method you use, generally you will change a path element such as `./fonts/hp_roman8/75dpi/` to `./fonts/iso_8859.1/75dpi/` (the "." in `./fonts` indicates the path relative to **basepath**.)

Accessing the Workstation Fonts: NFS and TFTP

If you have access to a **font server**, use it as the preferred method for accessing the fonts you need.

If you do not have access to a font server, use NFS rather than TFTP if possible. Before your netstations can use NFS, you need to have NFS running on the file server and you need to have your netstations configured into `/etc/exports`.

If NFS was running on your file server when you installed your netstations, your netstations were added to `/etc/exports` automatically and can access the workstation's fonts now. If you do not have NFS installed on your system, refer to the software installation instructions to learn how to start it.

If you do not want to use NFS, you need to copy the workstation fonts to a directory under the TFTP home directory so that the netstation can download these fonts using TFTP. A security feature restricts TFTP to directories under the TFTP home directory.

Note

For HP-UX 10.*x* systems: If you do not need to use NFS, you can edit the TFTP entry in `/etc/inetd.conf`.

Using Fonts from Different Computers

To use a font from a computer other than the file server, you can add the access mechanism and the computer's name to the beginning of the font path. The syntax of the font path is:
/[*access_mechanism*]/[*hostname*:*port*]/*path*

where:

- *access_mechanism* can be `tftp` or `nfs` (the default is the file server access method). On systems with a font server, you can also specify `tcp`. (Be sure to specify: `tcp/`[*hostname:port*]`/`*path* without the initial slash.)
- *hostname* is the computer's IP address or name (If omitted, the current file server is used.)
- *port* is the font server port (usually this is `7000`)
- *path* is the path to the font.

Example: Font Paths on Different Computers

The following paths are valid:

```
/tftp/25.6.6.1/usr/lib/X11/700X/fonts/misc/
/nfs/hp835-2/opt/hpxt/enware/xthome/fonts/iso_8859.1/75dpi/
//25.6.6.1/usr/lib/X11/fonts/misc/
/nfs//usr/lib/X11/fonts/iso_8859.1/75dpi/
tcp/25.6.6.1:7000
```

Note

If you use TFTP to download fonts, the netstation reads font paths *relative* to its home directory (`/usr/tftpdir` on HP-UX 9.*x* systems; `/tftpboot` on SCO and Sun).

For HP-UX 10.*x* systems: A `/usr/tftpdir` no longer exists. Instead, you can edit the TFTP entry in `/etc/inetd.conf`. Refer to `man tftp` for details.

Symbolic links have been set up to allow NFS to access fonts using the same font path as TFTP.

Using Fonts from a Font Server

If you have a font server on your network, you can save about 600 KB of netstation memory by setting your font path to use the font server. (A font server ships standard with all HP-UX 9.*x* and 10.*x* systems.) For information about setting up the font server itself, refer to the documentation that came with your host machine.

To set up your netstation to use a font server, do the following:

1. Press and hold F12 to access the configuration screens.
2. Click on Server to access the Server configuration screen.
3. Click on lines in the Default Font Path area and use the Backspace key to remove all of the font path entries except `/rom/fonts/default`.
4. Add a line to access the font server. The syntax is: `tcp/`*hostname*`:`*ipportnumber*[*/cataloglist*]

   where:

   - *hostname* is the hostname or IP address of the host running the font server
   - *ipportnumber* is the port on which the font server is listening for connections
   - *cataloglist* is a `+` separated list of catalogs (in other words, font types).

   For example: `tcp/25.7.1.15:7000` (You would not normally specify a */cataloglist*.)
5. Click on OK.

Your changes will take effect the next time you reset or reboot your netstation.

Note

If you are using HP VUE, you may need to set a new HOME session after you have changed the font path to set up for the next login session.

Adding and Deleting Fonts

This section explains how you can use font utilities to add fonts from other sources such as external applications and how you can delete font files and font directories. Topics include:

- "Adding Fonts from Other Sources"
- "Converting Sun Fonts"
- "Deleting Font Files".

Adding Fonts from Other Sources

To install new fonts not already on the workstation or installed from the software, follow the steps listed below:

Step 1: Create a New Font Directory

To create a new directory for the fonts:

1. Make the directory.

   Unless you use NFS, you must create the font directory under the TFTP home directory. For example:
   `mkdir` *tftp_home_dir*`/usr/lib/X11/700X/fonts/app`

   For security reasons, TFTP is restricted to operating in directories under the TFTP home directory.

2. Add a **fonts.alias** file.

Once you have made the font directory, add a `fonts.alias` file to the new directory. The `fonts.alias` file must contain the following line:

```
FILE_NAMES_ALIASES
```

This line allows files to be called by their filenames (without the `.snf` extension). For example, you can use `courB010` to specify the font that has the filename `courB010.snf`.

Step 2: Compile the New Fonts

Because HP netstations automatically uncompress and convert the `.snf` (server natural format) and `.scf` (compressed server natural format) fonts of most other X servers, most fonts can be used as they are. However, if a font is available only in `.bdf` (bitmap distribution format) or SCO's `.snf` format, it must be compiled to an acceptable format for the netstation (`.snf` or `.pcf`) before the X server can use it:

- To compile a font that is in `.bdf` format, use the `bdftosnf` font utility. From the directory where the `.bdf` font is stored, enter the appropriate command line:
  - For R3 or R4 fonts, type:
    `bdftosnf -t` *filename*`.bdf > /path/filename.snf`
  - For R2 fonts, you must add a `-i` option: `bdftosnf -t -i` *filename*`.bdf > /path/filename.snf`
- To translate fonts in SCO's `.snf` format, use `snftosnf`. Go to the directory where the fonts are stored and type:
  `snftosnf -i e <` *fontname*`.snf >` *newfontname*`.snf`

  For example:
  `snftosnf -i e < ibm6x13.snf > xtibm6x13.snf`

Caution

You must direct the output of the `snftosnf` utility into a file that is different from the source file. Otherwise you will destroy the source file and the output file.

Step 3: Create a fonts.dir File

This step directs you to create a `fonts.dir` file so the netstation can use the new font directory.

Each font directory must contain a `fonts.dir` file. The `fonts.dir` file lists all of the fonts in the directory in which it is located, and maps the font names used by clients to font files. The netstation requires this map to be able to access the font files.

Once you have added fonts to a directory, you need to run the `mkfontdir` program to create a new `fonts.dir` file. The command syntax is: `mkfontdir` *path*. For example, to create a `fonts.dir` file for the `app` font directory, type:
`mkfontdir basepath/fonts/app`

Step 4: Change Your Font Path

In this step you change your font path to include the new font directory. The new font directory must be in the X server's font path. To add a directory to the font path:

1. Type it into the Default Font Path on the netstation's Server configuration screen.
2. Click on OK
3. Reset or reboot the netstation so that your changes take effect.

Step 5: Check that the Font Has Been Added

In this step you check that the new fonts have been added by using `xlsfonts` as follows: `xlsfonts` *fontname* For example: `xlsfonts *10x20*`

Example: Adding a Font to a New Directory

1. Create the **basepath**`/fonts/app` font directory.
2. Go to the directory where the `.bdf` source file is located and type:

```
bdftosnf new.bdf > basepath/fonts/app/new.snf
```

3. Create the `fonts.dir` file by typing:
   `mkfontdir` **basepath**`/fonts/app`
4. Add `app` to the font path by editing the Default Font Path field on the netstation's Server configuration screen:
   basepath`/fonts/app/`
5. From a terminal emulator window, check that the font has been added by typing: `xlsfonts new`

Converting Sun Fonts

If you are adding a font not already found on the Sun workstation or installed from the netstation's server software, you must ensure that the font is in an acceptable format and has been integrated into the structure of X server font directories.

To convert new fonts, you need to log in as superuser and to have `$OPENWINHOME/bin` and `/usr/bin/X11/700X` in your path. To check your path, use `echo $PATH`. If you need to set your PATH environment variable, do the following:

- For C shell, type:

```
set path=($path /usr/bin/X11/700X $OPENWINHOME/bin)
```

- For Korn or Bourne shell, type:

```
PATH=$PATH:/usr/bin/X11/700X:$OPENWINHOME/bin
export PATH
```

If the fonts that you want to add are Sun fonts in `.fb` format, refer to "Converting .fb Fonts".

Converting .fb Fonts

Sun fonts that are in `.fb` format must be converted into `.snf` format (server natural format—a format that can be read by the netstation server).

To convert Sun fonts that are in `.fb` format:

1. Review the `/usr/bin/X11/700X/admin/fb2snf` script.

   `fb2snf` takes all 12 point `.fb` fonts from `/usr/openwin/lib/fonts`, converts them to `.snf` format, and saves them in the `/usr/lib/X11/700X/fonts/Xol` directory. The script also creates a **fonts.alias** and a **fonts.dir** file.

2. Modify the `fb2snf` script and change the Sun font directory (INDIR), the directory of converted fonts (OUTDIR), or the font files selected (FILES), by changing the appropriate line at the beginning of the `/usr/bin/X11/700X/admin/fb2snf` script file. The default settings are:

```
INDIR=/usr/openwin/lib/fonts        #Directory of Sun fb fonts
OUTDIR=/usr/lib/X11/700X/fonts/Xol  #Directory of converted fonts
FILES='[a-h]*12'                    #Selects all 12-point fonts
```

3. Execute the script by typing:

   `/usr/bin/X11/700X/admin/fb2snf`

   The `fb2snf` script attempts to derive the font size from the font's name. If you experience any problems, edit the statement:

   `/usr/openwin/bin/convertfont -S`

   to change the `-S` command line switch to `-s` and specify the font size manually. For example:

```
/usr/openwin/bin/convertfont -x -s12 -o /tmp/a12butto a12butto.fb
/usr/bin/X11/700X/xtbdftosnf -t /tmp/a12butto.bdf > /tmp/a12butto.snf
```

4. Once the script has finished, add the new font directory (OUTDIR) to the X server's font path on the netstation's Server configuration screen and click OK. Your changes will take effect the next time you reset or reboot your netstation.

Deleting Font Files

If you ever need to delete font files and font directories, keep in mind the following restrictions:

- It is a good idea to keep the **basepath/fonts/misc** directory.
- If you delete fonts from a directory, you must run the `mkfontdir` program to create a new **fonts.dir** file.
- If you delete a font directory, you should remove the directory from the user's font path.

Example: Deleting a Font from a Directory

1. Go to the `app` directory and delete `old.snf`
2. Update the `fonts.dir` file for the `app` directory by typing: `mkfontdir` **basepath**`/fonts/app`

Solving Font-Related Problems

Topics in this section include:

- "Finding Fonts"
- "Changing Your Default Font Path"

Finding Fonts

When the client cannot find a font, it may stop completely or it may substitute another font.

Sometimes the substituted font does not have the same file structure as the requested font, which causes the keyboard to produce incorrect characters. Usually a client reports font substitutions in the error log (either `.xsessionlog` or, with TELNET, `.x11startlog`).

To determine which fonts exist, list the **fonts.dir** files in each font directory. To list fonts the X server has *available*, type: `xlsfonts | more`.

If the font you want appears in the `fonts.dir` files, but not in the output from `xlsfonts`, you should be able to get the font you want simply by changing the font path to include the directory that contains the desired fonts. Refer to "Changing Your Default Font Path".

Changing Your Default Font Path

To determine the default font path, look on the netstation's Server configuration screen. The path listed as the `Default Font Path` represents the path that is used by the X server when it is reset.

If you want your current font path (the font path that is active now, according to the applications you use and the fonts they require), to be the default font path, select the Copy Current Path button on the Server configuration screen.

The next time you reset or reboot your netstation, the required fonts will automatically be found according to your new default font path.

9

Using Netstation Memory Effectively

This chapter explains how you can make the most effective use of your HP netstation memory and how you can diagnose and solve memory-related problems.

Topics include:

- "Understanding How the Netstation Uses Memory"
- "Making the Best Use of Netstation Memory"
  - "Optimizing Memory: Recommendations"
  - "Modifying Backing Store"
  - "Modifying Font and Glyph Caching"
  - "Using Local Clients and Netstation Memory Effectively"
  - "Using Downloadable Extensions"
  - "Using a Font Server to Save Memory".
- "Using a 4 MB Netstation"
- "Adding More Memory"
- "Understanding the Netstation Memory Statistics".

Understanding How the Netstation Uses Memory

HP netstations have a number of features that enhance performance by storing data in local memory rather than going over the network to get information from the host.

When your HP netstation has memory available, it can store the parts of windows obscured by other windows (a feature called **backing store**) and, if you use local terminal emulators, it can retain the terminal emulator template so that your next terminal emulator window opens quickly. In addition, HP netstations use internal caches to store information that is used frequently. Use of these caches improves performance but requires sufficient netstation memory. Performance features that require the most amount of memory include:

- Backing store
- Font caching
- Glyph caching.

You can disable any of these features if you need additional memory. In the long term, you can optimize the performance of your netstation by adding one or more additional memory SIMMs. Refer to "Adding More Memory".

If you have very limited memory (or severely fragmented memory) your netstation may not be able to start the clients you need. For example, if you request a local client when you have insufficient memory, the netstation tries to reclaim memory internally. However, if it cannot retrieve enough memory, you will see a popup informing you that the local client cannot be started. (If you have disabled popup messages, check the log screen for similar messages.)

The netstation can automatically reclaim memory from the following areas:

- Backing store
- The font cache
- The glyph cache.

If memory was freed from any of these areas, the X server tries to execute the request again. If there is enough free memory, your request will execute successfully. However, when memory is reclaimed from backing store or other caches, performance suffers slightly as clients are required to go to the host for window updates and font requests.

If the netstation was unable to free sufficient memory, the local client will respond with an appropriate message. If this occurs continually and you have followed the recommendations in "Optimizing Memory: Recommendations", you may wish to purchase more memory for your netstation. In the interim, if you want to disable the warning popup message, you can modify the remote configuration file and disable the following variables:

- WarnLowMem (set to 0)
- WarnLowFragSize (set to 0)
- WarnCacheMemUsed (set to OFF, the default)

For more information about these variables, refer to Appendix B.

Making the Best Use of Netstation Memory

If you want to make best use of the netstation memory, there are several configuration parameters you can modify and a number of X session choices you can make. Some of these choices require that you compromise between performance, appearance, and memory usage to find the type of operation that meets your needs. Refer to:

- "Optimizing Memory: Recommendations"
- "Modifying Backing Store".
- "Modifying Font and Glyph Caching".
- "Using Local Clients and Netstation Memory Effectively".
- "Using Downloadable Extensions".
- "Using a Font Server to Save Memory".

Optimizing Memory: Recommendations

In general, you can make the best use of your netstation's memory by following some or all of the following recommendations:

- Use a font server to access fonts.
- Use the fastest servers available (you can sort servers by response time in the Select Session Manager screen to help balance system load).
- Remove any downloadable extensions that you do not use (e.g, TELNET and perhaps SNMP)
- Get your applications to use the same fonts.
- Turn off features such as font caching, glyph caching and backing store if you do not need them.
- Use a simplified, plain color backdrop.

Modifying Backing Store

Backing Store is a configuration parameter that controls how the netstation stores the parts of windows obscured by other windows. You can modify this parameter as follows:

1. Press and hold F12 to access the configuration screens.
2. Select the Server configuration screen
3. Click on the Backing store field and select a value as follows:
   - "By Application" allows the application program to specify whether or not its window should be stored.
   - "When Mapped" causes all obscured windows to be stored unless the application specifies that this should not happen. This setting uses memory very quickly.
   - "Disabled" prevents local storage of obscured windows.

You can also set the backing store parameter in the remote configuration file.

Note

An application can request backing store "ALWAYS". This means that windows will remain in backing store even when not mapped.

Modifying Font and Glyph Caching

If you have limited netstation memory available, you may wish to disable font and glyph caching. (First refer to "Understanding Font Caching" in Chapter 8 and "Understanding Glyph Caching" in Chapter 8 for more information about these features.)

To turn off font caching, you can either:

- Set the `Font Caching` remote configuration variable to `OFF`, or
- Click on the Font Caching button on the Server configuration screen.

To turn off glyph caching:

- Set the `GlyphCacheMode` variable in the remote configuration file to `0`.

Using Local Clients and Netstation Memory Effectively

Local clients are applications (including terminal emulators or window managers) that run on the netstation rather than the host computer. As you might expect, local clients can require a great deal of netstation memory.

While you are free to use local clients in any way you want, if your netstation only has memory for only one kind of local client, you may want to use a local window manager rather than a local terminal emulator.

Use of a local window manager:

- Maximizes host memory savings
- Gives users better interactive performance
- Allows users with sufficient netstation memory to access local terminal emulators automatically. (If users have a host-based window manager, they (or you) need to modify the window manager resource file manually before the users can start local terminal emulators from the window manager's pulldown menu.)

How Much Memory Do Local Clients Need?

Note

This section applies only if you are using X11R5 clients. If you are running in an English-language environment (`LANG=C`), you use X11R4 clients by default.

Local clients use shared libraries. This feature reduces the amount of memory required for local clients once the first one is loaded.

Individually, local clients require memory as follows:

First xterm:	1.0 MB
Next xterm:	410 KB
First hpterm:	2.2 MB
Next hpterm:	730 KB
vt320:	2.6 MB
xflash:	2.9 MB
vuerx:	3.1 MB
dtwmlite:	3.1 MB
mwm:	2.1 MB
twm:	890 KB
xclock:	730 KB
xlock:	540 KB

The following clients are used on Sun systems only:

olwm:	575 KB
First cmdtool:	1.4 MB
Next cmdtool:	300 KB
First shelltool:	1.4 MB
Next shelltool:	300 KB
First clock:	1.4 MB
Next clock:	300 KB

Combinations of clients require substantially less than the combined totals. For example, sample scenarios including HP Netstation Software VUE/RX include:

hpterm + vuerx:	4.1 MB
xterm + vuerx:	3.6 MB

Using Downloadable Extensions

Downloadable extensions are operating characteristics that you can build into your X server the next time you reboot your netstation.

Some extensions, such as SNMP V2, may require additional netstation memory. For example, when the 10 KB multibuffering extension is used, it can require up to 1 MB of netstation memory in the course of updating a large window in memory before "flipping" that data to the display. If you are concerned about netstation memory, you should avoid loading these extensions, or load them only as required.

To turn off any downloadable extensions that you do not use, comment out the appropriate lines in the `modules.ld` file (**basepath/bin/modules.ld**).

Using a Font Server to Save Memory

If your system has a font server, you can change your font path to use the font server rather than the standard bitmapped fonts supplied with the software. By doing this, you can save 600 KB of netstation memory over the default font path.

To configure the netstation to use a font server, refer to the steps in "Using Fonts from a Font Server" in Chapter 8.

Using a 4 MB Netstation

If you have a netstation (for example, an HP ENTRIA netstation) that has 4 MB of memory, you may have difficulty loading some clients. You can save memory by:

- Turning off glyph caching (see "Modifying Font and Glyph Caching")
- Turning off font caching (see "Modifying Font and Glyph Caching")
- Turning off backing store (see "Modifying Backing Store")
- Changing your font path to use a font server (see "Using Fonts from a Font Server" in Chapter 8).
- Not running HP VUE. A netstation running HP VUE requires a minimum of 6MB; 8MB is recommended.

Adding More Memory

Depending upon which local clients you use, you may need to add additional memory to your netstation. The following memory expansion cards are available:

- 2 MB memory module (C2321A)
- 4 MB memory module (C2322A)
- 8 MB memory module (C2323A)
- 16 MB memory module (C2747A)
- 32 MB memory module (C2748A).

HP netstations have memory slots as follows:

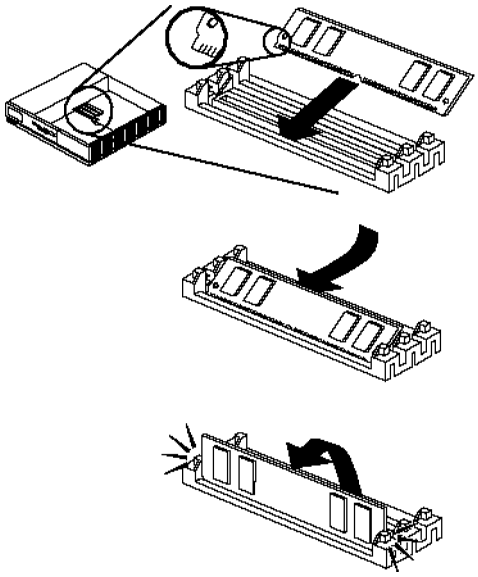
HP ENVIZEX 'a' and 'i' series = 4 slots

HP ENVIZEX 'p' series = 3 slots

HP ENTRIA = 2 slots

HP 700/RX = 2 slots

The steps for installing memory are essentially the same for all HP netstations. The following diagram illustrates how to install additional memory in an ENVIZEX 'p' series:



Interleaving Memory

If you need additional memory, you can install one or more SIMMs (memory cards). When you add two SIMMs that are the same size (e.g., two 4MB SIMMs), you can achieve slightly higher performance if you place them in the preferred slots that allow the memory to be interleaved.

Model	Preferred SIMM slots
ENVIZEX 'a' & 'i' series	Install two same-size SIMMs in slots 1 and 2 or in slots 3 and 4.
ENVIZEX 'p' series	Install two same-size SIMMs in slots 1 and 2.
ENTRIA/Aptrex	Install two same-size SIMMs in slots 1 and 2
HP 700RX	Install two same-size SIMMs in slots 1 and 2.

Understanding the Netstation Memory Statistics

To view the netstation memory statistics:

1. Press and hold (F12) to access the configuration screens.
2. Click on (Diagnostics), then click on (Memory Statistics). You will see a screen similar to the following:

```
                        Memory Statistics
Amount Installed         10240 KB
Free Pool:  current       5749 KB     Number of fragments  125
           low mark       5269 KB     Largest fragment    5602 KB
Used by backing store        0 KB     Used by font cache   220 KB
Backing store reclaimed      0 times  Cached fonts          20
```

Make sure the "Amount Installed" reflects the amount you believe to be installed in your netstation.

In this case, 10240 KB matches the quantity installed in this netstation: an 8 MB memory module combined with the 2 MB of memory on the netstation's CPU board. If two 8 MB memory modules were installed but only 10240 KB of memory was reported, that would indicate that one memory module was not properly seated in its connector or was faulty.

The "Free Pool" is a collection of statistics that describes the memory actually available for use. The "current" statistic is the amount of memory theoretically available for use by the netstation. However, there are some restrictions on how an application can use the memory; for example, it can't ask for a piece larger than the largest fragment. Thus, all of the memory available may not be usable at a given time.

The difference between the "current" value and the "Largest fragment" values is explained by the "Number of fragments," as explained in "What Is Memory Fragmentation?"

The "low mark" records the smallest amount of free memory that has been available since the netstation was last switched on or the Clear Stats button was selected.

What Is Memory Fragmentation?

Memory fragmentation is the breaking down of the memory pool into "non-contiguous" pieces. It occurs when pieces of free memory are separated by pieces of memory that are being used by processes. Here is how it happens.

Suppose that we represent all the free memory by this line of 0s:

```
00000000000000000000000000000000000000000000
```

Now, if you open a window that uses up memory represented by 1s and a second window represented by 2s, the following happens:

```
11111111122222222222000000000000000000000000
```

If you close window 1, it frees up that memory:

```
00000000022222222222000000000000000000000000
```

If you open another window, it uses up memory represented by 3s.

```
33333300022222222222000000000000000000000000
      ^^^
```

The group of three 0s is a memory fragment that is not going to be useful unless you have an application that requires that small amount of memory or if the memory on either side also becomes free and can merge together with it.

10

Using SNMP with HP Netstations

Network-management programs on a host computer use Simple Network Management Protocol (**SNMP**) to communicate with a corresponding program, called an **agent**, that runs on a netstation. By editing a netstation's SNMP configuration file, you can cause the netstation to report its error conditions.

SNMP is also used to monitor netstation parallel ports and report back status and configuration information for locally attached parallel printers.

You can choose to use either SNMP Version 1 or party-based SNMP Version 2. The default is to load the Version 1 downloadable extension. If you plan to use the functionality that is available in Version 2, you must specifically load it.

Note

For low-memory systems, SNMP Version 1 is recommended.

This chapter provides a brief overview of SNMP (V1 and V2) and how it is used with the software. Topics in this chapter include:

- "About SNMP"
  - "About SNMP Version 1"
  - "About SNMP Version 2"
- "Configuring the SNMP Agents"
- "Limitations of the SNMP Agents"
- "For More Information".

About SNMP

Simple Network Management Protocol (SNMP) provides a way to monitor and control devices on a network. SNMP does this by providing a mechanism to read and set specific variables in the device. The networked devices (e.g. netstations) run software (known as an SNMP agent) that communicates with network management software using SNMP, and performs the read and set operations.

There are two versions of SNMP available. Version 7.1 software includes an agent that supports just SNMP V1 and one that supports both V1 and party-based V2.

Management Information Bases (MIBs)

In SNMP terminology, a collection of variables that can be read and set is known as a **Management Information Base (MIB)**. Starting in Version 7.1, HP netstations have support for the following MIBs:

- MIB-II (RFC 1213)
- Interface MIB (RFC 1573)
- Ethernet-like Interfaces MIB (RFC 1643)
- Character Stream Devices MIB (RFC 1658)
- RS232 Devices MIB (RFC 1659)
- Parallel Port Devices MIB (RFC 1660)

If you have a Token Ring interface installed, then the agents also support:

- 802.5 Interfaces MIB (RFC 1748)
- 802.5 Source Routing MIB (RFC 1749)

If you have a 100VG interface installed, the agents also support an experimental MIB for this interface.

To find out more detailed information on version 7.1's compliance with these MIBs, refer to **basepath/snmp/conformance.mib**. This file contains information on the SNMP V2 agent capabilities for the version 7.1 agents.

HP netstations also support a proprietary MIB which also allows access to many of the netstation's configuration parameters. This MIB can be found in **basepath/snmp/hpxt.mib** (which is in SNMP V2 standard format), or **basepath/snmp/hpxtV1.mib** (which is in SNMP V1 standard format).

Most of the variables in this MIB are both readable and writable. Included are variables that allow rebooting the netstation and resetting the X server. These actions can be performed both immediately and after a specified delay.

For backwards compatibility, version 7.1 also supports the proprietary MIB supported by older HP netstation SNMP agents. This MIB can be found in **basepath/snmp/hp700rx.mib**. As in the older HP netstation agents, the variables in this MIB (excluding the reset variable) are read-only. Corresponding writable variables exist in the new MIB.

SNMP Agents and Traps

SNMP agents report events that occur to network management systems using messages called traps. Version 7.1 agents can be configured to generate traps for the following events:

Event	Description
Cold start	The netstation was just rebooted.
Authentication failure	The SNMP agent couldn't authenticate a message.
Link up	A network interface just went up.
Link down	A network interface just went down.
XDM failure	The netstation's XDM software has closed the X session.

Low memory	The netstations' memory pool is (almost) depleted.
Timed reset	The netstation is about to execute a time delayed X server reset.
Timed boot	The netstation is about to execute a time delayed reboot.

About SNMP Version 1

SNMP V1 is the commonly available version of SNMP. The agents provided with version 7.1 comply with RFC 1155 and RF 1157 and those parts of RFC 1213 which apply to this type of equipment.

The V1-only agent is **basepath/bin/Snmpd**. The netstation loads this agent by default.

V1 agents use text strings known as "communities" to control access to their MIBs. These communities essentially act as passwords.

About SNMP Version 2

A number of limitations have been recognized in SNMP V1. SNMP V2 is being developed as a replacement for SNMP V1. Ultimately, it will provide a number of enhancements, including:

- Support for better authentication
- Support for better data security using encryption
- Better access to large amounts of data
- A wider range of data types, including 64-bit counters needed for modern high-speed networks
- Better specification of agent and manager capabilities and data objects.

Definition of the security aspects (authentication and encryption) has proven to be difficult. For this reason, the current specification of SNMP V2 addresses only the last three of these enhancements. An earlier version of the specifications dealt with all five enhancements, using a scheme known as "party-based" security. The SNMP V2 agent included with version 7.1 supports this party-based security scheme.

Note

U.S. export regulations prohibit inclusion of DES support in version 7.1. The SNMP V2 agent provided in version 7.1 does not support data encryption.

The SNMP V2 agent included with version 7.1 conforms to RFCs 1441 to 1449. In addition to the MIBs already listed, party-based SNMP V2 supports:

- SNMP V2 Party MIB (RFC 1447)
- SNMP V2 MIB (RFC 1550).

To control access to their MIBs, SNMP V2 agents use a concept known as "parties". A party is one side of an SNMP agent exchange (e.g. a **network manager** would be one party and the agent another party). Both sides maintain information about either party.

Loading the SNMP V2 Agent

The SNMP V2 agent is: **basepath/bin/snmpdV2**

This agent supports both V1 and party-based V2 SNMP. To load this agent instead of the V1 agent:

1. Edit the file: **basepath/bin/modules.ld**

   This file contains two lines which cause the netstation to load SNMP software.

2. Comment out the following line that loads the V1 agent:

```
bin/Snmpd      "Ext autoload" Snmpd      "Snmpd V1 Extension"
```

3. Uncomment the line that loads the V1/V2 agent:

```
bin/SnmpdV2    "Ext autoload" Snmpd      "Snmpd V2 Extension"
```

Configuring the SNMP Agents

There are two sources that provide configuration information for the SNMP agents:

- Configuration files on the file server that the agents read
- Configuration information that the agents use by default.

The agents first read the file:

basepath/`etc/snmpdrc`

and then

basepath/`etc/`*terminal*`.snmpdrc`

The agent can be configured to read a different file by setting the remote configuration parameter `SNMP File`.

The configuration file format is a superset of the format used by previous HP netstation SNMP agents.

The type of configuration information that the agents will use by default is controlled by the `SNMP Default` remote configuration parameter.

This parameter may have one of 4 possible values:

None	The agent does not create a default configuration.
Read-Only	The agent uses a default configuration that will allow read access to variables.
Read-Write	The agent uses a default configuration that will allow read and write access to variables (with both V1 and V2).
Read-Write(V2)	The agent uses a default configuration that allows read access using V1 protocol and both read and write access using V1 and V2 protocol.

The default value of this parameter is Read-Write.

If, after reading the configuration files and creating any default configuration information, the agents have no V1 communities (both Snmpd and SnmpdV2) and no V2 parties (SnmpdV2 only) then they exit.

This situation would occur if the SNMP default parameter was set to `None` and the configuration files were not found or had no valid configuration information in them.

The agent uses the following default information:

- SNMP V1 read-only community "public" (used for cases 2-4 of SNMP Default)
- V1 read-write community "hpxtPrivate" (used for case 3)
- V2 read-only parties are under hpxtInitialParties.1 (agent) and hpxtInitialParties.2 (manager) (used for cases 2-4)

- V2 read-write parties are under hpxtInitialParties.3 (agent) and hpxtInitialParties.4 (manager) (used for cases 3 and 4)

In all cases the agent does not set `sysContact`, or `sysLocation` to any default value and will generate no traps by default.

For more information on the format of the configuration files, refer to: **basepath/etc/sample.snmpdrc**. This file contains details and examples of configuration records.

To avoid having the user configure V1 community and V2 private key (used by party-based V2 authentication and encryption algorithms) in world readable files on the file server, you can configure two SNMP secrets at the netstation. (These fields are found in the Utilities configuration screen, under SNMP Config.) These V2 private keys should be 128 bit hexadecimal numbers with each byte separated by a space (e.g. `ab 23 1d bf 8c f6 9b 39`).

Note

ASCII text can be used if they are to be V1 communities. `sample.snmpdrc` has more information on using these values in agent configuration.

Limitations of the SNMP Agents

The standard MIBs supported are determined by the netstation's system implementation. For information about variables that are supported as read-only rather than read-write, or not supported at all, refer to the file: **basepath/snmp/conformance.mib**

Almost all variables available with V2 are also available using V1. However, V2 supports some new variable types which are not available with V1. If a group of

variables or table includes new V2 variable types, then the entire group or table is not available with the V1-only agent (Snmpd). In particular, this applies to the RFC 1573 augmentation of the interfaces table and the 100VG statistics table.

When configuring V1 traps in the configuration files with previous versions of the HP netstation agent, it was possible to specify what traps would be sent to a particular manager. The `trap` command still allows this parameter, but is now ignored. All traps are sent to all managers specified using the `trap` command. V2 offers greater control over what managers receive what traps.

For More Information

The following documents define the Simple Network Management Protocols as implemented by the software:

- SNMP Version 1
  - RFC 1155
  - RFC 1157
  - RFC 1212
  - RFC 1215
- SNMP Version 2
  - RFCs 1441 through 1452.

In addition, there are several excellent books which cover SNMP Version 1 and 2 in great detail. For example:

Rose, M. *The Simple Book: An Introduction to Internet Management* (2nd Edition) New Jersey, Prentice-Hall, 1994. (ISBN 0-13-177254-6)

11

Using the Serial Session Screen with SLIP or PPP

This chapter describes how you can set up a **SLIP** or a **PPP** session from your netstation so that you can:

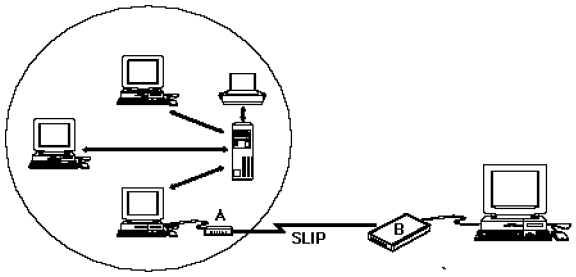
- Work from home
- Work from a remote office

You can make two types of connections:

- Netstation to netstation (or back to back). Refer to "Setting Up SLIP between Two Netstations".
- Netstation to host. Refer to "Configuring SLIP or PPP between a Host and a Netstation".

Setting Up SLIP between Two Netstations

This section describes how to set up SLIP for a back-to-back configuration as illustrated below. Location `A` represents a networked office environment. Location `B` represents a remote location such as a home office.



Note

Before you take the remote netstation to its intended location, you may wish to set up the local and remote netstations side-by-side to verify that the session works properly.

Perform the following steps:

"Step 1: Gather the Necessary Equipment"

"Step 2: Program the Flash ROM Card"

"Step 3: Configure the Local Netstation Parameters"

"Step 4: Configure the Remote Netstation Parameters"

"Step 5: Configure the Modems"

"Step 6: Boot the Netstations"

"Step 7: Set Up Routing Information"

"Step 8: Set Up and Test the Modems".

If necessary, refer to the "Optimizing Performance" or "Troubleshooting" sections for further information.

Step 1: Gather the Necessary Equipment

Gather all necessary equipment, including:

- 2 HP netstations (one with a ROM card adapter and a (minimum 4 MB) flash ROM card.)
- 2 modems (or equivalent functionality through leased lines). Modems must be high-speed and capable of supporting the following modem standards:
  - For data transmission:
    V.34 for 28,800 bps, or
    V.32 bis for 14,400 bps.
  - For error control:
    V.42/MNP 4
  - For data compression:
    V.42 bis/MNP 5
- 2 serial cables
- 2 telephone lines.

Before you begin, make sure you:

1. Identify one netstation as *local*, the other as *remote*.
2. Ensure that the remote netstation has a flash ROM card adapter and a flash ROM card (minimum 4 MB) installed.

Step 2: Program the Flash ROM Card

Use the `xflash` utility to program the flash ROM card with an appropriate ROM card image for the *remote* netstation. For example, if the remote netstation is an ENVIZEX 'p' series netstation, program the flash ROM card with the ENVIZEX 4MB standard package.

Step 3: Configure the Local Netstation Parameters

Set up the configuration parameters for the local netstation as described below. Note that you can set up some configuration parameters before you boot the netstation, and others only after the netstation has downloaded its server file. You should obtain the appropriate IP address from your site system administrator.

Parameter	Local Netstation Value
IP	(*Local_netstation_IP*)
SLIP Subnet Mask	255.*xxx.xxx.xxx*
Local IP	The SLIP IP address of the local netstation in the form `192.`*x.x.x*. (Note that this value must be the same as the SLIP `Remote IP` for the other netstation.)
Remote IP	The SLIP IP address of the remote netstation in the form `192.`*x.x.x*. (Note that this value must be the same as the SLIP `Local IP` for the other netstation.)
Subnet Mask	255.255.255.0
CSLIP	Enabled
Serial Port	38400, 8, 1, None, RTS/CTS (Set the baud rate according to your modem type. Note that the baud rate must be set to the same value on both netstations.)
Serial Port Use For	SLIP
File Server	*hostname*
Alt File Server	none

Name Server	*IP address of host*
Alt Name Server	none
XDMCP Direct	*any host*
Boot from	Network
Fonts from	Network
rgb.txt from	Network
Terminal Name	*terminal name of local netstation*
Domain Name	*your domain*
Time-out	10
Alternate NFS/TFTP	disabled
Gateway/Route	*any*

Step 4: Configure the Remote Netstation Parameters

Set up the configuration parameters for the remote netstation as described below:

Parameter	**Remote Netstation Value**
IP	(*Remote_netstation_IP*)
SLIP Subnet Mask	255.*xxx.xxx.xxx*
Local IP	The SLIP IP address of the remote netstation in the form `192.`*x.x.x*. (Note that this value must be the same as the SLIP `Remote IP` for the other netstation.)
Remote IP	Set the SLIP IP address of the remote netstation in the form `192.`*x.x.x*. (Note that this value must be the same as the SLIP `Local IP` for the other netstation.)

Subnet Mask	255.255.255.0
CSLIP	Enabled
Serial Port	38400, 8, 1, None, RTS/CTS (Set the baud rate according to your modem type. Note that the baud rate must be set to the same value on both netstations.)
Serial Port Use For	Serial Session
File Server	*hostname*
Alt File Server	none
Name Server	*IP address of host*
Alt Name Server	none
XDMCP Direct	*same as File Server*
Boot from	ROM
Fonts from	ROM
rgb.txt from	ROM
Terminal Name	*terminal name of remote netstation* (If you specify a Terminal Name, you must also specify both a Name Server and a Domain Name.)
Domain Name	*your domain*
Time-out	10
Alternate NFS/TFTP	disabled
Gateway/Route	*(IP of local netstation)*/0.0.0.0

Step 5: Configure the Modems

Make sure the modems are configured correctly:

- If you are using a high-speed Hayes-compatible modem, the Escape Command Mode (register 2) will usually be disabled (`s2=255`). If you leave Escape Command Mode enabled, your SLIP session will be interrupted as soon as the modem detects an escape sequence

  `(+++)`

  anywhere in the serial data stream.
- Set your modem's pacing to: `RTS/CTS` (consult your modem's documentation for instructions.)

Step 6: Boot the Netstations

If the netstations are not already booted, boot the local netstation from the network, and the remote netstation from the ROM card.

Step 7: Set Up Routing Information

Set up the routing information. The following example shows how you could do this for an HP-UX 9.*x* system.

1. Log in as superuser and edit the `/etc/gated.conf` file to add an entry. For example:

```
interface all passive
static {
        <remote terminal name or ip> gateway <local terminal ip>
       };
```

2. Add this entry to the file server, name server, and login (e.g., XDMCP) host if they are different.

Note

Any server that will be accessed by the remote netstation *must* have this file updated with the above entry.

3. Restart the existing `gated` process. For example:

```
ps -ef | grep gated
kill <pid>
/etc/gated
```

4. Check that the routing information is correct by typing:

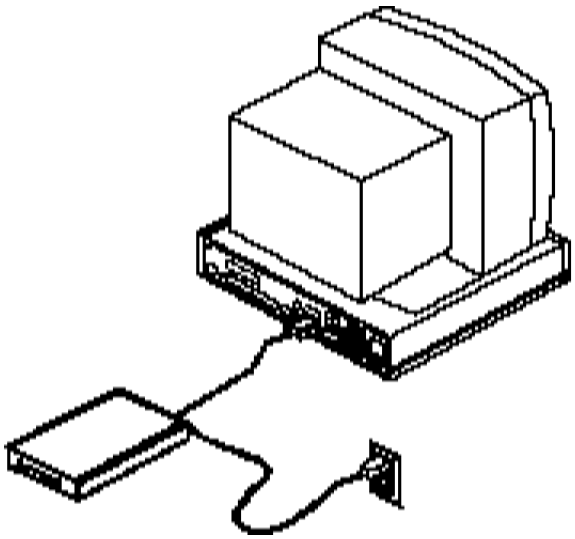
```
netstat -nr
```

   You should see a route to the remote netstation through the local netstation (with the local netstation acting as a gateway).

Step 8: Set Up and Test the Modems

Connect the modems as follows:

1. Connect the serial cable from one of the netstation's serial ports to the modem.
2. Connect the telephone line to the modem.
3. Ensure the modem is plugged in.



Test the modem connection as follows:

1. From the remote netstation, press F12 to access the configuration screens.
2. From the Serial Session screen, type: `at` (response should be `OK`).
3. Type:

   ```
   atdt <phone number of local modem>
   ```

4. When you see a `CONNECTED` response on the remote netstation's serial session screen, click on SLIP and then on To X Server.
5. When a login screen appears (approximately 35-45 seconds), log in as usual.

Optimizing Performance

When you are using SLIP with your remote netstation, you will notice significant performance improvements if you use:

- Local window managers (such as mwm or HP Netstation Software VUE/RX)
- Local terminal emulators (such as hpxt.hpterm or hpxt.xterm)
- Local applications (for example hpxt.xclock instead of the host-based xclock).

Troubleshooting

If the two netstations cannot communicate, try the following diagnostic steps:

1. Check that the cables to both modems are securely attached.
2. Check that you can `ping` both netstations.
3. Check the log screens on both netstations for errors or warning messages.
4. Check routing information carefully (see suggested configuration above).
5. Check that the serial sessions work before enabling SLIP on the remote netstation. To check the serial sessions, place both netstations in serial sessions and type in text from one. The text should appear on the opposite serial session screen.
6. Check the serial port parameters for both netstations.
7. Check the SLIP parameters.

Configuring SLIP or PPP between a Host and a Netstation

This section describes how to set up a SLIP or PPP connection between a host computer and a netstation.

Perform the following steps:

"Step 1: Reviewing the Prerequisites"

"Step 2: Connecting the Serial Port"

"Step 3: Setting Up SLIP" or "Step 3: Setting Up PPP"

"Step 4: Configuring a SLIP or PPP Session"

"Step 5: Connecting to the SLIP or PPP Host Computer"

"Step 6: Starting SLIP on the Host" or "Step 6: Starting PPP on the Host"

"Step 7: Starting Your X Session".

Note

These instructions apply to *both* SLIP and PPP, except where noted.

Step 1: Reviewing the Prerequisites

Make sure you review the following requirements:

- Use an HP 24542M cable to connect either serial port 1 (or serial port 2) to a modem.
- We have tested SLIP and PPP using V.32bis and V.42bis modems under compression at the 38.4 kbps interface data rate. For best performance, choose a modem that supports CCITT V.42.

For SLIP

In order for your host to run SLIP with an HP netstation, the host must be capable of supporting at

least SLIP. Check with your host's documentation to be sure. The following sections describe typical netstation-to-host SLIP configurations using common SLIP packages available to each host.

For PPP

To establish a PPP connection between a host and a netstation, the host must support PPP. On many systems, Morning Star PPP is available. The example in this section uses Morning Star PPP and either of the following authentication protocols:

- PAP
- CHAP (MD5)

Step 2: Connecting the Serial Port

Connect the serial port, keeping in mind the following tips:

- If you are wiring the serial connector for a direct connection to the host, you need to include modem signals for signal assurance.
  - Wiring pin 1 (DCD) provides signal assurance from the host (or modem)
  - Wiring pin 4 (DTR) provides signal assurance from the netstation.
  - Including modem controls assures correct disconnect and cleanup of X server windows and clients over SLIP.

Note

Set the modem so that DTR is in normal mode. Do not set DTR to ON. The hang up modem command does not work if DTR is ignored.

When you have completed connecting the serial port, refer to "Step 3: Setting Up SLIP" or "Step 3: Setting Up PPP" as appropriate.

Step 3: Setting Up SLIP

Note

For setup instructions for PPP, refer to "Step 3: Setting Up PPP".

You can configure SLIP for HP-UX, Sun, SCO and IBM systems. Refer to the appropriate section for details.

Setting Up SLIP on HP-UX Systems

To set up SLIP on the host computer and the netstation, you need to complete the following tasks:

- Edit the `ppl.users` to map each user name to a single netstation serial-line IP address. This allows the dial-in user to invoke PPL without specifying the netstation's serial-line IP address.
- Edit the `ppl.remotes` to add the parameters to allow PPL to set up a connection.
- Configure the hosts.

Note

HP-UX 9.*x* does not support CSLIP. For more information on setting up SLIP, refer to the HP AdvanceNet *Using Serial Line Protocols*.

1. To edit the `ppl.users` file:
   a. Edit one of the following:
      - For HP-UX 9.*x*, `/usr/lib/ppl/ppl.users`
      - For HP-UX 10.*x*, `/etc/ppl/ppl.users`
   b. Add the login of the user and the identifier for the netstation's local SLIP address using the following format:

```
<username> <hostname>
```

For example:

```
smith   192.81.1.2
jones   jones700rx
```

The `hostname` can be either the netstation's serial-line IP address or the netstation's serial-line nodename, provided that the nodename is listed in `/etc/hosts` or the NIS database, or it is resolved using a domain name server.)

c. Save and quit the file.

2. To edit the `ppl.remotes` file:

a. Edit one of the following:

- For HP-UX 9.*x*, `/usr/lib/ppl/ppl.remotes`
- For HP-UX 10.*x*, `/etc/ppl/ppl.remotes`

b. Provide the information for all six fields shown in the following sample `ppl.remotes` file which has been edited for use with a netstation:

```
192.81.1.2  # remote host name or Internet address (HP &stn;)
192.81.1.1  # local host name or Internet address (HP-UX host)
                # Internet mask
SLIP        # protocol [SLIP] [ASLIPC] [ASLIPS] [PPP]
DIALIN      # type [DIRECT] [DIALIN] [DIALOUT] [DIALIN & DIALOUT]
                # UUCP system name
NONE        # line parity [EVEN] [ODD] [NONE]
                # line speed
                # serial line
                # phone number
YES          # modem control available [YES] [NO]
                # login info
                # command name
```

Note

- The `remote host name or Internet address` is the netstation's serial-line `Local IP address`. The `local host name or Internet address` is the host computer serial-line IP address (named on the netstation as the serial-line `Remote IP Address`).
- You cannot leave the remote host name field blank. The netstation cannot use an Internet address assigned by `ppl` from the `ppl.ipool` file.
- If you have configured the host computer so that it always runs PPL and the netstation is connected directly through the serial port, then set `modem control available` to NO and set the `serial line`.

3. To configure the hosts:

   a. Verify that the serial-line subnet is automatically added to the routing table of that host by typing:

      - For HP-UX 9.*x* systems:
        `/usr/bin/netstat -r`
      - For HP-UX 10.*x* systems:
        `/usr/sbin/netstat -r`

   b. To display clients from other hosts, these hosts need to know how to reach the serial-line subnet through the host running the `ppl` session. To provide this information to each host, you can either set up a static route or run `gated`, as described below:

      - To add a static route to each host, edit their `/etc/netlinkrc` files as follows. Add:
        `/etc/route add net` *network ppl_host* `1` or
        `/etc/route add net` *netstation ppl_host* `1`
      - To propagate routing information dynamically, run the `gated` daemon on each host by uncommenting the `gated` lines in their `/etc/netbsdsrc` files.

Note

To add a static route or propagate routing information on HP-UX 10.*x* systems, edit the `/etc/rc.config/netconf` file.

4. When you complete setting up SLIP on an HP-UX system, refer to "Step 4: Configuring a SLIP or PPP Session".

Setting Up SLIP on Sun Systems

To set up SLIP to work with the netstation, you need to edit the `/etc/hosts.slip` file. (This is required for SLIP only, not for CSLIP.) When `sliplogin` runs, it finds the netstation's serial-line IP address associated with the user's login and the connection parameters in the `/etc/hosts.slip` file.

Note

The instructions in this section assume that SLIP or CSLIP has been installed and enabled on the host system. SLIP and CSLIP packages are in the public domain and are available from many ftp sites. At the time this manual was published, two addresses were:

```
SLIP: ai.toronto.edu (128.100.1.104): pub/slip-4.0.tar.Z
CSLIP: ftp.uu.net:networking/ip/slip/cslip/cslipbeta.tar.Z
```

To edit the `/etc/hosts.slip` file on the host computer:

1. Edit the `/etc/hosts.slip` file to set up your netstations.
2. Fill in the necessary information in the following format:

```
<username> normal <hostname> <station_name> <subnet mask>
```

where `username` is the login of the user, `hostname` is the host computer, `station_name` is the netstation. The subnet mask is optional. For example:

```
smith   normal   192.81.1.1   192.81.1.2   255.255.255.240
jones   normal   sunslc       jones700rx
```

Note

The `hostname` and `station_name` can be either the serial-line IP address or the serial-line terminal name, provided that the terminal name is listed in `/etc/hosts` or the Yellow Pages database, or it is resolved using a domain name server.)

3. Now that you have complete setting up SLIP on your Sun system, refer to "Step 4: Configuring a SLIP or PPP Session".

Using SLIP on SCO Systems

To use SLIP on SCO systems, complete the following:

Note

The instructions in this section assume that SLIP/CSLIP has been installed and enabled on the host system.

1. Verify that your host computer:
   - Has a `/dev/slip` file.
   - Has its serial port set correctly (`mkdev serial`)
   - Allows 8-bit characters on the serial device that you use for SLIP.
2. When you have confirmed the above information, refer to "Step 4: Configuring a SLIP or PPP Session".

Setting Up SLIP on IBM Systems

To set up SLIP on an IBM system, you need to configure:

- the serial port driver.
- the serial port IP address into the system files.
- the RS/6000's serial port interface.

1. To configure the `tty` for serial port 1 to get the best performance from your netstation, follow these steps:
   a. As superuser, type: `smit`
   b. Choose: `Devices`
   c. Choose: `TTY`
   d. Choose: `Change / Show Characteristics of a TTY`
   e. Select: `tty0 Available 00-00-S1-00`
   f. Select: `Enable LOGIN` and set to `disable`
   g. Set the `BAUD rate` to a value appropriate for your system.
      - If you have a direct connection, try `38400`.
      - If you have a modem, choose an appropriate value.
   h. Select: `XON-XOFF handshaking` and set to `no`
   i. Click on Do.
2. To configure the RS/6000 to know about the netstation's serial line IP address:
   a. As superuser, run `smit`.
   b. Choose: `Communications Applications and Services`.
   c. Choose: `TCP/IP`.
   d. Choose: `Further Configuration`.
   e. Choose: `Name Resolution`.
   f. Choose: `Hosts Table (/etc/hosts)`.
   g. Choose: `Add a Host`.
   h. Fill in the `INTERNET ADDRESS` and `HOST NAME` fields. (See the note that follows.)
   i. Click on Do.

Note

If your netstation gets its X server code from a network, you need to set up the netstation's routing table so that the netstation can communicate both over the LAN and over the serial line. Setting up the routing table is easiest if the LAN and the serial line are on different networks.

3. To configure the RS/6000's serial port interface:
   a. As superuser, run `smit`.
   b. Choose: `Communications Applications and Services`
   c. Choose: `TCP/IP`
   d. Choose: `Further Configuration`
   e. Choose: `Network Interfaces`
   f. Choose: `Network Interface Selection`
   g. Choose: `Add a Network Interface`
   h. Choose: `Add a Serial Line INTERNET Network Interface`
   i. Select: `tty0`
   j. Fill in:
      - `INTERNET ADDRESS`
      - `DESTINATION`
      - `Network MASK` fields.
   k. Set the following:
      - `ACTIVATE the Interface after Creating it?` should be set to `Yes`
      - `TTY PORT for SLIP Network Interface` should be set to `tty0`.
   l. If you use a modem, fill in the `BAUD RATE` and `DIAL STRING` fields. Otherwise, leave both blank.
   m. Click on Do.

4. Refer to "Step 4: Configuring a SLIP or PPP Session".

Step 3: Setting Up PPP

Note

For setup instructions for SLIP, refer to "Step 3: Setting Up SLIP".

You can set up your PPP session for HP-UX, Sun, SCO and IBM systems. Refer to the appropriate section for details.

Setting Up PPP on an HP-UX System

To set up PPP on your HP-UX system, you need to complete the following tasks:

Note

In this example, we assume that you are using the Morning Star PPP package and that it has been correctly installed.

1. Determine which serial ports on the host are going to be used for answering incoming calls.
2. Connect your modem to this serial port.
3. Log into your host as root.
4. At the prompt, type: `sam`.
5. When `sam` starts, complete the following:
   a. Select (Peripheral Devices).
   b. Select (Terminals and Modems).
   c. Under the (Actions) menu, select (Add Modem).
   d. Select the options you want for this serial port. In this example, the host will be receiving incoming PPP calls, so enable the `Receive Incoming Calls`

option. Be sure to set the baud rate to a speed that matches your modem.

Note

When selecting baud rates greater than 19200bps, it is important that you turn on hardware flow control. If you do not, there may be packet losses and errors in transmission over the serial device. On the host side, you can access the serial devices in the `/dev` directory. Typically, a serial device will be named something similar to `/dev/ttyd0p1` for a serial port connected to a modem. In an HP-UX environment, the hardware flow-control can only be turned on by creating a new device file under `/dev` using the `mknod` command.

e. When you have finished selecting the options, click on the OK button. `sam` creates the appropriate device files under `/dev` for your serial port.

Note

If your version of `getty` will not automatically answer incoming calls, you will have to configure the appropriate modem DIP switch to automatically answer incoming calls. Consult your HP-UX and modem documentation for details.

Your HP-UX system is now configured to accept incoming calls. Ensure that your modem is connected to the phone lines. You can call this modem now (from a terminal emulator or PC) and get a login prompt to your workstation. Refer to "Step 4: Configuring a SLIP or PPP Session".

Setting Up PPP on a Sun, SCO or IBM System

1. To set up PPP, refer to your system-specific PPP documentation.
2. When you are finished, refer to "Step 4: Configuring a SLIP or PPP Session".

Step 4: Configuring a SLIP or PPP Session

To configure a SLIP or PPP session from the netstation, you will need to complete the following steps:

1. Load the X server from the LAN or from a ROM-based server card.
2. Press and hold F12 to access the configuration screens.
3. Click on Network.
4. Click on SLIP or PPP, as appropriate.
5. Enter the serial line network information.

Note

The instructions below assume that you want to communicate with the host on the other side of the serial line. If you are connecting to other hosts, see "Connecting to Other Hosts through the Serial Line".

a. For `Local IP`, type in the netstation's serial-line IP address.

b. For `Remote IP`, type in the host computer serial-line IP address.

c. For `Subnet Mask`, type in the serial-line subnet mask. You can leave this field blank; the netstation can calculate it.

- *(For SLIP only)* When you use SLIP, the netstation server automatically responds with CSLIP when it receives CSLIP. To initiate CSLIP, enable `Compression` now.
- *(For PPP only)* If applicable, provide the `Username:` and `Password:` for PPP Authentication. Note that the password cannot be more than 15 characters.

6. Click on [OK].
7. Click on [Terminal] to go to the Terminal configuration screen.
8. Set the serial port parameters so that it works with the modem or with the serial-line direct connection:

   a. Select your modem speed.

   b. Select `8` for data bits.

   c. Select `None` for parity.

   d. For flow control, choose `None` if XON/XOFF is set, otherwise the configured setting will be used.

9. Set the serial port use to [Serial Session] so you can type to the serial port; for example, to dial out.

10. Click on (Utilities), then on (Serial Session).
11. Click on (Options) to configure the local echo, auto wrap, new line, character set, and configurable-key operations to work with the host computer.
12. Click on (OK).
13. Refer to "Step 5: Connecting to the SLIP or PPP Host Computer".

Connecting to Other Hosts through the Serial Line

To run clients on other hosts you need to configure both the Setup menu (for SLIP or PPP) and the routing table. You may also need to configure routing information on the hosts.

To illustrate how to configure a netstation to use a serial-line gateway, consider a person whose office has two workstations and whose home has a netstation:

- The office has two workstations, IP addresses 192.81.1.1 and 192.81.1.5, connected by a LAN. The latter workstation has a modem connected to its serial port, whose SLIP IP address is 192.81.2.20.
- The home netstation, SLIP local IP address 192.81.2.23, has a modem connected to its serial port.

The serial line network, which consists of the netstation and the serial-line side of one workstation, is on a subnet that comprises IP addresses from 192.81.2.1 to 192.81.2.254. The LAN network, which consists of the two workstations, is on a subnet that comprises IP addresses from 192.81.1.1 to 192.81.1.254.

The subnet mask for these networks is 255.255.255.0, which indicates these Class C networks can have 254 hosts (256 minus the two reserved numbers, x.x.x.255, which is the broadcast address, and x.x.x.0, which is not used for hosts).

To configure the netstation to operate in the above environment, the netstation's Setup SLIP menu or Setup PPP menu requires the following entries:

`Local IP Address`	`192.81.2.23`
`Remote IP Address`	`192.81.2.20` This must be the IP address of the remote device on the serial line (the gateway).
`Subnet Mask`	`255.255.255.0`

Note

You must use different IP addresses for SLIP and PPP.

The Gateway Table entries indicate that the gateway leads to the rest of the network (in this case, the workstation):

`Gateway`	`Route to`
`192.81.2.20`	`0.0.0.0`

When you have completed these entries, refer to "Step 5: Connecting to the SLIP or PPP Host Computer" for details.

Step 5: Connecting to the SLIP or PPP Host Computer

You can use SLIP or PPP on a direct line to the host computer, or through a modem. To start a serial session:

1. Press (F12) to access the configuration screens.
2. Click on (Utilities).
3. Click on (SLIP) or (PPP).
4. Click on (Serial Session).
5. If (Serial Session) is not enabled, click on it now. When the Serial Session screen appears and (Serial Session) is enabled, the characters you type are sent to the serial

port. Typically you would use this to dial a modem and start a SLIP session.

6. If necessary, refer to "Establishing a Connection through a Modem".
7. When you are finished, refer to "Step 6: Starting SLIP on the Host" or "Step 6: Starting PPP on the Host", as appropriate.

Establishing a Connection through a Modem

Use the Serial Session screen to dial and log into the host computer. If you have a modem, type a dial-out command as described in the documentation that came with your modem. Typically, this is similar to:

```
ATDT 555-1234
```

If you have a dial-back configuration, log in normally (giving `vt100` as your netstation type) and indicate your netstation as the dial-back machine. Hang up, and wait for the callback.

Step 6: Starting SLIP on the Host

Note

For startup instructions for PPP, refer to "Step 6: Starting PPP on the Host".

How you start SLIP on the host depends on which type of host you have:

Starting SLIP on HP-UX Hosts

1. Log in normally. If prompted for your netstation type, give `vt100` as your response.
2. Once you have logged in, to start SLIP on the host, type: `ppl`

If you have *not* set up `ppl.users` on the host computer, type `ppl` and the netstation's serial-line IP address. For example: `ppl 192.81.1.3`

3. Click on (SLIP).
4. Click on (To X Server).
5. Once you have started SLIP on the host, refer to "Step 7: Starting Your X Session".

Starting SLIP on Sun Hosts

1. Log in normally. If prompted for your netstation type, give `vt100` as your response.
2. Once you have logged in, start SLIP on the host:
   - If you are using SLIP, type `sliplogin`
   - If you have enabled CSLIP on the (SLIP Network) configuration screen and your connection is on `/dev/ttya`, (for Solaris 2.*x*, `/devices/ptm/tty`), type:
     `slattach ttya` *host_ip_address netstation_address*
3. Click on (SLIP) to activate it.
4. Click on (To X Server).
5. Once you have started SLIP on the host, refer to "Step 7: Starting Your X Session".

When You Have a Connection on SCO Hosts

1. Log in as root.
2. If prompted for your netstation type, give `vt100` as your response.
3. Once you have logged in as root, start SLIP on the host. You must be logged in as root for `slattach` to work. If your connection is on `/dev/tty1a`, type:
   `slattach /dev/tty1a` *host_ip_address netstation_SLIP_address baud_rate*

where `tty1a` is com1 and `tty2a` is com2. The *baud_rate* is optional.

4. Click on [SLIP] to activate it.
5. Once you have started SLIP on the host, refer to "Step 7: Starting Your X Session".

When You Have a Connection on IBM Hosts

1. Log in normally. If prompted for your netstation type, give `vt100` as your response.
2. Click on [SLIP] to activate it.
3. Click on [To X Server].
4. Once you have started SLIP on the host, refer to "Step 7: Starting Your X Session".

Step 6: Starting PPP on the Host

Note

For startup instructions for SLIP, refer to "Step 6: Starting SLIP on the Host".

How you start PPP on the host depends on which type of host you have:

Starting PPP on HP-UX Hosts

Note

This section assumes you have used the Morning Star PPP setup.

1. When you call your host from your netstation, log into your host as you normally would when you get the login prompt.
2. Now you can initiate PPP on the host by directly invoking the Morning Star PPP daemon:

`/usr/etc/pppd` *host_IP terminal_IP* `idle 300` `netmask` *netmask value*

Note

A typical setup in which a host answers incoming calls for PPP connections usually involves creating a *separate* login account for the PPP user. When the user logs into this special account, the PPP daemon starts automatically. For details, refer to your Morning Star PPP documentation.

3. Once you have started PPP on the host, refer to "Step 7: Starting Your X Session".

Starting PPP on Sun, SCO or IBM Hosts

1. Refer to your system-specific PPP documentation for details.
2. Once you have started PPP on the host, refer to "Step 7: Starting Your X Session".

Step 7: Starting Your X Session

You can use XDM, `dtlogin`, `vuelogin` (HP-UX), `scologin` (SCO UNIX), or TELNET to start your serial-line X session, just as you can for an Ethernet-based X session.

However, an Ethernet user can have a startup script that uses many resources (multiple terminal emulators, `mwm`, and numerous X clients). Rather than attempt to start such a time-consuming X session over a serial line, users may prefer to disable XDMCP and to use TELNET for a serial-line X session. By using TELNET, the user can either start clients individually or create a startup script that runs a limited number of clients.

For more information:

- For details on using TELNET, refer to "Using TELNET".
- To learn how to end the SLIP or PPP session, refer to "Ending the Session".

Using TELNET

To use TELNET to begin a serial line X session, do the following:

1. Press and hold (F12) to access the configuration screens.
2. Disable XDMCP by following these steps:
   a. Click on (Server) to access the Server configuration screen.
   b. Click beside the (Login) button.
   c. Drag the cursor to set the field to (None).
   d. Click on (OK).
   e. Click on (OK) again.
3. Click on (Utilities).
4. Click on (Telnet Session).
5. Type in the IP address of the TELNET host. (This must be the SLIP or PPP `Remote IP Address` unless you have the appropriate entries in the routing table (see "Connecting to Other Hosts through the Serial Line").
6. If you want to use 8-bit characters with TELNET, click on the TELNET (Character Set) button until the 8-bit character set of your choice (ISO Latin-1 or HP Roman-8) appears.
7. Click on (Execute TELNET).
8. Log in normally. If asked for your netstation type, respond: `vt100`

9. Before you can access clients, you must use one of the following command lines to set the DISPLAY environment for your netstation (substitute the *serial line* IP address or hostname of your netstation in place of *192.81.1.3*)
   - If you use Korn or Bourne shell:
     `DISPLAY=`*192.81.1.3*`:0.0 ; export DISPLAY`
   - If you use C shell:
     `setenv DISPLAY` *192.81.1.3*`:0.0`
10. Start your clients.
11. Click on To X Server.

Ending the Session

To end the SLIP or PPP session, follow these steps:

1. Terminate your serial port's clients. Note that if you choose to reset the netstation, you terminate both the clients on the serial connection and those on the LAN (if any).
2. Terminate the serial session on the host.
3. Go to the Serial Session screen and click on Disconnect and OK. If you are using a modem, this hangs up the modem and terminates the serial session on the host. If you have a direct connection to the host that uses the modem control lines, this terminates the serial session on the host.

Note

If you are using PPP, make sure you return to serial line mode.

12

Controlling Input Devices

This chapter describes how you can use additional input devices beyond the usual PS/2 or HP-HIL keyboard and mouse. Topics include:

- "Supported Devices"
- "Using Remote Configuration to Configure Devices"
- "Setting Up a Button Box"
- "Setting Up a Knob Box"
- "Setting Up a Tablet"
- "Setting Up a Space Ball"
- "Setting Up a Serial PC Mouse".

Note

The `.Xdevices` file and `.Xpointerkeys` files are no longer used to configure input devices. All of this functionality has been centralized in the remote configuration file. For more information, refer to "Using Remote Configuration to Configure Devices".

Supported Devices

Topics in this section include:

- "Supported Keyboards"
- "Supported Mice"
- "Supported Tablets"
- "Miscellaneous Input Devices"
- "Operating without a Mouse"
- "Operating without a Keyboard or Mouse"

Note

HP-HIL device support applies to ENVIZEX and 700/RX netstations only.

Supported Keyboards

A wide variety of national-language PS/2 and HP-HIL-type keyboards is supported. For a complete list, refer to the keyboard selection list on the Terminal configuration screen.

Changing Keyboard Behavior

If you need to modify which keys can reset the netstation (typically Ctrl Alt Del) or which keys can access the configuration screens (typically F12), you can set the following remote configuration variables:

- X Server Reset Key
- X Server Reset Modifiers
- Configuration Key
- Configuration Modifiers.

For more information about these parameters, refer to Appendix B.

Supported Mice

Product	Description
46060B	HP-HIL mouse
A2839A	PS/2 3-button mouse
100296-536L-5	PS/2 trackball mouse
46060A	HP-HIL 2-button
	Serial PC mouse (Microsoft, Logitech)

Supported Tablets

The following Hewlett-Packard and CALCOMP tablets are supported:

Product	Description
A4364A	HP Graphic Tablet 12 x 12 (Serial)
A4365A	HP Graphic Tablet 12 x 18 (Serial)
46087C	HP Tablet A Size (HP-HIL)
46088C	HP Tablet B Size (HP-HIL)
33120SER	CALCOMP 12 x 12 Drawingboard Tablet III (Serial)
33180SER	CALCOMP 12 x 18 Drawingboard Tablet III (Serial)

Most other tablets use the same protocol and may work, but are not supported.

Miscellaneous Input Devices

The following input devices are supported:

Product	Description
A4363A	HP Button Box (Serial)
A4362A	HP Dial Box (Serial)
A46085A	HP-HIL 9 Knob Box

A46086A	HP-HIL 32 Button Box
A4360A	HP Spaceball (Serial)

Other HP-HIL devices (such as barcode readers) should also work, but are not supported.

Operating without a Mouse

For mouseless operation, simply leave the mouse disconnected from the netstation. The keyboard cursor movement keys will function as the pointing device. If you want to attach a mouse later, simply plug in any PS/2-type mouse.

Operating without a Keyboard or Mouse

If you want the netstation to operate without a keyboard or mouse, leave them disconnected: the netstation will boot up successfully. If you need a keyboard or mouse later on, simply plug in any PS/2-type keyboard or mouse.

Using Remote Configuration to Configure Devices

If the input device you plan to use has an HP-HIL interface, simply plug the device in—no configuration changes are necessary. However, to configure a non-standard *serial* input device, you need to configure one or more of these new remote configuration variables:

- Input Drivers
- XKeyboard Device
- XPointer Device
- Keyboard is Pointer
- Other Pointers
- Other Keyboards

Each variable can be specified as a comma-separated string of fields. Each field specifies a single driver and its associated optional parameters:

```
"driver_name[args],driver_name[args],driver_name[args]"
```

In most cases, all you need to specify is the driver name as listed below:

Driver	Default Path and Parameters
PS2_KEYBOARD	`/dev/ps2kbd` (PS/2 keyboard driver)
PS2_MOUSE	`/dev/ps2mouse` (PS/2 mouse driver)
HIL_DRV	`/dev/hil` (HP-HIL devices driver)
NULL_KBD	`/dev/null2` (Keyboard cannot be used)
NULL_MSE	`/dev/null2` (Mouse cannot be used)
HP_TABLET	`/dev/serial1` (HP4364A, HP4365A tablets)
HP_BUTTONBOX	`/dev/serial1` (HP4363 button box)
HP_KNOBBOX	`/dev/serial1` (HP4362 dial box)
PC_MOUSE	`/dev/serial1` (Microsoft and Logitech RS232 mouse).

For more information about these remote configuration parameters, refer to Appendix B.

Setting Up a Button Box

If your button box has an HP-HIL interface, simply plug it into the HIL port at the back of your netstation. If the button box has a serial interface, follow these steps:

1. Plug the device into the netstation's first serial port
2. Edit the remote configuration file as follows:
   Set the `Input Drivers` variable to:
   `HP_BUTTONBOX /dev/serial1`
3. Reboot the netstation.

The serial button box will be reported as an extension device.

Setting Up a Knob Box

If your knob box has an HP-HIL interface, simply plug it into the HIL port at the back of your netstation. If it has a serial interface, follow these steps:

1. Plug the device into the netstation's first serial port
2. Edit the remote configuration file as follows:
   Set the `Input Drivers` variable to:
   `HP_KNOBBOX /dev/serial1`
3. Reboot the netstation.

The knob box will be reported as an extension device.

Setting Up a Tablet

If your tablet has an HP-HIL interface, simply plug it into the HIL port at the back of your netstation. However, if your tablet has a serial interface, follow the steps listed below:

If you plan to use a serial tablet and NO mouse ...

1. Plug the device into the netstation's first serial port
2. Edit the remote configuration file as follows:
   a. Set the `Input Drivers` variable to:
      `HP_TABLET /dev/serial1`
   b. Set the `XPointer Device` variable to:
      `TABLET`
   c. Set the `Other Pointers` variable to:
      `TABLET`
3. Reboot the netstation.

Because no mouse is attached, the tablet will act as the pointing device.

If you plan to use a serial tablet AND a mouse ...

1. Plug the mouse (PS/2 or HP-HIL) into the mouse port as usual.
2. Plug the tablet device into the netstation's first serial port.
3. Edit the remote configuration file as follows:
   a. Set the `Input Drivers` variable to:
      `HP_TABLET /dev/serial1`
   b. Set the "Other Pointers" variable to:
      `HP_TABLET FIRST_TABLET`
4. Reboot the netstation.

Using this configuration, the tablet becomes a second pointing device.

Tablet Subsetting

If your application uses tablet subsetting, you will need to modify the `Tablet Subset Area (W,H,X,Y)` variable in the remote configuration file to section off and assign the tablet area. Some applications need to assign part of the tablet as the X Pointer and the rest as an X input extension device. For details, refer to "Tablet Subset Area (W,H,X,Y)" in Appendix B.

Setting Up a Space Ball

Applications that use the spaceball provide their own drivers. No configuration changes are necessary. Simply plug in the spaceball and use it as your application directs.

Setting Up a Serial PC Mouse

If you want to use a serial mouse (e.g., a Microsoft or Logitech RS232 style mouse), set the remote configuration variables as follows:
`Input Drivers = PC_MOUSE /dev/serial1`
If you have two serial ports, you can plug the serial mouse into either serial port (and use `/dev/serial1` or `/dev/serial2` accordingly).

If you also want to use a tablet with this netstation, set the variables as follows:

```
Input Drivers = PC_MOUSE /dev/serial1, HP_TABLET /dev/serial2
```

13

Using TELNET

If you do not want to use an X session manager such as XDM, you can start an X session yourself by using a TELNET window to start your clients, then switching from the TELNET window into the X server.

This chapter includes the following topics:

- "Connecting to a Host via TELNET"
- "If You Want an Automatic TELNET Window".

Connecting to a Host via TELNET

To open a connection to a UNIX system using TELNET, follow these steps:

1. Press and hold (F12) to access the configuration screens.
   a. Press and hold (F12) to re-access the configuration screens.
   b. Click on (Utilities).
   c. Click on (Telnet Session).
   d. Enter the TELNET host's name or IP address.
   e. Click on (Execute TELNET).
   f. If you want to use 8-bit characters with TELNET, click on the (Character Set) button until the 8-bit character set of your choice (ISO Latin-1 or HP Roman-8) appears.
   g. Click on the (Execute TELNET) button.

   A TELNET window appears.
2. Log in normally. If prompted for a terminal type, enter `vt100`. So that clients can output to your screen, enter one of the following UNIX commands:
   - *If you are running the Bourne shell or the Korn shell* (which give a `$` command-line prompt), then enter a command similar to the following:
     `DISPLAY=`*75.4.11.126*`:0.0 ; export DISPLAY`
   - *If you are running the C shell* (which gives a `%` command-line prompt), enter a command similar to the following:
     `setenv DISPLAY` *75.4.11.126*`:0.0`

   In both cases, replace *75.4.11.126* with the IP address of your netstation.

3. To start your clients, typically you would copy the startup script **basepath/examples/x11start.700x** to your home directory so you can edit this script to control the clients it starts.

   If you have copied the startup script, type:
   `x11start.700x`
   otherwise, type:
   basepath/examples/x11start.700x

4. To enter X server mode and display your clients, click on [To X Server].

Note

Clients won't be able to start until you enter X server mode and they may time out if you wait too long.

If You Want an Automatic TELNET Window

If you wish, you can configure your netstation to open a TELNET window automatically on the host system of your choice:

1. Press and hold [F12] to access the configuration screens.
2. Click on [Server].
3. Click on the button beside [Login] field and drag to [TELNET Session].
4. Click in the [Login Host] field and enter the IP address (or hostname) of the host you want to TELNET to. If your TELNET system is on a different subnet, make sure your `Gateway` field and `Subnet Mask` field are properly set.
5. Click on [OK].

6. You are prompted to reset your netstation. After you do, the netstation automatically opens a TELNET window on the desired host.

Logging Out from TELNET

To log out from TELNET, close all X connections by pressing the following:

- On PC 101/102/104 layout keyboards: Ctrl Alt Delete
- On 46021A/B HP-HIL keyboards: Ctrl Shift Reset
- On the LK201-layout keyboard: Ctrl Shift F4

This returns you to the TELNET screen where you can type: `exit` or use the Disconnect button.

A

Configuration Options

This appendix explains the various methods you can use to configure your netstation. Topics include:

- "Local versus Remote Configuration"
- "Configuring Netstations from the Host"
- "Configuring Netstations from the Configuration Screens"
- "Remsh Reference".

See also Appendix B for a complete listing of all remote configuration parameters with explanations, defaults, and valid values.

Local versus Remote Configuration

You can configure your HP netstations remotely (from the host) or locally (from each netstation's configuration screens).

For most customers, the best way to make users productive quickly is to configure the netstations from the host using either **BOOTP** or **DHCP**, and remote configuration.

However, other customers find that the flexibility to change configuration values from the netstation's configuration screens is an important feature. The benefits of configuring remotely and locally are listed below:

Configuring from the Host

There are two important advantages to configuring from the host:

- Users can operate netstations without needing to configure their units
- You can set the configuration lock function to disable access to the configuration screens ("Securing The Configuration Screens" has details).

For more information about using DHCP/BOOTP and remote configuration, refer to "Configuring Netstations from the Host".

Configuring from the Netstation

There are two advantages to configuring locally using the configuration screens:

- The configuration screens provide quick and easy access to the netstation configuration parameters. For example, you can quickly reset a parameter, such as

bell volume, and click on OK to activate the new setting.

- An advanced user can change the netstation's configuration immediately, without interrupting the system administrator. (However, if the user enters improper configuration values, network operation could be disrupted.)

For details on the configuration screens, refer to "Configuring Netstations from the Configuration Screens".

Configuring Netstations from the Host

The administration script (`xtadm`) helps you to configure your netstations remotely from the host. It automatically sets up a **BOOTP** file which then configures your netstations with the necessary network configuration data. For many users, this is all the configuration information that the netstations require.

In addition, the administration script creates a remote configuration file that contains any configuration information that is not supplied by BOOTP. This file is automatically downloaded to a netstation when the netstation is switched on.

When used together, BOOTP and remote configuration can configure the netstation completely.

Note

If you are using an Aptrex netstation, you can configure the netstation remotely from the host using RARP.

The following sections provide more detail about BOOTP/DHCP and remote configuration:

- "Using BOOTP and DHCP"

- "Modifying the Remote Configuration File"
- "Changing the Default Font Path"
- "Setting Up a Non-Standard Keyboard"
- "Speeding Up the Boot Process"
- "Securing the Configuration Screens"
- "Securing X Windows Access"
- "Using Remote Configuration"

Using BOOTP and DHCP

BOOTP (boot protocol) and the related **DHCP** (dynamic host configuration protocol) are standard protocols that can download network configuration data to a netstation. The network configuration data enables the netstation to communicate directly with devices on the network. This data includes the IP addresses of the netstation and the computers it accesses.

Note

You can make use of DHCP if it is provided with your host software. However, a DHCP daemon is not provided with the netstation software. DHCP is not supported for Token Ring networks.

You can also give a netstation its network configuration data by typing the network data in the configuration screens and rebooting the netstation. However, using BOOTP or DHCP to download the data has two major benefits:

- The network configuration data for the entire network is in one place (in `bootptab`) and is easy to maintain.
- Once the `bootptab` file has been set up, the user of a new netstation does not have to configure it before using it. Configuration data downloads automatically when the netstation is switched on.

Caution

If the General Network configuration screen is set to "Network Parameters Download From Host (BOOTP)" or "Network Parameters Download From Host (DHCP)", DHCP or BOOTP overwrites the network parameters in the configuration screens with parameters stored in the `bootptab` file every time the netstation is switched on. To prevent this from happening, change the configuration to "Network Parameters (from Fields Below)".

How BOOTP and DHCP Work ...

If the netstation is configured to use BOOTP or DHCP, switching the netstation on causes it to broadcast a boot request on its subnet.

Factory default configuration methods are as follows:

Netstation	Factory Default
HP 700/RX	BOOTP
ENTRIA/Aptrex	DHCP
ENVIZEX 'a', 'i' series	BOOTP
ENVIZEX 'p' series	DHCP

All HP netstations that default to DHCP continue to boot from hosts that run BOOTP. When the netstation sends a boot request, that request contains the netstation's Ethernet address. What happens next depends on which process—BOOTP or DHCP—is running on the host.

If BOOTP Is Running on the Host:

If BOOTP is running, any boot request causes `bootpd` to look through `bootptab` for the Ethernet address of the netstation.

If a match is found, the network configuration data for the requesting netstation is extracted from `bootptab` and sent as a packet over the network.

If no match is found, the netstation fails to boot.

If DHCP Is Running on the Host:

If DHCP is running, you need to be aware of whether the netstation is configured to use DHCP or BOOTP:

- If DHCP is running and the netstation is configured to use BOOTP, `dhcpd` operates just as `bootpd` does.
- If DHCP is running and the netstation is configured to use DHCP, `dhcpd` looks through `bootptab` for the Ethernet address of the netstation.

  If no match is found, `dhcpd` searches for a resource file that contains IP addresses and terminal names you have made available. If `dhcpd` can find an available IP address and terminal name, it assigns them to the netstation, which allows the netstation to boot. Otherwise the netstation fails to boot.

  If a match is found, `dhcpd` operates as `bootpd` does.

Modifying the Remote Configuration File

If you need to set all of your netstations to a non-standard configuration, (as would be the case if all of your users had non-USASCII PS/2 keyboards, for example), before you use `xtadm` (or an equivalent process) you should edit `sample.cfg` so that each remote configuration file created from this master file specifies the proper parameter value. These changes may include:

- "Changing The Default Font Path"
- "Setting Up A Non-Standard Keyboard"
- "Speeding Up The Boot Process"
- "Securing The Configuration Screens"
- "Access Control"
- "Client Authorization"
- "Using Remote Configuration."

To get a list of all remote configuration parameters and their corresponding options, issue the command:
`remsh` *terminal_name* `get config`

On Sun systems, the command is `rsh` instead of `remsh`.

Note

All configuration parameters are listed in Appendix B with explanations, defaults, and valid values.

Changing the Default Font Path

If you chose not to install the HP netstation fonts, you need to change the netstation's font path to use the workstation's fonts. To change the default font path:

1. As superuser, edit:
   basepath`/config/sample.cfg`
2. Find the line that has the `Font Path` keyword and remove the comment character (#).
3. Change the font path to access the workstation fonts. For example:

```
Font Path=/usr/lib/X11/fonts/hp_roman8/75dpi/,/usr/lib/X11/fonts/misc/,
```

Note

The font path cannot contain remote-configuration style variables (such as `$(BasePath)`).

Setting Up a Non-Standard Keyboard

To change the master remote configuration file so that it sets netstations to have a new keyboard language:

1. As superuser, edit:
   basepath`/config/sample.cfg`
2. Find the line that has the `PS/2 Keyboard Language` keyword and remove the comment character (#).
3. Change the line:

   ```
   PS/2 Keyboard Language   =  USASCII
   ```

   to the appropriate keyboard language. For example:

```
PS/2 Keyboard Language   =  Deutsch
```

4. Change the line that has the `Save Config` keyword to remove the comment character (#) in column 1, if present. Make the line similar to the following:

   ```
   Save Config
   ```

5. Save the changed file.

After the netstation downloads the remote configuration file, the keyboard will be fully functional.

Speeding Up the Boot Process

Lines in the remote configuration file direct the netstation to load files specified by the following parameters: `SNMPFile` and `XpointerkeysFile`.

If your netstations do not require these files, define these parameters to "" as follows. Change:

```
XpointerkeysFile  = $(SearchPath)/config/$(Personality)Xpointerkeys
```

to:

```
XpointerkeysFile  = ""
```

Securing the Configuration Screens

If you need to restrict users from accessing specific configuration screens, you can set the `configuration access` parameter in the remote configuration file. There are four levels of configuration lock:

Unlocked	(Default). The configuration screens are completely accessible, unless the configuration Password has been set. When a user specifies a configuration password, only people who know the password can view or change the

	netstation's significant configuration parameters.
Pref+Stats+Log	Users can access only the Preferences screen and the screens available through the Diagnostics configuration menu.
Stats + Log	Users can access only the screens available through the Diagnostics configuration menu.
Locked	There is no configuration screen access and the mouse and keyboard are disabled during bootup. However, you can use a local terminal emulator to display error messages that would otherwise go to the Log screen. For details about using a local terminal emulator for this purpose, refer to "Why Use Local Clients?" in Chapter 5.

When configuration access is locked, remote configuration and BOOTP are automatically enabled.

Securing X Windows Access

The X server that runs on HP netstations supports two types of security: access control and client authorization. Refer to:

- "Access Control"
- "Client Authorization"
- "How Access Control and Client Authorization Work Together"
- "Modifying the Access Control List"
- "Sharing Windows when Client Authorize Is Enabled".

The X server uses these security features when an X client is negotiating a connection with the X server.

These two forms of security restrict which clients may connect but not what these clients may do once connected. Changes in access control and client authorization will not have any effect on clients which are already connected.

Access Control

Access control allows the X server to discriminate between X clients on the basis of which host they are running on. The X server manages the "access control list" which consists of a list of IP addresses. Only clients running on any of these machines will be allowed to connect.

The access control list is managed locally on the netstation. Initially, the access control list contains only the IP address(es) of the netstation itself, including `localhost`. When the user logs in with an XDM or telnet session, that host will also be added.

Additionally, the file pointed to by the configuration variable `Xhosts File` may contain host names or IP addresses which will also be added automatically to the access control list. The netstation reads this file when it boots up.

Client Authorization

Client authorization allows the X server to restrict access to those clients that produce an acceptable 128-bit **magic cookie** or key. This method of authorization is also referred to as MIT-MAGIC-COOKIE-1 authorization.

When a user logs in via a display manager such as XDM, `dtlogin`, or `vuelogin`, some things happen automatically and transparently. The display manager generates a random 128-bit key which it passes to the X server via the XDMCP protocol. The display manager also adds this key to the user's .Xauthority file. If a file other than $HOME/.Xauthority is being used,

the display manager will set the environment variable XAUTHORITY to point to it.

The .Xauthority file is essentially a database. Each record consists of a display name, the authorization protocol to use, and the actual key. This file is not in a readable format - use the 'xauth' utility described below to view or manipulate it. The permissions on the .Xauthority file normally allow reading and writing only by the user, since this is how the key is protected.

When you run an X client, it looks for the display name in the authority file pointed to by the XAUTHORITY environment variable (and defaults to `$HOME/.Xauthority`). If a key is found for the display it wants to connect to, the client will use that key as part of the connection negotiation. If a client cannot read the authority file, it does not have the user's permission to access the display.

Note

Some X clients that were compiled with pre-X11R4 libraries may not be aware of the client authorization security scheme, will not search for the key, and will therefore be denied access. Client authorization cannot be enabled if these clients are used.

Additionally, when the terminal boots up, it reads the file pointed to by the configuration variable "Xauthority File". Any magic cookies in this file will allow a client to access the X server. This file is inherently a public file (readable by tftp), so the use of this feature should be restricted to testing or public netstations. General users should also be prevented from writing or creating these files. The format of this file is the same as the .Xauthority which is created in the user's home directory.

The X11 distribution includes a utility called "xauth" which allows you to modify the contents of the

authorization database. For example, "xauth l" lists the contents of the .Xauthority file in human-readable form. See "man xauth" for a complete description of this utility.

How Access Control and Client Authorization Work Together

If more than one user may be running clients on a given host and you wish to limit access to a display to a particular user, use client authorization rather than the access control list. The following examples describe how client authorization and the access control list work together.

- If you enable Client authorization, the X client must produce the correct key to be allowed to connect, regardless of which host it is running on and whether or not access control is enabled.
- If you disable Client authorization and enable access control, the client will be allowed to connect if it is running on one of the hosts in the access control list OR the client produces an acceptable key. This configuration is useful, for example, if the access control list contains only the netstation itself, thereby allowing local clients to run which do not have access to the user's home directory.
- If you disable both client authorization and access control, all clients are allowed to connect.

If an X client cannot connect to an X server because of security reasons, the client will likely print a message like the following:

```
Xlib:  connection to "terminal:0.0" refused by server
        Xlib:  Client is not authorized to connect to Server
        Error: Can't open display: terminal:0
```

In addition, the netstation log will contain a message similar to the following:

```
AUDIT: Tue May  9 13:41:54 1995: Xserver: client 17 rejected
        from IP 15.4.2.41 port 14090
```

Modifying the Access Control List

To allow a new host to access your netstation for this X session, use `xhost` on the login server as follows:
`xhost +`*ipaddress*
A hostname can be used in *ipaddress*.

To allow a new host "permanent" access to your netstation, add it to your *terminalname*`.hosts` file.

To deny a host access to your netstation for this X session, use:
`xhost -`*ipaddress*

To deny a host access to your netstation "permanently," remove it from your *terminalname*`.hosts` file.

Sharing Windows when Client Authorize Is Enabled

If you want to permit another user to send a window to your display, you need access to the user's `.Xauthority` file. Here is one way to permit such access for the duration of a session:

1. You (the receiver) type from your home directory:
   `chmod 644 .Xauthority`
2. The sender types from the home directory:
   `xauth merge` *receiver_home_dir*`/.Xauthority`
3. You (the receiver) should then restore the original read/write permissions on the `.Xauthority` file by typing:
   `chmod 0600 .Xauthority`

Because the X session manager sets a new magic cookie for the X server each time a user starts a new X session, users wishing to share windows need either to repeat the sharing of `.Xauthority` files or not use Client Authorization.

Using Remote Configuration

You can use BOOTP/DHCP and remote configuration to configure the netstation completely, and automatically. By default, at start up the netstation requests that BOOTP or DHCP send the netstation its network configuration information. After this has been received, the netstation searches for its remote configuration file, which you can use to change any of the netstation's configuration parameters.

The remote configuration file is created automatically when you install netstations using the administration script (`xtadm`). It copies the remote configuration file **basepath**`/config/sample.cfg` to *terminalname*`.cfg` for each netstation you install. If you need to customize the remote configuration file, you should do so before the master file gets copied for each netstation.

For more information, refer to "Modifying the Remote Configuration File". For specific values and syntax of remote configuration parameters, refer to Appendix B.

Caution

If remote configuration is enabled, any configuration parameters set in the netstation's *terminalname*`.cfg` file overwrite the netstation's configuration at every power on. If you change the netstation's configuration from the configuration screens, you may need to disable Remote Configuration. To do so:

1. Press and hold F12 to access the configuration screens.
2. Select Network

3. Select General
4. Set the `Network Parameters` field to: `From Fields Below`
5. Select the Terminal configuration screen
6. Click beside the `Remote Config` field to disable the download
7. Click on OK.

By default, remote configuration is re-enabled by BOOTP or DHCP each time you power up the netstation.

Using the Variables in the Remote Configuration File

The default remote configuration file contains variables of the form `$(`*variablename*`)`. Variables can include other variables—the server expands each variable until it derives a unique parameter. Alternative values for variables are specified as comma-separated lists.

The X server supports the following variables:

`$(BasePath)` All downloadable netstation files have this path in common. Normally it is: `/usr/lib/X11/700X`. For HP-UX 10.*x* systems, this path is: `/opt/hpxt/enware/xthome`.

`$(FileServerList)` This is the list of potential file servers and their access mechanisms. Elements are separated by commas. For example: `/nfs/`*fileserver1* `,/tftp/`*fileserver2*

`$(SearchPath)` This is a variable that allows you to search for files on the current host and on other hosts you specify. Thus, for example, setting

$(SearchPath) to $(BasePath), $(FileServerList)$(BasePath) could cause it to expand to /usr/lib/X11/700X and /nfs/*fileserver*/usr/lib/X11/700X.

$(LANG) This is the language of the netstation.

$(TerminalName)
This is the variable form of the Terminal Name parameter.

$(NodeNameList)
This is a list of the terminal names and IP addresses for each of the netstation's network interfaces. Entries are separated by commas.

$(Personality)
By default, this is the $(NodeNameList) variable followed by a period and by nothing: $(NodeNameList).,, In the case of $(Personality)snmpdrc for a netstation that has an IP address of 125.4.5.6 and a terminal name of xterm1, this expands to xterm1.snmpdrc, 125.4.5.6.snmpdrc, and snmpdrc

$(RGBClass) This names a version of the rgb.txt file that has been customized to work with 98xxx or A10xx monitors. The X server determines the correct value automatically.

Example: How the X Server Reads a Parameter's Variables

Assume that your netstation is configured as follows:

- The netstation's terminal name is xterm16
- The netstation's IP address is 125.4.5.6

- The primary file server is `fileserver1` and its access mechanism is `nfs`
- The first alternative file server is `fileserver2` and its access mechanism is `tftp`
- The SearchPath and Personality variables are set as shown above and the remote configuration file contains the following parameter:

```
ModulesFile  = $(SearchPath)/bin/$(Personality)modules.ld
```

The netstation loads the first available `modules.ld` file from the following list:

```
/usr/lib/X11/700X/bin/xterm16.modules.ld
/usr/lib/X11/700X/bin/125.4.5.6.modules.ld
/usr/lib/X11/700X/bin/modules.ld
/nfs/fileserver1/usr/lib/X11/700X/bin/xterm16.modules.ld
/nfs/fileserver1/usr/lib/X11/700X/bin/125.4.5.6.modules.ld
/nfs/fileserver1/usr/lib/X11/700X/bin/modules.ld
/tftp/fileserver2/usr/lib/X11/700X/bin/xterm16.modules.ld
/tftp/fileserver2/usr/lib/X11/700X/bin/125.4.5.6.modules.ld
/tftp/fileserver2/usr/lib/X11/700X/bin/modules.ld
```

For HP-UX 10.*x*, all occurrences of `/usr/lib/X11/700X` should be replaced by `/opt/hpxt/enware/xthome`.

Configuring Netstations from the Configuration Screens

To configure a netstation locally, you can enter all the netstation's network configuration data on the configuration screens and then re-boot the netstation. You can also use the configuration screens with BOOTP/DHCP and remote configuration to make configuration adjustments.

Using the Configuration Screens

To access the configuration screens, press and hold F12. (If a login screen is being displayed, you need to log in before you can access the configuration screens.)

To learn how to prevent access to the configuration screens, see "securing The Configuration Screens."

Note

On 46021A HP-HIL keyboards, the notation F12 refers to the fourth unlabeled key above the numeric keypad. On the LK201-layout keyboard, the notation F12 refers to the key labeled F3.

To select a screen button or field, click the left mouse button on it.

If you need information on a configuration parameter, move the cursor to that field and click the right mouse button to make a help window appear. Click a mouse button to make the window disappear. (This feature requires that Click for Help is enabled on the Preferences configuration screen.)

Note that the online help is available only after the netstation has downloaded the server file from the host.

Saving and Recalling Configuration Values

- OK saves the choices displayed on the configuration screens.
- Cancel removes the configuration screens without saving any changes.
- Factory Defaults sets all parameters on all configuration screens to their factory defaults.

Note

In addition to the changes you make to the configuration screens, there are two configuration processes that can set or reset values:

- DHCP and BOOTP, if enabled by setting "Network Parameters" to [Download from Host (BOOTP)], or [Download from Host (DHCP)], will overwrite your netstation's network configuration parameters and enable remote configuration. See "Using BOOTP and DHCP".
- Remote configuration, if enabled, can overwrite any of your netstation's configuration parameters. See "Using Remote Configuration".

You can also use the configuration screens to monitor performance and diagnose some types of problems. Refer to Appendix G for details.

Remsh Reference

HP netstations can provide you with remsh access (on Sun systems, rsh access) to their configuration, current status, and operation.

If this capability presents a security risk in your system, you can control remsh access by setting a remote configuration parameter. See "Controlling remsh Access" for details.

"Supported remsh Commands" describes the supported remsh commands.

Controlling remsh Access

Remsh commands require that a user have access privileges set for a particular netstation. You can set the following levels of privileges by remote configuration:

`x` The user can start, query, or kill processes on the netstation.

`w` The user can write configuration changes to the netstation.

`r` The user can read configuration and statistics information from the netstation.

`*` Equivalent to `rwx`.

blank The user has no access to the netstation's remsh services.

To control remsh access, use the remote configuration parameter `Remsh Access`. The syntax is:

```
Remsh Access  = <host name>:<user name>:<r|w|x|*| >, ...
```

where the definition is a comma-separated list. The default is `Remsh Access = *:*:rx`

Supported remsh Commands

HP netstations support remsh commands using the following syntax:
`remsh` *terminalname command [parameters]*

For example, if your netstation has the terminal name hpxterm1, the command to list the processes running on your netstation is:

```
remsh hpxterm1 ps
```

For a listing of all commands that get information from the terminal, type:
`remsh` *terminalname* `get help`

Commands Requiring x Privileges:

local_client client_parameters
executes the specified local client. For example:
`remsh xterm1 get log`

`ps` lists the processes running on the netstation.

`kill` *pid* terminates the specified local client.

Commands Requiring wx Privileges:

`reset` resets the X server, terminating the current session.

`reboot` reboots the netstation.

Commands Requiring w Privileges:

`putlog` *string* writes *string* to the netstation's log screen.

`reconfig` forces the netstation to re-read its remote configuration file.

Commands Requiring r Privileges:

`ls` lists the netstation's devices.

`cat` *file* prints the specified file (or device).

`get` *parameter* prints the specified information:

- `config` gives the netstation's current configuration
- `eeprom` gives the netstation's stored configuration
- `log` gives the contents of the log screen
- `stats` gets memory and network statistics
- `installed` gets the installed configuration screen

`adShow` lists the `modules.ld` file loaded by the netstation.

`env`	lists the netstation's environment variables.

Commands Requiring No Privileges:

`ping` *hostname*	"pings" the specified device.

B

Remote Configuration Parameter Reference

This appendix describes remote configuration parameters in alphabetical order.

Note

The parameter titles given below match the syntax used for that parameter in the netstation's remote configuration file.

100VG IP Address

Purpose:	The Internet Protocol address for the optional 100VG interface.
Valid Values:	Must be in valid dotted decimal format and must be unique to the network.
Default:	0.0.0.0

100VG Subnet Mask

Purpose:	The 100VG interface uses the subnet mask to derive the network subnet it is on.
Valid Values:	Must be in valid dotted decimal format and must be unique to the network.
Default:	255.255.255.0

100VG Terminal Name

Purpose: The name of the host for 100VG interface.

Valid Values:
- Terminal Name must be unique to the network
- Must be alphabetic or numeric (A to Z, 0 to 9)
- First character cannot be a digit
- Case is NOT significant
- Length is limited to 64 characters.

Default: Blank.

Access Control

Purpose: Limits the computers that can access the netstation's display.

Valid Values: ON or OFF

Default: OFF

Notes: If ON, access will be limited to those on the access control list. The default access control list contains:

- The file server
- The XDMCP Host (if enabled)
- The TELNET host (if used)
- The computers listed in:
  basepath/`etc/`*ipaddress*`.hosts`
  or:
  basepath/`etc/`*terminalname*`.hosts`

The netstation reads the *ipaddress*`.hosts` file only at power-up.

References: See also:

- "Xhosts File"

Alternate NFS and TFTP

Purpose:	Specifies whether the system should flip between NFS and TFTP.
Valid Values:	ON or OFF
Default:	ON
Notes:	For best performance, turn OFF and use NFS for access mechanism.

Auto Exec

Purpose:	To allow users to specify a list of local client applications to start when the X server starts up.
Valid Values:	A semi-colon (;) separated list of local clients.
Default:	popupd (a local client used by the software to display error messages)

Auto Repeat

Purpose:	Controls whether keys repeat when held down for more than one-half second.
Valid Values:	ON or OFF
Default:	ON

Auto Repeat Rate

Purpose:	Controls the rate at which the keyboard keys repeat.
Valid Values:	0 to 60
Default:	30

Auto Wrap

Purpose:	Controls whether the netstation automatically wraps text in a Serial Session
Valid Values:	ON or OFF
Default:	ON

Backing Store

Purpose:	Controls the backing store and save under functions.
Valid Values:	■ Disabled ■ By Application ■ When Mapped
Default:	By Application
Notes:	When enabled, Backing Store saves the parts of windows covered by other windows and Save Under saves the parts

of windows covered by pull-down menus in the netstation's memory.

When Disabled, the netstation redraws those windows by receiving updated display information from the host.

By Application allows specific applications to turn backing store on or off.

When Mapped turns backing store on at all times for currently-displayed windows (unless the client explicitly turns off backing store).

Note

Backing store can quickly consume the netstation's free memory. If you have limited memory, choose Disabled. If you want to use backing store, By Application is recommended.

Backspace Key

Purpose:	Controls what type of vt100 control sequence is issued when pressing the Backspace key while within a Serial Session
Valid Values:	Backspace or Delete
Default:	Backspace

Base Path

Purpose:	Used to load the software and access netstation-related configuration, system and local client files.
Valid Values:	Fully qualified path to netstation download bin directory.
Default:	`/usr/lib/X11/700X` (`/opt/hpxt/enware/xthome` for HP-UX 10.*x*)
Notes:	All downloadable netstation files have this path in common.

Bell Duration

Purpose:	Controls how long the bell sounds.
Valid Values:	25 - 975 (975 = 2 seconds).
Default:	100
References:	See also: ■ "Bell Frequency" ■ "Bell Volume"

Bell Frequency

Purpose:	Controls the pitch of the bell.
Valid Values:	20 - 20000
Default:	400
References:	See also: ■ "Bell Duration" ■ "Bell Volume"

Bell Volume

Purpose: Controls the bell's volume.

Valid Values: 0 - 100 (per cent)

Default: 50

References: See also:

- "Bell Duration"
- "Bell Frequency"

BinPath

Purpose: This is the directory path used for retrieving local clients and other executables.

Valid Values: Fully qualified path to netstation download bin directory.

Default: `$(BasePath)/bin/$(LANG), $(BasePath)/bin, $(BasePath)`

Notes: For some clients, both an X11R4 version and an X11R5 version are shipped. By default, the X11R4 version is used if the LANG variable is set to "C", and the X11R5 version is used otherwise. You can override the default, as follows:

- To use X11R5 clients even though LANG=C, change the BinPath so that `$(BasePath)/bin` appears before `$(BasePath)/bin/$(LANG)`.
- To use X11R4 clients even though LANG is not C, add `$(BasePath)/bin/X11R4` to the beginning of the BinPath.

Click For Help

Purpose:	Controls whether pressing F1 or clicking the right-most mouse button brings up a Help screen when in the configuration screens.
Valid Values:	ON or OFF
Default:	ON
Notes:	When enabled, users can place the cursor on a field in the netstation's configuration screens and click the right mouse button (or press the F1 key) to view help for that field.

Client Authorize

Purpose:	Prevents other users from accessing the netstation's display.
Valid Values:	ON or OFF
Default:	OFF
Notes:	When enabled, only clients that can access the `.Xauthority` file can display on the netstation's screen. Typically, this means any client started through an XDM, dtlogin, or vuelogin initiated session.
References:	Refer to the man page for xauth.

Client Start Mem

Purpose:	Specifies the limit, in Kilobytes, of memory which must be available before a local client loads and executes.
Valid Values:	0 - (total memory)
Default:	0 KB
Notes:	If available memory is less than this value, the local client will not startup. A zero value indicates no memory limit.

Config Screen Timeout

Purpose:	Displays the time, in seconds, to exit the config screen after no input activity.
Valid Values:	0 to 2147483647
Default:	300

Configuration Access

Purpose:	Specifies which configuration screens the netstation user can access.
Valid Values:	■ Unlocked ■ Pref + Stats + Log ■ Stats + Log ■ Locked (no configuration screens are accessible).
Default:	Unlocked

Configuration Key

Purpose: This parameter redefines the key or key sequence which accesses the netstation's configuration screens.

Valid Values: Keyname or keycode as follows:

- Keynames are generally a restricted set of standard X Keysym names. You can specify the Hex value of the keysym name.
- Keycodes can be specified as

  ```
  <Bit 31|keycode>
  ```

  When specified as keycode, the specific keyboard action will not be re-assigned when keyboard map assignments are changed via xmodmap.

Default: Null

Notes: If no Configuration Key is specified, the default behavior requires the F12 key (or upper right-most key on HP-HIL keyboards) to be held down for 2 seconds.

Configuration Modifiers

Purpose: Defines the modifier key to be used with the Configuration Key.

Valid Values: SHIFT, LOCK, CONTROL, MOD1, MOD2, MOD3, MOD4, MOD5

Default: Null

	Notes:	If no modifiers are specified, the default behavior requires the configuration key to be held down for 2 seconds.

CSLIP

Purpose:	Enables the netstation to compress headers during a SLIP session.
Valid Values:	ON or OFF
Default:	OFF
Notes:	If you do not enable compression and the netstation receives CSLIP headers, the netstation switches to CSLIP automatically.

CSLIP2

Purpose:	Enables the netstation to compress headers during a SLIP session for serial port 2 (if it exists).
Valid Values:	ON or OFF
Default:	OFF
Notes:	If you do not enable compression and the netstation receives CSLIP headers, the netstation switches to CSLIP automatically.

Cursor Font

Purpose:	Specifies the default cursor font.
Valid Values:	Alpha-numeric font name.
Default:	cursor

Cursor Keys

Purpose:	Controls what type of vt100 control sequences are issued when pressing the cursor keys while within a Serial Session
Valid Values:	Normal or Application
Default:	Normal

DDC Monitor Support

Purpose:	Identifies whether the monitor type is DDC and allows the netstation to determine what resolutions are supported.
Valid Values:	ON or OFF
Default:	True, ON

Domain Name

Purpose:	The name of the domain (the part of the host name after the first period) in which your netstation resides. You must specify the domain name if you want to use a name server.
Valid Values:	Any name in DNS format.
Default:	Domain is set to the domain supplied via the "hn" tag in bootp. Otherwise, the domain name is blank.
Notes:	As an example, if your terminal address is xnet4.tw.usa, then xnet4 is the Terminal Name and tw.usa is the domain. The domain name is the unique name for your network; the terminal name is tied to your IP address and is unique to your netstation.

File Server List

Purpose:	Lists the file servers with the default access method.
Valid Values:	Comma separated list of file server names or IP address. The name/IP address could include the Access mechanism (for example, /nfs/hppadan, /tftp/15.4.1.1).
Default:	*/Access Mechanism/File Server*, */Alt Access Mechanism/Alt File Server*

File Timeout

Purpose:	Controls the length of time the netstation should attempt to access the file via TFTP server before it tries to access the alternative file server or gives up.
Valid Values:	0 - 9999 seconds
Default:	20 seconds
Notes:	Increase the File Timeout if: ■ Many netstations boot from the same file server ■ The file server is known to be slow. ■ The netstation boots via TFTP. This value only affects transfers via TFTP. There is no corresponding file timeout when using NFS.

Font Caching

Purpose:	Retains all previously read fonts in memory. Future requests for these fonts will not require reloading them.
Valid Values:	ON or OFF
Default:	ON
Notes:	Font Caching requires additional memory in the netstation. Although cache memory is reclaimed in low-memory situations, netstations with insufficient memory should disable this feature.

Font Path

Purpose: Provides the default font path for the netstation.

Default: The default font path includes:

```
./fonts/hp_roman8/75dpi/
./fonts/iso_8859.1/75dpi/
./fonts/iso_8859.1/100dpi/
./fonts/misc/
/rom/fonts/default/
```

(Where `./` represents the base path.)

Notes: If you chose not to install the software fonts, you need to change the netstation's font path to use the workstation's fonts.

You can specify the font path to access the workstation fonts in the Default Font Path field on the Server configuration screen. For example, to get fonts from an HP-UX 9.0 host you could enter:

```
/usr/lib/X11/fonts/hp_roman8/75dpi/,/usr/lib/X11/fonts/misc/
```

Note that the font path cannot contain remote-configuration style variables (such as `$(BasePath)`). Leave the path `/rom/fonts/default` in the Default Font Path field.

The font path can also include font servers through the format:

```
tcp/hostname:port
tcp/hppadc:7000
```

Using a font server both increases speed and significantly reduces memory requirements on the netstation.

References: For more information about how this is set, refer to “Base Path”.

Gateway List

Purpose: Lists the gateways and route names or IP addresses in a list.

Valid Values:

```
<gateway>:<route to>,<gateway>:<route to>
```

Default: Blank.

Notes: Maximum four entries in the list.

Glyph Cache Mode

Purpose: Determines what types of font characters (glyphs) to store in memory.

Valid Values:
0 (Disable glyph caching).
8 (Enable caching for 8-bit, 16-bit, 24-bit, and 32-bit fonts)
16 (Enable caching for 16-bit, 24-bit, and 32-bit fonts).

Default: 16.

Hosts Table

Purpose: Provides a list of hostnames and their corresponding IP addresses so that the netstation can resolve names without a valid domain name resolver (nameserver).

Valid Values: Comma-separated list of IP address and hostnames.

Default: Blank.

Example:

```
Hosts Table = "19.4.1.22 hostname1 hostname1.domain.com,
19.4.1.21 hostname2 hostname2.domain.com"
```

Input Drivers

Purpose: Specifies how additional input drivers such as RS232 Tablets are initialized by the input system for the X server. HP-HIL and PS/2 drivers are always used internally and are initialized accordingly before additional drivers are configured. More than one driver can be specified if devices are to be hooked up simultaneously.

Valid Values: PS2_KEYBOARD, PS2_MOUSE, HIL_DRV, NULL_KBD, NULL_MSE, HP_TABLET, HP_BUTTONBOX, HP_KNOBBOX, PC_MOUSE

Default: Null

IP Address

Purpose: The Internet Protocol address is assigned when you add a netstation.

Valid Values: The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.

Default: Blank.

Notes: The IP address can be set automatically for the netstation if BOOTP/DHCP is used. Otherwise it must be manually set in the ROM Configuration System.

References: This value sets the IP Address for the Ethernet interface. For others, see:

- 100VG IP Address
- Token Ring IP Address

Japanese FontPath

Purpose: This font path element is added if the system LANG variable is configured to be one of:

- japanese
- japanese.euc
- ja_JP.SJIS (for HP-UX 10.*x*)
- ja_JP.eucJP (for HP-UX 10.*x*)

The Japanese FontPath is used to access the Japanese Font 8 and 16 so that:

- Log messages can be displayed
- X clients can have these fonts available.

Valid Values: `<font path>`

Default: `./fonts/hp_japanese/75dpi/`

Japanese Font8

Purpose: The base name of the bitmap font file which has the 8 bit primary fonts. The netstation will attempt to open the pcf, snf, or bdf file.

Valid Values: `<base filename>`

Default: `jpn.8x18`

Japanese Font16

Purpose: The base name of the bitmap font file which has the 16 bit fonts.

Valid Values: `<base filename>`

Default: `j16.16x18`

Keyboard is Pointer

Purpose: This allows the X keyboard to control the pointer.

Valid Values: OFF or ON

Default: OFF

Notes: An "ON" value is typically only used when both keyboard and pointing device are installed but require an additional method for controlling the pointer. If

no pointing devices is detected, the keyboard will default to both a keyboard and pointer device.

Keyboard Map Files

Purpose: Specifies a list of files containing keymap information.

Valid Values: Any comma-separated list of valid path and filenames.

Default:

```
$(SearchPath)/bin/Xkeymaps,$(SearchPath)/config/Xkeymaps
```

Keyboard Map Name

Purpose: Specifies a keyboard map to use from the list of Keyboard Map Files. This value overrides the "PS/2 Keyboard Layout" definition.

Valid Values: Any name within the keymap file

Default: Null

Key Click

Purpose:	Determines whether the netstation emits a “click” when a key is pressed.
Valid Values:	ON or OFF
Default:	OFF
Notes:	If ON, when you press a key, the netstation emits a short beep.

LANG

Purpose:	Identifies the netstation’s language locale.
Valid Values:	language[_territory][.codeset][@modifier]
Default:	“C”
References:	See also “LANG Set By Keyboard”.

LANG Set By Keyboard

Purpose:	To autoselect LANG based on keyboard selection.
Valid Values:	ON or OFF
Default:	ON
References:	See also “LANG”.

Load Extensions

Purpose:	Determines the extensions to load by default.
Valid Values:	Comma-separated list of extensions
Default:	Blank.

Local Command

Purpose:	Specifies which local clients to execute instead of negotiating an XDMCP session if Startup Session is set to Local Command.
Valid Values:	A semicolon-separated list of local clients.
Default:	Blank.

Local Echo

Purpose:	Specifies whether the netstation displays the characters typed in during a Serial Session, even if the Serial Session also echos them.
Valid Values:	ON or OFF
Default:	OFF

Local LED Ctrl

Purpose:	Controls whether the netstation's CAPSLOCK and NUMLOCK keys are controlled by the keyboard (ON) or the X server (OFF).
Valid Values:	ON or OFF
Default:	OFF

Local Num Lock

Purpose:	Determines if the Num Lock LED is controlled by the netstation or by the application software.
Valid Values:	ON or OFF
Default:	ON (local control)

Log Screen Rows

Purpose:	Determines the number of log screen rows to keep in display.
Valid Values:	Any integer
Default:	80

Modules File

Purpose: Specifies the name of the file that contains the local clients and extensions the netstation can download.

Valid Values: Fully qualified path accessible by the file access method.

Default:

```
$(Search Path)/bin/$(Personality) modules.ld,
$(Search Path)/xtbin/$(Personality) modules.ld
```

References: See also:

- "Search Path"

Monitor

Purpose: Specifies the monitor model number.

Valid Values: See the `sample.cfg` file for a complete list.

Default: Depends upon the type of netstation base unit you have. See the `sample.cfg` for a complete description of this parameter.

Mouse Accel

Purpose: Specifies how quickly the cursor should move when the mouse is moved faster than the threshold speed.

Valid Values: 1 - 10

Default: 2

References: See also:

- "Mouse Thresh"

Mouse Thresh

Purpose:	Specifies the speed the mouse must move before the mouse acceleration is applied.
Valid Values:	1 - 30
Default:	4
References:	See also: ■ "Mouse Accel"

Name Server List

Purpose:	Specifies the Name Servers available to the netstation.
Valid Values:	Comma separated list of Name Server IP addresses.
Default:	Blank.
Notes:	Maximum two entries in the list.

Name Services Order

Purpose:	Dictates both order and method used to resolve IP names to their corresponding IP Addresses.
Valid Values:	Comma-separated list containing one or more of CACHE, HOSTS, DNS.
Default:	CACHE, HOSTS, DNS
Notes:	The valid values correspond to the following name resolution methods: ■ HOSTS - from the remote config file "Hosts Table" entry

- CACHE - from previously resolved name and ip address pairs
- DNS - from the bind nameserver.

Network Config

Purpose:	Determines what source the netstation will use for network configuration information (IP addresses, nameserver, fileserver etc.).
Valid Values:	■ Downloaded from Host (BOOTP) ■ Downloaded from Host (DHCP) ■ From Fields Below
Default:	Downloaded from host (DHCP)
Notes:	Unless set to "From Fields Below", DHCP or BOOTP may override some values set in this remote configuration file.

New Line

Purpose:	Specifies whether the netstation automatically inserts a line feed after carriage returns in Serial Sessions.
Valid Values:	OFF or ON
Default:	OFF

Node Name List

Purpose: A netstation generated variable based on the installed network hardware.

Note: The variable should never be modified.

Numeric Keypad

Purpose: Controls what type of vt100 control sequences are issued when pressing keys on the numeric keypad while within a Serial Session.

Valid Values: Numeric application

Default: Numeric.

Other Keyboards

Purpose: Specifies which other devices (if present) would also operate as an X Keyboard device.

Valid Values:

```
<complete device name><complete device name>
```

Default: Blank.

Notes: The keyboard(s) type and layout must match the X Keyboard.

Other Pointers

Purpose:	Specifies which other devices (if present) would also operate as an X Pointer device.
Valid Values:	Complete device name is required. For example: `Other Pointers ="FIRST_TABLET,HP_TABLET"`
Default:	Blank.
Notes:	The complete device name is required and multiple devices can be specified.

Password

Purpose:	Specifies the password that must be entered before entering any configuration screen other than Preferences. The Configuration Access parameter overrides this parameter.
Valid Values:	A password.
Default:	Blank.

Personality

Purpose:	Specifies a user-defined personality for the netstation.
Default:	Personality is the `$(NodeNameList)` remote configuration variable followed by a period and by nothing: `$(NodeNameList).,,`
Notes:	In the case of `$(Personality)snmpdrc` for a netstation named `xterm1`, this

expands to `xterm1.snmpdrc` and `snmpdrc`.

Pointer Accelerator Modifiers

Purpose:	Defines up to 3 Modifier keys which have to be pressed down in addition to Pointer Modifiers (e.g., SHIFT, CONTROL, MOD1).
Valid Values:	Comma-separated list of up to three values: SHIFT, LOCK, CONTROL, MOD1, MOD2, MOD3, MOD4, MOD5
Default:	Null

Pointer Accelerator Amounts

Purpose:	Defines the amount (in pixels) to move the pointer for each of the accelerator modifiers defined in `Pointer Accelerator Modifiers`.
Valid Values:	Comma-separated list of up to three numbers, ranging from 1-255.
Default:	1,40,5

Pointer Button Keys

Purpose:	Defines up to 8 keys which are the pointer buttons specified as buttons 1 through 8.
Valid Values:	For a complete list of valid values, type `xmodmap` and use the value from column 1.
Default:	KP_7,KP_8,KP_9,KP_4,KP_6

Pointer Button Maps

Purpose:	An array which defines the *default* button map. Applies to all X pointer devices. For example, a value of "3,2,1" would swap buttons 3 and 1 suited for a left-hand mouse.
Valid Values:	1-8
Default:	1,2,3,4,5,6,7,8

Pointer Chording

Purpose:	Defines if simultaneous buttons should simulate extra buttons. By default, 2 button pointers are in chording mode (i.e, pressing 2 buttons simultaneously = 3rd button). By default, 3 button pointers have chording off.
Valid Values:	ON, OFF, or DEFAULT
Default:	DEFAULT

Pointer Keys (L,R,U,D)

Purpose:	Defines the four keys which control the cursor position (left, right, up, and down).
Valid Values:	For a complete list of valid values, type `xmodmap` and use the value from column 1.
Default:	"KP_1,KP_3,KP_2,KP_5"

Pointer Keys Modifiers

Purpose:	Defines up to 3 Modifier keys which enable Pointer Keys (e.g., LOCK).
Valid Values:	SHIFT, LOCK, CONTROL, MOD1, MOD2, MOD3, MOD4, MOD5
Default:	Null

Pointer Latching

Purpose:	Defines whether button press/releases work in latched mode (that is, press once to signal one press, press again to release the first press). This feature is currently supported for HP-HIL devices only.
Valid Values:	ON or OFF
Default:	OFF

Pointer Move

Purpose:	Defines the amount a pointer moves in pixels (without accelerators).
Valid Values:	1-255
Default:	5

PPP Authentication Password

Purpose:	Specifies the password for CHAP authentication (using serial port 1).
Valid Values:	Up to 15 characters.
Default:	Blank.

PPP Authentication Username

Purpose:	Specifies the username for CHAP authentication (using serial port 1).
Valid Values:	Up to 15 characters.
Default:	Blank.

PPP Local IP

Purpose:	Specifies the IP address of the netstation for communication via PPP through serial port 1.
Valid Values:	The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.
Default:	Blank.
Notes:	The host must expect to have this address as its remote PPP IP address.
References:	See also: ■ "PPP Remote IP"

PPP Remote IP

Purpose:	Specifies the IP address of the computer with which the netstation communicates during PPP sessions through serial port 1.
Valid Values:	The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.
Default:	Blank.
Notes:	This IP address would normally have the same Network portion as the Local PPP address.
References:	See also: ■ "PPP Local IP"

PPP Subnet Mask

Purpose:	Specifies the Network portion of the IP address for communication via PPP through serial port 1.
Valid Values:	The Subnet Mask must be in dotted decimal format.
Default:	255.255.255.0
Notes:	This allows you to reduce network address usage.

PPP2 Authentication Password

Purpose:	Specifies the password for CHAP authentication (using serial port 2).
Valid Values:	Up to 15 characters.
Default:	Blank.

PPP2 Authentication Username

Purpose:	Specifies the username for CHAP authentication (using serial port 2).
Valid Values:	Up to 15 characters.
Default:	Blank.

PPP2 Local IP

Purpose: Specifies the IP address of the netstation for communication via PPP through serial port 2 (if it exists).

Valid Values: The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.

Default: Blank.

References: See also:

- "PPP Local IP"
- "PPP Remote IP"

PPP2 Remote IP

Purpose: Specifies the IP address of the computer with which the netstation communicates during PPP sessions through serial port 2 (if it exists).

Valid Values: The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.

Default: Blank.

References: See also:

- "PPP Remote IP"
- "PPP Local IP"

PPP2 Subnet Mask

Purpose:	Specifies the Network portion of the IP address for communication via PPP through serial port 2 (if it exists).
Valid Values:	The Subnet Mask must be in dotted decimal format.
Default:	`255.255.255.0`
Notes:	This allows you to reduce network address usage.

PS/2 Keyboard Language

Purpose:	Specifies the keyboard and keymappings for the PS/2 keyboard.
Valid Values:	Current list of PS/2 keyboards.
Default:	USASCII
Notes:	Click on the field within the configuration system to display the list of supported keyboard languages.

PS/2 Keyboard Layout

Purpose:	The layout and keyboard mapping to use for the Keyboard Language.
Valid Values:	■ DEC LK201 ■ Sun Type 5 ■ PC 101/102/104 ■ IBM 3270 ■ Hitachi ■ Sun Type 4
Default:	PC101/102/104

R3 Compatible

Purpose:	Sets X11R3 bug compatibility mode in the X server.
Valid Values:	ON or OFF
Default:	OFF
Notes:	Use this parameter for R3 applications that use R3 bugs as features.

Receive Buffer Size

Purpose:	Sets the size of the network receive buffer in kilobytes.
Notes:	Customers are advised not to tune this unless directed.

Remote Config

Purpose: Specifies whether the netstation should load the remote config file.

Valid Values: OFF or ON

Default: ON

Remote Config File

Purpose: Specifies the path to the netstation's Remote Config File.

Valid Values: Fully qualified path to the Remote Config file accessible by the chosen file access method.

Default:

```
$(SearchPath)/config/$(Personality).cfg, config/default.cfg
```

Remsh Access

Purpose: Defines host name, user name and access permissions for the configuration, status checking, and operation of HP netstations on the network via the Remote Shell Access (remsh/rsh) protocol.

Valid Values:

```
<host name>:<user name>:<r|w|x|*| >, ...
```

where the definition is a comma-separated list.

Default: `Remsh Access = *:*:rwx`

Report

Purpose: Specifies the level of messages that should be reported in the netstation's error log.

Valid Values:
- All Messages
- Errors/Warnings
- Errors Only

Default: All Messages

RGB Class

Purpose: The class of monitor used when loading the rgb.txt file.

Valid Values:
- 98xxx
- A10xx

Default: A10xx

RGB File

Purpose: Specifies the color file the netstation should download.

Valid Values:
- rgb/rgb.txt.A10xx
- rgb/rgb.txt.98xxx

Default:

```
$(SearchPath)/rgb/rgb.txt.$(RGBClass)
```

Notes: By default, the netstation downloads a file that has been optimized to work with its monitor.

RGB File From

Purpose: Determines whether the netstation loads its RGB file over the network or from the ROM card.

Valid Values:
- Network (Default)
- ROM

Notes:
- Select Network to download the rgb.txt color file.
- Select ROM to use the color file that is present in the ROM server.

ROM Fonts

Purpose: Adds or subtracts the ROM card font directories to the netstation's font path.

Valid Values: ON or OFF

Default: OFF

Screen Change Amount

Purpose: Specifies how many pixels the cursor must be moved at the edge of the screen before it jumps to the next screen (if there are multiple screens on the netstation).

Valid Values: `0 - 255`

Default: `255`

Screen Column Wrap

Purpose:	Specifies how to move pointer when screen has no adjacent screen on that edge.
Valid Values:	NoWrap, Wrap, Default, SameScreen, ChangeByTwo
Default:	Default
Notes:	This parameter is only required for installations implementing multiple screens per netstation.

Screen Orientation

Purpose:	Defines the stacking of multiple screens.
Valid Values:	Vertical, Horizontal, Matrix
Default:	Horizontal
Notes:	This parameter is only required for installations implementing multiple screens per netstation.

Screen Row Wrap

Purpose:	Specifies how to move pointer when screen has no adjacent screen on that edge.
Valid Values:	NoWrap, Wrap, Default, SameScreen, ChangeByTwo
Default:	Default

	Notes:	This parameter is only required for installations implementing multiple screens per netstation.

Screen Saver

Purpose:	Specifies the number of milliseconds that can elapse without user input before the netstation's screen saver turns on.
Valid Values:	`0 - 1 800 000`
	`(1 800 000 = 30 minutes)`
Default:	`600 000`
Notes:	A zero value disables the screen saver functionality.

Search Path

Purpose:	Specifies which paths and in which order the netstation searches for its files.
Default:	`$(BasePath)`

Send Buffer Size

Purpose:	Displays the size of the IP send buffer in kilobytes.
Notes:	Customers are advised not to tune the unless directed.

Serial Char Set

Purpose: The character set to use for telnet sessions.

Valid Values:
- USASCII
- HP Roman-8
- ISO Latin-1.

Default: USASCII

Notes:
- Choose USASCII to use 7-bit characters.
- Choose HP Roman-8 to use 8-bit characters with HP hosts.
- Choose ISO Latin-1 to use 8-bit characters with non-HP hosts.

Serial Port Use

Purpose: Controls how the netstation's serial port is used.

Valid Values:
- General
- Serial Session
- SLIP

Default: General

Shared Library Path

Purpose: Sets the search path of the shared libraries to use for the local clients.

Default: `$(SearchPath)/lib`

SLIP Local IP

Purpose:	Specifies the IP address of the netstation for communication via SLIP through serial port 1.
Valid Values:	The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.
Default:	Blank.
Notes:	The host must expect to have this address as its remote SLIP IP address.
References:	See also: ■ "SLIP Remote IP"

SLIP Remote IP

Purpose:	Specifies the IP address of the computer with which the netstation communicates during SLIP sessions through serial port 1.
Valid Values:	The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.
Default:	Blank.
Notes:	This IP address would normally have the same Network portion as the Local SLIP address.
References:	See also: ■ "SLIP Local IP"

SLIP Subnet Mask

Purpose:	Specifies the Network portion of the IP address for communication via SLIP through serial port 1.
Valid Values:	The Subnet Mask must be in dotted decimal format.
Default:	255.255.255.0
Notes:	This allows you to reduce network address usage.

SLIP2 Local IP

Purpose:	Specifies the IP address of the netstation for communication via SLIP through serial port 2 (if it exists).
Valid Values:	The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.
Default:	Blank.
References:	See also: ■ "SLIP Local IP" ■ "SLIP Remote IP"

SLIP2 Remote IP

Purpose:	Specifies the IP address of the computer with which the netstation communicates during SLIP sessions through serial port 2 (if it exists).
Valid Values:	The IP address must be in valid dotted decimal format (for example, `15.5.3.133`) and *must be unique* to the network.
Default:	Blank.
References:	See also: ■ "SLIP Remote IP" ■ "SLIP Local IP"

SLIP2 Subnet Mask

Purpose:	Specifies the Network portion of the IP address for communication via SLIP through serial port 2 (if it exists).
Valid Values:	The Subnet Mask must be in dotted decimal format.
Default:	`255.255.255.0`
Notes:	This allows you to reduce network address usage.

SNMP Default

Purpose: Defines the type of configuration information created by the SNMP agent. This configuration is in addition to any read from the SNMP file.

Valid Values:
- None
- Read-Only
- Read-Write
- Read-Write (V2)

Default: Read-Write

SNMP File

Purpose: Specifies the names of the SNMP files the netstation downloads at power-up.

Default:

```
$(SearchPath)/etc/$(Personality)snmpdrc
```

Notes: You can decrease the netstation's boot time by setting this value to null.

SP1 Baud Rate

Purpose: Configures the baud rate, handshaking, and so on for serial port 1 to work with a serial line device.

Valid Values: 75, 150, 300, 600, 1200, 2400, 4800, 9600 19 200, 38 400, 56 000, 115 2000

Default: 9600

SP1 Data Bits

Purpose: Sets the data bits for the device on serial port 1.

Valid Values: 7 or 8

Default: 8

SP1 Pacing

Purpose: Sets the pacing for the device on serial port 1.

Valid Values:
- None
- XON/XOFF (Default)
- RTS/CTS

SP1 Parity

Purpose: Sets the parity for the device on serial port 1.

Valid Values: Even, Odd, or None

Default: None

SP1 Stop Bits

Purpose: Determines the number of stop bits used for serial port 1.

Valid Values: 1 or 2

Default: 1

SP2 Baud Rate

Purpose:	Configures the baud rate, handshaking, and so on for serial port 2 (if it exists) to work with a serial line device.
Valid Values:	75, 150, 300, 600, 1200, 2400, 4800, 9600, 19 200, 38 400, 56 000, 115 200
Default:	9600

SP2 Data Bits

Purpose:	Sets the data bits for the device on serial port 2 (if it exists).
Valid Values:	7 or 8
Default:	8

SP2 Pacing

Purpose:	Sets the pacing for the device on serial port 2 (if it exists).
Valid Values:	■ None ■ XON/XOFF ■ RTS/CTS
Default:	XON/XOFF

SP2 Parity

Purpose: Sets the parity for the device on serial port 2 (if it exists).

Valid Values: Even, Odd, or None

Default: None

SP2 Port Use

Purpose: How the netstation's second serial port is used in a duo-serial unit.

Valid Values:
- General
- Serial Session
- SLIP

Default: General

SP2 Stop Bits

Purpose: Determines the number of stop bits used for serial port 2 (if it exists).

Valid Values: 1 or 2

Default: 1

Startup Session

Purpose: Defines what the netstation does after booting.

Valid Values:
- XDMCP Direct
- None
- XDMCP Broadcast
- XDMCP Indirect
- TELNET Session
- Serial Session
- Local Command

- Broadcast Auto

Default: XDMCP Direct

Notes: If no host is specified for XDMCP Direct, the netstation will attempt a direct XDMCP connection to the fileserver.

Subnet Mask

Purpose: The netstation uses the subnet mask to derive the network subnet it is on.

Valid Values: The Subnet Mask must be in dotted decimal format

Default: `255.255.255.0`

Notes: If you do not specify a subnet mask, the netstation chooses a class mask according to the first digit of the netstation's IP address. The class mask defaults are:

Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

References: See also:

- "100VG Subnet Mask"
- "PPP Subnet Mask"
- "PPP2 Subnet Mask"
- "SLIP Subnet Mask"
- "SLIP2 Subnet Mask"
- "Token Ring Subnet Mask"

syslog Class Mask

Purpose:	Specifies which message classes are sent to the specified host.
Valid Values:	A list of message classes, including <EMERGENCY>, <ALERT>, <CRITICAL>, <ERROR>, <WARNING>, <NOTICE>, <INFO>, <DEBUG>, <CLIENTERR>, and <CLIENT>. For more information, see "Syslog Message Classes" in Chapter 3.
Default:	`<EMERGENCY>, <ALERT>, <CRITICAL>, <ERROR>`

syslog Host List

Purpose:	Specifies which hosts the specified message classes are sent to.
Valid Values:	A list of host names or dotted decimal IP addresses separated by commas. Each name or address is optionally followed by a colon (:) and a facility name, optionally followed by a colon (:) and a port number. The following facilities are supported: logKern, logUser, logMail, logDaemon, logAuth, logLpr, logLocal0-7.
Default:	Blank. The default facility is logLocal0.

Tablet Subset Area (W,H,X,Y)

Purpose:	Defines a rectangular area of the tablet where the tablet's pen or puck becomes the pointer device.
Valid Values:	W,H,X,Y represents Width, Height, X Origin, Y Origin (in millimeters).
Default:	0,0,0,0
Notes:	■ Width of 0 disables tablet subsetting. ■ If the XPointer was previously defined as anything other than tablet (e.g., a mouse), the previously defined pointer will become the secondary `Other Pointer`.

TCP Keepalive Count

Purpose:	The number of keepalive probes sent (and not answered) before the connection is declared dead.
Valid Values:	1 to 20000
Default:	8

TCP Keepalive Idle

Purpose:	Controls the number of seconds that the network stack will allow a TCP connection, which has TCP keepalives enabled, to be idle before it sends a probe.
Valid Values:	2 seconds - 2147483647 seconds
Default:	7200 seconds (2 hours)

TCP Keepalive Interval

Purpose:	Controls the number of seconds between keepalive probes.
Valid Values:	1 second to 20000 seconds
Default:	75 seconds (1.25 minutes)

TCP Keepalive With Data

Purpose:	Controls whether keepalive prompts sent by the netstation contain data. For HP-UX 10.*x* systems, this is unnecessary. For HP-UX 9.*x* systems, we recommend that you apply the patch that makes this unnecessary. If you enable this variable, each keepalive probe includes the last byte of the previously sent data. If this data was already correctly received by the

	remote end, it will not be passed to the application again. Sending data in keepalive probes is non-standard and not recommended.
Valid Values:	ON (enabled or yes) or OFF (disabled or no)
Default:	OFF

Telnet Char Set

Purpose:	Controls the character set used for the telnet emulation.
Valid Values:	USASCII HP Roman-8 ISO Latin-1
Default:	USASCII
Notes:	■ Choose USASCII to use 7-bit characters. ■ Choose HP Roman-8 to use 8-bit characters with HP hosts. ■ Choose ISO Latin-1 to use 8-bit characters with non-HP hosts.

Telnet Host

Purpose:	Specifies the IP address or the host name of the TELNET host.
Valid Values:	Any IP name or address.
Default:	0.0.0.0 (defaults to the file server).
Notes:	If you specify a host name, you must also fill in the Name Server and Domain Name fields.

Terminal Name

Purpose: Specifies the name of the netstation.

Valid Values:
- Terminal Name must be unique to the network
- Must be alphabetic or numeric (A to Z, 0 to 9)
- First character cannot be a digit
- Case is NOT significant
- Length is limited to 64 characters.

Default: Blank

Text Font

Purpose: Specifies the default font for text if other fonts cannot be found.

Valid Values: Any font name.

Default: Fixed.

Time Zone

Purpose: Modifies the Time Zone parameter to correctly "timestamp" logging information within the configuration system.

Valid Values: Standard timezone format

Default: EST5EDT

Notes: If your system uses XDM, the control panel clock defaults to Greenwich Mean Time. If you don't live in the Greenwich time zone, you'll need to set the clock by doing the following:

1. To learn the syntax for your time zone, switch to a terminal emulator window and type: `env`
2. Look for the line that reports your time zone (for example `TZ=EST5EDT`).
3. Enter the time zone value (for example, `EST5EDT`) in the Time Zone field.

Token Ring IP Address

Purpose:	The Internet Protocol address for the optional Token Ring interface.
Valid Values:	Must be in valid dotted decimal format and must be unique to the network. The Token Ring interface uses the subnet mask to derive the network subnet it is on.
Valid Values:	Must be in valid dotted decimal format and must be unique to the network.
Default:	Blank

Token Ring Subnet Mask

Purpose:	The Token Ring interface uses the subnet mask to derive the network subnet it is on.
Valid Values:	Must be in valid dotted decimal format and must be unique to the network.
Default:	255.255.255.0

Token Ring Terminal Name

Purpose: The name of the host for Token Ring interface.

Valid Values:
- Terminal Name must be unique to the network
- Must be alphabetic or numeric (A to Z, 0 to 9)
- First character cannot be a digit
- Case is NOT significant
- Length is limited to 64 characters.

Default: Blank

User Monitor

Purpose: If you have a monitor that is not listed in the selection list for the Monitor field, you can define your monitor's characteristics by using a set of pre-defined keywords.

Valid Values: For a complete description of all possible values, refer to the remote configuration sample file: **basepath**/config/sample.cfg

Default: Blank

Notes: The custom monitor definition can be specified as a listing of keywords separated by commas. For example, the HP C2745A monitor could be specified as:

```
98xxx, 1280x1024, 110 dpi, 135.000 Mhz, Horz=(64,192,192),
Vert=(3,3,55), CS AV +BP -SS -E NI
```

Vendor Release

Purpose:	Defines X server identification data at client contact time.
Valid Values:	Integer 0 ... 2147483647
Default:	507000
Notes:	For optimum compatibility with other HP X devices, do not reconfigure this value.

Vendor String

Purpose:	Defines X server identification data at client contact time.
Valid Values:	A string.
Default:	"Hewlett-Packard Company"
Notes:	For optimum compatibility with other HP X devices, do not reconfigure this value.

Warn Cache Mem Used

Purpose:	Notifies user that memory was reclaimed from cache.
Valid Values:	On or OFF
Default:	OFF

Warn Low Frag Size

Purpose:	Specifies the low free memory threshold at which point the netstation announces it is running out of memory.
Valid Values:	0-(total memory)
Default:	128 KB
Notes:	A value of 0 KB disables the warning.

Warn Low Mem

Purpose:	Specifies the low free memory threshold at which point the netstation announces it is running out of memory.
Valid Values:	0-(total memory)
Default:	128 KB
Notes:	A value of 0 KB disables the warning.

Xauthority File

Purpose:	Determines which path or filenames and in which order the netstation searches for its `.Xauthority` file.
Valid Values:	List of fully qualified path names which may include remote configuration variable such as `$(Search Path)`, `$(Base Path)`, and `$(Personality)`.

Default:

```
$(SearchPath)/config/$(Personality).authority
```

XDMCP Display Class

Purpose:	Allows the reconfiguration of the netstation configuration according to display type.
Valid Values:	A string with a minimum length of 80 characters
Default:	Hewlett_Packard_Company-Partnumber

XDMCP Dormancy Period

Purpose:	Specifies the number of seconds to wait for a response to a request before attempting a retry or declaring a failure.
Valid Values:	1 to 65535
Default:	180

XDMCP Host

Purpose:	Specifies the destination of the XDMCP request.
Default:	Blank (defaults to the file server).
Notes:	You can specify an IP address or a host name. If you specify a host name, you must also specify a Name Server and Domain Name.

XDMCP Keepalive

Purpose:	Specifies how many keep alive messages are sent to the XDMCP host.
Valid Values:	0 to 65535
Default:	4

XDMCP Keeptrying

Purpose:	Controls whether XDMCP times out and stops sending requests to the host if it does not respond within the timeout period.
Valid Values:	ON or OFF
Default:	OFF

XDMCP RTX Limit

Purpose:	Specifies the number of times that a request is retransmitted before it is declared failed. This is especially useful when a list of hosts is specified in XDM direct mode.
Valid Values:	1 to 65536
Default:	7

XDMCP Sort By

Purpose: Determines how the hosts in the XDMCP broadcast screen are sorted.

Valid Values: None, Host, Response

Default: Host

XDMCP UDP Port

Purpose: Specifies the port number used by XDMCP. Sets the UDP port number. Can be changed to run dtlogin or vuelogin and XDM simulatneously.

Valid Values: 0 - 65535

Default: 177

Xhosts File

Purpose: Specifies where the netstation should look for its hosts file in conjunction with "Access Control" security.

Valid Values: List of fully qualified path names which may include remote configuration variable such as `$(Search Path)`, `$(Base Path)`, and `$(Personality)`.

Default:

```
$(SearchPath)/etc/$(Personality)hosts
```

Notes: To allow a new host "permanent" access to the netstation, add it to the *terminalname*`.hosts` file. To deny a host access to the netstation "permanently," remove it from your *terminalname*`.hosts` file.

References: See also:

- "Access Control"

XKeyboard Device

Purpose: Determines a specific keyboard device to be the X Keyboard.

Valid Values: `XKeyboard Device =` *device name*

Driver Name	Device Name
PS2_KEYBOARD	PS2_DIN_KEYBOARD
PS2_MOUSE	PS2_DIN_MOUSE
HIL_DRV	FIRST_KEYBOARD, FIRST_MOUSE, FIRST_TABLET, FIRST_BUTTONBOX, FIRST_KNOB_BOX, SECOND_KEYBOARD, SECOND_MOUSE, SECOND_TABLET, SECOND_BUTTONBOX, SECOND_KNOB_BOX
NULL_KBD	NULL_KEYBOARD
NULL_MSE	NULL_MOUSE
HP_TABLET	HP_TABLET
HP_BUTTONBOX	BUTTONBOX
HP_KNOBBOX	KNOB_BOX
PC_MOUSE	PC_MOUSE

Default: Null

Example: `XKeyboard Device = FIRST_KEYBOARD` would make the HP-HIL keyboard the first keyboard if both PS/2 and HP-HIL keyboards were plugged in.

Notes:	This parameter is only necessary if more than one keyboard is hooked up.

XKeymap File

Purpose:	This file, used by the Makemap extension, contains a keymap definition in a subset of the xmodmap format. The keymap should be defined before the modmap using the syntax `keycode nn = keysym keysym ...` . The modmap definition should follow the keymap description.
Valid Values:	`$(SearchPath)/config/`*mymodmap*
Default:	Null
Notes:	For more information about using the XKeymap file and the xtkeymap_ed utility, refer to the file `xtkeymap_ed.doc` in the **basepath/**`doc` directory.

XPointer Device

Purpose:	Specifies which pointer device will be the X Pointer if more than one device is specified.
Valid Values:	Generic names such as TABLET, MOUSE, etc. or full device name.
Default:	Null
Notes:	If no pointer device is present than the X Keyboard device will control the pointer. A PS/2 mouse can be plugged in at a later time.

X Server File

Purpose:	Specifies which base system file to download.
Valid Values:	Any file name, host override available
Default:	Blank
Notes:	By default, the netstation downloads the file: **basepath**/bin/C*xxxx*A (with a TR or VG appended if a token ring or 100VG network card is installed), where *xxxx* is the 4-digit model number on the back of the netstation.

X Server From

Purpose:	Specifies whether the netstation loads its base system over the network or from the ROM card.
Valid Values:	Network or ROM
Default:	Network

X Server Reset Key

Purpose:	If you want to change the default key sequence that resets the X server, this parameter defines the Key name/Keycode to be used instead of the default.
Valid Values:	■ Keynames are generally a restricted set of standard X Keysym names. You can specify the Hex value of the

keysym name (e.g., you can specify `0X80000065` to specify the PS/2 Delete key. For a complete list of valid values, type `xmodmap` and use the value from column 1.

- Keycodes can be specified as

  `<Bit 31|keycode>`

  When specified as a keycode, the X server action will not be re-assigned if you or another user changes keycode to keysym map assignments with xmodmap.

Default: Null

X Server Reset Modifiers

Purpose: Defines the modifier names for the keys which have to be pressed together to reset the X server.

Valid Values: SHIFT, LOCK, CONTROL, MOD1, MOD2, MOD3, MOD4, MOD5

Default: Null

X Server TCP Keepalives

Purpose:	Controls whether the X server enables TCP keepalives for its connections. This includes font server connections.
Valid Values:	ON (enabled or yes) or OFF (disabled or no)
Default:	OFF

C

Solving Bootup Problems

This section includes the following topics:

- "If a "BOOT FAILED" Error Message Appears"
- "Solving BOOTP Problems"
- "Solving NFS Problems"
- "Solving Problems Related to Token Ring"
- "Solving Problems Related to 100VG".

If a "BOOT FAILED" Error Message Appears

If a "Boot Failed" error message appears, identify the specific problem by following the steps outlined in the following sections:

- "Step 1: Review All Error Messages"
- "Step 2: Use the Simplest Configuration"
- "Step 3: Check the Netstation Hardware"
- "Step 4: Test the Network"
- "Step 5: Check TFTP"
- "Step 6: Check the Software Installation".

Step 1: Review All Error Messages

Accompanying the above bootup error message are other error messages. Look them up in Appendix F and take the action suggested there.

Step 2: Use the Simplest Configuration

If you cannot solve the problem in Appendix F, verify that the network and essential host programs are operating normally by downloading the server using the simplest configuration.

In its simplest configuration the netstation depends only on the TFTP software running on the host software.

To use the simplest configuration, connect the netstation to the computer without an intervening gateway.

1. On the (General Network) configuration screen, click on (Factory Defaults), then set `Network Parameters` to (from Fields Below).
2. On the (Ethernet Network) configuration screen, set `IP Address` to the netstation's IP address and `File Server` to the computer with the netstation's base system file.

Step 3: Check the Netstation Hardware

If the netstation does not boot when using its simplest configuration, run the built-in selftests:

1. Access the configuration screens. Depending upon the type of netstation you have, you may need to:
   - Click on the (Setup) icon,
   - Click on (To Config), or
   - Press the space bar.
2. Click on (Diagnostics), then (Selftests).

For more details on the Selftests screen, refer to "Using the Selftests Screen" in Appendix G.

Step 4: Test the Network

Once it is given an IP address, the netstation can respond to a ping.

1. Press and hold (F12) to access the configuration screens.
2. Click on (Network), then click on (Ethernet).
3. Click in the IP Address field and enter your netstation's IP address.
4. Click on (OK).
5. Turn the netstation off and on.
6. To ping the netstation, log into the file server from another netstation or console and type:
   `/etc/ping` *netstation_ip_address*
   for example: `/etc/ping 75.4.11.128`
   (For HP-UX 10.*x* systems, type:
   `/usr/sbin/ping` *netstation_ip_address*).

If the netstation is correctly connected to the LAN, it echoes packets.

Step 5: Check TFTP

If the network is working, but the server code still does not download, check the operation of TFTP as follows;

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts" in Chapter 2.
2. Choose `Installation testing` from the main menu.
3. Choose `Check software installation` from the installation testing menu.

This automatically verifies the operation of TFTP.

If TFTP passes, try increasing the File Timeout setting on the (General Network) configuration screen.

Step 6: Check the Software Installation

If TFTP and NFS fail but the LAN is working, configuration files may not be set up properly on the file server or the netstation software may not be installed correctly:

1. If you have an `inetd` security file at `/usr/adm/inetd.sec`, ensure that you included the IP address of your netstation.
2. If you have a large `/etc/hosts` table (with more than 200 entries), be sure that your netstation is entered near the top of the table.

Solving BOOTP Problems

This section helps you solve some problems you may encounter with BOOTP. See:

- "If You Are Transferring Parameters through a Gateway"
- "If You Have Edited bootptab Manually ... "

If You Are Transferring Parameters through a Gateway

Using BOOTP to transfer parameters through a gateway *may* work, but it is *not* supported; the boot server should be on your immediate network subnet. If you cannot use BOOTP, on the [General Network] configuration screen set the configuration to "Network Parameters [from Fields Below]" and on the Ethernet Network screen type in the network values.

If You Have Edited bootptab Manually ...

If an error is present in an entry, all entries below the erroneous entry are inaccessible. These errors are best diagnosed by turning on `inetd loggin`. Refer to the man page for `inetd` for details.

Note

We strongly recommend that you use the administration script (`xtadm`) to create `bootptab` entries instead of editing the file directly.

For more information about editing `bootptab` manually, refer to the following sections:

- "Including Vendor Information Tags"
- "Size Limitations on Vendor Information"
- "If There Is Not Enough Room for Your Vendor Information ... ".

Including Vendor Information Tags

The BOOTP packet is divided into a standard portion and a vendor information portion. The tags that supply vendor information are *terminalname.domain*, `ds`, `gw`, `sm`, `T144`, and `T145`. `T144` and `T145` are specific to the netstation:

Tag	Description
T144	Specifies the name of the remote configuration file, if any. The name of the file must be in double quotes, for example, `"xterm1.cfg"`.
T145	Specifies the name or IP address of the file server, the computer where the base system code resides, if different from the computer that responds to the BOOTP request (the **boot server**). Two names or IP addresses separated by a blank are permitted; the first is stored in the File Server field and the second is stored

in the Alt. File Server field. The names or IP addresses must be in double quotes, for example, "75.6.8.3 75.6.8.5". Leave this tag out if the file server is the same as the boot server.

Size Limitations on Vendor Information

The total size of the vendor information portion of a BOOTP packet cannot be larger than 64 bytes. Hence, it is important to minimize the length of all strings. It may also be advisable to omit the inclusion of an alternative name server unless it is deemed necessary.

The size of the vendor information portion of a BOOTP packet can be calculated as follows:

terminalname = 2 bytes + string
domain = 2 bytes + string
`ds` = 2 bytes + 4 bytes/name server
`gw` = 2 bytes + 4 bytes for the gateway
`sm` = 6 bytes
`T144` = 2 bytes + string (excluding quotation marks)
`T145` = 2 bytes + string (excluding quotation marks)

If There Is Not Enough Room for Your Vendor Information . . .

If there is not enough room for your information in the vendor information portion of the BOOTP packet, you can still download the information by using a remote configuration file. If you installed your netstations by using the administration script, it created the remote configuration files automatically and you need only to edit them. For details on using remote configuration, refer to Appendix A.

Solving NFS Problems

If the netstation boots using TFTP but not using NFS, NFS probably has not been set up properly:

1. Ensure that your netstations have entries in `/etc/exports` and `/etc/hosts`.
2. Ensure that the installation directory is NFS exported. Usually this happens automatically when you install the netstation software. However, if the installation script was unable to update the necessary file, you may need to do this manually as follows:
   a. Edit the `/etc/exports` file (Note: on Solaris 1.*x* systems, this is `/etc/hosts`. On Solaris 2.*x* systems this is: `/etc/dfs/dfstab`)
   b. Insert a line into this file to reference the installation directory, for example: `/opt/hpxt/enware/xthome`
3. Verify that the NFS mount daemon is running with the secure option switched off. If the secure mode is switched on, the netstation cannot use NFS. Refer to your NFS documentation for information on the operation of the secure option.
4. Verify that NFS is actually running. Use the following commands to verify that the required daemons are running on your file server:

   ```
   ps -ef | grep nfsd
   ps -ef | grep mountd
   ```

5. Verify that the base system file, the X server file, and the fonts have read permission for `other` and that **basepath**`/bin` and your font directories have read and execute permissions for `other`.

If NFS works in general except for certain fonts, there must be something peculiar about these fonts. Look in

`/etc/checklist` (`/etc/fstab` for HP-UX 10.x) and review the partitioning of your file systems.

If you use the administration script to add a netstation while NFS is installed on your computer, your netstation is assigned export permission for all installed software font directories. Additional font directories must be on the same physical drive or disk partition. If your font directories do not meet this condition, you need to edit `/etc/exports`.

If you are able to boot using TFTP but occasionally have problems with NFS, check the number of CRC errors on the Ethernet Statistics screen to see if you have a noisy LAN.

Note

NFS may not work over devices unable to accommodate an entire 8KB NFS read or write buffer sent in a burst. This includes HP Remote Bridges operating over serial links of less than 64 Kbps.

Solving Problems Related to Token Ring

With the addition of the Token Ring adapter card, the ENVIZEX netstation can boot using either the Token Ring or the Ethernet interface. When configured to use BOOTP, the netstation first tries the Token Ring interface. If the attempt fails, the netstation then tries to boot from the Ethernet interface.

Topics in this section include:

- "Normal Behavior"
- "Changing Default Ring Speed"
- "Running Token Ring Selftests".

Normal Behavior

When you boot an ENVIZEX netstation that has a Token Ring adapter card installed, the boot screen displays a Token Ring icon:

If this icon is not present and you have installed an adapter card, open the chassis and ensure the card is seated properly (push down).

Changing Default Ring Speed

With the ENVIZEX Token Ring Adapter, you can connect your ENVIZEX netstation to a Token-Ring network with a speed of either 4 Mbps or 16 Mbps. The default speed is 16Mbps. If you have a Token Ring with a data speed of 4 Mbps, you MUST change the default speed as follows:

1. Press and hold F12 to access the configuration screens.
2. Select the Network screen.
3. Select Token Ring.
4. Change the TokenRing Ring Speed to 4Mbps.
5. Click on OK.
6. Reboot the netstation.

Running Token Ring Selftests

The first step towards diagnosing a problem involving the Token Ring connection is to run the selftests from the (Token Ring) Network screen. A message line below the selftest button displays state messages for 60 seconds, or until the selftest passes, whichever comes first. These messages are also logged to the log screen.

Selftest Messages and Conditions

If the selftest passes, the Token Ring adapter card inserts itself into the ring and functions normally. The message sequence for a normal selftest is:

- Performing Token Ring Selftests ...
- Trying Bring Up Diagnostics
- Bring Up Diagnostics Passed
- Test Passed

If the selftest detects an error, the two most likely causes are:

- The ring is beaconing (most likely due to a speed difference), or
- The cable needs to be re-connected or replaced.

If the Ring Is Beaconing ...

If the ring is beaconing, the usual message sequence is:

- Performing Token Ring Selftests ...
- OPEN: Error During Insertion. Ring Beaconing (check speed)
- Selftest Display Timer Expired

If the selftest determines beaconing on the ring (most likely due to a speed difference), the selftest terminates. After you have changed the Token Ring Speed (Default

= 16Mbps), remember to reboot the netstation to regain the connection to the Token Ring.

If the Cable Needs to Be Replaced ...

If the cable has been disconnected or needs to be replaced, the usual message sequence is:

- Performing Token Ring Selftests ...
- Ring Recovery
- Wire Fault
- Trying Bring Up Diagnostics
- Bring Up Diagnostics Passed
- Selftest Display Timer Expired
- OPEN: Error During Lobe Test. Function Failure.

If you see these messages, examine both ends of the cable to ensure proper connection. If necessary, replace the cable and run the selftest again.

If the selftest fails for any other reason, contact your Hewlett-Packard support representative.

If the Problem Relates to BOOTP

Depending upon the version of BOOTP you are running, you may have to use the `wire link level address` instead of the `option link level address` in the bootptab entry.

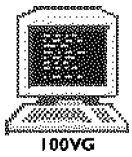
Solving Problems Related to 100VG

Topics in this section include:

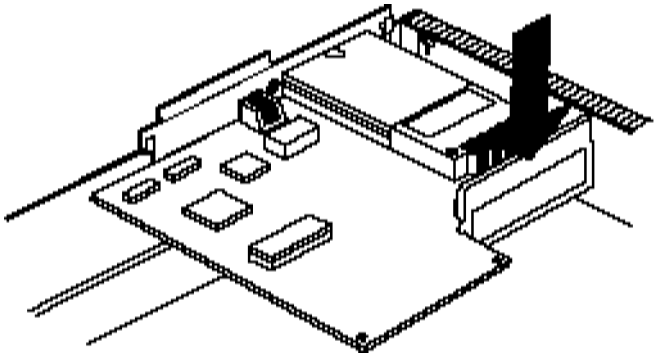
- "Normal Behavior"
- "Selftests"
- "Troubleshooting Hints".

Normal Behavior

When you boot an ENVIZEX netstation that has a 100VG adapter card installed, the boot screen displays a 100VG icon:



If this icon is not present and you have installed an adapter card, open the chassis and ensure the card is seated properly (push down):



If a red "X" appears over the icon, check the cable connection from the netstation to the hub. Click on the Start icon to reboot.

When you attach a netstation to a 100VG network, there is an initial training period (called "logging in a node") during which the hub becomes aware of the node and includes it in its polling cycle. During this period (up to 12 seconds), no data can be sent or received over the network.

Note

The 100VG card for ENVIZEX netstations supports Ethernet framing only: it does not support Token Ring framing.

Selftests

The first step towards diagnosing a problem involving the 100VG connection is to run the selftests from the 100VG Network screen. A message below the selftest button displays diagnostic messages. These messages are also logged to the log screen.

Common messages and suggested actions include:

`The cable may be bad or disconnected`
: Check the connections at the netstation and the hub. Replace the cable to verify problem diagnosis.

`The cable has too much noise`
: Replace the cable from the netstation to the hub to ensure optimum transmission. Use a 4-pair, voice-grade or better (type 3) cable for 100VG connections.

Troubleshooting Hints

1. Run the selftests as described in "Selftests". If an error occurs, take the appropriate action as indicated by the error message. Check the log screen (in the Diagnostics configuration screens) for all messages.
2. Monitor the 100VG network statistics. Choose 100VG Statistics from the Diagnositics screen menus. These statistics measure the number of frames received and transmitted and may indicate errors occurring on the LAN or possible hardware problems.

D

If the Printer Will Not Print

If the printer connected to your HP netstation fails to print, your system could have a bad connection or, in the case of a serial printer using XON/XOFF handshaking, the printer may have developed a handshaking problem. Refer to:

- "If You Suspect a Bad Connection"
- "Host-Side Sockets"
- "If the Printer Fails with an XOFF Pending ... "

If You Suspect a Bad Connection

If the printer connected to your netstation is configured to match the configuration of the netstation but does not print data, the printer may have a bad connection. Refer to:

- "Test the Netstation-to-Printer Connection"
- "Test the Computer-to-Printer Connection".

Test the Netstation-to-Printer Connection

To test the netstation-to-printer connection on non-PostScript printers, use the (Print Test) function.

1. Press and hold (F12) to access the configuration screens.
2. Click on (Terminal).

3. Click on the Print Test button.
4. Choose one of:
   - Serial 1
   - Serial 2
   - Parallel.

   Your printer should print your netstation's configuration data.
5. If your printer does not print, check the cable, the serial port's flow control settings, and the printer for problems.

Test the Computer-to-Printer Connection

To test the computer-to-printer connection, do the following:

1. Invoke the administration scripts, as described in "Running the Netstation Administration Scripts" in Chapter 2.
2. Choose `Printers, plotters` from the main menu.
3. Choose `Check operation of a printer or plotter`.

This script uses `ping` to verify that the netstation is connected to the LAN, then send a test file to the printer. This test bypasses the print spooler.

Host-Side Sockets

The HP netstation's serial port connects to the host-side socket with the port number 9100. If you have a second serial port on your netstation, it connects to the host-side socket with the port number 9102.

The HP netstation's parallel port connects to the host-side socket with the port number 9101.

If the Printer Fails with an XOFF Pending . . .

If your printer uses XON/XOFF handshaking, it is possible to have the printer fail while the netstation's serial port is locked with an XOFF. When the printer is ready to print again, it should send an XON signal. If it does not, you can cause the netstation to cancel the XOFF it has stored by doing the following:

1. Press and hold (F12) to access the configuration screens.
2. Click on (Terminal).
3. Change the Serial Port pacing from (XON/XOFF) to (None).
4. Click on (OK).
5. Press (F12) to return to the configuration screens.
6. Change the Serial Port pacing from (None) back to (XON/XOFF).
7. Click on (OK).

E

Solving Client Startup Problems

The following are common problems encountered with X clients:

Reliance on R3 Bugs

Some old clients may rely on X11R3 bugs for some features. For example, some X11R4 versions of `xterm` (but not the local client shipped with the software) use an X11R3 bug for displaying popup menus. If you find that a client runs with an X11R3 server, but does not run with the current X server, try switching on R3 Compatible.

Some clients do not rely on the user to set the font path and attempt an `X_SetFontPath` to find the fonts they need. With versions later than X11R3, if this attempt fails, the server returns an error and the client hangs even if the required font is already in the font path. The client may begin to work if you go to the configuration screens and switch on R3 Compatible. Another fix is to move the required fonts to the directory where the application expects to find them.

Missing Fonts

A client may also hang or quit if it requests fonts that are not in the font search path of the X server. To determine the font path, look on the Server configuration screen. You can change the font path by typing in new paths.

`DISPLAY` Variable Not Set

If you log into a computer using TELNET, you must set the `DISPLAY` variable to the netstation's *ip_address*`:0.0` (use `DISPLAY=`*ip_address*`:0.0 ; export DISPLAY` for Korn or Bourne shell `setenv DISPLAY` *ip_address*`:0.0` for C shell.)

Insufficient Memory

If low-memory warnings pop up on your screen, you need more memory.

If backing store is on, you should be able to free up some memory by going to the configuration screens and switching it off. Press and hold F12 to access the configuration screens. If the `Backing Store` button reads When Mapped or By Application, click on it until it reads Disabled. Click on OK and then reboot your netstation.

If you are using local clients, you may need to stop and use host-based versions instead. For more information about local clients and memory requirements, refer to Chapter 9.

You can also add more memory to your netstation.

Too Many Clients

The netstation supports in excess of 100 clients at the same time.

Too Many Connection Requests

The netstation queues up to 25 requests from the computer to open connections to the X server at the same time. If you attempt to open more than 25 clients too quickly, some may fail to open.

Local Client Not Found

If the login server and the boot server are different, do the following:

1. Copy the hpxt binaries from the login server to the boot server. The path (on both servers) is:
   `/usr/bin/X11/700X/hpxt.*`
   or, for HP-UX 10.*x*:
   `/opt/hpxt/enware/bin/hpxt.*`
2. If the login server is running HP-UX 10.*x*, create the following link:
   `ln -s /opt/hpxt/enware/bin /usr/bin/X11/700X`

F

Messages

Messages can appear in various places:

- Before the server code has been downloaded to the netstation, the boot screen displays messages.
- After the server code has been loaded, the log screen records any messages generated by the X server or the netstation's hardware.
- You can use syslog message classes to filter messages in the log screen and send them to one or more hosts. For more information, see "Filtering Log Messages" in Chapter 3. Note that some messages are generated from ROM and cannot be forwarded.
- Some messages appear on the TELNET screen.

To View the Log Screen

To view the Log Screen once the server has started:

1. Press and hold F12 to access the configuration screens.
2. Click on Diagnostics, then click on Log Screen. The Log Screen appears.
3. Click on the Report button to select the desired reporting level for the Log Screen.

Note

X Window System and operating system error messages also appear on the boot screen and the Log Screen. These messages are documented elsewhere.

Reviewing Syslog Messages

Refer to the following sections for a list of important messages, organized by syslog message class. Where appropriate, additional information for the message is provided. Messages with a message class less than `NOTICE` have been omitted.

CRITICAL Messages

`Duplicate IP Address.`
: The configured network address is being used by another host.

`Hardware failure --- Cannot access link address`
: An EEPROM failure

`The terminal's IP address is not in valid dotted decimal format.`
: Check the Network screen. In fact, the address is in valid format, but has not been changed from its factory default value of `0.0.0.0`.

`Trying BOOTP.... failed.`
: No computer responded to the netstation's boot request. The netstation sends bootp requests every minute until successful or until you press a key.

ERROR Messages

`Bad file path specified:` *path*

`Bad font path:` *path*

`Boot failed.`

`Can't open '`*filename*`':`

`Cannot resolve host name '`*hostname*`'`

`Config File Error:`

`Default cursor font failed:` *font*

`Default font failed:` *font*

`EEPROM error:` *error*
: The EEPROM is defective. Returning to factory defaults. Action: type in configuration data.

`EEPROM overflow: configuration not saved`
: Too much configuration data was specified to save in EEPROM.

`Failed to load X Server:` *hostname*

`Failed to open` *device* `driver for rp910`*x* `printer task.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port. *device* is `/dev/serial1`, `/dev/parallel`, or `/dev/serial2`.

`Failed to open directory:` *directory*

`File server '`*hostname*`' down or unreachable.`

`Font not found:` *'font'*

`Font path failed:` *'path'*

`Host communications error in rp910`*x* `printer task.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port.

`Host connection attempt failed for rp910`*x* `printer task.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port.

`Invalid File Server.`

`Invalid File Server:` '*hostname*'

`Invalid or missing disk detected.`
: A floppy disk was not found.

taskname`: malloc(`*num*`) failed`
: Too little memory is available.

`name server down or unreachable.`
: A name server cannot be contacted with **ping**.

`Name server not responding.`
: A name server does not answer a name query.

`Network initialization failed for rp910`*x* `printer task.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port.

`No Domain Name specified. Cannot configure name server.`

`No File Servers Specified.`

`No memory available for rp910`*x* `printer task read buffer.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port.

`No memory available for rp910`*x* `printer task write buffer.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port.

filename`: Not an extension file.`

`Not enough memory to start local client.`

`Not enough memory.`

extension`: Not found in database.`
: No extension with the specified name exists.

`Out of memory: local client terminated.`

`Peripheral device control error in rp910`*x* `printer task.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port.

'*device*' `port read error in rp910`*x* `printer task.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port. *device* is `/dev/serial1`, `/dev/parallel`, or `/dev/serial2`.

'*device*' `port write error in rp910`*x* `printer task.`
: *x* is 0 for the first serial port, 1 for the parallel port, or 2 for the second serial port. *device* is `/dev/serial1`, `/dev/parallel`, or `/dev/serial2`.

`PPP extension not loaded.`

`PPP initialization error (`*description*`).`

`PPP option negotiation failed.`
: Local and remote PPP could not agree on a set of communication parameters.

'task' `routing task spawn failed.`

`SLIP initialization error (`*description*`).`

`TELNET: No connection.`
: TELNET could not open a connection to the TELNET host. The TELNET host name/IP address is correct, but the computer does not respond.

`TELNET: Resolving host address ... unknown host.`
: Check the Server and Network screens. This message appears briefly if the TELNET host name cannot be resolved. Likely causes are that the TELNET host does not appear in the name server database, that the wrong IP address appears in the Name Server field, or that the wrong Domain Name appears in the Domain Name field.

extension`: Unable to load.`

`XDM: Declaring Session dead`

WARNING Messages

`Autodetected monitor/cable unsupported. Using default.`

`Cleared Alternate` *var* `Link Level Address: 000000000000`
: *var* is `Ethernet` or `Option`.

`Default configuration used`
: EEPROM has been cleared.

`Invalid Alternate` *var*`: '`*altlla*`'`
: *var* is either Ethernet or Option. *altlla* is the alternate link-level address.

`Less than` *num*`KB of free memory.`

`Link level addresses writable!`

`Network cable fault detected.`
: If the netstation continues to boot, this is not a serious problem. Confirm the following:

  - All netstations are connected to the LAN through a T-connector
  - Each segment of the LAN ends with a 50-ohm terminator
  - No section of a ThinLAN cable has a length that is a multiple of 5 meters
  - The LAN cable does not have severe bends or kinks
  - No segment of ThinLAN is longer than 185 m (600 ft.) or shorter than 1 m (3 ft.).

`Network cable not connected` *var*

`Network hardware fault: run selftests.`
: To run self tests, press F12 and click on Diagnostics, then Selftests.

`No devices on HP-HIL, KEYBOARD or MOUSE ports`

`No EtherTwist hub detected.`

`Server ROM not installed.`
: Check the Server screen. The netstation is configured to get its X server from ROM, but there is no ROM server installed.

`Unable to load log screen font: switching to English. Some messages in log may be unreadable`
: The `$LANG` variable indicates that you are using a Japanese system, but the required Japanese font could not be loaded. English messages will be used instead of Japanese messages.

NOTICE Messages

`DHCP: Couldn't contact DHCP server while renewing address for` *interface*`. Broadcasting renewal request.`

`HIL Device detected: Unknown device`
: You have an unsupported keyboard or mouse plugged into the HP-HIL port.

`Less than` *num*`KB of free memory in largest fragment.`

`Mouse reset FAILED!`
: You have something other than a mouse plugged into the mouse port.

`Name servers not responding.`
: Check the General Network screen. The Name Servers specified are not responding.

`X Server grabbed, can't start configuration`
: Local configuration could not start.

`X Server Reset:`

`XDM: Too many retransmissions`

G

Diagnosing Problems from the Configuration Screens

You can use the netstation's configuration screens to monitor performance and diagnose some types of problems. Online help is provided for fields in the configuration screens. Once the server code has been downloaded to the netstation, you can use the right mouse button to display help on any configuration field.

This section provides additional information about accessing and using diagnostic information on the configuration screens.

Note

If an entry is made in the Password configuration field, access to the Network, Server, and Terminal configuration screens requires that password.

If the configuration screens have been locked from the host, only the system administrator can unlock the netstation's configuration screens.

Topics in this section include:

- "Determining Your Software Version"
- "Using the Statistics Screens"
- "Using the Selftests Screen".

Determining Your Software Version

Before you contact your system administrator or support representative for assistance, check the version of the software you are currently downloading to your netstation:

1. Press and hold (F12) to access the configuration screens.
2. Select (Diagnostics).
3. Select (Installed Configuration).
4. Look under the "Version" heading for the "Server" entry. The current software release at the time this manual was printed is: `B.07.10`.

Using the Statistics Screens

The Statistics screens contain information about the network and memory usage. To access any of the Statistics screens, click on (Diagnostics).

Using the Selftests Screen

If the netstation appears to be configured correctly, but still does not boot or fails to print, power cycle the netstation and run the selftests to verify that the netstation is in working order:

1. Turn your netstation off.
2. Disconnect your netstation from the network.

3. Attach a BNC loopback connector to the LAN port. Refer to "Making a LAN Loopback Connector".
4. Attach an RS-232 loopback connector to the serial (RS-232) port. Refer to "Making an RS-232 Loopback Connector".

Note

Testing the serial port with an external loopback connector provides a reasonable test for the circuitry of the serial ports.

5. Turn your netstation on.
6. Click on the (Setup) icon or (To Config) immediately after the netstation beeps.
7. Click on (Diagnostics), then (Selftests).
8. Click on all of the test buttons that have "selected" lights.
9. Click on (Internal) once to select the External RS-232 loopback test.
10. Click on (Stage 1 Internal) twice to set up the External LAN loopback test.
11. Click on (Start Tests) to execute the tests.

    (Continuous) specifies whether or not the self tests repeat continuously. To stop a continuous test, click the left mouse button 3 times, or press any key on the keyboard. The current test will run to completion before the tests stop.

    Keystrokes and button clicks may be lost during the Keyboard/Mouse selftest. Repeated attempts may be necessary to stop continuous execution of this test.

If a failure occurs, contact HP support for servicing.

Making a LAN Loopback Connector

LAN loopback tests require that you attach a BNC loopback connector to the LAN port. You can use the LAN port for your LAN loopback tests whether or not you normally connect to the LAN through the LAN port (as long as the AUI port remains unconnected).

To make a BNC loopback connector, put 50 ohm LAN terminators on the ends of a LAN T-connector.

Making an RS-232 Loopback Connector

To make a loopback connector for the serial (RS-232) port, connect the following:

- pin 1 to pin 7
- pin 2 to pin 3
- pin 4 to pin 6
- pin 7 to pin 8
- pin 8 to pin 9.

Glossary

access control

1. On HP netstations, a configuration parameter that, when switched on, restricts the computers that can communicate with your netstation to:
   - the TELNET host
   - the X session manager
   - hosts listed in the file **basepath**`/etc/`*terminalname*`.hosts` (where *terminalname* is the **terminal name** or **IP address** of your netstation).
2. On host computers running the X11R5 version of XDM or HP VUE, you can configure one of the following files to prevent a netstation or a range of netstations from receiving X session management services from the host computer:

   `/usr/lib/X11/xdm/Xaccess`
   `/usr/vue/config/Xaccess`
   `/opt/hpxt/enware/xdm/Xaccess` (HP-UX 10.*x*)
   `/etc/dt/config/Xaccess` (HP-UX 10.*x*)

administration script

You can use the administration script (`xtadm`) to do the following:

- Create or remove a netstation's remote configuration file and the netstation's entry in `bootptab` and `/etc/hosts`

- Add or remove a netstation in `/bootptab` and `/etc/hosts` and create or remove a remote configuration file for the netstation
- Add or remove a printer connected to a netstation
- Check the installation of the netstation software
- Check the operation of BOOTP, TFTP, and XDM
- Control the operation of XDM.

For information about invoking the script, see "Running the Netstation Administration Scripts" in Chapter 2.

agent
The SNMP software that runs on the equipment being controlled, such as the netstation. The agent is polled by the **network manager**, which runs on a host computer.

Aserver extension
A downloadable extension for use with the audio card. This extension is loaded by default on any ENVIZEX or ENTRIA netstation with the audio card installed.

backing store
A feature that saves parts of windows that are obscured by other windows. This feature can improve performance, but can also quickly consume the netstation's memory.

basepath
All downloadable netstation files have this path in common. Normally it will be:

Platform	**Default Base Path**
HP-UX 9.*x*	`/usr/lib/X11/700X`
HP-UX 10.*x*	`/opt/hpxt/enware/xthome`
IBM AIX	`/usr/lib/X11/700X`
SCO UNIX	`/usr/lib/X11/700X`
Sun/Solaris	`/usr/lib/X11/700X`

base system
The hardware-dependent file that is used when starting up the netstation. The default file name is: **basepath/**`bin/C`*xxxx*`A`

(with a `TR` or `VG` appended if a token ring or 100VG network card is installed), where *xxxx* is the 4-digit model number on the back of the netstation.

See also **X server**.

BOOTP
Boot protocol, a standard protocol for downloading network configuration data to a netstation. The computer looks for a netstation's Ethernet address (which is contained in the boot request) in the **bootptab** file and, if it is found, downloads the netstation's configuration information.

Alternatives include using **DHCP** or the configuration screens.

bootpquery
A diagnostic tool that sends out boot requests and reports the responding boot servers. `bootpquery` can detect responses only if the boot server has the `ba` flag set.

bootptab
A file that contains configuration information, including **IP address**, for an entire network. Typically, `bootptab` is located in:

- On HP-UX and IBM systems: `/etc/bootptab`
- On SCO and Sun systems: *install_directory*`/usr/etc/700X/bootptab`

boot request
A request for network configuration information that a netstation submits when it is switched on. This request includes the netstation's Ethernet address.

boot server
The computer that responds to a netstation's **BOOTP** or **DHCP** request. By default, the boot server is also the **file server**. You can change this by using the `T145` tag in the **bootptab** file.

clients
Programs written specifically for the X Window System, for example `mwm`, `xterm`, and `xclock`.

clock (local client)
On Sun systems, a local OpenLook clock client.

control panel
In VUE/RX and HP VUE, a window that shows the time and date and contains a collection of icons you can use to launch frequently-used applications. The control panel services all your workspaces.

In VUE/RX, the control panel is set up by the user's `.Xdefaults` and `.vuerxrc` files. These files are derived from **basepath/**`lib/app-defaults/Vuerx` and **basepath/**`vuerx/sys.vuerxrc` respectively.

CSLIP
Compressed Serial Line Internet Protocol, a method by which a netstation can communicate with a host computer connected to the netstation's serial port. CSLIP is not supported on HP-UX 9.*x* computers.

See also **SLIP**.

C*xxxx*A files
The C*xxxx*`A` files (which are found in **basepath/**`bin`) contain the **base system** code for the HP netstations. Each netstation looks for the appropriate base system code automatically. The X server classname is `Hewlett_Packard_Company-C`*xxxx*`A`, where *xxxx* matches the model number of the netstation (for example, `Hewlett_Packard_Company-C2731A`).

DEC_XTRAP extension
An extension that "traps" and records mouse, keyboard, and notify events when used with DEC_XTRAP software on the host. This extension is most useful in debugging software programs or looking at what events are occurring inside the X server.

DHCP
Dynamic Host Configuration Protocol, a standard protocol for downloading network configuration data to a netstation. Unlike **BOOTP**, which sends network configuration data only if the netstation is listed in the **bootptab** file, DHCP sends network configuration data to any netstation as long as the DHCP daemon has **IP address**es and **terminal name**s available in its database.

dkmserver extension
An X server extension that enables you to send a predefined keyboard map to the window that runs a particular client.

domain
The part of each netstation's unique address (**host name**) that follows the first period. For example, if the address is `xnet4.tw.usa`, then `xnet4` is the **terminal name** and `tw.usa` is the domain. The domain name is the unique name for your network; the terminal name is tied to your **IP address** and is unique to your netstation. You do not need to specify a domain if you do not use a domain **name server**.

domain name server
See **name server**.

drag
To press *and hold down* a mouse button while moving the mouse on the desktop (and the pointer on the

screen). Typically, dragging is used with menu selecting, window moving, and window resizing.

dtterm (local client)
A local client CDE terminal emulator. It is part of the HP Netstation Software CDE optional product.

dtwm (local client)
A local client CDE desktop window manager. It is part of the HP Netstation Software CDE optional product.

HP Netstation Software VUE/RX
A local-client window manager that adds an HP VUE-like control panel and workspaces to an mwm-like window manager. For more information and memory requirements, refer to Chapter 5.

Ethernet address
Another name for the hardware (or link-level) address, a unique identifier required for every device that operates on a network (for example, 08000908acf6 (hex)). The netstation's Ethernet address is on its shipping carton, its boot screen, and its configuration screens.

file server
The computer that sends a netstation the files it requires (such as the fonts and the **base system** file). This is not the same as a cluster server, which controls the file-system disk drive in a network cluster.

Floppy extension
A downloadable extension that is automatically loaded by ENVIZEX netstations with the optional floppy drive installed. This extension supports reading and writing IBM-Formatted DOS diskettes through the NFS protocol. For more information

about the floppy drive, see "Using the Floppy Drive" in Chapter 6.

font
A collection of characters that have a characteristic shape. For example, the body of this manual is printed in Modern Roman font, while the headlines are printed in Helvetica.

fonts.alias
A file that sets up font aliasing. Each font directory should contain a `fonts.alias` file. The `fonts.alias` file must contain the following line:

```
FILE_NAMES_ALIASES
```

This line allows you to call fonts by their filenames (without the `.snf` extension). For example, you can enter an R3 fontname such as:

```
-adobe-courier-bold-o-normal--10-100-75-75-m-60-hp-roman8
```

as `courB010` (the filename is `courB010.snf`).

The `fonts.alias` file may also contain lines similar to the following:

```
fixed  -misc-fixed-medium-r-semicondensed--13-120-75-75-c-60-iso8859-1
variable  -*-helvetica-bold-r-normal-*-*-120-*-*-*-*-*-*
```

These lines tell the X server which fonts to use whenever a client calls for a font called `fixed` or `variable`. A good definition of `fixed` is quite important. It is the font that clients usually accept when the font they request is not available.

`fixed` and `variable` can only be defined once. The first occurrences of `fixed` and `variable` in the font path define the `fixed` and `variable` fonts. Occurrences in subsequent `fonts.alias` files are ignored.

fonts.dir
A file that lists the fonts found in a directory and maps the font names used by clients to font files. To find a font, the X server checks the `fonts.dir` files of the directories in its font path.

font path
A list of font directories the X server searches to find the fonts that it needs.

font server
A program that creates fonts as needed, rather than having the computer store the various font styles, sizes, and weights in separate bitmap files.

gateway
A device that allows interconnection between computer networks, such as a router.

home directory
The initial directory that you are placed in when you log on. Typically, this is `/users/`*username*, where *username* is your logon name. You keep all "your" files in or under your home directory.

The `HOME` environment variable contains the path of your home directory. Type `echo $HOME` to find the value of this variable.

host name
A unique string that identifies a computer on the network. It consists of a **terminal name**, possibly followed by a period and a **domain**. For example, in the host name `pc.tw.usa`, `pc` is the terminal name and `tw.usa` is the domain. You do not need to specify a domain if you do not use a domain **name server**.

hosts table
A list of host names and the corresponding **IP address**; typically, `/etc/hosts`.

hpnpf
A the utility that is used by the print spooler. A print command causes the wrapper-model script to use `hpnpf` to complete a print request.

hpnptyd
A daemon that starts a separate child process for each serial or parallel port input device.

hpterm
A client that displays a terminal window that emulates HP 2622-compatible terminals. A local `hpterm` client is supplied with the software. For more information, see the man page for `hpxt.hpterm`.

icon
A small, graphic representation of an object on the root window. Objects can be "iconified" (turned into icons) to clear a cluttered workspace and "normalized" (returned to their original appearance) as needed. Processes executing in an object continue to execute when the object is iconified.

image
A set of files that can boot and run a netstation.

IP address
An Internet Protocol address consists of four decimal integers separated by periods. Each integer represents eight bits (an octet) of an IP address. The IP address consists a network portion and a host portion.

link-level address
See **Ethernet address**.

local clients
Applications that run directly on the netstation rather than on the host. The most common local clients are window managers and terminal emulators. Local clients reduce host loading and network traffic, but require netstation memory.

local configuration
Configuring each netstation from its own configuration screens.

See also **remote configuration**

login server
A computer that runs an X session manager such as XDM, HP VUE, dtlogin, or scologin. By default, the file server is also the login server.

Log2File extension
A downloadable extension that dumps log screens to a file.

magic cookie
The client authorization mechanism used in HP netstations. The magic cookie is a key generated by `dtlogin`, `vuelogin`, `scologin`, or XDM and sent to the X server at login time. Each X session has one, unique, key.

Makemap extension
A downloadable extension that creates and adds a keyboard map from the file specified in the "XKeymap File" remote configuration variable. The configuration screens present this added map in the list of usable keyboards. (The keyboard map must be in "xmodmap" format.)

Management Information Base (MIB)
A list of variables (SNMP objects) that an SNMP agent can access. The standard lists are called MIB I and MIB II.

modules.ld
The `modules.ld` file (**basepath/bin/modules.ld**) lists the local clients that are available to HP netstations. The contents of this file are displayed on the Preferences configuration screen (for local clients) and on the Server configuration screen's Extensions popup window (for downloadable extensions).

MPEG

1. An internationally recognized standard for compressing and decompressing video and synchronized sound.
2. A downloadable extension used by the video player.

MultiBuf extension
A downloadable extension that lets graphic and animation-intensive software use "software multi-buffering" in the netstation. This results in faster visual performance and smoother image rendering.

mwm (local client)
A local-client version of the mwm window manager.

name server
The computer that resolves host names and their corresponding **IP address**. If you use a name server, you can enter the host name (rather than the IP address) in the configuration screens. HP netstations support DNS and local (`/etc/hosts`) name services.

netmask
See **subnet mask**.

network manager
The SNMP software that runs on a host computer. HP's version of this software is called Network Node Manager (NNM); the X windows extension to this software is X Node Manager (xnm). NNM is part of Open View/UX (OV/UX), HP's network management package.

NFS
Network File System, a file-transfer mechanism for downloading X server code and font files from the **file server** to the netstation. NFS is a faster alternative to **TFTP**.

NFSServer extension
A downloadable extension that is loaded with the Floppy extension, or separately by systems containing Flash ROM card options. This extension lets you read and write either to the floppy disk (if that option is installed) or the ROM card through the NFS protocol.

NIS server
The computer that resolves host names and their corresponding **IP address** on systems that use the NIS name service.

node name
See **terminal name**.

non-X-client
A program that is written to run on a netstation and so must be "fooled" by a **terminal emulator** into running in the window environment.

olwm (local client)
On Sun systems, a local OpenLook window manager client.

peer
An intermediate process that can start a local client. The peer seeks out specific information about your netstation from your $HOME directory and passes it along to the local client. We recommend that you always start local clients by using their peer processes (with names `hpxt.*`).

ping
A program that sends an echo packet, usually once a second. Each packet is echoed back and the time taken displayed. When `ping` terminates, a screen of communications statistics is displayed. The ping program is located in `/etc/ping` (`/usr/sbin/ping` for HP-UX 10.*x*).

pointer
Sometimes called the "mouse cursor," the pointer shows the location of the mouse. The pointer's shape depends on its location. In the root window, the pointer is an ×.

PPP

1. Point-to-Point Protocol, an Internet standard for transferring data within UNIX systems, and between UNIX and other systems. You can use PPP to make a connection from netstation to host.

   See also **SLIP**.

2. A downloadable extension.

primary manager
The XDMCP manager that relays a netstation's indirect request for an X session manager to a list of secondary managers. These secondary managers can send the netstation a "willing" response to indicate that they are available to provide X session management.

pseudo-terminal driver
A program that allows the computer to talk to a device on the LAN as if that driver were connected directly to one of the computer's output ports.

Each pseudo-terminal driver has two sides, a master side that talks to the hardware device and a slave side that talks to the application software within the computer.

Each pseudo-terminal driver is designated by two characters in the form *ah*. *a* is an alphabetic character from `p` up to `z`, depending on how many pseudo-terminal drivers are on your system. *h* is a hexadecimal number from 0 to f.

The master side of the pseudo-terminal driver is controlled by a `pty`*ah* file in `/dev/ptym` and the slave side of the pseudo-terminal driver is controlled by a `tty`*ah* file in `/dev/pty`. Thus, the pseudo-terminal driver `r8` would be controlled by the following two files:

master-side of `r8`	`/dev/ptym/ptyr8`
slave-side of `r8`	`/dev/pty/ttyr8`

RARP
Reverse Address Resolution Protocol, a protocol for downloading network configuration data to a netstation. The network configuration data, which includes the **IP address** of the netstation and of the computers it accesses, enables the netstation to

communicate directly with the other devices on the network.

reboot
To reload the X server code. The easiest way to accomplish this is by switching the netstation off and on.

remote configuration
Configuring all netstations from the host.

See also **local configuration**

reset
To restart the X server code that is already loaded into the netstation. Resetting closes all connections to X clients and activates certain configuration parameters, such as the XDMCP method, and reloads the fonts. To reset the netstation either Exit your session manager (the recommended method) or press the following keys:

- On PC 101/102/104 layout keyboards: Ctrl Alt Delete
- On 46021A HP-HIL keyboards: Ctrl Shift Reset
- On the LK201-layout keyboard: Ctrl Shift F4
- On the Sun Type 4 layout keyboard: Ctrl Alt Delete

rgb.txt file
A file that maps color names to the output of the monitor's color guns.

root menu
The menu associated with the root window. The root menu enables you to control the behavior of your environment.

root window
The backdrop of your X environment when you start X. Although you can hide the root window under windows or other graphic objects, you can never position anything behind the root window. All windows and graphic objects appear "stacked" on the root window.

ScanServer extension
Automatically loaded by ENVIZEX netstations installed with an optional SCSI/ROM kit, the ScanServer extension provides the "driver" information necessary to use supported HP scanners across the network. HP deskscan software, standard on HP MPower installations, is also required.

scologin
On SCO systems, a program used to take care of the login process and control X server displays. It checks the password file, selects a system shell, and sets up the user's environment. It starts clients automatically when users log in and closes sessions automatically when users log out.

session manager
See **X session manager**.

SharedX (local client)
A local client version of SharedX, which lets you share X windows with any other X capable device on the network, including non-HP X servers. The sender must run the **SXext extension**; the receiver does not need to run SXext.

As the sender, you can:

- Decide who may input to a shared window
- Control whether the receiver can input into the shared window

- Allow the receiver to forward the window to another receiver, (termed "daisy chaining").

During a SharedX session, you can also choose to use a shared pointing device, called a "telepointer", which can be manipulated by both the sender and all receivers. SharedX also includes a sample address book, font aliases and user preferences.

Before you start SharedX as a local client, make sure you disable the Client Authorize and Access Control parameters from the configuration screens.

SLIP

Serial Line Internet Protocol, a method by which the netstation can communicate with a host computer connected to the netstation's serial port. If you set a netstation to initiate communications in SLIP and it receives a response in CSLIP, the netstation switches to CSLIP.

See also **CSLIP** and **PPP**.

SNMP

Simple Network Management Protocol, a protocol used in network monitoring and management. The term "SNMP" is usually taken to mean the protocol, daemons, and MIBs used in network management.

Snmpd extension

A downloadable extension that supports SNMP Version 1.

SnmpdV2 extension

A downloadable extension that supports both SNMP Version 1 and party-based SNMP Version 2.

subnet mask

Four decimal integers that subset the host address space into multiple subnetworks. When the subnet mask is expressed as a binary number, each 1

represents a network part of the **IP address** (which is the same for all devices in the subnet), and each 0 represents a host part (which can be different for different devices).

For example, if the subnet mask is `255.255.0.0`, the device with IP address `25.7.1.15` is part of the same subnet as every other device with IP address `25.7.`*x.x*.

The default subnet mask depends on the first digit of the netstation's IP address:

Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

SXext extension

A downloadable extension used by SharedX (either the host version or the local client). To use SharedX, the sender must run the SXext extension; the receiver does not need to run SXext.

sync

To display a data image, a monitor must synchronize (sync) its screen refresh rate with the output of the netstation. To make this synchronization possible, the netstation sends out a sync signal that tells the monitor when the next bit of data is coming. There are two common ways of providing this sync signal:

- External sync (also known as digital sync). Horizontal and vertical synchronization signals are sent on two separate lines. Digital sync is part of the VGA standard.
- Internal sync (also known as sync on green in the case of color monitors and composite sync in the case of monochrome monitors). Synchronization signals are sent on the line that carries green or monochrome information to the monitor.

Internal sync is typically used with high resolution monitors.

Sync extension
A downloadable extension that lets clients synchronize via the X server. This eliminates the network delays and the differences in synchronization primitives between systems. The extension provides a general counter resource; clients can alter the value of a counter, and can block their execution until a counter reaches a specific threshold. For example, two clients share a counter initialized to 0; one client draws graphics and then increments the counter; the other client is blocked until the counter is 1, and then draws additional graphics.

sys.xsession
A sample startup script used with XDM (and `dtlogin` or `vuelogin` in XDM-mode) if `.xsession` (or `.xinitrc`) is not found in the user's home directory. A sample `sys.xsession` file is located in:

- On HP-UX 9.*x* systems: `/usr/lib/X11/xdm`
- On HP-UX 10.*x* systems: `/opt/hpxt/enware/xdm`
- On Solaris 1 systems: `/usr/enware/usr/lib/X11/xdm/`
- On Solaris 2 systems: *installdir*`/usr/lib/X11/xdm/`
- On SCO UNIX systems: `/u/enware/usr/lib/X11/700X/examples/`

Sun users can copy a sample `.xinitrc` file from `$OPENWINHOME/lib/Xinitrc`.

TELNET

1. The Internet standard protocol that allows a user at a netstation to interact with a remote computer over a network.
2. A downloadable extension (loaded by default) that allows the netstation to use the TELNET (and serial) protocols to different hosts (or serial devices) via local clients. Unloading this extension saves approximately 70KB of memory.

terminal emulator

A window that emulates a complete display terminal. Terminal emulators are typically used to "fool" non-X-client programs into believing they are running in their favorite netstation. When not running programs or executing operating system commands, terminal emulators display the command-line prompt.

Common terminal emulators include **hpterm**, which emulates HP terminals, and **xterm**, which emulates DEC VT102 and Tektronix 4014 terminals.

The software contains several *local* terminal emulators that run on the netstation, thus reducing the load netstations place on the host system.

terminal name

The part of the **host name** that precedes the first period. For example, in the host name `xnet4.tw.pjl`, `xnet4` is the terminal name and `tw.pjl` is the **domain**.

The terminal name (also called "node name") is tied to the unique **IP address** of the netstation, and identifies the netstation on the network. The system administrator typically chooses a name that identifies the netstation's user.

TFTP

Trivial File Transfer Protocol, a file-transfer program for downloading X server code and font files from

the **file server** to the netstation. **NFS** is a faster alternative to TFTP, but it must be set up on your system.

trap
An SNMP message sent by an **agent** to the **network manager** that indicates a particular event has occurred (for example, a cold start).

twm (local client)
A local-client version of the twm window manager. (`twm` is provided as a convenience, but is not supported.)

video player (local client)
A local client that plays **MPEG** video files, with or without audio. It requires an MPEG accelerator card.

vuelogin
An X session manager that can provide users with HP VUE sessions or with XDM-mode sessions. It checks the password file, selects a system shell, and sets up the user's environment. It starts clients automatically when users log in and closes sessions automatically when users log out.

vuewm (local client)
A local-client window manager that interacts with HP VUE 3.0 to off-load management of the control panel and workspaces to the netstation.

WhiteBoard
A local graphics application. You can use WhiteBoard by yourself or collaborate with other netstation and workstation users.

window manager
A client that controls the size, placement, and operation of windows on the root window. The

window manager menu is called from the root window.

workspace
The screen area where you can put your applications. `mwm` and `twm` have only one workspace; by default, VUE/RX has four workspaces.

Xauthority
The file that contains a **magic cookie**, used for client authorization.

xclock (local client)
A local-client version of the standard X11 clock program. It displays the time, in either analog (hands and dial) or digital (text readout) form.

XDM (X Display Manager)
A program used to take care of the login process and control X server displays. It checks the password file, selects a system shell, and sets up the user's environment. It starts clients automatically when users log in and closes sessions automatically when users log out.

When you log in, XDM (and `dtlogin` or `vuelogin` in XDM-mode) automatically runs the `.xsession` (or `.xinitrc`) script in your home directory to start the window manager and clients.

Error messages from clients are put in the `.xsessionlog` file in your home directory.

XDMCP (X Display Manager Control Protocol)
Netstations that support XDMCP, such as HP netstations, are able to broadcast to a computer a request for XDM services. In contrast, netstations that do not support XDMCP require the computer to poll the netstation continuously to ask if the

netstation requires X session management services yet.

Once the computer is able to provide X session management services to a netstation, the computer must poll continuously to determine if the netstation still requires those services.

xflash (local client)
A local client that you use to reprogram a ROM-based server card. Only "flash" cards can be reprogrammed.

XIdle extension
A downloadable extension that provides the time in hours, minutes, and seconds since either the keyboard or mouse was last used. Software often links the XIdle extension to a screen saver, locking the display after a specified period of inactivity.

XIE extension
The X image extension, combined with XIE-capable software, provides fast image manipulation without the expense of transferring large images across the network.

xlock (local client)
A local-client version of the standard lock program.

xlsfonts
A program that lists the fonts available to your netstation. Changing your font path changes the fonts you have available. Typically, `xlsfonts` is located in:

- On Sun systems: `/usr/openwin/bin/xlsfonts`
- On other systems: `/usr/bin/X11/xlsfonts`

X server
The combination of graphics display, hardware, and X-server software that provides display services for clients. Three different X server files are provided: XEnvizex, XEntria, and XEntriaM. See also **base system**.

Xsession
`Xsession` is used with XDM to start the user's X session script. It uses `.xsession` in the user's home directory if this exists, otherwise it uses `/usr/lib/X11/xdm/sys.xsession`. For HP-UX 10.*x* systems, the `sys.xsession` file is in: `/opt/hpxt/enware/xdm/sys.xsession`.

X session manager
A process running on the host that takes care of how users log in, which clients are started automatically, and how clients are terminated when the users log out. Some common X session management programs are HP VUE, XDM, and `scologin`.

xsessionlog
`.xsessionlog` is the user's error log when using XDM.

xtadm
See **administration script**.

xterm
A client that displays a terminal window that emulates DEC VT102 and Tektronix 4014 terminals. A local `xterm` client is supplied with the software. For more information, see the man page for `hpxt.xterm`.

XTest extension
A downloadable extension developed by the X consortium that provides a method for capture and playback (with synchronization) of X traffic,

keyboard, and mouse events. Software generally employs the XTest extension for regression testing or "live" unattended demos.

XTouch extension
A downloadable extension for use with touch screens.

x11start.700x
The netstation startup script for use with TELNET. A sample can be found in **basepath/**`examples`.

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