# ENWARE X Station Software 5.2 Technical Reference

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Edition 1 ENWARE X Station Software 5.2

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# About This Manual

## Who This Manual Is For

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

- Using Hewlett-Packard X stations on a network
- Setting up the X station user's environment.

## How To Use This Manual

This manual is divided into five parts:

Part One: "Using Your HP X Station" introduces your Hewlett-Packard X station and describes how to use host-based clients, local clients, and the X station's hardware accessories. You will also learn how to modify your keyboard's output, how to set up a local printer, how to work with fonts, and how to use the X station's memory effectively. See Chapter 1 through Chapter 8.

Part Two: "Administering HP X Stations" explains how to configure X stations from the host or from the local configuration screens, how to configure an X session manager, and how to use SNMP. See Chapter 9 through Chapter 12.

Part Three: "Advanced Topics" includes how to use SLIP, how to control input devices, and how to use TELNET. See Chapter 13 through Chapter 15.

Part Four: "Troubleshooting" provides information on how to troubleshoot your X station and your network. See Chapter 16 through Chapter 22.

Part Five contains the Glossary and Index.

## Conventions Used In This Manual

This manual uses the following typographical conventions:

| **If you see ...** | **It means ...** |
|---|---|
| `computer text` | The text is displayed by the computer or is the name of a file or a program. |
| *italic text* | The text is a manual title, an important point, or a variable. For example, *path1* could be a path such as `/usr/lib/X11`. |
| CTRL | This is a key you select. CTRL refers to the key labelled CTRL. |

**Note**

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

- On HP-UX: `/usr/tftpdir`
- On IBM: `/usr/lpp/HPXT`
- On SCO, typically: `/u/tftpboot`
- On Sun, typically: `/tftpboot`

These links should be created automatically when you install the ENWARE software, but if these links are not in place, you need to prepend the installation directory to the path given in the text. For example, if you have a Sun system and the command:

```
more /usr/lib/X11/700X/rgb.txt
```

produces an error ("No such file"), you need to prepend the installation directory to the path. If your ENWARE X station software was installed in `/tftpboot`, type:

```
more /tftpboot/usr/lib/X11/700X/rgb.txt
```

## For More Information

Other information sources include:

- 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 and select *ENWARE X Station Software 5.2 Technical Reference* from the Help Manager window. In addition, all users can access help screens and man pages for the X station software.

- Hardware assembly information

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

- 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.

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**Glossary**

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# 1

# Introducing Hewlett-Packard X Stations

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

- "Using Hewlett-Packard X Stations On A Network"
- "Using Your X Station's Hardware Accessories"
- "New Features In The ENWARE 5.2 Release".

## Using Hewlett-Packard X Stations On A Network

You can network your HP X stations together with any number of host servers so that users can share all of the devices and all of the processing power on the network. Users of HP X stations can access any application on any host that is compliant with the X Window System. A typical network environment consists of the following components:

- X stations
- Host servers
- Additional devices (printers, plotters, scanners).

### X Stations

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

The Hewlett-Packard family of X stations includes:

- HP 700/RX stations
- HP ENVIZEX stations
- HP ENTRIA X terminals.

With all types of Hewlett-Packard X stations, you can view and interact with programs running on remote computers as if they were running locally. Programs that are written specifically for use with the X Window System are called **clients**. You can also download and run selected clients directly on the X station. These programs are called **local clients**. For more information about running local clients, refer to Chapter 3.

### Host Servers

Depending upon your processing requirements, you can have any number of host servers on your network. HP X stations use several different servers as follows:

| Server | Function |
|---|---|
| File Server | The **file server** is the computer that sends the X station 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 X station's BOOTP/DHCP request and sends the X station its configuration information. By default, the file server is also the boot server. |
| Font Server | An X11R5 **font server** is a program that creates fonts as needed, rather than having the computer store the various font styles, sizes, and weights in separate bitmap files. |
| Login Server | The **login server** is a computer that runs an X session manager such as XDM, HP VUE, or scologin. By default, the file server is also the login server. |

### Additional Devices (Printers, Plotters, Scanners)

Depending upon your requirements, you can add additional devices to your network, including:

- Printers and plotters
- Scanners.

You can also attach some devices directly to your X station, including:

- Serial or parallel printers or plotters. For details, refer to Chapter 6.
- A local scanner (for HP ENVIZEX models only). For details, refer to "Using A Scanner" in Chapter 4.
- A floppy drive (for HP ENVIZEX models only). For details, refer to "Using The Floppy Drive" in Chapter 4.

## Using Your X Station's Hardware Accessories

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

### Floppy Drive

If you have an HP ENVIZEX station, 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 4.

### Audio

For both HP ENVIZEX stations and HP ENTRIA X terminals, 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 4.

### Scanner

For HP ENVIZEX stations, 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 4.

### ROM Card

The ROM server card allows you to use any HP X station on 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 4.

## New Features In The ENWARE 5.2 Release

ENWARE X station software release 5.2 contains these new features:

- Support for the new HP ENTRIA Ch X terminal.
- The ability to start a non-XDMCP session automatically at login.
  - To learn how to start local clients automatically at bootup, see "Using Startup Mode: Local Command" in Chapter 3.
  - To learn how to start a TELNET session automatically at bootup, see "If You Want An Automatic TELNET Window" in Chapter 15.
  - To learn how to start a Serial session automatically at bootup, see "Connecting To The SLIP Host Computer" in Chapter 13.
- New local applications: xclock and xlock. See "Using Local Applications" in Chapter 3.
- A new downloadable extension: XIE. See "Use Downloadable Extensions" in Chapter 10.
- Some modifications to the syntax of the `modules.ld` file. (Refer to `/usr/lib/X11/700X/bin/modules.ld` and to "Using The Variables In The Remote Configuration File" in Chapter 9).

**Note**

With ENWARE X station software release 5.2 you can run other ENWARE products:

- ENWARE X Terminal Manager (part number B3670AA)
- ENWARE 3270 Terminal Emulator (part numbers B3664AA (CD ROM), B3665AA (HP DAT), or B3666AA (IBM 8mm tape).

# 2

# Using Clients In An XDM Environment

If you are using XDM (X Display Manager), this chapter describes how you can set up and use a customized desktop environment that includes the clients you use on a regular basis:

- To learn how to start and modify clients from the command line of a terminal emulator window, refer to "Starting Clients From A Command Line".
- When you are familiar with using a command line to start a client, refer to "Starting Clients From A Window Manager" to learn how to set up clients to start with the click of a mouse button.
- If there are clients you want to start automatically when you log in, refer to "Starting Clients From Your Startup Script" to learn how to modify your startup script. One of the clients that starts automatically is your window manager. If you want to try a new window manager, such as ENWARE VUE/RX, read this section.
- If you want to change the default characteristics of your clients, refer to "Customizing Colors And Fonts In .Xdefaults".

If you have problems starting clients, refer to Chapter 18.

**Note**

The instructions in this section assume the following:

- That your PATH contains the "usual" directories for UNIX executable programs:
  - On HP-UX, IBM, and SCO: `/usr/bin/X11`
  - On Sun: `/usr/openwin/bin`
- That your system has links between directories such as `/usr/lib/X11/700X` and the actual installation directory:
  - On HP-UX: `/usr/tftpdir`
  - On IBM: `/usr/lpp/HPXT`
  - On SCO, typically: `/u/tftpboot`
  - On Sun, typically: `/tftpboot`

  If these links are not in place, you need to prepend the installation directory to the path given in the text. For example, if you have a Sun system and the command:

  ```
  more /usr/lib/X11/700X/rgb.txt
  ```

  produces an error ("No such file"), you need to prepend the installation directory to the path. If your ENWARE X station software was installed in `/tftpboot`, type:

  ```
  more /tftpboot/usr/lib/X11/700X/rgb.txt
  ```

## Starting Clients From A Command Line

You can set the colors, fonts, and other characteristics of a client in the command line that starts the client. A command line has the form:

*clientname -option value -option value* `&`

(The ampersand (`&`) at the end of the line runs the client as a background process and allows you to start other clients from the same terminal emulator.)

This section describes how you can choose and assign values to some popular options: fonts, colors, size, and position.

For a complete list of options for a particular host-based client, in a terminal emulator window type the client's name followed by a `-help` option. For example:

```
xterm -help
```

To learn how to change your clients' default characteristics, refer to "Customizing Colors And Fonts In .Xdefaults".

### Specifying A Client's Font

The `-fn` option specifies a client's font. To learn which fonts you can choose, type:

```
xlsfonts | grep [0-9]x | more
```

This gives you a list of non-proportional fonts you can try. For example, to specify the `10x20` font for an `xterm` window, type the following line from an existing terminal emulator window:

```
xterm -fn 10x20 &
```

### Specifying A Client's Colors

The `-fg` option sets the foreground color and the `-bg` option sets the background color for `xclock`, a client that displays a clock. Enter the following line from a terminal emulator window:

```
xclock -fg White -bg LightSteelBlue &
```

To learn which colors you can choose, type:

```
more /usr/lib/X11/700X/rgb.txt
```

### Specifying Size And Position

The `-geometry` *width*×*height*±*column*±*row* option specifies the size and location of a new window. For terminal windows, the size, *width*×*height*, is measured as the number of characters by the number of lines; for other windows, this measurement is in pixels. The location, ±*column*±*row*, is in pixels and depends on the resolution of the screen. Plus values (+) start at the upper left corner and proceed to the right and down. Minus values (−) start at the lower right corner and proceed to the left and up.

| **To position a window here ...** | **Use ...** |
|---|---|
| The screen's upper left corner | `-geometry +1+1` |
| The screen's lower left corner | `-geometry +1−1` |
| The screen's upper right corner | `-geometry −1+1` |
| The screen's lower right corner | `-geometry −1−1` |

### Determining A Client's Position

When you put the mouse cursor on the title bar, then drag the window to the desired location, a small pop-up window in the middle of your screen reports the position of the window being moved. You can use this information to start clients in a particular position. Refer to "Customizing The .xsession Startup Script".

## Starting Clients From A Window Manager

If you use ENWARE VUE/RX, mwm, or twm, you can write the command line that starts a client into the file that specifies your window manager's root menu. This is a convenient way to start clients that you use occasionally.

You call up the root menu by pressing *and holding* the left mouse button when the mouse pointer is in the **root window**, the backdrop of your X environment. By dragging the mouse pointer to the root menu entry and releasing the mouse button, you start the client.

To customize the root menu, copy the appropriate system defaults file to your home directory:

- For ENWARE VUE/RX, copy
  `/usr/lib/X11/700X/vuerx/sys.vuerxrc`
  to `$HOME/.vuerxrc`.
- For mwm, copy
  `/usr/lib/X11/system.mwmrc`
  to `$HOME/.mwmrc`
- For twm, copy
  `/usr/lib/X11/twm/system.twmrc`
  to `$HOME/.twmrc`.

#### Example: Adding A Selection To Your mwm Root Menu

Follow these steps to add an electronic mail selection to your root menu.

1. Copy `system.mwmrc` to your home directory as `.mwmrc`
2. Add the following line to the file `.mwmrc`:

```
"Read/Send Mail" f.exec "xterm -geometry 80x24+1+1 -e mailx &"
```

3. Save the changed file.
4. Restart `mwm` by pressing *and holding* the left mouse button while the pointer is over the root window, then dragging the pointer down the menu until the "Restart" selection is highlighted. Release the left mouse button.

When you restart `mwm`, the root menu displays the changes. If you select the new item, you create a window 80 characters wide and 24 lines long in the upper-left corner of the root window and start the `mailx` electronic mail program in it.

**Note**

If you use ENWARE VUE/RX, you can add clients to the front panel as well as to the root menu. For details, see "Using ENWARE VUE/RX" in Chapter 3.

## Starting Clients From Your Startup Script

If there are clients you want to start every time you log in, you can change your startup script so that the clients you want start automatically. This section includes the following topics:

- "Understanding How Clients Start Automatically"
- "Customizing The .xsession Startup Script".

### Understanding How Clients Start Automatically

If you are using XDM, scologin, or `vuelogin` in xdm-mode, the clients you are running now were started with a startup script, typically `$HOME/.xsession` (or, on Sun systems, `$HOME/.xinitrc`).

If `.xsession` is not found, the XDM/vuelogin default is `sys.xsession`. (The scologin default is described in "Using scologin To Control Clients" in Chapter 11.)

Other files used by XDM include:

- `$HOME/.xsessionlog`, which contains any error messages from clients
- `$HOME/.Xdefaults`, which sets up the default fonts and colors used by your clients.

  If you want to change the default colors and fonts, you can customize your .Xdefaults file. Refer to "Customizing Colors And Fonts In .Xdefaults".

XDM, scologin, and `vuelogin` in xdm-mode log you out when `.xsession` runs to completion. The foreground task (the first client that does not have an ampersand at the end of its command line) keeps the X session active. Therefore when you close the foreground task, a terminal emulator in the default `.xsession` script, you are logged out.

## Customizing The .xsession Startup Script

To customize the startup script, users of XDM and `vuelogin` in xdm-mode should edit `$HOME/.xsession` according to the instructions that follow.

SCO users should copy `/u/tftpboot/usr/lib/X11/700X/examples/sys.xsession` to `$HOME/.xsession`.

### Example: Adding A Client To The Startup Script

1. Open `.xsession` with an editor.
2. Scroll down or search for two lines similar to the following:

```
# Add client commands below, one command per line.
# End each command line with an ampersand (&).
```

3. Beginning on the line below these, insert the following line:

```
xclock -digital -update 1 -geometry 160x35+1-1 &
```

   The ampersand (`&`) at the end of the line runs the client as a background process and allows you to start other clients from this terminal emulator.

4. Save the file and exit from your text editor.

Now when you log in, the startup script starts a digital clock, 160×35 pixels in size, in the bottom-left corner of the screen.

### Example: Changing Your Window Manager

1. Open `.xsession` with an editor.
2. Search for lines similar to the following:

```
###  6) Local window managers
###     To run a local window manager on your X station,
###     uncomment the appropriate line:

###  local mwm
#       WM="/usr/bin/X11/700X/hpxt.mwm"
```

   The line that defines `WM` sets your window manager. You can choose not only from the command lines that start local window managers, you can start a host-based window manager by defining `WM` appropriately. To start `twm`, add the line:

```
WM="/usr/contrib/bin/X11/twm"
```

**Note**

Before you edit your `.xsession` file to start a local window manager, refer to Chapter 3 to learn what memory requirements local clients have.

## Customizing Colors And Fonts In .Xdefaults

The default colors and fonts of X clients are set by resource files in `/usr/lib/X11/app-defaults/*` and by `/usr/lib/X11/sys.Xdefaults`. If you find the default colors and fonts unappealing, you can either:

- Specify the colors and fonts you want in the command lines that start your clients. Refer to "Starting Clients From A Command Line"
- Customize the default colors and fonts of your X clients by specifying these characteristics in your own `.Xdefaults` file as described below.

To customize the default colors and fonts of your X clients, copy `/usr/lib/X11/sys.Xdefaults` to your home directory as `.Xdefaults` and edit this file according to the instructions that follow.

### Setting A Client's Default Colors

To give `xclock` the default colors of a white foreground and a light steel blue background, open `.Xdefaults` and scroll down to the "Client Colors and Operational Defaults" section. Make the following changes:

```
XClock*foreground: White
XClock*background: LightSteelBlue
```

If you would prefer other colors, the color names you can use are contained in the `/usr/lib/X11/700X/rgb.txt` file.

After making changes to your `.Xdefaults` file, you need to inform your X server of the changes. To download the `.Xdefaults` file to the X server, type:

```
xrdb -merge .Xdefaults
```

`xrdb` downloads the edited `.Xdefaults` file without restarting the X session.

### Setting A Client's Default Fonts

To learn which fonts you can assign, type:

```
xlsfonts | grep [0-9]x | more
```

This gives you a list of non-proportional fonts you can try.

For example, to make `9x15` the default font for `xterm` terminal emulator windows, put the following line in the `.Xdefaults` file:

```
Xterm*Font: 9x15
```

After making changes to your `.Xdefaults` file, you need to inform your X server of the changes. To download the `.Xdefaults` file to the X server, type:

```
xrdb -merge .Xdefaults
```

`xrdb` downloads the edited `.Xdefaults` file without restarting the X session.

# 3

# Understanding And Using Local Clients

Local clients are applications that run directly on the X station 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 Hewlett-Packard X stations.

Topics include:

- "What Are Local Clients?"
- "Why Use Local Clients?"
- "Which Local Clients Can I Use?"
- "Starting A Local Window Manager".
  - "Using A Local Window Manager"
  - "Using ENWARE VUE/RX"
- "Using A Local Terminal Emulator"
- "Using Startup Mode: Local Command"
- "Using Local Applications".

**Note**

To use the ENWARE 5.2 local clients, your X terminal must have loaded the release 5.2 X server.

## What Are Local Clients?

Local clients are programs that are downloaded from the host computer and run on the X station. (In comparison, host-based clients run on the host computer and just display on the X station.) There are three general categories of local clients:

- Local window managers
- Local terminal emulators
- Local applications.

### Local Window Managers

The local window managers included with ENWARE software are twm, mwm, ENWARE VUE/RX, and local vuewm.

As you would expect, the twm and mwm local window managers allow you to move, resize, and iconify windows and to start applications from pull-down menus.

ENWARE VUE/RX and local vuewm give you workspaces (which can be thought of as virtual screens), a control panel (which displays and can launch applications), and allow you to move, resize, iconify, and start applications.

**Note**

To use local vuewm, HP VUE 3.0 must be running on the host computer.

### Local Terminal Emulators

The local terminal emulators are xterm, hpterm, and vt320. They provide functions similar to those provided by their host-based equivalents.

### Local Applications

The ENWARE software contains the following local applications:

- xflash, which is used to reprogram flash ROM cards ("Programming A ROM Card With xflash" in Chapter 4 has details).
- dkmserver, which enables you to map your keyboard dynamically for the different clients you run. Refer to Chapter 5 for details.
- xclock (see "Using Local Applications")
- xlock (see "Using Local Applications").

## Why Use Local Clients?

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

- Freeing up host memory
- Reducing the network load
- Displaying diagnostic information.

### To Free Up Host Memory

Using local clients frees up host memory for other tasks. If your host computer's performance is being degraded by the number of users, you can free host memory by running a window manager and terminal emulators on each X station. (You must ensure that the X stations have enough memory to run the local clients. For specific resource requirements, refer to "Using Local Clients And X Station Memory Effectively" in Chapter 8).

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 running a terminal emulator on the host, shared resources make it possible to start more copies of the terminal emulator while increasing the host load 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 X stations, overall it is most efficient to run clients on the host. For example, say that a particular terminal emulator requires 1,000 KB for the first invocation, then 300 KB for each subsequent invocation whether running on the host or on an X station. If you have ten X station 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 X stations:
  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 X stations.

### To Reduce The Network Load

It is commonly thought that local clients reduce the network load. While this is true, strictly speaking, the network load savings are not likely to be significant until you reach at least 25% of the LAN's capacity. Local window managers provide better network-traffic savings than local terminal emulators.

### For Diagnostic Purposes

Another interesting use of local clients is to run terminal emulators that communicate to the X station's serial port or Log Screen. You can use the latter to display diagnostic messages without the need to go into the configuration screens.

## Which Local Clients Can I Use?

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

- ENWARE Window Managers
  - Local vuewm: With local vuewm, the X station 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. The local vuewm offloads some of the work the host computer has to do, but the host is still required to provide VUE login, the Style Manager, File Manager, and Drag&Drop.
  - ENWARE VUE/RX is a local window manager designed specifically for HP X stations. With ENWARE VUE/RX you have workspaces and a control panel in addition to mwm functionality.
  - mwm: Local mwm provides all the functionality of host-based mwm.
  - twm: twm is provided as a convenience, but is not supported.
- ENWARE Terminal Emulators:
  - xterm
  - hpterm
  - vt320
- ENWARE Local Applications
  - xflash, which is used to reprogram flash ROM cards
  - dkmserver, which enables you to map your keyboard dynamically for the different clients you run
  - xclock
  - xlock.

## Starting A Local Window Manager

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

#### If You Run XDM or "vuelogin" in XDM-mode

Users of XDM and `vuelogin` in XDM-mode need to have their `.xsession` startup scripts edited to change the automatically-started window manager from the host-based version to the local-client version. Refer to "Editing .xsession".

#### If You Run HP VUE 3.0

You can use HP VUE 3.0 with the local vuewm or with the stand-alone local window managers (ENWARE VUE/RX, mwm, and twm), but the start-up methods are quite different:

- HP VUE 3.0 users who want to use the local vuewm start it from within HP VUE 3.0. Refer to "Starting The Local vuewm From HP VUE 3.0".
- HP VUE 3.0 users who want to start a local ENWARE VUE/RX, mwm, or twm window manager need to have HP VUE 3.0's `vuelogin` run in XDM-mode and to have their `.xsession` startup scripts edited. Refer to:
  - "Editing .xsession"
  - "Directing HP VUE 3.0 To Read .xsession".

## Editing .xsession

Edit the user's `.xsession` file (or the `sys.xsession` file) to change the host-based window manager it starts to the local window manager you want the user to run. As you will see from the lines in `$HOME/.xsession`, the window managers are started by a mediating process, `hpxt.*`, which is known as a "peer." The peer passes your home directory and display name to the local window manager's executable portion.

The local window managers and their peer processes are:

For VUE/RX: `/usr/bin/X11/700X/hpxt.vuerx`

For mwm: `/usr/bin/X11/700X/hpxt.mwm`

For twm: `/usr/bin/X11/700X/hpxt.twm`

### Directing HP VUE 3.0 To Read .xsession

If you want to start local ENWARE VUE/RX, mwm, or twm with HP VUE 3.0, you need to direct HP VUE 3.0 to read the user's `.xsession` file.

As superuser edit the `/usr/vue/config/Xconfig` file. The line:

```
Vuelogin*xdmMode:            True
```

controls whether or not all displays run XDM-style X sessions. You can choose to run XDM-style X sessions for selected displays by replacing the `*` with (*.terminalname*`_0.`) for the X stations:

`Vuelogin.`*terminalname*`_0.xdmMode:  True`

For example, you would list the X station in the accounting department that has the terminal name acctsmith as follows:

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

### Starting The Local vuewm From HP VUE 3.0

You can invoke the local vuewm from within an "HP VUE Session" (which the user selects from the Options button on the VUE login screen). To start the local vuewm, the user needs to 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 "SelectVUEwm"
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.
8. Click on the Exit icon to end the session
9. If the user wants to have a VUE Lite session, choose "HP VUE Lite Session" on the VUE login screen
10. Log in. The local vuewm starts automatically with the HP VUE session or HP VUE Lite session.

The user should see no difference in operation with the exception that the Root Menu automatically displays the local clients the user can start.

**Note**

- To turn off the local vuewm, follow the steps above. When asked, "You are currently configured to execute VUEWM as a local client on your HP X station. Do you want to run VUEWM on the workstation instead?" click on OK.
- To use HP MPower, execute vuewm on the host.

## Using A Local Window Manager

When you log on, your .xsession file starts a peer process that invokes the local window manager. An example of a peer process is `/usr/bin/X11/700X/hpxt.mwm`.

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`, `/usr/lib/X11/700X/vuerx/sys.vuerxrc` or `/usr/vue/config/sys.vuewmrc`.

**Note**

- Only a local window manager started by the peer process can start clients on the host.
- When switched on, the X station reads the file `/usr/lib/X11/700X/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 no window manager, the user *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 the user's home directory. Consequently, the window manager uses the system default colors and operation, which may be disruptive for the user.
- Local vuewm does not work with HP MPower.

#### About mwm and twm

Local versions of mwm and twm behave in the same fashion as their host-based equivalent. However, there are some parameter restrictions that apply to the local versions. Refer to the appropriate man page for details.

#### 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 X station and running a VUE session completely on the host.

#### About ENWARE VUE/RX

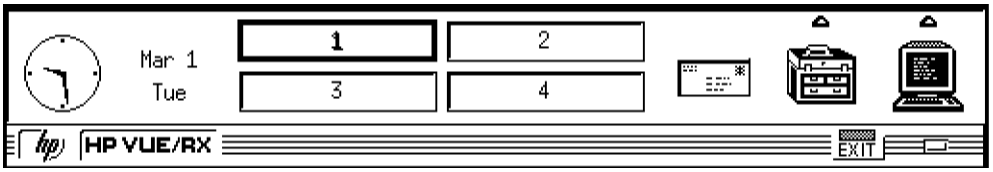
ENWARE VUE/RX is a unique product that has been designed specifically for HP X stations. For information about using this local window manager, refer to "Using ENWARE VUE/RX".

## Using ENWARE VUE/RX

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

The default control panel contains:

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




**ENWARE VUE/RX Control Panel**

The control panel is defined by two files:

- `$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 default ENWARE VUE/RX uses 62 colors, which will be of concern only if you want to display full-color graphics.

In order to have the full functionality of ENWARE VUE/RX, users need to have two resource files in their home directory:

`/usr/lib/X11/700X/vuerx/sys.vuerxrc` must be copied to the user's `$HOME/.vuerxrc`

`/usr/lib/X11/app-defaults/Vuerx` must be appended to the user's `$HOME/.Xdefaults` file.

The remainder of this section describes modifications you can make to customize the ENWARE 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".

- "Setting The Control Panel Clock For Use With XDM"

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

```
man vuerx
```

For information on the ENWARE 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 ...` The "Occupy Workspace ... " selection provides a Workspace Presence menu.

  To add the window to new workspaces, click on the desired workspace names to highlight the workspaces into which you want to place that window, then click on OK.

  To remove the window from workspaces, click on the desired workspace names to turn off the highlight, then 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 will likely 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, copy the system default file to your home directory:

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

2. If you have not already appended `Vuerx` to your `.Xdefaults` file, open `$HOME/.Xdefaults` and append to it:

```
/usr/lib/X11/app-defaults/Vuerx
```

3. Find the line that reads:

```
Vuerx*workspaceList:   1 2 3 4
```

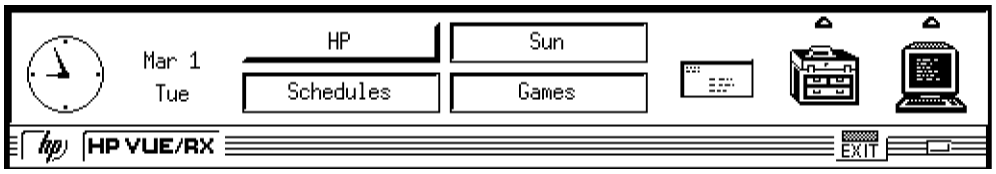
   and change the workspace names as required. You will see the changes the next time you log in.

For example:

```
Vuerx*workspaceList:   HP Sun Schedules Games
```

creates four workspaces called HP, Sun, Schedules, and Games.

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




**Modified ENWARE VUE/RX Control Panel**

## Changing The Color Palette

ENWARE VUE/RX uses 62 colors. Because of the difficulty of matching that number of colors in a harmonious way, ENWARE VUE/RX is typically modified as a palette of colors, rather than as individual colors for particular attributes. You can choose from 28 palettes. To change ENWARE VUE/RX's color palette, edit your `.Xdefaults` file as follows:

1. If you do not have a `.Xdefaults` file, copy the system default file to your home directory:

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

2. If you have not already appended `Vuerx` to your `.Xdefaults` file, open `$HOME/.Xdefaults` and append to it `/usr/lib/X11/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 `.Xdefaults` as *palette*`.vp`

4. To load your changes into the X server, type:

   ```
   xrdb -merge .Xdefaults
   ```

5. To see the changes, restart ENWARE VUE/RX.

**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. Try other palettes as well; some of the color schemes are more exuberant than Broica and Dalla.

#### If You Have A Grayscale X Station ...

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

```
*colorPalette:          GrayScale.vp
```

#### If You Have A Monochrome X Station ...

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.

You can add a client to the tool box by doing the following:

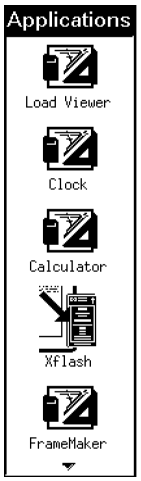
1. Open your `$HOME/.vuerxrc` file.
2. Find the section named `BOX LiteToolsSubpanel` and define a new control by adding the line:

```
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 ENWARE VUE/RX, your tool box slide-up will be similar to this:




**Modified Tool Box**

## Launching A Terminal Emulator

To launch a local terminal emulator:

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

**Note**

The vt320 terminal emulator requires that your font path includes:
`/usr/lib/X11/700X/fonts/vt340`
or one of its sub-directories: `extrasmall`, `small`, `large`, or `extralarge`.

If the terminal emulator fails to appear, the problem could be that the X session manager does not have local clients installed.

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 ENWARE 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 details on the host override function (shown here by prepending `/nfs/`*hp720* to the path of `hpxt.xterm`), see "Using Different Hosts For The X Server And For Fonts" in Chapter 10.

## 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 doing the following:

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
```

## Using A Local Terminal Emulator

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

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

- When the X station is switched on, it reads `/usr/lib/X11/700X/bin/modules.ld` and any local terminal emulators listed there become available from the Preferences configuration screen. To start a local terminal emulator from the Preferences screen, do the following from an X session:

  1. Press (F12) for two seconds to display 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.

- When you start a local window manager, it reads `/usr/lib/X11/700X/bin/modules.ld` 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.

- 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 options given in the `modules.ld` file. For example: `'hpterm -dev /dev/serial '`

  See `modules.ld` for details.)

- You can start a local terminal emulator from a command line by invoking the terminal emulator's "peer program." A peer

process passes your home directory and display name to the local terminal emulator's executable portion. The peers are found in `/usr/bin/X11/700X`.

To start a local xterm, type:

```
/usr/bin/X11/700X/hpxt.xterm
```

To specify a particular type of operation for a local terminal emulator (either telnet, serial, or log operation), use a `-dev /dev` option. For example:

```
/usr/bin/X11/700X/hpxt.xterm -dev /dev/serial
```

See also "Controlling Which Local Terminal Emulators Are Available".

## Controlling Which Local Terminal Emulators Are Available

The file `/usr/lib/X11/700X/bin/modules.ld` lists the local clients available on your file server. When you power on the X station, 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. `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:
  - `-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 X station's serial port (by using the option `-dev /dev/serial`)
- Display the error messages that would otherwise go to the X station's Log Screen (by using the option `-dev /dev/log`).

For more information, refer to the man page for your local window manager. Type: `man hpxt.mwm` or `man hpxt.twm`

**Note**

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

## Using Startup Mode: Local Command

The Server configuration screen's Startup Mode 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 Startup Mode set to Local Command, type in the Startup Source field the names of the local clients you want to start, separated by semicolons.

| **Local Client To Start:** | **Command** |
|---|---|
| mwm | mwm |
| twm | twm |
| vuerx | vuerx |
| | |
| xterm | xterm |
| xterm (TELNET) | txterm |
| xterm (serial) | sxterm |
| xterm (log screen) | xlog |
| | |
| hpterm | hpterm |
| hpterm (TELNET) | thpterm |
| hpterm (serial) | shpterm |
| hpterm (log screen) | loghp |
| | |
| vt320 | vt320 |
| vt320 (TELNET) | tvt320 |
| vt320 (serial) | svt320 |

For example, to start mwm, xterm, and vt320 (TELNET), type in the Startup Source field:

```
mwm;xterm;tvt320
```

## Using Local Applications

The ENWARE X station software contains the following local applications:

- xflash, which is used to reprogram flash ROM cards ("Programming A ROM Card With xflash" in Chapter 4 has details).
- dkmserver, which enables you to map your keyboard dynamically for the different clients you run. Refer to Chapter 5 for details.
- xclock
- xlock.

### Starting Local xclock

Local xclock is a version of xclock that runs on the X terminal. To start local xclock from a terminal emulator window, invoke its peer process by typing:

```
/usr/bin/X11/700X/hpxt.xclock
```

For more xclock options, type: `man hpxt.xclock`

### Starting Local xlock

xlock is a program that locks your display until you type in your password. Local xlock is a version of xlock that runs on the X terminal. To start local xlock from a terminal emulator window, invoke its peer process by typing:

`/usr/bin/X11/700X/hpxt.xlock` [`-password` *password*] [`-mode` *pattern*]

where:

- the `-password` *password* option specifies the password you need to type to unlock the display. The default is the password of the user who invoked xlock.
- the `-mode` *pattern* option specifies the pattern that covers the display. You can specify the following patterns:

| | |
|---|---|
| hop | displays "real plane fractals" |
| life | displays Conway's game of life |
| qix | displays spinning lines |
| image | displays logos at random |
| swarm | displays a swarm of bees following a wasp |
| rotor | displays a swirling rotor |
| pyro | displays fireworks |
| flame | displays flame fractals |
| worms | displays worms |
| random | displays one of the above patterns at random |
| blank | displays a black screen. |

For more xlock options, type: `man hpxt.xlock`

# 4

# Using The X Station'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 A Scanner"
- "Using A ROM Server Card".

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 station, 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 DOS 4.0.

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

To format a floppy disk, do the following:

1. Insert the floppy disk into the drive.
2. Press F12 for two seconds to display the configuration screens.
3. Click on Accessories.
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`. 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  /users/smith/floppy/data.tmp
```

The floppy's DOS-based file system does not support UNIX hard links. If your application performs an illegal 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 X station.

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 the drive is installed properly and that the X station has loaded the "Floppy" module.

To confirm that the floppy drive is properly installed:

1. Press F12 for 2 seconds to display the configuration screens.
2. Click on Options. A screen that enables you to format a floppy should appear. If no screen appears, you need to power off the X station, open the chassis, and confirm that the connectors are seated properly. Confirm that the floppy drive has a two-wire connection to the power supply and a 34-pin connection to the main board.

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

To confirm that the X station loaded the Floppy module:

1. Press F12 to go to the configuration screens
2. Click on Diagnostics
3. Click on Installed Configuration.

You should see the following:

```
Other Peripheral Devices
 Floppy Drive installed

Downloadable Extensions
      NFSServer
      DOSServer
```

If these lines do not appear, the 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 HP ENVIZEX software installed, lines added to `Xstartup` by the HP ENVIZEX installation scripts automatically NFS-mount the floppy drive and creates a symbolic link to `$HOME/floppy`. This enables you to 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:

- "Using A Session Mount"
- "Using An Automount Daemon"
- "Mounting Only As Required"
- "Using Floppy Drives In A Single-Account, Multi-User Environment".

### Using A Session Mount

By default, the HP ENVIZEX uses session mounts set up in `/usr/lib/X11/xdm/Xstartup` and `/usr/lib/X11/xdm/Xreset` or, for users of HP VUE, in `/usr/vue/config/Xstartup` and `/usr/vue/config/Xreset`. These files mount the floppy drive and creates a symbolic link to `$HOME/floppy` when users log in and unmount the drive when users log out.

If you choose to use one of the other two methods to mount the floppies, you will have to remove the lines from `Xstartup` and `Xreset` that mount and unmount the floppy.

### Using An Automount Daemon

In order for an application to access the floppy drive, the application's computer needs to mount the floppy. If you use an application that runs on a computer other than your login server, you can use an automount daemon to enable that host to access your floppy drive. Perform the following steps on each computer you access:

1. As superuser, create the file `/etc/auto.hpxtfd`

   and put the following line in it:

   ```
   *       -soft,retry=2,timeo=50  &:/hpxtfd
   ```

2. Edit the file `/etc/netnfsrc2`

   Find the two occurrences of the line that starts the automounter. The format of the line depends on whether or not you have HP MPower installed. By default, it is:

   ```
   /usr/etc/automount
   ```

   If you have HP MPower installed, it is:

   ```
   /usr/etc/automount  /nfs -hosts
   ```

3. 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
   ```

When you access a computer, the automount daemon mounts the floppy drive and creates a symbolic link to `$HOME/floppy`. The automount daemon unmounts the floppy drive when it has not been accessed for the timeout period (by default, this is 5 minutes).

#### Mounting Only As Required

If you are a technically inclined user who has superuser privileges, you can mount and unmount the floppy as required. To mount the floppy, type (on one line):

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

To unmount the floppy, type:

`/etc/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 station users to log into a single 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`
   - For HP VUE users, this is: `/usr/vue/config/Xstartup`
3. Find the line that mounts the floppy:

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

   and append `/$DISPLAY` to it:

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

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 append `/$DISPLAY` to it:

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

7. Save the changed file.

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

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

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

## 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:

- "Audio Specifications"
- "System Prerequisites For Audio Support"
- "Starting Audio"
- "Directing The Audio Data To The X Station"
- "Directing The Audio Data Within The X Station"
- "Playing A Sample Audio File"
- "Troubleshooting The Audio Card".

### Audio Specifications

The following audio specifications apply to both ENVIZEX stations and ENTRIA X terminals 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 |

## System Prerequisites For Audio Support

To use the audio kit, you require an HP audio server running on an HP 9000 Series 700 workstation. The host must be running HP-UX 9.03 or HP MPower 1.2.

If your HP-UX 9.x is version HP-UX Application Release 12 or less, put the following lines into `/usr/vue/config/Xsession` (for vuelogin users) or into `/usr/lib/X11/xdm/Xsession` (for XDM users):

```
touch /tmp/llbdbase.dat
AUDIO=‘echo $DISPLAY | sed -e ’s;:.*;;’‘
export AUDIO
```

### 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
- 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 X stations automatically detect that you have installed an audio card and configure the X station 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 X station.

If your audio plays on the host instead of your X station, you need to set your `AUDIO` environment variable as described in “Directing The Audio Data To The X Station”. If your audio plays on the X station but you need to change where it plays (the internal speaker or your headphones), refer to “Directing The Audio Data Within The X Station”.

## Directing The Audio Data To The X Station

If your audio plays on the host instead of your X station, 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 X Station

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 X station'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 &`

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, click on the audio editor's "File" pulldown, then choose "Load File ... ". The "Select File to Load" window appears.

You can find sample audio files in `/usr/audio/sounds`. To choose one of these samples, do the following:

1. In the "Select File to Load" window, set the filter to `/usr/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, press F12 to go to the configuration screens, click on Diagnostics, then click on Installed Configuration. You should see the following:

```
Other Peripheral Devices
 Audio Board installed.


   Downloadable Extensions
/usr/lib/X11/700X/bin/Aserver
```

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

## Using A Scanner

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

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.) DeskScan requires that the host has HP-UX 8.07 or greater and/or HP MPower 1.xx.

Before you power on your X station, 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 &
```

### Selecting The Scanner

You can use a scanner that is connected to your host computer or one that is connected to your X station.

The X station 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` 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, press F12 to go to the configuration screens, click on Diagnostics, then click on Installed Configuration. You should see 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 Hewlett-Packard X station, you can:

- Connect to a host over a serial line (using SLIP)
- Operate the X station without downloading any files from the host
- Use the fonts available in the ROM server.

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

- For HP ENVIZEX stations, you require the SCSI/ROM kit and a ROM card.
- For HP ENTRIA X terminals, you require a ROM Server kit and a ROM card.

You can use an HP X station with a ROM-based server for many applications. However, you will need to purchase host-based software for your X station if you want to:

- Print from the UNIX system to the X station's serial or parallel port.
- Reprogram your flash ROM card using the xflash local client.

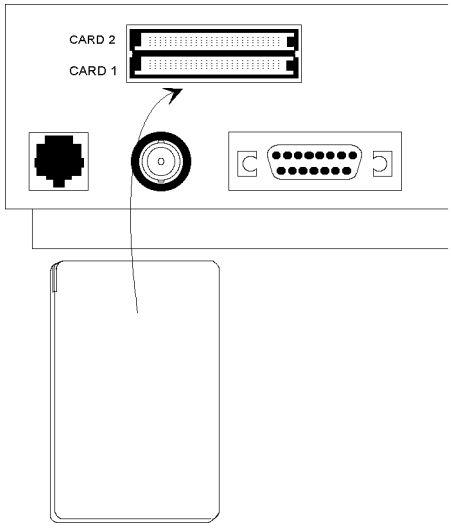
To learn how to use the X station with a ROM-based server, refer to "Using A ROM Card With An X Station".

To learn how to use xflash to reprogram your flash ROM card, refer to "Programming A ROM Card With xflash".

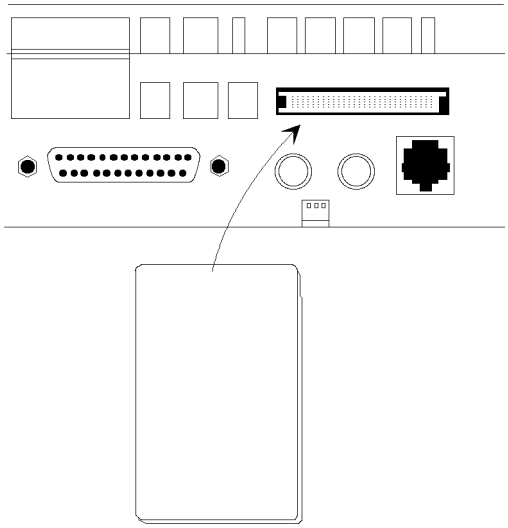
To learn how to boot other HP X terminals from your ROM card, refer to "Booting One HP X Station From Another".

### Inserting The ROM Card

The following diagrams show you how to insert a ROM card into an HP ENVIZEX or an HP ENTRIA unit. Note that the ROM card is installed face up on one unit and face down on the other.




**Inserting The ROM Card In An HP ENVIZEX**



**Inserting The ROM Card In An HP ENTRIA**

## Using A ROM Card With An X Station

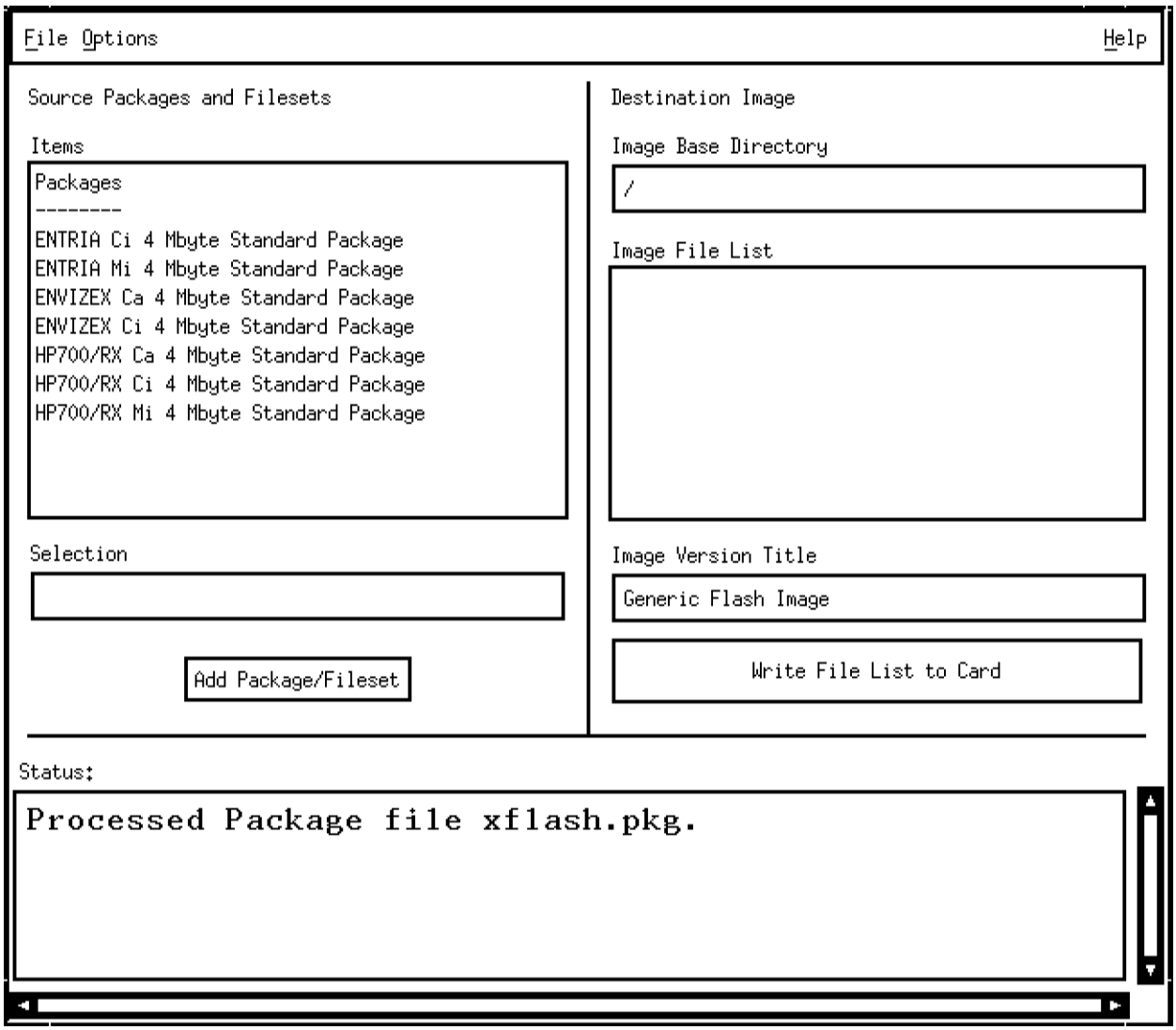
Once your X station has been set up in the host files (as described in Chapter 9), you need only configure your X station to use the ROM card. Perform the following steps to configure the X station to boot from its ROM card the next time it is switched on:

1. Click on (Server).
2. 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.)
3. Select `X Server from` (ROM) and `RGB file from` (ROM).
4. Click on (Network), then click on (Ethernet) or (SLIP), as appropriate.
5. Click on the `IP Address` field and enter your IP address.
6. Click on the `File Server` field and enter the IP address of a computer you will be running applications on.
7. 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"
  - "Upgrading The X Server"
  - "Customizing The File List"
  - "Customizing The xflash.pkg File"
  - "Other xflash Options".




**xflash Main Screen**

**Note**

You must insert the flash ROM card into the X terminal before you switch on the unit.

## Starting xflash ...

If your X terminal has 3 MB of memory free, you can start xflash from a command line in a terminal emulator window or from a window manager:

### Starting xflash From A Terminal Emulator Window

To start xflash from a terminal emulator window, type:

```
/usr/bin/X11/700X/hpxt.xflash &
```

### Starting xflash From mwm

To start xflash 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 &"
```

When you restart mwm, xflash will be available on your root menu.

### Starting xflash From ENWARE VUE/RX

To start xflash from ENWARE 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 an X terminal. When you choose files to include on the ROM card, you need to ensure that you have included all the files the X terminal requires to boot and that the files you have chosen fit on the ROM card.

The following topics explain how to create an updated server image for the ROM card and how to add new fonts. Refer to:

- "Upgrading The X Server"
- "Customizing The File List"

### Upgrading The X Server

To create an image with the 5.2 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 "File List to Program" 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.
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, do the following:

1. Copy `/usr/lib/X11/700X/config/xflash.pkg` to `$HOME/xflash.pkg`
2. Edit `$HOME/xflash.pkg` by following the instructions it contains.

### 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 X Station From Another

When an X station boots, it downloads its X server and fonts from a file system. At one time, this file system had to be on a computer (the file server) or on a ROM-based server card installed in the X station. Now, an HP X station with a ROM-based server card can boot any number of similar X stations:

1. On the X stations you want to boot:
   a. Configure the File Server field with the IP address (or terminal name) of the X station with the ROM card.
   b. Set the access mechanism field to (NFS).
2. On the X station with the ROM card:
   a. Go to the Server configuration screen.
   b. Click on (Extensions...).
   c. If the `NFSServer` line does not say `Current State: Loaded`, doubleclick on the `NFSServer` line so that it says `Next Reboot: Load`.
   d. Click on (OK).
   e. Click on (OK).
   f. Power the X station off and on.

When the X station with the ROM card reboots, the other X stations will be able to boot from it.

**Note**

Both X stations must have the same Boot Directory (as shown on the Server configuration screen and controlled by the `$(BasePath)` remote configuration variable). By default, this is: `/usr/lib/X11/700X`

# 5

# Customizing Your Keyboard's Operation

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

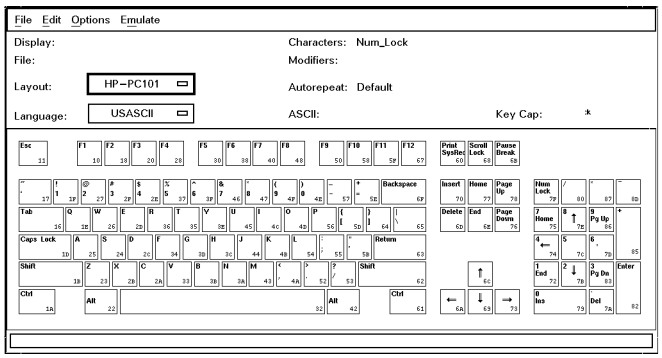
- Use the ENWARE Keyboard Mapper to change the operation of some of the keys on your keyboard (see "Remapping Your Keyboard") (this program requires an HP-UX system). For suggestions about which keys you might want to redefine, refer to "Choosing Which Keys To Map".
- Customize how your keyboard operates 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 National Language Characters On Sun Systems" describes changes you made need to make to your environment on Sun systems.
- "Using National Language Characters On SCO Systems" describes changes you made 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 ENWARE Keyboard Mapper to change the characters their keyboards produce.




**ENWARE Keyboard Mapper**

With the ENWARE 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 ENWARE 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 &
```

A display of a USASCII PC-101 keyboard appears.

### Selecting The Keyboard To Modify

To modify the keyboard of your X station:

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 X station.
4. Click on OK.

A display of your X station's keyboard appears.

---

**Note**

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

To modify a keyboard that is not associated with a particular X station:

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.

#### To Edit 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.

#### To Emulate 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.

### To Copy 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 X station off and on:

- To apply the changes immediately:
  1. Select File, then Write Keyboard.
  2. In the "Write Keyboard" popup, specify the display name of your X station.
  3. Click on OK.

  The changes stay in effect until you power the X station off and on.
- To apply the changes after you reboot the X station:
  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 (`/usr/lib/X11/700X/config/`*terminalname*`.cfg`) as follows:

     Xkeymap File = "$HOME/*terminalname*.kbd"
  5. Save your remote configuration file.

  If you have remote configuration enabled, the X station applies the changes you made to its keyboard the next time you switch the X station 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 ENWARE Keyboard Mapper (see "Remapping Your Keyboard").
2. Modify your `$HOME/.xsession` 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

To set up dynamic keyboard mapping, edit your `$HOME/.xsession` file. After the line that reads:

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

add the following lines (replacing `terminalname` with the name of your X station 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 &
```

Those lines do the following:

1. Start the dynamic-keyboard-mapping local client. The initial keyboard map has no keys defined.
2. Output the current keyboard map to a file.
3. Apply the current keyboard map to the keyboard mapping client.
4. Apply the file that contains the keyboard modifications required by your first client to the keyboard mapping client.
5. Start the first client.
6. Apply the current keyboard map to the keyboard mapping client.
7. Apply the file that contains the keyboard modifications required by your second client to the keyboard mapping client.
8. Start the second client.

**Note**

You cannot remap "modifiers" (Shift, Control, Lock, Mod1 to Mod 5) 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 HP clients.

To re-map your PS/2 keyboard:

- XDM users need to uncomment the following line in their `.xsession` file:
  `xmodmap /usr/lib/X11/700X/examples/hpemulation`
- HP VUE users need to add the following line to their `.vueprofile` file:
  `xmodmap /usr/lib/X11/700X/examples/hpemulation`

**Note**

The `hpemulation` line that maps [Delete Char] to [Delete] also makes it impossible to use [Shift][Ctrl][Delete] to reset the X station. 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 National Language Characters On Sun Systems

If you want to activate national language characters that are 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 National Language 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. (The `-ls` option ensures that `.profile` or `.cshrc` is called.)

For information on using non-US-English keyboards, "dead" keys, and compose keys, refer to "Configuring non-U.S. English keyboards" in the SCO Open Desktop manual, *Graphical Environment Administrator's Guide*.

# 6

# Using A Local Printer

This chapter describes how you can attach a printer, plotter, or serial-input device to an HP X station. Topics include:

- "Which Devices Can I Connect?"
- "Connecting A Printer Or Plotter To The X Station"
- "Setting Up The Host For The X Station's Printer"
- "Printing A File".

If you have problems with the printer installation, refer to Chapter 17.

**Note**

If your application requires input from a serial-connect input device (touch screen, tablet, etc.), you cannot use the instructions in this chapter. Instead, you need to configure a pseudo-terminal to communicate with the device. Follow the instructions in "Using HP Plotters On HP-UX Systems" or read the man page for `hpnptyd`.

## Which Devices Can I Connect?

Which devices you can connect depends on your host computer:

- On HP-UX systems, HP X stations support any printer or plotter that can plug into the X station and has a model script in `/usr/spool/lp/model`. However, HP 7440a, HP 7475a, HP 7550a, HP 7570a, HP 7595a, or HP 7596a plotters 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 X stations 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 X Station

This section explains how to connect a printer or plotter to the X station and how to test the connection.

### Connecting To The Parallel Port

To connect a parallel printer to the X station, use a Centronics-style cable (HP 24542D).

### Connecting To The Serial Port

To connect a serial printer to the X station, use an HP 24542G cable. To configure the Serial Port to work with the printer:

1. Press (F12) for two seconds to access the configuration screens.
2. Go to the Terminal configuration screen. Set the `Serial Port Use for` to `Printer`. The printer's documentation describes the baud rate, stop bits, data bits, parity, and pacing you must set.
3. Click on (OK) to exit.

### Testing The X Station-Printer Connection

Hewlett-Packard X stations have print tests you can use with non-PostScript printers to test the X station-to-printer connection.

1. Press and hold the (F12) button to access the configurations screens.
2. Click on (Terminal).
3. Click on the (Serial) or (Parallel) Print Test button.

If your printer does not print the X station's configuration, check the cable and the printer for problems.

## Setting Up The Host For The X Station's Printer

How you set up the host for the X station'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:

- "For An HP-UX Or Sun 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".
- "For An IBM AIX System"
- "For An SCO UNIX System".

### For An HP-UX Or Sun System

The administration script (`xtadm`) makes it easy for you to add an X station'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:

1. The terminal name of the printer's X station
2. The type of connection (serial or parallel)
3. The name you wish to assign to the printer (the default is the X station's terminal name)
4. The printer type (laserjet, quietjet, etc.).

To begin:

1. As superuser, type: `/usr/bin/X11/700X/admin/xtadm`
2. Choose: `3) Printers, plotters`
3. To test the network connection, choose:
   `3) Check operation of a printer or plotter`

   When you choose, `Check operation of printer or plotter`, `xtadm` uses `/etc/ping` to verify that the X station 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 X station and the printer are properly connected and configured.
4. Choose: `1) 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 X stations, 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 X station.
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 a line having the following format:

```
/usr/lib/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`.

  Because using a pty that is already in use causes strange results, the name you choose should be as high as possible to reduce the likelihood that another program will grab the pty. Note the name you choose; 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 X station to which the printer is attached (`xterm2` in this example).
- The *port* identifies the serial or the parallel port on the X station:
  - Choose `9100` to send the data to the serial port.
  - Choose `9101` to send the data to the parallel port.

### Assigning The Slave Side Of The Pseudo-terminal Driver

How you assign the slave side of the pseudo-terminal driver depends on whether or not you have an HP 9000 Series 800 running HP-UX 8.x. If you do not have a Series 800 computer running HP-UX 8.0, use `sam` as follows:

1. On the root server as superuser, type: `sam`
2. Open `Printers and Plotters`
3. Open `Printers and Plotters`
4. From the (Actions) pulldown, choose: "Add Printer/Plotter Requiring Nonstandard Device File ... "
5. Fill in the resulting menu as follows:
   - For `Printer name`, choose a unique name. You may use the X station'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`. *Type over the default* `Printer device file name`. *This default name is incorrect.*
   - Enter `Printer Class` to suit your system or leave it blank.

### If You Have A Series 800 With HP-UX 8.0

If you have a Series 800 with HP-UX 8.0, you configure the slave side of the pseudo-terminal driver as follows:

1. Log on to the root server as superuser.
2. Type the following:
   `lpshut`
   `lpadmin -p` *printername* `-v` *devicename* `-m` *model*
   `accept` *printername*
   `enable` *printername*
   `lpsched`
   - For *printername*, use the terminal's terminal name.
   - The *devicename* is the slave side of the pseudo-terminal driver and therefore must correspond to the master side of the pseudo-terminal driver, as specified in `/etc/rc`.

     For example, if the `/etc/rc` entry has `/dev/ptym/ptyr0`, the device name is `/dev/pty/ttyr0`.
   - The *model* is one of hp7440a, hp7475a, hp7550a, hp7570a, hp7595a, or hp7596a, as appropriate.

## For An IBM AIX System

Before you begin you need to know the following:

1. The terminal name of the X station to which the printer is connected
2. The type of connection (serial or parallel)
3. The name you wish to assign to the printer (the default is formed from the X station's terminal name)
4. The printer type (laserjet, etc.).

To begin:

1. As superuser, type: `smit`
2. Choose:
   - `Devices`
   - `Printer/Plotter`
   - `Manage Local Printer Subsystem`
   - `Virtual Printers`
   - `Add a Virtual Printer`
   - `Printer or Plotter Attached to an HP X Station`
3. `smit` prompts you for all the necessary information.

To learn how to print a file, see "Printing A File".

## For An SCO UNIX System

Before you begin you will need to know:

1. The terminal name of the X station to which the printer is connected
2. The type of connection (serial or parallel)
3. The name you wish to assign to the printer (the default is the X station's terminal name)
4. The printer type (laserjet, quietjet etc).

To begin:

1. As superuser, type: `sysadmsh`
2. Choose: `System`
3. Choose: `Hardware`
4. Choose: `HP X Station - X terminal admin`
5. Choose: `3) Printers, plotters`
6. Choose: `3) Check operation of a printer or plotter`

   When you choose, `Check operation of printer or plotter`, `sysadmsh` will use `ping` to verify that the X station is connected to the LAN, then send a test file to the printer. This test bypasses the print spooler.

   If the test fails, check that the X station and the printer are properly connected and configured.
7. When the test is finished, choose:
   `1) Add a printer or plotter`

   The script will prompt you for all the necessary information. To access the online help, type `?` at the prompt.

## Printing A File

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.

### On HP-UX, AIX, or SCO UNIX Systems

To print a file, use:
`lp -d`*printername filename*

For example: `lp -dxterm1par data.output`

**Note**

You can eliminate the `-d` option if you make the local printer the default for a user by putting one of the following command lines in the user's startup script or, for HP 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`

# 7

# Working With Fonts

This chapter explains how the HP X station accesses fonts and explains how you can configure the X station 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"
- "Using Fonts From The ENWARE X Station Software"
- "Using The Workstation's Fonts"
- "Using Fonts From Different Computers"
- "Using Fonts From An X11R5 Font Server"
- "Adding And Deleting Fonts".

If you experience any font problems, refer to Chapter 19.

**Note**

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

- On HP-UX: `/usr/tftpdir`
- On IBM: `/usr/lpp/HPXT`
- On SCO, typically: `/u/tftpboot`
- On Sun, typically: `/tftpboot`

If these links are not in place, you need to prepend the installation directory to the path. For example, if you have a Sun system and you want to create a font to be downloaded by TFTP, instead of locating the font file in:

```
/usr/lib/X11/700X/fonts/misc
```

you need to prepend the installation directory to the path. If your ENWARE X station software was installed in `/tftpboot`, use:

```
/tftpboot/usr/lib/X11/700X/fonts/misc
```

## Which Fonts Are Available?

For a font to be available to the X server, the following need to be true:

- 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 X station's Server configuration screen. By default, the font path includes only fonts installed with the X station'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 X station's Server configuration screen or by using remote configuration.
- The font needs to be in a format the X server can read. Your Hewlett-Packard X station can use most `.snf` and `.pcf` format fonts. "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 X station can automatically download the fonts installed from its server tape. However, if you want to download fonts from other locations, your workstation may need to be set up to allow the X station to access these fonts.

## Understanding How The X Server Finds And Downloads Fonts

When switched on, the X station searches for fonts on its **font path**, a list of font directories the X server searches to find fonts it needs, and downloads fonts using a font access mechanism.

The X station can use any of three font access mechanisms:

- TFTP
- NFS
- TCP

#### TFTP (Trivial File Transfer Program).

TFTP is present on any system on which the ENWARE X station software has been installed. All Hewlett-Packard X stations can access fonts under `/usr/lib/X11/700X/fonts` using TFTP.

#### NFS (Network File System).

If NFS was running on your system when you installed your X station, your X station 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 font transfer method that uses TCP/IP to access FontServer fonts. (This capability is independent of the "usual" file access mechanism between the X station and the host that provides the fonts.)

## Using Fonts From The ENWARE X Station Software

By default, the X station can download the fonts installed from the ENWARE X station software by using the TFTP font transfer mechanism. When you installed the ENWARE X station software, you installed the following font directories:

- Standard on all supported systems:

  ```
  /usr/lib/X11/700X/fonts/iso_8859.1/75dpi
  /usr/lib/X11/700X/fonts/iso_8859.1/100dpi
  /usr/lib/X11/700X/fonts/hp_roman8/75dpi
  /usr/lib/X11/700X/fonts/misc
  ```

  On Sun systems, the standard fonts and:

  ```
  /usr/lib/X11/700X/fonts/Xol
  ```

  On SCO systems, the standard fonts and:

  ```
  /usr/lib/X11/700X/fonts/r2
  ```

- On HP-UX systems with NLIO running, the standard fonts and:

  ```
  /usr/lib/X11/700X/fonts/hp_japanese/75dpi
  /usr/lib/X11/700X/fonts/hp_korean/75dpi
  /usr/lib/X11/700X/fonts/hp_chinese_t/75dpi
  /usr/lib/X11/700X/fonts/hp_chinese_s/75dpi
  ```

Asian fonts are not included in the default font path. To *add* an Asian font directory to the font path, type the path onto the X station's Server configuration screen. 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 X station's software, you may decide to set up the X station to use fonts already installed on the workstation. By using workstation fonts, you can save a considerable amount of disk space.

HP workstations have the following fonts available:

```
/usr/lib/X11/fonts/iso_8859.1/75dpi
/usr/lib/X11/fonts/iso_8859.1/100dpi
/usr/lib/X11/fonts/hp_roman8/75dpi
/usr/lib/X11/fonts/misc
```

HP workstations with NLIO installed also have:

```
/usr/lib/X11/fonts/hp_japanese/75dpi
/usr/lib/X11/fonts/hp_korean/75dpi
/usr/lib/X11/fonts/hp_kana
/usr/lib/X11/fonts/hp_chinese_t/75dpi
/usr/lib/X11/fonts/hp_chinese_s/75dpi
```

IBM workstations have the following fonts:

```
/usr/lib/X11/fonts/75dpi
/usr/lib/X11/fonts/100dpi
/usr/lib/X11/fonts/misc
```

SCO workstations have fonts that are in an `.snf` format that the X station cannot use. However, you can compile SCO fonts in `.bdf` (bitmap distribution) format into the `.snf` format the X station 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 "Setting Up The Access Mechanisms: NFS And TFTP".

### Setting The Font Path

You can set the X server's font path from the host or from the X station's configuration screens:

- To use remote configuration to set the X station's font path, edit the file `/usr/lib/X11/700X/config/`*terminalname*`.cfg` for each X station. Uncomment the line that has the `Font Path` keywords and edit the font path to show the new directories.
- To use the X station's configuration screens, press F12 to display the configuration screens, then click on Server to access the font path. Edit the path, then click on OK.

Whichever method you use, generally you will change a path element such as `./fonts/hp_roman8/75dpi/` to `./fonts/hp_roman8/75dpi/` (the "." in `./fonts` sets the base path, which is `/usr/lib/X11/700X` by default).

## Setting Up The Access Mechanisms: NFS And TFTP

NFS is the preferred mechanism to access the workstation's fonts. Before your X stations can use NFS, you need to have NFS running on the file server and you need to have your X stations configured into `/etc/exports`. If NFS was running on your file server when you installed your X stations, your X stations 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 ENWARE X station 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 X station can download these fonts using TFTP. A security feature restricts TFTP to directories under the TFTP home directory.

## Using Fonts From Different Computers

To use a font from a computer other than the file server, you can prepend the access mechanism and the computer's name to the font path. The syntax of the font path is:

/[*access_mechanism*]/[*hostname*]/*path*

where:

- *access_mechanism* can be `tftp` or `nfs` (the default is the file server access method). On systems with an X11R5 font server, you can also specify `tcp`.
- *hostname* is the computer's IP address or name (If omitted, the current file server is used.)
- *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/usr/lib/X11/700X/fonts/iso_8859.1/100dpi/`
- `//25.6.6.1/usr/lib/X11/fonts/misc/`
- `/nfs//usr/lib/X11/fonts/iso_8859.1/75dpi/`
- `tcp/25.6.6.1:7000` (to use the font server on computer 25.6.6.1)

**Note**

If you use TFTP to download fonts, the X station reads font paths *relative* to its home directory (`/usr/tftpdir` on HP-UX systems; `/tftpboot` on SCO and Sun).

Symbolic links have been set up to allow NFS to access fonts using the same font path as TFTP.

## Using Fonts From An X11R5 Font Server

If you have an X11R5 font server on your network, you can configure your X station to use it by setting your font path appropriately. One of the advantages of doing this is that you can reduce memory usage on your X station. See "Using A Font Server To Save Memory" in Chapter 8 for details.

If you want to use an alternative font server, refer to "Setting An Alternative Font Server".

The X station communicates with the font server by using TCP/IP (not TFTP or NFS, the standard file access mechanisms), consequently you need to specify the path to the font server somewhat differently than you would for fonts in font files. 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 (font types).

For example, to get courier-style fonts and helvetica-style fonts from a computer that has an IP address of 25.7.1.15, use:

```
tcp/25.7.1.15:7000/courier+helvetica
```

### Setting An Alternative Font Server

You set an alternative font server by configuring the font server, not by configuring the X station. Configure the font server as follows:

1. Start the font server with the configuration file option by putting the following line in the `localrc()` section of `/etc/rc`:

   `/usr/bin/X11/fs -daemon -config` *configfile*
2. Put lines similar to the following in the *configfile*:

   ```
   clone-self=on
   use-syslog=on
   catalogue=list of font catalogues
   default-point-size=120
   default-resolution=75,75,100,100
   alternate-servers=tcp/alternative-font-server-name:7000
   ```

   where *alternative-font-server-name* is another computer that is running a font server.

## 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 ENWARE X server 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 Hewlett-Packard X stations automatically uncompress and convert the `.snf` (server natural format) and `.scf` (compressed server natural format) fonts of most other X servers, such 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 the X station's `.snf` format 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` as follows:

  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 X station 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 X station requires this map to be able to access the font files.

Having added fonts to a directory, you must 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 /usr/lib/X11/700X/fonts/app
```

This creates the file

```
/usr/lib/X11/700X/fonts/app/fonts.dir
```

#### 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, type it into the Font Path on the X station's Server configuration screen.

#### 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 `/usr/lib/X11/700X/fonts/app` font directory.
2. Go to the directory where the `.bdf` source file is located and type:

   ```
   bdftosnf new.bdf > /usr/lib/X11/700X/fonts/app/new.snf
   ```

3. Create the `fonts.dir` file by typing:

   ```
   mkfontdir /usr/lib/X11/700X/fonts/app
   ```

4. Add `app` to the font path by typing on the X station's Server configuration screen's Font Path:

   ```
   /usr/lib/X11/700X/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 X station'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 X station server). To convert Sun fonts that are in `.fb` format, look at 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.

You can 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
```

To execute, type:

```
/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
```

Once the script has finished, add the new font directory (OUTDIR) to the X server's font path on the X station's Server configuration screen and click OK.

## Deleting Font Files

If you ever need to delete font files and font directories, keep in mind the following restrictions:

1. It is a good idea to keep the `/usr/lib/X11/700X/fonts/misc` directory.
2. If you delete fonts from a directory, you must run the `mkfontdir` program to create a new `fonts.dir` file.
3. 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 /usr/lib/X11/700X/fonts/app
```

# 8

# Using X Station Memory Effectively

HP X stations 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 X station 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. Given all of these performance features that require memory, it is clear that if you want to use all the capabilities of the X station, it provides its best performance when it has a great deal of available memory.

This chapter explains how you can make the most effective use of your HP X station memory and how you can diagnose and solve memory-related problems. Topics include:

- "Understanding The X Station Memory Statistics"
- "Making Best Use Of X Station Memory"
- "When There Isn't Enough Memory"
- "Adding More Memory".

## Understanding The X Station Memory Statistics

To view the X station memory statistics, press F12 for two seconds, 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
Backing store reclaimed     0 times
```

Make sure the "Amount Installed" reflects the amount you believe to be installed in your X station. In this case, 10240 KB matches the quantity installed in this X station: an 8 MB memory module combined with the 2 MB of memory on the X station'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 X station. However, there are some constraints 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 X station 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. This is what 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:

000000000000000000000000000000000000000000000

Now, open a window that uses up memory represented by 1s and a second window represented by 2s.

```
11111111122222222222000000000000000000000000
```

Close window 1, freeing up that memory:

```
00000000022222222222000000000000000000000000
```

Open another window that uses up memory represented by 3s.

```
33333000222222222220000000000000000000000000
      ^^^
```

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 coalesce (merge together) with it.

## Making Best Use Of X Station Memory

If you want to make best use of the X station 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:

- "Modifying Backing Store".
- "Using Local Clients And X Station Memory Effectively".
- "Using Downloadable Extensions".
- "Using A Font Server To Save Memory".

### Modifying Backing Store

Backing Store is a configuration parameter that controls how the X station stores the parts of windows obscured by other windows. You can modify this parameter 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.

**Note**

- Backing store never occurs for windows not currently being displayed, such as windows in other workspaces in HP VUE and ENWARE VUE/RX.
- An application can request backing store "ALWAYS" which causes the window to remain in backing store even when not mapped.

## Using Local Clients And X Station Memory Effectively

Local clients are applications (including terminal emulators or window managers) that run on the X station rather than the host computer. As you might expect, local clients can require a great deal of X station memory.

While you are free to use local clients in any way you want, if your X station only has memory for only one kind of local client, you may find it most advantageous to have your users 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, and allows users with sufficient X station 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.)

To reduce the amount of memory required by the local window manager, you need to change window managers (of course, the functionality and appearance of the window managers vary dramatically). Memory requirements for the various window managers and terminal emulators follow.

**Local Client Memory Requirements**

| | |
|---|---|
| First xterm: 730 KB | Next copy: 285 KB |
| First hpterm: 1,250 KB | Next copy: 475 KB |
| First vt320: 1,850 KB | Next copy: 725 KB |

twm: 490 KB
mwm: 1,310 KB
ENWARE VUE/RX: 2,290 KB

local vuewm: 2,900 KB

xflash: 2,200 KB
xclock: 515 KB
xlock: 340 KB

Of course, you can also use host-based clients rather than local clients.

## Using Downloadable Extensions

Downloadable extensions are operating characteristics that you can build into your X server the next time you reboot your X station. Any given extension does not take up a great deal of memory when loaded. However, when the 10 KB multibuffering extension is used, it can use up to 1 MB of X station memory in the course of updating a large window in memory before "flipping" that data to the display.

## Using A Font Server To Save Memory

If your system has an X11R5 font server (as described in "Using Fonts From An X11R5 Font Server" in Chapter 7), you can change your font path to use the font server rather than the standard bitmapped fonts supplied with the ENWARE software. By doing this, you can save 500 KB of X station memory over the default font path.

To configure the X station to use a font server, do the following:

1. Press F12 for 2 seconds to access the configuration screens.
2. Click on Server to access the Server configuration screen.
3. Click on lines in the Font Path area and use the Backspace key to remove all of the font path entries except `./fonts/misc` and `/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, to get fonts from a computer that has an IP address of 25.7.1.15, use:

   ```
   tcp/25.7.1.15:7000
   ```

   (You would not normally specify a */cataloglist*.)

## When There Isn't Enough Memory

In general, the X station does everything it can to fulfill all of your requests. However, lack of memory may limit what your X station can do. For example, if you request a local client when you have insufficient memory, you will see a popup informing you that the local client cannot be run. If you start a host-based client that causes free memory to become too low, the X station reclaims memory from the following areas:

- From backing store
- From local terminal emulator templates stored in memory
- From an existing local client.

When memory is reclaimed from backing store or local terminal emulator templates, X station performance suffers slightly as clients are required to go to the host for window updates or templates. The third case is more drastic and involves terminating a terminal emulator window. This would only occur when the server would otherwise crash, causing the entire X session to be lost.

Typically, you see warning popup messages when your X station is running out of memory:

```
Not enough memory to start local client
```

If this occurs continually, you may wish to add more memory to your X station.

## Adding More Memory

Using local clients can take up to 4 MB of memory, so you may find that you want to add memory to your X station. 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).

**Tip**

For HP ENVIZEX units: when adding memory cards that are the same size, you get slightly better performance if you put the two cards in slots 1 and 2 or in slots 3 and 4, as the HP X station can interleave the memory.

# 9

# Preparing To Configure HP X Stations

This chapter helps you decide upon the best configuration method for your installation and explains what modifications you can make to the default configuration values.

Topics include:

- "Understanding Your Configuration Options"
- "Configuring X Stations From The Host"
- "Remsh Access To HP X Stations"
- "Configuring X Stations From The Configuration Screens".

## Understanding Your Configuration Options

You can configure your HP X stations remotely (from the host) or locally (from each X station's configuration screens).

For most customers, the best way to make users productive quickly is to configure the X stations from the host using BOOTP (or DHCP (Dynamic Host Configuration Protocol), if available) and remote configuration. However, other customers find that the flexibility to change configuration values from the X station'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 X stations 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 X Stations From The Host".

### Configuring From The X Station

There are two advantages to configuring locally using the configuration screens:

- A knowledgeable user can change the configuration of the X station immediately, without interrupting the system administrator. Although this can be a great advantage in many situations, a careless user could easily disrupt the network by entering improper configuration values.
- The configuration screens allow you to boot through a gateway.

For more information about using the configuration screens, refer to "Configuring X Stations From The Configuration Screens".

## Configuring X Stations From The Host

The `xtadm` administration script makes it easy for you to configure your X stations remotely from the host. When you run `xtadm`, it automatically sets up a **BOOTP (boot protocol)** file that configures your X stations with the network configuration data they require to communicate on the network. For many users, this is all the configuration information that the X stations require.

In addition, `xtadm` creates a remote configuration file that contains any configuration information that is not supplied by BOOTP. This file is automatically downloaded to an X station when the X station is switched on.

When used together, BOOTP and remote configuration can configure the X station completely. The following sections provide more detail about BOOTP/DHCP and remote configuration. Refer to "Using BOOTP And DHCP" and "Using Remote Configuration".

### Using BOOTP And DHCP

**BOOTP (boot protocol)** and the related **DHCP (dynamic host configuration protocol)** are programs that can download network configuration data to an X station. The network configuration data is the information that enables the X station to communicate directly with devices on the network. This data includes the IP addresses of the X station 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 HP ENWARE 5.2 X station software.

You can also give an X station its network configuration data by typing the network data in the configuration screens and rebooting the X station. 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 X station does not have to configure it before using it. Configuration data downloads automatically when the X station 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 X station is switched on. To prevent this from happening, change the configuration to "Network Parameters [from Fields Below]".

### How BOOTP and DHCP Work . . .

If the X station is configured to use BOOTP (which is the factory default configuration for HP 700/RX and HP ENVIZEX X stations) or DHCP (which is the factory default configuration for HP ENTRIA X terminals), switching the X station on causes it to broadcast a boot request on its subnet. The boot request contains the X station's ethernet link level address. What happens next depends on which process—BOOTP or DHCP—is running on the host. If DHCP is running, whether the X terminal is configured to use DHCP or BOOTP is significant:

- If BOOTP is running, any boot request causes `bootpd` to look through `bootptab` for the ethernet link level address of the X station.

  If a match is found, the network configuration data for the requesting X station is extracted from `bootptab` and sent as a packet over the network.

  If no match is found, the X station fails to boot.

- If DHCP is running and the X station is configured to use BOOTP, `dhcpd` operates just as `bootpd` does.

- If DHCP is running and the X station is configured to use DHCP, which is the default for HP ENTRIA X terminals, `dhcpd` looks through `bootptab` for the ethernet link level address of the X station.

  If a 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 X terminal, which allows the X terminal to boot. Otherwise the X terminal fails to boot.

  If a match is found, `dhcpd` operates as `bootpd` does.

## Using Remote Configuration

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

The remote configuration file is created automatically when you install X stations using the `xtadm` administration script (or an equivalent program). `xtadm` copies the remote configuration file `/usr/lib/X11/700X/config/700RX.cfg` to *terminalname*`.cfg` for each X station you install. If you need to customize the remote configuration file, you should do so before the master file gets copied for each X station. For more information, refer to "Modifying The Remote Configuration File". If you have problems with the syntax of the remote configuration file, refer to "Using The Variables In The Remote Configuration File".

**Caution**

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

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

### 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 X station files have this path in common. Normally it will be: `/usr/lib/X11/700X`

`$(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`

`$(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 X terminal'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 an X terminal 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 X terminal is configured as follows:

- The X terminal's terminal name is `xterm16`
- The X terminal'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 X terminal 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
```

### Modifying The Remote Configuration File

If you need to set all of your X stations 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 `700RX.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 The Boot Process"
- "Securing The Configuration Screens"
- "Securing Against Unauthorized Access"
- "Securing Against Unauthorized Clients".

#### Changing The Default Font Path.

If you chose not to install the HP X station fonts, you need to change the X station's font path to use the workstation's fonts. To change the default font path:

1. As superuser, open: `/usr/lib/X11/700X/config/700RX.cfg`
2. Find the line that has the `Font Path` keyword and remove the comment character (#).
3. Edit 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 X stations to have a new keyboard language, edit `700RX.cfg` as follows:

1. As superuser, open `/usr/lib/X11/700X/config/700RX.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. Edit 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 X station downloads the remote configuration file, the keyboard will be fully functional.

**Speeding The Boot Process.** Lines in the remote configuration file direct the X station to load files specified by the following parameters: `SNMPFile`, `XdevicesFile`, and `XpointerkeysFile`.

If your X stations 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 specified configuration screens, you can set the `configuration lock` 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 X station'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 3. |

When configuration lock is set, remote configuration is automatically enabled.

### Securing Against Unauthorized Access.

In the default remote configuration file, the parameter `Access Control` is disabled (Off). If you want to control which host systems can access your X stations, edit the remote configuration file and set `Access Control = On`.

When Access Control is enabled, the only computers that users can access through an X session are:

- The X session manager, after XDM connection
- The TELNET host, while TELNET is active
- The computers listed in:

  `/usr/lib/X11/700X/etc/`*terminalname*`.hosts`

### Modifying The Access Control List

To allow a new host to access your X station for this X session, use `xhost` on the login server as follows:

`xhost +`*ipaddress*

If your system has a name server, a hostname can be used in *ipaddress*.

To allow a new host "permanent" access to your X station, add it to your *terminalname*`.hosts` file.

To deny a host access to your X station for this X session, use:

`xhost -`*ipaddress*

To deny a host access to your X station "permanently," remove it from your *terminalname*`.hosts` file.

**Securing Against Unauthorized Clients.** In the default remote configuration file, the parameter `Client Authorize` is disabled (Off). If you need to control which hosts can access an X station, you can edit the remote configuration file and set `Client Authorize = On`. Note that Client Authorization works only if XDMCP is enabled.

### How Client Authorization Works

XDMCP sets a client authorization mechanism, called the MIT magic cookie, that the X server can use. When a user logs into a `vuelogin` or XDM session, the X session manager creates a new magic cookie in the `.Xauthority` file in the user's home directory. If the X station is configured to Client Authorize enabled, the X server compares each client's magic cookie with the `.Xauthority` file to decide whether or not to accept the client. Clients with no authorization or the wrong authorization are prohibited from accessing the server. Generally this means that only clients started under the user's XDM session are able to access the user's display. Thus, with Client Authorization enabled, local clients cannot be started from the configuration screens.

### Sharing Windows If Client Authorize Is Enabled

If a user wants to permit another user to send a window to his display, the sender needs access to the user's `.Xauthority` file. Here is one way to permit such access for the duration of a session:

1. The receiver types from his home directory:

   `chmod 644 .Xauthority`

2. The sender types from his home directory:

   `xauth merge` *receiver_home_dir*`/.Xauthority`

3. 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.

## Remsh Access To HP X Stations

HP X stations 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. "Controlling remsh Access" has 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 X station. You can set the following levels of privileges by remote configuration:

`x` The user can start, query, or kill processes on the X station.

`w` The user can write configuration changes to the X station.

`r` The user can read configuration and statistics information from the X station.

`*` Equivalent to `rwx`.

*blank* The user has no access to the X station'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 X stations support remsh commands using the following syntax:

`remsh` *terminalname command [parameters]*

For example, if your X station has the terminal name hpxterm1, the command to list the processes running on your X station is:

```
remsh hpxterm1 ps
```

#### Commands Requiring x Privileges:

*local_client client_parameters*
executes the specified local client. For example: `hpxt.hpterm -dev /dev/log`

`ps` lists the processes running on the X station.

`kill` *pid* terminates the specified local client.

**Commands Requiring wx Privileges:**

`reset` resets the X server, terminating the current session.

`reboot` reboots the X station.

**Commands Requiring w Privileges:**

`putlog` *string* writes *string* to the X station's log screen.

`reconfig` forces the X station to re-read its remote configuration file.

**Commands Requiring r Privileges:**

`ls` lists the X station's devices.

`cat` *file* prints the specified file (or device).

`get` *parameter* prints the specified information:
`config` gives the X station's current configuration
`eeprom` gives the X station's stored configuration
`log` gives the contents of the log screen.

`adShow` lists the `modules.ld` file loaded by the X station.

`env` lists the X station's environment variables.

`export` *name*`=`*value*
sets an X station's environment variable.

**Commands Requiring No Privileges:**

`ping` *hostname* "pings" the specified device.

## Configuring X Stations From The Configuration Screens

To configure an X station locally, you can enter all of the X station's network configuration data on the configuration screens and then re-boot the X station. You can also use the configuration screens in combination with BOOTP/DHCP and remote configuration to make configuration adjustments at each X station.

### Using The Configuration Screens

To access the configuration screens, press [F12] for two seconds. (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.)

### 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 will, if enabled by setting "Network Parameters" to [Download from Host (BOOTP)], or [Download from Host (DHCP)], overwrite your X station's network configuration parameters and enable remote configuration. See "Using BOOTP And DHCP".
- Remote configuration, if enabled, can overwrite any of your X station'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 Chapter 22 for details.

# 10

# Configuring And Customizing HP X Stations

After you have installed the X station software on your host, you need to configure your host system files so that the X stations can be identified to the network. Once the host system files are configured, you can customize your X stations to meet your requirements.

Topics in this chapter include:

- "Introducing X Station Administration"
- "Running X Station Administration Scripts"
- "Adding An X Station To HP-UX Or Sun Systems"
- "Creating Users' Startup Scripts"
- "Adding An X Station To IBM AIX Systems"
- "Adding An X Station To SCO UNIX Systems"
- "Starting Up The X Station"
- "Customizing Your X Stations".

## Introducing X Station Administration

This section explains how to administer HP X stations using the scripts provided with the ENWARE 5.2 software. These scripts makes it easy for you to set up your X stations in the system files. Before you run the X station administration scripts, you need to know:

- The subnet mask and gateway and for the X station, if applicable
- The terminal name of the X station you want to add (any name is fine as long as it is unique on networks your X station accesses)
- The X station's link level address, which is displayed on the X station's screen at boot up.

How you access the X station's administration scripts depends on which operating system your computer runs:

- HP-UX and Sun system administrators should refer to "Running X Station Administration Scripts".
- AIX system administrators should refer to "Adding An X Station To IBM AIX Systems".
- SCO UNIX system administrators should refer to "Adding An X Station To SCO UNIX Systems".

**Note**

If you have many HP X terminals to configure, you may want to purchase the ENWARE X Terminal Manager (part number B3670AA) to ease the task of administering your network.

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

## Running X Station Administration Scripts

To run the X station administration scripts:

- On HP-UX systems, as superuser
  1. Type: `sam`
  2. Choose: Other Utilities-->
  3. Choose: X Station Administration
- On Sun systems, as superuser, type:

  `/usr/bin/X11/700X/admin/xtadm`

The X station administration menu appears:

```
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

       ?) Help         x) exit

Please enter selection (default=1):
```

This menu is described in the sections that follow.

#### 1) Add an X station

Adds an X station to the host system files. For details, refer to "Adding An X Station To HP-UX Or Sun Systems".

#### 2) Remove an X station

Removes an X station from the host system files.

#### 3) Printers, plotters

Allows you to add or remove an X-station-connected printer or plotter to this computer's print spooler. For step-by-step instructions, refer to Chapter 6.

#### 4) Installation testing

Tests the X station software installation, BOOTP, and TFTP.

#### 5) XDM Administration

Allows you to start/stop and configure XDM (or scologin for SCO systems).

(If you have an HP host, you can also access the `xtadm` script through `sam`'s "Other Utilities" option.)

### Modifying The X Terminal Administration Scripts

The X terminal administration scripts ask you to supply values for your subnet mask and your default gateway. These values are supplied to all X terminals you administer using `/usr/bin/X11/700X/admin/xtadm`

If your network topology changes and you want to change the subnet mask and default gateway `xtadm` supplies, you need to edit the following files:

- To change the subnet mask: edit `/usr/bin/X11/700X/admin/SUBNETMASK`
- To change the default gateway: edit `/usr/bin/X11/700X/admin/GATEWAY`

## Adding An X Station To HP-UX Or Sun Systems

To add an X station, choose the `Add an X station` selection from the main menu. When you choose `Add an X station`, `xtadm` automatically does the following:

1. Adds an X station to the `/etc/hosts` table
2. Creates an entry in the BOOTP file `bootptab`

   (BOOTP, which can download the X station's network configuration data when the X station is switched on, is described in Chapter 9. Use BOOTP even if you are installing only one X station.)
3. Updates the NIS database (or instructs you to do so).
4. Creates a remote configuration file called `/usr/lib/X11/700X/config/`*terminalname*`.cfg`.

   (Remote configuration, which can download any X station configuration parameters from the file server, is described in Chapter 9. If there are non-standard configuration settings you wish to apply to all of your X terminals, refer to "Modifying The Remote Configuration File" in Chapter 9 before you run `xtadm`.)
5. Prompts you to start up XDM, if no X session manager is already running
6. Updates the NFS file `/etc/exports` with assignments for the X station (or instructs you to do so).

Once you have added the X stations to the system files, you can start up each X station and ensure that it boots successfully. Refer to "Starting Up The X Station".

## Creating Users' Startup Scripts

The ENWARE X terminal administration scripts enable you to create startup scripts for your users. A user's startup script starts the clients that begin an X session.

To create the startup script for a user, do the following:

1. From the `xtadm` Main Menu, choose:

   5) XDM Administration
2. From the XDM Administration Menu, choose:

   3) Create .xsession script in user's home directory.

## Adding An X Station To IBM AIX Systems

To add an X station to an IBM AIX system, you need to do the following:

- "Add A Device To The Network"
- "Enable The X Station To Use NFS"
- "If You Want To Use A Name Server ... "
- "Add The X Station To The System Files"

### Add A Device To The Network

You need to add all of your X stations 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 X station) and the HOST NAME (the terminal name of your X station) in the screen that appears.
3. To save the entry, click on Do.
4. When you are done, click on Cancel.

### Enable The X Station To Use NFS

If your X stations are going 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.

### If You Want To Use A Name Server ...

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

### Add The X Station To The System Files

To add your X station to the appropriate system files, run `smit` as superuser and choose:

- `Devices`
- `HP X Station Configuration`
- `Add an HP X Station`

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

1. Creates an entry in the BOOTP file `/etc/bootptab` (BOOTP is described in Chapter 9.) You should use BOOTP even if you are installing only one X station.
2. Creates a remote configuration file called `/usr/lpp/HPXT/lib/X11/700X/config/`*terminal*`.cfg`. (Remote configuration is described in Chapter 9.)

Once you have added the X stations to the system files, you can start up each X station and ensure that it boots successfully. Refer to "Starting Up The X Station".

## Adding An X Station To SCO UNIX Systems

To add an X station to SCO UNIX systems:

1. As superuser, start `sysadmsh`
2. Choose: `System`
3. Choose: `Hardware`
4. Choose: `HP X Station Admin`

### To Add An X Station . . .

The `Add an X station` menu selection available on the main menu automatically does the following:

1. Adds an X station to the required places, depending on the conditions below:
   - If you are not running NIS, adds the X station to the `/etc/hosts` table.
   - If you are running NIS, and current host is the master server, adds the X station to `/etc/hosts` table and updates the host database.
   - If you are running NIS, and current host is not the master server, the script instructs you to go to the master server and add the X station to the host map. You cannot continue until this has been done.
2. Creates an entry in the BOOTP file `bootptab` (BOOTP is described in Chapter 9.)
3. If NFS is installed on your system but is not exported to the X station or "world", the installation script, at your request, updates the `/etc/exports` file with assignments for the X station you are installing.
4. Creates a remote configuration file called `/usr/lib/X11/700X/config/`*terminalname*`.cfg`. (Remote configuration is described in Chapter 9.)

Once you have added the X stations to the system files, you can start up each X station and ensure that it boots successfully. Refer to "Starting Up The X Station".

## Starting Up The X Station

After you have run `xtadm` (or an equivalent product) and added the X stations to the system files, you can start up each X station and ensure that it boots successfully. Topics in this section include:

- "Switching On The X Station"
- "Understanding The Bootup Sequence"
- "Setting Your Monitor Type"
- "Setting Your Keyboard Type"
- "Logging Out From XDM".

### Switching On The X Station

The power button is located on the front of the base unit. After you press the power button the X station 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").

If you are booting using the recommended configuration, using BOOTP to download network configuration data and an X session manager (either XDM or `vuelogin`) to open an X Window session, your X station follows the bootup sequence in "Understanding The Bootup Sequence".

If you are supplying network configuration data manually or using TELNET, additional configuration of the X station is necessary. You can find the information you need in Chapter 15.

### Understanding The Bootup Sequence

When the X station is switched on:

1. The X station broadcasts a boot request on its subnet.
2. The boot server responds by sending the X station the network parameters it needs.

**Note**

The default X station configuration assumes that you have a USASCII PS/2 keyboard. If you have another keyboard type, click on (Abort Download) and then (To Configuration) to change your keyboard type. Refer to "Setting Your Keyboard Type".

3. Once the X station has its network parameters, it makes a connection with the file server and attempts to download its X server and fonts by using NFS. If this fails, the X station automatically attempts to download the files by using TFTP.

By default, the X server file is `/usr/lib/X11/700X/bin/C`*xxxx*`A` where *xxxx* represents the model number on the back of your X station. You would not normally change this value.

4. The X station downloads its remote configuration file.
5. The X station then directs an XDMCP request to the file server.
6. After about 10 seconds, a login window appears. If you have an account on the X session manager, you can now log in.

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

## Setting Your Monitor Type

Most bundled monitors have custom monitor cables that tell the X station what the monitor type is. However, if you are using your own monitor, you may need to set your monitor type as follows:

1. Switch the X station 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 on the right of your keyboard, 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) key.
3. Click on (OK).
4. If there are no other parameters to configure, click on (OK).

**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.
- If you have a D1195A or D1196A monitor, you may want to adjust the monitor's resolution:
  1. Click on (Terminal) to go to the Terminal configuration screen.
  2. Click on the monitor resolution you would prefer:

     For D1195A monitors, choose one of: `HP D1195A (SVGA)`, `HP D1195A (VGA+)`, or `HP D1195A (VGA)`.

     For D1196A monitors, choose `HP D1196A`.
  3. If you have an ENTRIA Ch that came bundled with a 17-inch monitor, your X terminal defaults to use the monitor at 1024×768 resolution. To use 1280×1024 resolution, reconfigure the X terminal.

### Using Energy Star Monitors

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

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

## 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 X station's remote configuration file (see "Modifying The Remote Configuration File" in Chapter 9), or by using the configuration screens as follows:

1. On the Terminal screen, click on the PS/2 Keyboard Language button.

   Select your language from the table that appears.
2. Click on OK
3. Click on the PS/2 Keyboard Layout button.

   Select your keyboard's layout from the table that appears.
4. Click on OK.

   You need to reset the X terminal before the keyboard layout changes.

## Logging Out From XDM

There are two ways to log out from XDM or `vuelogin` in XDM-mode:

- You can close the last task in the `.xsession` startup script (the foreground task). If the foreground task is a terminal emulator (which is the default), then you can simply type: `exit`

  This method is guaranteed to terminate only those clients that were 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.
- Although it is not the preferred method, you can press
  - On PS/2 keyboards: Ctrl Alt Delete
  - On 46021A HP-HIL keyboards: Ctrl Shift Reset
  - On the LK201-layout keyboard: Ctrl Compose Char F4

# Customizing Your X Stations

After you have configured the network for HP X stations, you can customize the X station so that it can:

- Access computers beyond the local subnet. Refer to "Communicating Through A Gateway".
- Use an X server file that is different than the default. See "Changing The X Server".
- Use the X Imaging Extension. Refer to "Use Downloadable Extensions".
- Use different hosts as sources for the X server and fonts. See "Using Different Hosts For The X Server And For Fonts".

## Communicating Through A Gateway

The X station 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 X station has to go through gateways or routers to access computers, you need to set up the X station's gateway table, which is accessed through the General Network configuration screen.

### How The X Station Uses The Gateway Table

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

### 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. Be sure to give the name of the gateway as it applies to the subnet the X station is on.

### Route-To Entry

The "Route to" entry describes the class A, B, or C network number of the hosts you want to access through the associated gateway. A class A entry such as `25.0.0.0` indicates the IP address of the destination computer is `25.`*x.x.x* (for example, `25.6.6.1`); a class C entry such as `205.130.22.0` indicates the IP address of the destination computer is `205.130.22.`*x* (for example, `205.130.22.9`).

You are permitted to specify a host as a `Route to` entry. Thus, if `25.6.6.1` is the only host on that network, you can use `25.6.6.1` as the `Route to` entry. However, if you make an illegal `Route to` network entry, such as `25.6.0.0`, the X station interprets this as a host's IP address, not as a subnet number on that network.

You are permitted one "default" gateway—this is defined as the gateway that leads to any network not explicitly specified in the other gateway table entries. You specify the default gateway by giving it a "Route to" of `0.0.0.0`

When the X station determines that the destination computer is not on the local subnet, the X station compares its Class A, B, or C network number to the network number of the destination computer:

- If there is no match (for example, 15.6.7.8 and 22.3.5.23), the X station compares the destination computer's Class A, B, or C network number to the "Route to" entries, and chooses the appropriate gateway (the gateway to 22.0.0.0 or the default gateway).
- If there is a match (for example, 15.6.7.8 and 15.3.5.23), the X station assumes that it should apply its subnet mask when resolving the "Route to". In this way you can differentiate between subnets on networks that have the same network number as that of your X station.

### Setting The Default Gateway

If the X station 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 "Gateway" to "0.0.0.0".

`Route to` entries must not specify two paths to the same network. If you have two gateways that can connect an X station to a computer, one must 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 X station to have a specified default gateway on the network. Instead, the X station relies on other devices on the network (such as routers and gateways) to have the routing information the X station needs. When the X station determines that it has data to send to a destination that is outside of the local subnet and that is 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 X station an initial destination for its data. The X station then sends its data to the router that can move the data towards its final destination.

To set the X station to use proxy ARP, configure the gateway table so that the X station's address is the address of the default gateway:

| **Gateway** | **Route to** |
|---|---|
| *terminal_ipaddress* | `0.0.0.0` |

## Changing The X Server

In normal operation, the X station looks in `/usr/lib/X11/700X/bin` for an X server file that matches the X station's part number, for example `C2731A`. This is done automatically—you do not need to specify the X server file name in the configuration screen field `X Server File`. However, there are occasions when you might want to change the operation of your X station by changing the X server. There are two ways of doing this:

- "Specify A New X Server File Name"
- "Use Downloadable Extensions".

### Specify A New X Server File Name

You can specify a new X server file name by typing the new X server file name into the `X Server File` field. If the file is not in `/usr/lib/X11/700X/bin`, specify the full path.

### Use Downloadable Extensions

Downloadable extensions are capabilities the X station builds into its X server at boot up. To control which downloadable extensions are available on X stations, edit the file `/usr/lib/X11/700X/bin/modules.ld` (it contains instructions and descriptions of the extensions). The X station reads this file when switched on and displays the available extensions in the Downloadable Server Extensions popup. You can configure the X station to download an X server with extensions when next switched on as follows:

1. Log into an X session
2. Press F12 until the configuration screens appear
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 X station off and on again.

Once loaded in, the downloadable extensions remain until the user disables them and reboots the X station.

The ENWARE X station software includes the following extensions:

- `MultiBuf`, a multibuffering extension that can improve the performance of applications that rotate graphics displays. Multibuffering is the process that draws updating windows into memory, then flips the completed drawing onto the display in one operation.
- `XIE` (X Image Extension), a 500 KByte downloadable extension that supports the transport of compressed image data. This improves imaging transfer, representation, and rendition when the host or the network are heavily loaded.

**Note**

The version of XIE shipped with the ENWARE 5.2 X station software is the latest version available from MIT, the Massachusetts Institute of Technology as of March, 1994. This is intended as a developer's version for use in prototypes and the development of new applications. MIT pans to adopt the XIE extension as an X Consortium standard in X11R6.

## Using Different Hosts For The X Server And For Fonts

If you want to use one host to provide your X station with its X server and a different host to provide its fonts, you can use the host override function to specify that the X station should download its X server file from a host other than the configured file server. The host override allows you to specify the access method and the host name as part of a file's path. The syntax is:

**/**[*access_method*]**/**[*hostname*]**/***path*

where

- *access_method* can be `tftp` or `nfs` (default: the current access mechanism)
- *hostname* is the computer's IP address or name (default: the file server)
- *path* is the path to the file.

For example, to download the X server file from `74.4.11.8` and fonts from `74.4.11.12`, configure the X station as follows:

1. On the Server configuration screen, set the `X Server File` entry to `/tftp/74.4.11.8/usr/lib/X11/700X/bin/C2730A`.

   (In place of `C2730A`, put the model number of your X station.)

2. On the General Network configuration screen, set the `File Server` to `74.4.11.12`.

# 11

# Configuring An X Session Manager

An X session manager takes care of the login process. It 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:

- "About Your Default X Session Manager"
- "Selecting An X Session Server"
- "Configuring vuelogin On HP-UX Computers"
- "Configuring XDM On HP-UX, Sun, And IBM Computers"
- "Using Restricted Shells"
- "Configuring scologin On SCO Computers".

## About Your Default X Session Manager

Your host computer determines which X session manager is available to you:

- HP-UX systems can have either of two X session managers: XDM (X Display Manager) or `vuelogin`. These products use similar processes; for example, both communicate with X stations by using XDMCP (X Display Manager Control Protocol).

  The ENWARE X station software installs `vuelogin` as the default session manager. 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, `vuelogin` defaults to XDM mode. If you still wish to run XDM instead, the 5.2 software contains the X11R5 version of XDM. For more information, refer to "Starting XDM On HP-UX 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 X stations. The Sun OpenWindows Version 3 XDM resets the Sun console when the X station ends its session. The HP X station's XDM does not. We strongly recommend that you use the XDM provided with the ENWARE software.

## 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, Hewlett-Packard X stations are configured to Startup Mode (XDMCP Direct), and the default X session server is the file server. However, you can configure the X station to any of three types of XDMCP operation:

- XDMCP Direct to *host*
- XDMCP Broadcast
- XDMCP Indirect to *host* (with XDM only; not available with `vuelogin`).

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* or Indirect, you must also specify the IP address of the X session server.

### XDMCP Direct To *host*

The X station 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 X station to use the same host.

### XDMCP Broadcast

The X station 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 X station 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.)

The user can choose the host desired by clicking on the host, then on OK.

### XDMCP Indirect to *host*

The X station 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 X station. This method permits you to direct the primary manager to assign which computer should provide XDM services based on factors such as relative host loading, the X station 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 Computer With XDM".

Note that the indirect request applies only to XDM and is not available with `vuelogin`.

## Configuring vuelogin On HP-UX Computers

Vuelogin is an X session manager that can provide users with HP VUE sessions or with XDM-mode session. This section explains how you can configure vuelogin from the host computer. Topics include:

- "Running vuelogin In XDM Mode"
- "Bypassing The Login Screen Under vuelogin"
- "Controlling Access To The Host Computer With vuelogin"

### Running vuelogin In XDM Mode

Vuelogin can run either an HP VUE session or an XDM session for users. The default is an HP VUE session for all users, but by editing the file `/usr/vue/config/Xconfig`, you can cause `vuelogin` to run in XDM-mode for selected users.

To direct `vuelogin` to read users' `.xsession` files, as superuser edit the `/usr/vue/config/Xconfig` file. The line:

```
Vuelogin*xdmMode:            True
```

controls whether or not all displays run XDM-style X sessions. You can choose to run XDM-style X sessions for selected displays by replacing the `*` with *.terminalname*`_0.`) for the X stations: `Vuelogin.`*terminalname*`_0.xdmMode:    True`

For example, the X station in the accounting department that has the terminal name acctsmith would be listed as

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

### Bypassing The Login Screen Under vuelogin

You can use `/usr/vue/config/Xaccess` to cause `vuelogin` to bypass the login screen and automatically start a specified user's X session at login. As superuser, add to `Xaccess` lines similar to the following:

*display* `BYPASS_LOGIN` *loginname*

For example

```
xterm1     BYPASS_LOGIN       ksmith
```

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

## Controlling Access To The Host Computer With vuelogin

Vuelogin contains provision for an access control list (Xaccess) that prevents an X station or a range of X stations from receiving X session management services from the host computer. The access control list is in `/usr/vue/config/Xaccess`.

The host computer can receive a direct or a broadcast request for X session management from X stations.

To set up Xaccess to control direct and broadcast requests from X stations, use the following syntax:

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

### Examples: Using Xaccess To Manage X Stations

- 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 Computers

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

- "Starting XDM On HP-UX Systems"
- "Controlling The XDM Error Log"
- "Aging Passwords On HP-UX Systems With XDM"
- "Preventing Unauthorized Root Login"
- "Controlling Access To The Host Computer With XDM"
- "Bypassing The Login Screen Under XDM"
- "Setting XDM Resources For A Particular Class Of X Station".

### Starting XDM On HP-UX Systems

The ENWARE X station software installs `vuelogin` as the default session manager. However, for those users who prefer to run XDM instead, the ENWARE X station software contains the X11R5 version of XDM.

If you want to run XDM instead of `vuelogin`, you need to add the following line to `/etc/inittab` as superuser:

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

and comment out the `vuelogin` line as follows:

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

#### Starting XDM On Diskless Workstations

The `/usr/lib/X11/xdm` directory is context-dependent, so to use XDM on a diskless HP-UX workstation, you have to edit the files in this directory so that they have appropriate content. The `/etc/inittab` file is also context-dependent and the startup command line for XDM, which is:

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

has to be added to each node's `/etc/inittab` file.

### Controlling The XDM Error Log

Periodically you should trim the XDM error log `/usr/lib/X11/xdm/xdm-errors`. How you do this depends on which host you have:

#### On HP-UX And Sun Systems ...

To control the XDM error log, as superuser, type:

```
/usr/bin/X11/700X/admin/xtadm
```

Choose `5) XDM Administration`, then
`6) Trim XDM logfile`.

#### On IBM Systems ...

To control the XDM error log, as superuser, type: `smit`

Choose:

- ☐ `Devices`
- ☐ `HP X Station Configuration`
- ☐ `XDM Administration`
- ☐ `Trim XDM logfile`

## Aging Passwords On HP-UX Systems With XDM

To use password aging with XDM, type:
`/usr/bin/X11/700X/admin/xtadm`

Choose `5) XDM Administration`, then the script that permits password aging with XDM, `4) Enable/disable password aging`.

This script adds the following to `/usr/lib/X11/xdm/Xsession`:

```
PWEXPD=/usr/bin/X11/700X/pwexpd
if [ -x $PWEXPD ] ; then
    while $PWEXPD $USER
    do
        hpterm -e passwd $USER
    done
fi
```

## Preventing Unauthorized Root Login

XDM bypasses `/etc/securetty`, a file which you can create to limit the X stations where a root login can occur. How you prevent unauthorized root login depends on which host you have:

#### On HP-UX and Sun Systems ...

To prevent users from logging on as root, type:
`/usr/bin/X11/700X/admin/xtadm`

Choose `5) XDM Administration`, then the script that prevents unauthorized login with XDM, `5) Enable/disable root login`.

This script does the following:

- On HP-UX systems, it adds lines similar to the following to `/usr/lib/X11/xdm/Xsession`:

```
if [ $USER = root ] ; then
    exit 1
fi
```

- On Sun systems, it uncomments the `NoRoot` line in `/tftpboot/usr/lib/X11/xdm/Xstartup` to disable root login.

**On IBM Systems** ...

To prevent users from logging on as root, as superuser, type: `smit`

Choose:

- ▢ `Devices`
- ▢ `HP X Station Configuration`
- ▢ `XDM Administration`
- ▢ `Enable/disable XDM root login.`

This script adds lines similar to the following to `/usr/lpp/HPXT/lib/X11/xdm/Xsession`:

```
if [ $USER = root ] ; then
    exit 1
fi
```

## Controlling Access To The Host Computer With XDM

The X11R5 version of XDM contains provision for an access control list (Xaccess) that prevents an X station or a range of X stations from receiving X session management services from the host computer. The access control list in XDM is `/usr/lib/X11/xdm/Xaccess`

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

- To set up Xaccess to control direct and broadcast requests from X stations, use the following syntax:
  - *terminalname* to agree to manage the X station called *terminalname*
  - `!`*terminalname* to refuse to manage that X station
  - 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 X stations, you can define a macro of the form:

  `CHOOSER %`*hostlist*  list of host computers

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

### Examples: Using Xaccess To Manage X Stations

- 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

On HP-UX, Solaris 1.*x*, and IBM systems, you can use `/usr/lib/X11/xdm/Xaccess` to cause XDM to bypass the login screen and automatically start a specified user's X session at login. As superuser, add to `Xaccess` lines similar to the following:

*display* `BYPASS_LOGIN` *loginname*

For example

```
xterm1      BYPASS_LOGIN        ksmith
```

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

## Setting XDM Resources For A Particular Class Of X Station

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 `/usr/lib/X11/xdm/Xconfig`, you can set a resource to affect a specific class of X stations. The X server classname is:

`Hewlett_Packard_Company-C`*`xxxx`*`A`

where `C`*`xxxx`*`A` is the X station hardware model number. You can find the hardware model number on the Diagnostics' Installed Configuration screen. 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
```

## Configuring scologin On SCO Computers

scologin is the X session manager available on SCO UNIX systems. This section describes:

- "Starting scologin"
- "Using scologin To Control Clients".

### Starting scologin

When you installed the X station's software, scripts for a set of utilities were installed in `/usr/bin/X11/700X/admin/xtadm`. These utilities make it easy for you to set up `scologin` for your system.

To start `scologin`, do the following:

1. As superuser, type: `sysadmsh`
2. Choose `System`
3. Choose `Hardware`
4. Choose `HP X Station Admin`
5. Choose `5) scologin Administration`
6. Choose `scologin` startup method appropriate for your system.

### Using scologin To Control Clients

`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 `icons 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, for use with an X station. 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`.

The colors and fonts of X clients started by `scologin` are read from `/usr/lib/X11/app-defaults/*`. To customize these X clients, create a file called `.Xdefaults` in the user's home directory and add the appropriate lines. For more information see "Understanding How Clients Start Automatically" in Chapter 2.

`scologin` logs out the user when `~/.xsession`, `~/.startxrc` or `/usr/lib/X11/sys.startxrc` runs to completion. The foreground task, that is, the first client that does not have an ampersand 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.

# 12

# Using SNMP With Hewlett-Packard X Stations

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 an X station. By editing an X station's SNMP data files, you can cause the X station to report its performance and error conditions.

Topics in this chapter include:

- "About SNMP"
- "Reporting Information Using SNMP"
- "Reporting Error Conditions Using SNMP".

## About SNMP

At startup, the X server reads the following files:

1. `/usr/lib/X11/700X/etc/snmpdrc`, a general file that you can use to set values common to all terminals (such as community names)
2. `/usr/lib/X11/700X/etc/`*terminalname*`.snmpdrc`, a terminal-specific SNMP data file that you can use to set values for the X station *terminalname*.

If neither the terminal-specific file(s) nor the general file is found, the X station's SNMP agent uses default values. Here the SNMP agent:

- Generates no trap messages
- Does not allow the SNMP reset function,
- Permits read-only access to MIBs for community "public"
- Reports empty strings for the `sysContact` and `sysLocation` objects.

The X station's vendor-specific **Management Information Base (MIB)** (`/usr/lib/X11/700X/examples/hp700rx.mib`) is in the object name space:

```
.iso.org.dod.internet.private.enterprises.hp.nm
.system.netPeripherals.hpXStation.config
```

Variables in the X station's MIB are grouped according to the configuration screen their information appears on and by the reset function. The groupings are:

`terminal`, `network`, `startup`, `statistics`, `preferences` and `reset`.

The X station's SNMP agent is in full compliance with RFC 1155 and RFC 1157 and is in compliance with the aspects of RFC 1156 and RFC 1213 that are mandatory for this type of equipment.

## Reporting Information Using SNMP

You configure X stations to report information using SNMP as follows:

1. Copy `/usr/lib/X11/700X/etc/sample.snmpdrc` to `/usr/lib/X11/700X/etc/snmpdrc`
2. Copy `/usr/lib/X11/700X/etc/sample.snmpdrc` to `/usr/lib/X11/700X/etc/`*terminalname*`.snmpdrc`
3. Edit `snmpdrc` to contain values common to all X stations (such as additional community names) and to cause all X stations to report error conditions
4. Edit *terminalname*`.snmpdrc` to contain values specific to that particular X station.

### Reporting Error Conditions Using SNMP

HP X stations can report cold starts and authentication failures. You set an X station to report these error conditions as follows:

1. Set the X station's community in the *terminalname*`.snmpdrc` file
2. Set the error conditions you want to "trap" in the snmpdrc file (and possibly in the *terminalname*`.snmpdrc` file).

For example, your company has two X stations in the accounting department and you want to know when the X stations have an authentication failure or a cold start. The host computer, called `hp837ac`, is running OpenView, a network manager that can detect error conditions in the X stations. You have previously configured the network manager with the definition for the community called "accounting".

For the person responsible for accounts payable, put the following lines in the file `/usr/lib/X11/700X/etc/acct1.snmpdrc`:

```
variable sysLocation "Accounting Dept. Accounts Payable"
variable snmpEnableAuthenTraps enable
community accounting 0.0.0.0
```

For the person responsible for accounts receivable, put the following lines in the file `/usr/lib/X11/700X/etc/acct2.snmpdrc`:

```
variable sysLocation "Accounting Dept. Accounts Receivable"
variable snmpEnableAuthenTraps enable
community accounting 0.0.0.0
```

Put the following lines into `/usr/lib/X11/700X/etc/snmpdrc` so that they will apply to all X stations:

```
trap accounting hp837ac ColdStart
trap accounting hp837ac AuthenTraps
```

# 13

# Using The Serial Session Screen And SLIP

The Serial Line Internet Protocol (SLIP) and the Compressed Serial Line Internet Protocol (CSLIP) make it possible for you to use the X station's serial port to communicate with a host computer. You can use SLIP either as your sole connection to the host (if you have a ROM-based server installed) or as a remote connection for windows.

Topics in this chapter include:

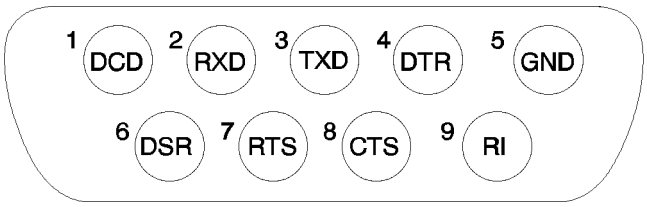
- "Connecting The Serial Port"
- "Configuring The X Station For SLIP"
- "Setting Up SLIP On HP-UX Systems"
- "Setting Up SLIP On Sun Systems"
- "Using SLIP On SCO Systems"
- "Setting Up SLIP On IBM Systems"
- "Running A SLIP Session"
- "Starting Your X Session".

## Connecting The Serial Port

To connect the serial port to a modem, use an HP 24542M cable. We have tested SLIP 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.

If you are wiring the serial connector for a direct connection to the host, you may wish to consider including modem signals for signal assurance. Wiring pin 1 (DCD) provides signal assurance from the host (or modem) and wiring pin 4 (DTR) provides signal assurance from the X station. Including modem controls assures correct disconnect and cleanup of X server windows and clients over SLIP.

If you have to make your own cable, refer to the pinout for the serial port connector on the X station. Connect the DTR and DCD control lines to allow the Disconnect button on the Serial Session screen to end your serial session and to allow modem disconnection to notify the X server. The DSR line and RI line are not used.




**Pinout For The RS-232 Port**

**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.

## Configuring The X Station For SLIP

To configure the X station to use its Serial Session screen and SLIP, do the following after the X server has been loaded:

1. Press and hold F12 to access the configuration screens.
2. Click on Network and drag to SLIP.
3. Enter the serial line network information. (The instructions below assume that you want to communicate with only the serial line host computer. If you are connecting to other hosts, see "Connecting To Other Hosts Through The Serial Line".)
   - In `SLIP Local IP` type in the X station's serial-line IP address.
   - In `SLIP Remote IP` type in the host computer serial-line IP address.
   - In `SLIP Subnet Mask` type in the serial-line subnet mask. You can leave this field blank; the X station can calculate it.
   - When you use SLIP, the X station server automatically responds with CSLIP when it receives CSLIP. To initiate CSLIP, enable Compression now.
   - Click on OK.
4. Click on Terminal to go to the Terminal configuration screen.
5. Set the serial port so that it works with the modem or with the serial-line direct connection.

---

**Note**

Not all serial port parameters are configurable with SLIP:

- The data bits used will be `8`
- The parity used will be `None`
- The flow control used will be `None` if XON/XOFF is set, otherwise the configured setting will be used.

---

6. Set `Serial Port Use For` to Serial Session so you can type to the serial port; for example, to dial out. Click on OK.
7. Click on Serial Session, then on Options.

   Configure the local echo, auto wrap, new line, character set, and configurable-key operations to work with the host computer.
8. Click on OK.

## Connecting To Other Hosts Through The Serial Line

So far we have assumed that the remote device on the serial line is the host on which you wish to run your clients, but you may also wish to run clients on other hosts. This situation makes it necessary to configure both the Setup SLIP menu and the routing table. You may also need to configure routing information on the hosts.

To illustrate how to configure an X station to use a serial-line gateway, consider a person whose office has two workstations and whose home has an X station:

- 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, the SLIP IP address of which is 192.81.2.20.
- The home X station, SLIP local IP address 192.81.2.23, has a modem connected to its serial port.

The serial line network, which consists of the X station 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 X station to operate in the above environment, the X station's Setup SLIP 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` |

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` |

## Setting Up SLIP On HP-UX Systems

To set up SLIP on the host computer and the X station, you need to edit the `ppl.users` and `ppl.remotes` files to set up your X stations.

**Note**

HP-UX does not currently support CSLIP.

When PPL is invoked, it finds the X station's serial-line IP address associated with the user's login in the `usr/lib/ppl/ppl.users` file. It uses the IP address to access connection parameters stored in the `usr/lib/ppl/ppl.remotes` file.

### Editing The ppl.users File

The `usr/lib/ppl/ppl.users` file maps each user name to a single X station serial-line IP address. It allows the dial-in user to invoke PPL without specifying the X station's serial-line IP address. The `ppl.users` file does not exist by default—you must create it.

The format of `ppl.users` is:

```
<username> <hostname>
```

where `username` is the login of the user and `hostname` is the identifier of the X station's local SLIP address. For example:

```
smith   192.81.1.2
jones   jones700rx
```

The `hostname` can be either the X station's serial-line IP address or the X station'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.)

### Editing The ppl.remotes File

The entry for each X station in `/usr/lib/ppl/ppl.remotes` is a multi-line form that contains the parameters that allow PPL to set up the connection. The following example shows a sample `ppl.remotes` edited for use with an X station:

```
192.81.1.2  # remote host name or Internet address (HP X station)
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
```

You must complete the six fields shown in the sample file for SLIP to work with the X station. The `remote host name or Internet address` is the X station's serial-line `Local IP address`. The `local host name or Internet address` is the host computer serial-line IP address (named on the X station as the serial-line `Remote IP Address`).

**Note**

1. You cannot leave the remote host name field blank. The X station cannot use an Internet address assigned by `ppl` from the `ppl.ipool` file.
2. If you have configured the host computer so that it always runs PPL and the X station is connected directly through the serial port, then set `modem control available` to NO and set the `serial line`.

### For More Information

Refer to the HP AdvanceNet *Using Serial Line Protocols* (Customer Order Number 98194-60522) for more information.

### Configuring The Hosts

When a `ppl` session is started on an HP-UX host, the serial-line subnet is automatically added to the routing table of that host. You can verify this by typing:

```
/usr/bin/netstat -r
```

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. You can provide this information to each host by setting up a static route or by running `gated`:

- 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` *Xstation 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.

### For More Information

See *Installing and Administering ARPA Services* for more information on `gated`.

See *Installing and Administering LAN/9000* for more information on routes.

## Setting Up SLIP On Sun Systems

To set up SLIP to work with the X station, you need to edit the `/etc/hosts.slip` file. (This is required for SLIP only, not for CSLIP.)

**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

### Editing The /etc/hosts.slip File On The Host Computer

When `sliplogin` is invoked, it finds the X station's serial-line IP address associated with the user's login and the connection parameters in the `/etc/hosts.slip` file.

You need to edit the `/etc/hosts.slip` file to set up your X stations. The format of `/etc/hosts.slip` file is:

```
<username> normal <hostname> <X_station_name> <subnet mask>
```

where `username` is the login of the user, `hostname` is the host computer, `X_station_name` is the X station. 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
```

The `hostname` and `X-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.)

## Using SLIP On SCO Systems

*The instructions in this section assume that SLIP/CSLIP has been installed and enabled on the host system.*

At this point, please 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.

When you have confirmed that the above is set up, refer to "Running A SLIP Session".

## Setting Up SLIP On IBM Systems

To set up SLIP on an IBM system, use `slip` as follows:

1. "Configuring The Serial Port Driver"
2. "Configuring X Station's Serial Port IP Address Into The System Files"
3. "Configuring The RS/6000's Serial Port Interface".

### Configuring The Serial Port Driver

To configure the `tty` for serial port 1 to get the best performance from your X station, do the following:

1. As superuser, type: `smit`
2. Choose:

   `Devices`
   `TTY`
   `Change / Show Characteristics of a TTY`

3. Select: `tty0 Available 00-00-S1-00`
4. Select: `Enable LOGIN` and set to `disable`
5. 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.
6. Select: `XON-XOFF handshaking` and set to `no`
7. Click on Do.

### Configuring X Station's Serial Port IP Address Into The System Files

To configure the RS/6000 to know about the X station's serial line IP address, you need to use `smit`, as superuser, as follows:

1. Choose:

   `Communications Applications and Services`
   `TCP/IP`
   `Further Configuration`
   `Name Resolution`
   `Hosts Table (/etc/hosts)`
   `Add a Host`

2. Fill in the `INTERNET ADDRESS` and `HOST NAME` fields. (See the note that follows.)
3. Click on Do.

**Note**

If your X station gets its X server code from a network, you need to set up the X station's routing table so that the X station 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.

## Configuring The RS/6000's Serial Port Interface

To configure the RS/6000's serial port interface, you need to use `smit`, as superuser, as follows:

1. Choose:

   - `Communications Applications and Services`
   - `TCP/IP`
   - `Further Configuration`
   - `Network Interfaces`
   - `Network Interface Selection`
   - `Add a Network Interface`
   - `Add a Serial Line INTERNET Network Interface`

2. Select: `tty0`

3. Fill in the `INTERNET ADDRESS`, `DESTINATION`, and `Network MASK` fields. `ACTIVATE the Interface after Creating it?` should be set to `Yes` and `TTY PORT for SLIP Network Interface` should be set to `tty0`. If you use a modem, fill in the `BAUD RATE` and `DIAL STRING` fields; otherwise, leave both blank.

4. Click on Do.

## Running A SLIP Session

To run a SLIP session from the X station:

1. Load the X server from the LAN or from a ROM-based server card
2. Configure the X station to use SLIP (refer to "Configuring The X Station For SLIP").
3. Use the Serial Session screen to dial and log into the host computer and begin the SLIP session. Refer to "Connecting To The SLIP Host Computer".
4. Start SLIP on the host. Refer to "Starting SLIP On The Host".
5. Run clients by logging into the host computer. Refer to "Starting Your X Session"
6. End the session by terminating the clients and disconnecting from the host. Refer to "Ending The SLIP Session".

### Connecting To The SLIP Host Computer

You can use SLIP on a direct line to the host computer or through a modem. From the Terminal configuration screen, click on Serial Session to go to the Serial Session screen. If Serial Session is not enabled, click on it now.

**Tip!**

If you use SLIP exclusively, you may want to have your X terminal display the Serial Session screen automatically at bootup. To do this:

1. On the Server configuration screen, click on the button beside Startup Mode.
2. Click on Serial Session.
3. Type the serial host's address in the Startup Source field.
4. Click on OK.

When the Serial Session screen is displayed 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.

#### To Establish A Connection Through A Modem

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 terminal type) and indicate your X station as the dial-back machine. Hang up, and wait for the callback.

## Starting SLIP On The Host

How you start SLIP depends on which type of host you have:

### Starting SLIP On HP-UX Hosts

1. Log in normally. If prompted for your terminal 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 X station's serial-line IP address. For example: `ppl 192.81.1.3`
3. Click on SLIP.
4. Click on To X Server.

### Starting SLIP On Sun Hosts

1. Log in normally. If prompted for your terminal 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 X_station_address*
3. Click on SLIP to activate it.
4. Click on To X Server.

### When You Have A Connection On IBM Hosts

1. Log in normally. If prompted for your terminal type, give `vt100` as your response.
2. Click on SLIP to activate it.
3. Click on To X Server.

### When You Have A Connection On SCO Hosts

1. Log in as root.
2. If prompted for your terminal 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 X_station_SLIP_address baud_rate*

   where `tty1a` is com1 and `tty2a` is com2. The *baud_rate* is optional.
4. Click on SLIP to activate it.

## Starting Your X Session

You can use either XMD, `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. Typically you would use `vuelogin` in XDM mode for ethernet-based X session because it is so easy to use—you log into the host and the `.xsession` startup script runs automatically. 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 details on using TELNET, refer to "Using TELNET With SLIP".

To learn how to end the SLIP session, refer to "Ending The SLIP Session".

## Using TELNET With SLIP

To use TELNET to begin a serial line X session, do the following:

1. Access your configuration screens by clicking on (To Config) or by pressing (F12), as appropriate.
2. On the General Network screen, disable XDMCP, click on (OK), then (OK) again.
3. On the Terminal screen, click on (TELNET).
4. Type in the IP address of the TELNET host. (This must be the SLIP `Remote IP Address` unless you have the appropriate entries in the routing table (see "Connecting To Other Hosts Through The Serial Line").
5. If you want to use 8-bit characters with TELNET, click on the TELNET language selection button until the 8-bit character set of your choice (ISO Latin-1 or HP Roman-8) appears.
6. Click on (Execute TELNET).
7. Log in normally. If asked for your terminal type, respond: `vt100`
8. Before you can access clients, you must use one of the following command lines to set the DISPLAY environment for your X station (substitute the *serial line* IP address or hostname of your X station 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`
9. Start your clients.
10. Click on (To X Server).

## Ending The SLIP Session

To end the SLIP session, do the following:

1. Terminate your serial port's clients. Note that if you choose to reset the X station, 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**

(Disconnect) and (Hangup Modem) (on the Terminal screen) attempt to hang up the modem by dropping DTR for three seconds. This requires a modem that uses pin 20. If these buttons do not work with your modem, switch the modem off and on.

# 14

# Controlling Input Devices

If you want to change the usual operation of one of the X station's input devices (the pointer and the keyboard), you will need to modify two files:

- *terminal*.`Xdevices`, which configures the X station *terminalname* to use specific input devices as the pointer and keyboard
- *terminal*.`Xpointerkeys`, which can change the key-combination that resets the X station and can enable keyboard keys to act as the pointer device.

**Note**

You should create an `Xdevices` file for an X station *only* if you want to change the usual operation of one of the input devices, for example, to use a tablet to replace a mouse as a pointer device.

If you want to use a tablet as an additional input device (for example, in conjunction with a mouse), just plug an HP 46087A or an HP 46088A into the HP-HIL loop while the X station is switched off. When you switch the X station on, the X station detects the tablet automatically.

To learn how to edit an `Xdevices` file or an `Xpointerkeys` file for an X station, read the instructions in the sample files: `/usr/lib/X11/700X/config/sample.Xdevices` and `/usr/lib/X11/700X/config/sample.Xpointerkeys`.

# 15

# Using TELNET

If you do not want to make use of 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"
- "Logging Out From TELNET".

## Connecting To A Host Via TELNET

To open a connection to the UNIX computer using TELNET, perform the following steps:

1. Go to the configuration screens by holding (F12) down for 2 seconds.
   a. Click on (Server)
   b. Disable XDMCP (XDM, the recommended method for logging on to computers, cannot be used with TELNET.)
   c. Click on (Terminal)
   d. Click on TELNET
   e. Enter the TELNET host's IP address
   f. If you want to use 8-bit characters with TELNET, click on the TELNET language selection 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), then 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 X station.

3. To start your clients, typically you would copy the startup script `/usr/lib/X11/700X/examples/x11start.700x` to your home directory so you can edit this script to control the clients it starts. If you have done this, type:

   `x11start.700x`

   otherwise, type:

   `/usr/lib/X11/700X/examples/x11start.700x`
4. Click on [To X Server] to enter X server mode and display your clients.

**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 X station to open a TELNET window automatically on the host computer of your choice:

1. When the X terminal has booted up, press [F12] for two seconds to bring up the configuration screens.
2. Click on [Network] and drag to [General].
3. Click on the button beside Startup Mode and drag to [TELNET Session].
4. Click in the Startup Source field and enter the IP address (or hostname) of the host you want to TELNET to.

   If your TELNET computer 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 X station. After you do, the X station automatically opens a TELNET window on the desired host.

## Logging Out From TELNET

To log out from TELNET, close all 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.

# 16

# Solving Bootup Problems

This section includes the following topics:

- "If A "BOOT FAILED" Error Message Appears"
- "Solving BOOTP Problems"
- "Solving NFS Problems".

## 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 X Station 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 Chapter 21 and take the action suggested there.

### Step 2: Use The Simplest Configuration

If you cannot find the problem by using the information in Chapter 21, you can verify that the network and essential host programs are operating normally by downloading the server using the simplest configuration.

In its simplest configuration the X station depends only on the TFTP software running on the host software.

To use the simplest configuration, connect the X station to the computer without an intervening gateway.

On the General Network configuration screen, click on (Factory Defaults), then set `Network Parameters` to (from Fields Below).

On the Ethernet Network configuration screen, set `IP Address` to the X terminal's IP address and `File Server` to the computer with the X terminal's X server file.

### Step 3: Check The X Station Hardware

If the X station does not boot when using its simplest configuration, run the built-in selftests:

1. Press the (F12) key.
2. When the configuration screen appears, click on (Diagnostics), then (Selftests).

The selftest screen is self-explanatory; however, for more details, refer to "Using The Selftests Screen" in Chapter 22.

### Step 4: Test The Network

Once it is given an IP address, the X station can respond to a ping.

1. Press the F12 key.
2. When the configuration screens appear, click on Network, then click on Ethernet.
3. Click in the IP Address field and enter your X station's IP address.
4. Click on OK.
5. Turn the X station off and on.
6. To ping the X station, log into the file server from another terminal or console and type:

   `/etc/ping` *Xstation_ip_address*

   for example: `/etc/ping 75.4.11.128`

If the X station 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. Type:

```
/usr/bin/X11/700X/admin/xtadm
```

and choose `4) Installation testing`, then `1) Check software installation`. 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, HP-UX configuration files may not be set up properly on the file server or the X station software may not be installed correctly:

1. If you have an `inetd` security file at `/usr/adm/inetd.sec`, be sure that you have included the IP address of your X station (for more information see Chapter 21).
2. If you have a large `/etc/hosts` table (with more than 200 entries), be sure that your X station is entered in the table and is 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. Therefore, you should use `/usr/bin/X11/700X/admin/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 X station:

| 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 X server 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 X stations by using the `xtadm` administration script, it created the remote configuration files automatically and you need only to edit them. For details on using remote configuration, refer to Chapter 9.

## Solving NFS Problems

If the X station boots using TFTP but not using NFS, NFS probably has not been set up properly:

1. Ensure that your X stations are installed in `/etc/exports` and `/etc/hosts`.
2. Verify that the NFS mount daemon is running with the secure option switched off. If the secure mode is switched on, the X station cannot use NFS. Refer to your NFS documentation for information on the operation of the secure option.
3. 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
   ```

4. Verify that the X server file and fonts have read permission for `other` and that `/usr/tftpdir/usr/lib/700X/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` and review the partitioning of your file systems. If you use the `/usr/bin/X11/700X/admin/xtadm` scripts to add an X station while NFS is installed on your computer, your X station is assigned export permission for all installed ENWARE 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.

# 17

# If The Printer Will Not Print

Topics in this section include:

- "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 X station is configured to match the configuration of the X station but does not print data, the printer may have a bad connection. Refer to:

- "Test The X Station-to-Printer Connection"
- "Test The Computer-to-Printer Connection".

### Test The X Station-to-Printer Connection

To test the X station-to-printer connection on non-PostScript printers, use the Print Test function.

1. Press F12 to access the configuration screens.
2. Go to the Terminal configuration screen.
3. Click on the Serial or Parallel Print Test button. Your printer should print your X station's configuration data.
4. 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. As superuser, type: `/usr/bin/X11/700X/admin/xtadm`
2. Choose: `3) Printers, plotters`
3. To test the network connection, choose:
   `3) Check operation of a printer or plotter`

   When you choose, `Check operation of printer or plotter`, `xtadm` uses `/etc/ping` to verify that the X station is connected to

the LAN, then send a test file to the printer. This test bypasses the print spooler.

### Host-side Sockets

The HP X station's serial port connects to the host-side socket with the port number 9100.

The HP X station'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 X station'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 X station to cancel the XOFF it has stored by doing the following:

1. Press [F12] to go to the configuration screens. (On HP-HIL keyboards, [F12] is the fourth unlabeled key over the numeric keypad.)
2. On the Terminal configuration screen, change the Serial Port pacing from [XON/XOFF] to [None]
3. Change `Serial Port Use For` to [Disabled]
4. Click on [OK]
5. Change the Serial Port pacing from [None] back to [XON/XOFF]
6. Change `Serial Port Use For` to its original setting
7. Click on [OK]
8. Click on [OK] to return to the X server.

# 18

# Solving Client Startup Problems

The following are common problems encountered with X clients:

- Reliance on R3 bugs. Some clients, such as the R4 version of `xterm`, rely on R3 bugs for some features. For example, `xterm` internal popup menus rely on an R3 bug. If you find that a client runs with an X11 R3 server, but does not run with the current X server, try switching on (R3 Compatible). (This is not necessary when using the X station's `xterm` local client.)

  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 X11 R4 but not with X11 R3, if this attempt fails, the server returns an error and the client hangs even if the required font is already in the font path. However, 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.

- Bad file path. If clients don't start check your path on the computer. Your path must include `/usr/bin/X11` and other directories where you have X clients. Also, `/usr/bin/X11` must precede `/usr/bin` in your path so that the computer searches for X11 files before it searches for X10 files.

- 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 X station's *ip_address*`:0.0` (use
  `DISPLAY=`*ip_address*`:0.0 ; export DISPLAY` for Korn or Bourne shell
  or `setenv DISPLAY` *ip_address*`:0.0` for C shell.)

- Insufficient memory. You can tell if you need more memory if low-memory warnings pop up on your screen.

  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 (F12) for two seconds. 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 X station.

If you are using local clients, you may need to stop and to use host-based versions instead. The X station does not start a local client unless there is a reserve of 512 KB of memory free.

You can also add more RAM to your X station.

- Too many clients. The X station supports in excess of 100 clients at the same time.
- Too many connection requests. The X station 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.

# 19

# Solving Font Problems

Topics in this section include:

- "Finding Fonts"
- "Truncated Characters".

## 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*, use `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.

To determine the font path, look on the X station's Server configuration screen.

## Truncated Characters

Some R2 clients display characters that have pieces missing, typically the lower parts of the letters g, j, p, q, and y. This is caused by the use of an R3 font in place of the intended R2 font. In the fonts issued by MIT, eight font names that were used in R2 were repeated in R3. The X station uses these names to specify R3 fonts. R2 clients that use these font names must use the X station names in the following list:

| MIT Name | X Station Name |
|---|---|
| 6x10 | 6x10r2 |
| 6x12 | 6x12r2 |
| 6x13 | 6x13r2 |
| 8x13 | 8x13r2 |
| 8x13bold | 8x13boldr2 |
| 9x15 | 9x15r2 |
| cursor | cursorr2 |
| fixed | fixedr2 |

# 20

# Solving Problems Involving HP VUE

If you have problems getting HP VUE to act as the X stations' X session manager, the problem could be on the host or it could be in the X stations' configuration.

Topics in this section include:

- "Configuring A Workstation That Has An ASCII Console"
- "Troubleshooting HP VUE On The Host"
- "Troubleshooting HP VUE On The X Station"
- "Configuring Your Host For Best Performance"
- "Common Questions About HP VUE".

## Configuring A Workstation That Has An ASCII Console

If your workstation has an ASCII console (such as a Model 9000 Series 800), it cannot run HP VUE or XDM. To configure your system to allow the console to operate while providing HP VUE or XDM to your X stations, you need to do the following:

1. Ensure the following lines are in `/etc/inittab`:

   - `init:2:initdefault:`

     This sets the system's run level to "2."

   - `vu:234:respawn:/usr/vue/config/vuerc`

     This sets your system to start HP VUE on your X stations. To start XDM instead, use:

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

   - `cons:2:respawn:/etc/cuegetty console console`

```
con2:013456:respawn:/etc/getty console console
```

     These set the console to receive ASCII text, not X windows.

2. Ensure the line that starts HP VUE or XDM on the console is commented out in the `Xservers` file:

   - For HP VUE systems, ensure the following line is commented out in `/usr/vue/config/Xservers`:

     ```
     # * Local local@console /usr/bin/X11/X :0
     ```

   - On XDM systems, ensure the following line is commented out in `/usr/lib/X11/xdm/Xservers`:

     ```
     #:0  console local /usr/bin/X11/X :0
     ```

## Troubleshooting HP VUE On The Host

To troubleshoot the HP VUE installation, do the following:

1. Check that vuelogin is running and that XDM is not running. In particular, check the current processes and determine that at least one vuelogin session is running with a PPID=1. To do this, type:

   ```
   ps -ef | grep vuelogin
   ```

   In the response, you should see a line similar to the following:

   ```
   root   191   1  0  Mar 1  ?  0:00 /usr/vue/bin/vuelogin
   ```

   If you do not see this line, look at `/etc/inittab`, which starts vuelogin and XDM. You should see lines similar to the following:

```
vu:34:respawn:/etc/vuerc        # VUE invocation
#xd:23:respawn:/usr/bin/X11/xdm -nodaemon < /dev/null > /dev/null 2>&1
```

   This setup runs vuelogin any time the init state on the system is set to 3 or 4. The XDM daemon start-up is commented out. You must not start XDM and vuelogin simultaneously, but you can use HP VUE to run an XDM-style X session (see "Configuring vuelogin On HP-UX Computers" in Chapter 11).

2. Check the errors in the error file (`/usr/vue/config/Xerrors`).

3. Check that the X station's terminal name is in the `/etc/hosts` file. If you use a domain name server, you must configure the X station in the name server database.

4. Press F12 for two seconds and click on Log Screen. If you see the error message:

   ```
   XDM: too many retransmissions
   ```

   this can indicate a network communications problem. To test network communications, try pinging the X station from the host computer using the X station's terminal name instead of its IP address. For example: `/etc/ping xterm1`

## Troubleshooting HP VUE On The X Station

If an X station configured to its factory defaults has been set up in the host system files with the `xtadm` X terminal administration scripts, the X station should start HP VUE without any modifications. If you are having difficulties, hold down F12 for two seconds to access the configuration screens and check the following:

- On the Network screen, ensure that the IP Address, File Server, Subnet Mask, and, if necessary, the Gateway fields are set up correctly. Typically, BOOTP/DHCP sets these parameters. If you need to change any parameters, set the Network Parameters field to from Fields Below to prevent BOOTP from overwriting your changes the next time the X station is switched on.
- On the Server screen, set Startup Mode to XDMCP Direct; for Startup Source, enter the IP address or the node name of the HP VUE computer. When the vuelogin daemon running on the designated host receives the XDMCP request, it spawns a vuelogin and a vuegreet process to manage the X station.

  To ensure that HP VUE can start without problems, ensure that the Server screen's Font Path field contains at least the following paths:

  ```
  /usr/lib/X11/fonts/700X/misc
  /usr/lib/X11/fonts/700X/hp_roman8/75dpi
  /usr/lib/X11/fonts/700X/iso_8859.1/75dpi
  /rom/fonts/default
  ```

  If the displayed font path does not contain at least this group, type in the missing entries.

If you made any changes to these parameters, click on Save and reset the X station.

## Configuring Your Host For Best Performance

HP VUE is made up of several component programs, each of which requires system resources. You can customize the following HP VUE components to optimize system performance:

vuewm
: Vuewm, which controls the control panel seen at the bottom of the VUE screen, requires less than 400KB of memory per user. If your X station has 10 MBytes of memory installed, you can run vuewm as a local client. See Chapter 3 for details.

vuefile
: Vuefile controls files and can launch applications. Because it must check the file system periodically to determine if files have been added, deleted, or moved, if vuefile swaps out, it soon reloads and executes. You can save memory and CPU by moving vue actions to the control panel and not operating vuefile.

xload
: Xload displays the system load average. It usually updates the display every 5 seconds, but you can adjust this period to lessen system load. To set the system for one minute updates, add the following line to `/usr/lib/X11/app-defaults/XLoad`:

  ```
  XLoad*update:          60
  ```

  To prevent xload from displaying on a user's system, find the xload process, kill it, then save the configuration by logging the user out or, if the session is set up to return to a HOME session, by setting the HOME session with the style manager.

kernel
: The default kernel shipped with Instant Ignition HP-UX systems may need some tweaking to allow large numbers of users to use HP VUE. Use SAM's `Kernel Config=Misc` menu to modify the following:

  Set `maxusers` to as much as four times the number of users actually on the system.

  Set `nfile` to allow about 100 file handles per user. This number is affected by `maxusers`, however, and it may still be low.

  Allocate approximately three times the memory size in swap space. You can use file system swap to supplement disk swapping.

## Common Questions About HP VUE

- How many X stations can I run from a host computer?

  The host's RAM limits the number of X stations a host computer can support. The first HP VUE session requires about 6 MBytes of memory whereas additional sessions require about 2 MBytes each. This compares to about 3 MBytes for the first user and 1 MByte for additional users when `mwm` and associated utilities are used. However, HP VUE's workspaces allow users to leave more applications active simultaneously, which puts more load on the host. When configuring a system, you must look at all the processes that require resources and estimate their impact on the system. Typically, applications require more resources than the HP VUE or `mwm` environments.

- How do I disable HP VUE and XDM from an X station?

  Disabling XDMCP on the X station's Startup configuration screen stops vuelogin and XDM from controlling the X station. The user then would start an X session either from TELNET or from another X station.

- Why do I get the error `Getty: can't open /dev/tty` on the console?

  When the console is configured to run X windows and a getty at the same time, vuelogin and getty compete for the console. Check the `/etc/inittab` file to determine if the console getty is set to run at the same init state as the vuelogin daemon. To fix this problem, edit `/etc/inittab` either to disable the getty on the console at this init state or to disable vuelogin.

  The default configuration runs HP VUE on the console. If you have an ASCII console, HP VUE cannot connect to it, so you need to comment out the line in `/usr/vue/config/Xservers` that starts the server on the console. To restart vuelogin, find the vuelogin process that has a PPID=1 and do a `kill -1` on this process.

- Do Vuelogin and XDM bypass the login process?

  They actually use a different login process, one which bypasses some of the normal login applications. For instance, `.profile` is not executed at login time so you need to put equivalent commands into `$HOME/.vueprofile` .

- Why does HP VUE change the font path?

  When a user logs out of HP VUE or sets the home session using "Set Home Session" from the style manger, vuesession reads the database information from the X server. If vuesession fails, it may create a bad entry in the `vue.settings` file. The next time a user logs in, HP VUE fails to read `vue.settings` and defaults to a minimal font path. The work around for this problem is to remove the font path entry from

`~/.vue/sessions/home|current/vue.settings` and allow the X station to use its stored font path.

For consistent operation, X station users should use the "Return to Home Session" startup mechanism from the style manger.

# 21

# Warning And Error Messages Generated By The X Station

Many of the warning and error messages generated by the X station are self-explanatory. This section describes those messages that may require further explanation.

Error messages can appear on the boot screen or in the error log:

- Before the server code has loaded in the X station, the boot screen displays any error messages.
- After the server code has been loaded, the Log Screen records any messages generated by the X server or the X station's hardware. Error messages appear in bold.

Some error messages also appear on the TELNET screen.

### To View The Log Screen

To view the Log Screen once the server has started, press (F12) for two seconds, click on (Diagnostics), then click on (Log Screen).

Click on the (Report) button to select the desired reporting level for the Log Screen. Click on the (Clear Log) button to clear the Log Screen.

**Note**

X Window System and HP-UX error messages also appear on the boot screen and the Log Screen. These messages are documented elsewhere.

`Can't open ... : directory mount failed.`
: The directory mount attempted by NFS failed. This may be because the directory is not there or your X station has not been given permission in `/etc/exports`.

`EEPROM error: Bad data`
: The EEPROM is defective.

`Fatal error: no memory. Rebooting`
: When this message appears the X server attempts to close all clients. Consider adding more memory or running fewer applications.

`Font ... not in fonts.dir(s).`
: Check to see if the named font is in the directory. If it is, run the `mkfontdir` program as described in Chapter 7.

`Error loading font.`
: The font may not be in the proper format for the X station. Compile the font as described in Chapter 7.

`HIL Device detected: Unknown device`
: You have an unsupported keyboard or mouse plugged into the HP-HIL port.

`MEMORY FAULT: Memory module in slot 2 must be placed in slot 1.`
: If you are using only one memory module, it must be in slot 1. If you choose to upgrade to two memory modules, you can install a matching memory module in the empty slot.

`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.

`Network cable fault detected.`
: If the X station continues to boot, this is not a serious problem. Confirm the following:

  - All X stations 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 hardware fault: run selftests.`
To run self tests, press F12 and click on Diagnostics, then Selftests.

`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.

`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.

`Server ROM not installed.`
Check the Server screen. The X station is configured to get its X server from ROM, but there is no ROM server installed.

`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 X station's boot request. The X station sends bootp requests every minute until successful or until you press a key.

If you have edited the `/etc/bootptab` file and are unable to use BOOTP to download data to several X stations, check that there are no syntax errors. Refer to "If You Have Edited bootptab Manually ... " in Chapter 16 for a summary of `bootptab` syntax.

To verify that there is no network or hardware problem, refer to Chapter 16.

Unexpected characters during `vi` sessions in the TELNET screen.
You have probably set your terminal type to a value other than `vt100`. This may have been set with a startup script. Set your terminal type to

vt100 by typing: `TERM=vt100 ; export TERM` (for Bourne shell or Korn shell) or: `setenv TERM vt100` (for C shell).

# 22

# Diagnosing Problems From The Configuration Screens

You can use the X station's configuration screens to monitor performance and diagnose some types of problems. Online help is provided for all fields in the configuration screens. This section provides additional information about using the Statistics and Selftests 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 X station's configuration screens.

Topics in this section include:

- "Using The Statistics Screens"
- "Using The Selftests Screen".

## Using The Statistics Screens

The Statistics screens keep a running tally of the Ethernet statistics, the SLIP statistics, the X station's memory statistics, and serial and parallel port statistics. To access the Statistics screens, click on Diagnostics, then choose the screen you wish to view.

- The Memory Statistics screen allows you to monitor the memory usage on the X station. If you have less than 10% of memory available in the free pool, you may want to consider adding RAM to your X station.
- The Ethernet Statistics screen allows you to compare the number of LAN packet collisions to the total number of LAN packets sent. A collision rate of 5% or more may indicate that you should use subnets or bridges to reduce LAN traffic.
- The Other Statistics screen allows you to keep track of errors versus bytes received and transmitted.

## Using The Selftests Screen

If the X station appears to be configured correctly, but still does not boot or fails to print, run the self tests to verify that the X station is in working order.

**Note**

1. To run the external loopback test for the LAN port or the RS-232 port, you require external loopback connectors (see "Making A LAN Loopback Connector" and "Making An RS-232 Loopback Connector").
2. Testing the serial port with an external loopback connector provides a reasonable test for the circuitry of both the serial port and the parallel port.
3. 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.

To test the X station completely, do the following:

1. Turn your X station off.
2. Disconnect your X station 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 RS-232 port. Refer to "Making An RS-232 Loopback Connector".
5. Turn your X station on.
6. Press F12 immediately after the X station 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.

If a failure occurs, contact Hewlett-Packard 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 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 Hewlett-Packard X stations, a configuration parameter that, when switched on, restricts the computers that can communicate with your X station to the TELNET host, the X session manager, and those listed in the file `/usr/lib/X11/700X/etc/`*terminalname*`.hosts` (where *terminalname* is the terminal name or IP address of your X station).
2. On host computers running the X11R5 version of XDM or HP VUE, you can configure the file `/usr/lib/X11/xdm/Xaccess` or `/usr/vue/config/Xaccess` to prevent an X station or a range of X stations from receiving X session management services from the host computer.

**agent**
The SNMP software that runs on the equipment being controlled, such as the X station. The agent is polled by the **network manager**, which runs on a host computer.

**background process**
A process that does not control the terminal window from which it was started. Background processing enables an operating system to execute more than one program or command at a time from the same terminal window.

**backing store**
Backing store automatically saves parts of windows obscured by other windows. The software uses "active" backing store, which does update obscured portions of windows, but also can quickly consume the X station's memory.

**bdftosnf**
`bdftosnf -t -i` *source_font*`.bdf > `*700X_font*`.snf` converts fonts from bdf form to snf form. (Use the -i option only with Release 2 fonts.)

**bold text**
Terms in **bold text** are defined in the glossary.

**BOOTP (boot protocol)**
BOOTP can download network configuration data to an X station. The network configuration data, which includes the IP addresses of the X station and of the computers it accesses, is the information that enables the X station to communicate directly with the other devices on the network. The computer looks for that X station's Ethernet address (which is contained in the boot request) in the `/etc/bootptab` file and, if it is found, the computer downloads the X station's configuration information from `/etc/bootptab`. (The alternative is to type in the X station's configuration information on the Ethernet Network configuration screen.)

**bootpquery**
`bootpquery` is 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**
`bootptab` is a file that contains the X stations' Ethernet addresses and configuration information. 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**
When switched on, the X station makes a request on its local subnet for some computer to send the X station the network configuration data it needs. The boot request sends the X station's Ethernet address using boot protocol (BOOTP).

**boot server**
The computer that responds to the X station's BOOTP 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`, `hpterm`, and `xclock`.

**cluster server**
The cluster server is the computer that controls the file-system disk drive in a network cluster. The computers that Ethernet the network need not have disk drives and are sometimes known as "diskless nodes."

**Compressed Serial Line Internet Protocol (CSLIP)**
A method by which the X station can communicate with a host computer connected to the X station's serial port. CSLIP is not supported on HP computers. See Serial Line Internet Protocol (SLIP).

**control panel**

In ENWARE 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 ENWARE VUE/RX, the control panel is setup by the user's `.Xdefaults` and `.vuerxrc` files. These files are derived from `/usr/lib/X11/app-defaults/Vuerx` and `/usr/lib/X11/vuerx/sys.vuerxrc` respectively.

**C*xxxx*A files**

The C*xxxx*A files (which are found in `/usr/lib/X11/700X/bin`) contain the X server code for the Hewlett-Packard X stations. Each X station looks for the appropriate X server code automatically. The X server classname is `Hewlett_Packard_Company-C`*xxxx*`A`, where *xxxx* matches the model number of the X station (for example, `Hewlett_Packard_Company-C2731A`).

**DHCP (dynamic host configuration protocol)**

DHCP can download network configuration data to an X station, just as BOOTP can. The network configuration data, which includes the IP addresses of the X station and of the computers it accesses, is the information that enables the X station to communicate directly with the other devices on the network.

DHCP differs from BOOTP in that BOOTP will send network configuration data to only an X station that is listed in the `bootptab` file. DHCP will send network configuration data to any X station, as long as the DHCP daemon has IP addresses and terminal names available in its database.

**domain**

The part of each X station's unique address (host name) that follows the first period. (That is, "host name" = "terminal name"."domain name".) 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 X station. You do not need to specify a domain if you do not use a domain 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.

**dynamic keyboard mapping**
An X server extension that enables you to send a predefined keyboard map to the window that runs a particular client.

**ENWARE VUE/RX**
ENWARE VUE/RX is 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 3.

**file server**
The computer that sends the X station files it requires (that is, the fonts and the X server file). Do not confuse the file server with a cluster server, which controls the file-system disk drive in a network cluster.

**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 file**
`fonts.alias` 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**
`fonts.dir` is a file that lists the fonts found in a directory. 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 fonts 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.

**foreground task**
A client that does not have an ampersand at the end of its command line.

**gateway**
A gateway is loosely defined to be any device that allows interconnection between computer networks. Interconnection devices, such as routers, are included in this use of the term "gateway."

**hardware address**
Another name for the Ethernet address, a unique identifier required for every device that operates on a network (for example, 08000908acf6 (hex)). The X station's Ethernet address is on its shipping carton, on its boot screen, and on its configuration screens.

**home directory**
The directory on the computer in which you are placed after 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. Your home directory is sometimes represented as, "`$HOME`" (for example, "Type: `echo $HOME`").

**host name**
A unique string that identifies a computer on the network. It has two parts, a *terminal name* 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.

**host table**
A file where all the host names are correlated with IP addresses; typically, `/etc/hosts`.

**hpnpf**
`hpnpf` is the utility that is used by the print spooler on printers that have been set up by using `xtadm`. A print command causes the wrapper-model script to use `hpnpf` to complete a print request.

**hpnptyd**
`hpnptyd` is a daemon that starts a separate child process for each serial or parallel port input device.

**hpterm**
An X11 client program supplied with HP-UX. It displays a terminal window that emulates HP 2622-compatible terminals.

**hpterm (local client)**
`hpterm` is a local-client version of the HP terminal emulator. Most standard options are supported, but `-e`, `-S`, `+/-l`, `-lf`, and `-C` are not. For additional options and memory requirements, refer to Chapter 3.

**hpxt.* peer programs**
`hpxt.*` are "peer" programs that invoke local clients. The peers are able to pass to the user's home directory and display name to local client's executable portion thus ensuring that the user's resource files (`.*rc` and `.Xdefaults`) are used when the local client is initiated.

**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 an X station.

**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**
Another name for the Ethernet address, a unique identifier required for every device that operates on a network (for example, 08000908acf6 (hex)). The X station's Ethernet address is on its shipping carton, on its boot screen, and on its configuration screens.

**Local clients**
Applications that run directly on the X station 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 X station memory.

**Login server**
A computer that runs an X session manager such as XDM, HP VUE, or scologin. By default, the file server is also the login server.

**magic cookie**
The client authorization mechanism used in Hewlett-Packard X stations. The magic cookie is a number generated by `vuelogin`, `scologin`, or XDM and sent to the X server at login time. Each X session has one, unique, number.

If the X station is configured to Client Authorization enabled and XDMCP enabled, during a client's attempt to connect to the X server, the X server compares the client's magic cookie to its own magic cookie. If these numbers do not match, the connection is rejected.

**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**
`modules.ld` (in `/usr/lib/X11/700X/bin`) lists the local clients that are available to Hewlett-Packard X stations. 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).

**multiscanning**
Also known as multisync. Refers to the ability of a monitor to synchronize to a range of video frequencies, so it can display at various resolutions.

**mwm (local client)**
`mwm` is a local-client version of the mwm window manager. For more information and memory requirements, refer to Chapter 3.

**name server**
The computer that resolves host names and their corresponding IP addresses. If you use a name server, yo can enter the host name (rather than the IP address) in the TELNET Host field and XDMCP host field on the Server screen as well as in the File Server and Alt. File Server fields on the General Network screen.

**netmask**
The netmask specifies how much of the IP address is reserved for subdividing addresses into networks. The mask contains 1's for the bit positions used as the network part and 0's for the host part. The netmasks for the various classes of internet addresses are as follows:

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

**network manager**
The SNMP software that runs on a host computer. Hewlett-Packard'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), Hewlett-Packard'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 X station. NFS is a faster alternative to TFTP, but NFS is more complicated to set up.

**node name**
The part of the host name that precedes the first period. For example, in the host name `xnet4.tw.usa`, `xnet4` is the node name and `tw.usa` is the domain. Node names are used by NFS and domain name servers. Node names (terminal names) are tied to the unique IP address of the X station, and are a way of identifying an X station on the network. The system administrator typically chooses a name that identifies the X station's user. This appears on the X station's Network configuration screens as the Terminal Name.

**non-X-client**
A program that is written to run on a terminal and so must be "fooled" by a terminal emulation window into running in the window environment.

**objects**
Variables in an SNMP MIB.

**peer process**
An intermediate process that can start a local client. When used to start a local window manager, the peer is able to pass the user's home directory and display name to the local window manager's executable portion. Although local clients do not need to be started through a peer, it is the recommended process. For example, only a local window manager started by the peer process can start clients on the host.

**ping**

`ping` (usually `/etc/ping`) is 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.

**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 ×.

**primary manager**

The XDMCP manager that relays an X station's indirect request for an X session manager to a list of secondary managers. These secondary managers can send the X station a "willing" response to indicate that they are available to provide X session management.

**pseudo-terminal driver**

A pseudo-terminal driver is 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` |

**rebooting**

Rebooting means reloading the X server code. The easiest way to accomplish this is by switching the X station off and on. To ensure that no stray X clients are left on the UNIX computer, it is generally advisable to reset the X station before rebooting.

**resetting**

Resetting means restarting the X server code that is already loaded into the X station. Resetting closes all connections to X clients and activates certain configuration parameters, such as the XDMCP method, and reloads the fonts. To reset the X station, 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 Compose Char F4
- On the Sun Type 4 layout keyboard: Ctrl Alt Delete

**rgb.txt files**
`rgb.txt` files (in `/usr/lib/X11/700X/rgb`) map color names to the output of the monitor's color guns. The file named `rgb.txt` is designed to be used with the A1097A monitor. You may want to experiment with loading the file `rgb.txt.98xxx` as well (this requires that you use remote configuration).

**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.

**save under**
Save under saves parts of windows obscured by pop-up screens.

**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.

**Serial Line Internet Protocol (SLIP)**
A method by which the X station can communicate with a host computer connected to the X station's serial port. See also Compressed Serial Line Internet Protocol (CSLIP).

You can set Hewlett-Packard X stations to initiate communications in SLIP or CSLIP. However, if it is set to SLIP and receives a response in CSLIP, the X station switches to CSLIP.

**Simple Network Management Protocol (SNMP)**
Literally, the definition of a protocol used in network monitoring and management. SNMP is usually taken to mean the protocol, daemons, and MIBs used in network management.

**snmpdrc files**
`snmpdrc` files and *terminalname*`.snmpdrc` configure the SNMP agent that runs in the X station, telling it how to respond to SNMP queries. A sample file is located in `/usr/lib/X11/700X/etc/sample.snmpdrc`

**subnet**
A network segment that is on the other side of a gateway.

**subnet mask**
Four decimal integers that subset the host address space into multiple subnetworks. When the subnet mask is expressed as a binary number, the contiguous 1s indicate the network part of IP addresses and the contiguous 0s indicate the host part of IP addresses. Before attempting to establish a communication link to a computer, for example the file server, the X station logically ANDs the entry in the `Subnet Mask` field with the IP address of the X station itself and with the IP address of the file server. If the resulting numbers differ, this indicates that the X station is on a different subnet than the file server. This causes the X station to use the entries in the routing table to establish communications.

**sync**
To display a data image, a monitor must synchronize (sync) its screen refresh rate with the output of the X station. To make this synchronization possible, the X station 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.

**sys.xsession**
`sys.xsession` is a sample startup script used with XDM and `vuelogin` in XDM-mode if `.xsession` (or, on Sun systems, `.xinitrc`) is not found in the user's home directory. A sample `sys.xsession` file is located in:

- On HP-UX systems: `/usr/lib/X11/xdm/`
- On Sun systems: `/tftpboot/usr/lib/X11/xdm/`
- On SCO systems: `/u/tftpboot/usr/lib/X11/700X/examples/`

Sun users can copy a sample `.xinitrc` file from `$OPENWINHOME/lib/Xinitrc`.

**TELNET**
TELNET is the Internet standard protocol that allows a user at a terminal to interact with a remote computer over a network.

**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 terminal—not a difficult task in most cases. When not running programs or executing operating system commands, terminal emulators display the command-line prompt.

Two common terminal emulators are `hpterm`, which is supplied with HP-UX X11 and emulates HP terminals, and `xterm`, which emulates DEC VT102 and Tektronix 4014 terminals. The ENWARE X station software contains `hpterm` and `xterm` local terminal emulators that can run on our X stations, thus reducing the load X stations place on the host system.

**terminal name**
The terminal name, which appears on the X station's Network configuration screens, is another term for "node 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 system administrator typically chooses a name that identifies the X station'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 X station. NFS is a faster alternative to TFTP, but it must be set up on your system.

**tftpd**
`tftpd`, the TFTP daemon, can transfer the server image, fonts, and `rgb.txt` from the computer to the X station.

**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)**
`twm` is a local-client version of the twm window manager. (`twm` is provided as a convenience, but is not supported.) For more information and memory requirements, refer to Chapter 3.

**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)**
Local vuewm is a local-client window manager that interacts with HP VUE3 to off-load management of the control panel and workspaces to the X station. For more information and memory requirements, refer to Chapter 3.

**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, ENWARE VUE/RX has four workspaces.

**Xauthority**
`.Xauthority` is a file created by XDM and `vuelogin` that contains a client authorization mechanism called an MIT magic cookie. If the X station is configured with client authorization enabled, only clients that know the magic cookie have access to the user's screen (this includes all clients started under that XDM session).

**xclock**
An X11 client program that displays the time, either analog (hands and dial) or digital (text readout). Typically, `xclock` is located in:

- On HP-UX and IBM systems: `/usr/bin/X11/xclock`
- On Sun systems: `/usr/openwin/bin/xclock`

**xclock (local client)**
`xclock` is a local-client version of the standard clock program. Typically, you would start the `xclock` local client by typing:

```
/usr/bin/X11/700X/hpxt.xclock
```

**Xdevices**
*terminalname*`.Xdevices` configures the X station *terminalname* to use specific input devices as the pointer and keyboard. (A sample file can be found in `/usr/lib/X11/700X/config`).

**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 `vuelogin` in XDM-mode) automatically run the `.xsession` script in your home directory to start the window manager and clients. If `.xsession` is not found,

they default to `/usr/lib/X11/xdm/sys.xsession`. The default `.xsession` starts a window manager, a terminal emulator, and other clients (which vary depending upon your host's operating system).

XDM and `vuelogin` in XDM-mode also download a resource file to the X server. This is `.Xdefaults.700x`, if present in the user's home directory. Otherwise it downloads `.Xdefaults`, or, if that is not found, `/usr/lib/X11/sys.Xdefaults`. The resource file sets up the fonts and colors used by clients and, once downloaded, remains in effect until the X station is rebooted or the X server resets.

Error messages from clients, if any, are put in the `.xsessionlog` file in your home directory.

**XDMCP (X Display Manager Control Protocol)**
X terminals that support XDMCP, such as Hewlett-Packard X stations, are able to broadcast to a computer a request for XDM services.

In contrast, X stations that do not support XDMCP require the computer to poll the X station continuously to ask if the X station requires X session management services yet. Once the computer is able to provide X session management services to an X station, the computer must poll continuously to determine if the X station still requires those services.

**xdm-config**
`xdm-config` (in /usr/lib/X11/xdm) sets the operation of XDM.

**xflash (local client)**
`xflash` is a local client that you use to reprogram a ROM-based server card. Only "flash" cards can be reprogrammed. For more information and memory requirements, refer to Chapter 3.

**xload**
An X11 client program that displays the work load of the system as a histogram.

**xlock (local client)**
`xlock` is a local-client version of the standard lock program. Typically, you would start the `xlock` local client by typing:

```
/usr/bin/X11/700X/hpxt.xlock
```

**xlsfonts**
`xlsfonts` is a program that lists the fonts available to your X station. Changing your font path changes the fonts you have available. Typically, `xlsfonts` is located in:

- On HP-UX systems: `/usr/bin/X11/xlsfonts`
- On Sun systems: `/usr/openwin/bin/xlsfonts`

**X server**
The combination of graphics display, hardware, and X-server software that provides display services for clients.

**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`.

**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`.

The X session manager may be any one of a number of computers, depending on how the X station is configured. If the X station is configured to send out a directed requested, the X session manager is the computer in the `Startup Source` field (or the file server, by default). If the X station is configured to broadcast a request, the `Select Session Manager` screen displays the computers that are willing to be X session managers.

**Xpointerkeys**
*terminalname*`.Xpointerkeys` can change the key-combination that resets the X station and can enable keyboard keys to act as the pointer device. (A sample file can be found in `/usr/lib/X11/700X/config`).

**Xsessionlog**
`.xsessionlog` is the user's error log when using XDM.

**xtadm**
`xtadm` (`/usr/bin/X11/700X/admin/xtadm`) is the Hewlett-Packard X station's administration script. You can use it to do the following:

- Create or remove an X station's remote configuration file and the X station's entry in `bootptab` and `/etc/hosts`
- Add or remove an X station in `/etc/bootptab` and `/etc/hosts` and create or remove a remote configuration file for the X station
- Add or remove a printer connected to an X station
- Check the installation of the X station software
- Check the operation of BOOTP, TFTP, and XDM
- Control the operation of XDM.

**xterm**
An X11 client program that displays a terminal window that emulates DEC VT102 and Tektronix 4014 terminals. `xterm` requires use of the bug compatibility mode.

**xterm (local client)**

`xterm` is a local-client version of the VT100/Tek terminal emulator. Most standard options are supported, but `-e`, `-S`, `-C` are not. For additional options and memory requirements, refer to Chapter 3.

**x11start.700x**

`x11start.700x` is the X station startup script for use with TELNET. (A sample can be found in `/usr/lib/X11/700X/examples`)

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