PC-Xware
for Windows XP, Windows 2003 and Windows 2000 Professional

User's Guide

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About This Online Document

This online document introduces you to NCD PC-Xware. It covers concepts you need to use PC-Xware knowledgeably and efficiently.

Topics Covered

Chapter 1: Overview of PC-Xware
Introduces the key concepts needed to use PC-Xware features efficiently.

Chapter 2: Starting Your X Applications
Explains how to create and use connections to start X applications from your PC.

Chapter 3: Configuring PC-Xware
Surveys configuration capabilities and shows how to access configuration controls.

Chapter 4: Managing Fonts
Provides background on fonts issues, and shows how to use PC-Xware features to resolve them.

Chapter 5: Additional PC-Xware Tools
Explains how to access and use handy PC-Xware utilities.

Chapter 6: Customizing the Keyboard
Covers the Keymapper tool, and methods for assigning alternate functions to keys.

Chapter 7: Login Scripting
Explains how to create or modify login scripts to automate and customize logins to hosts and startup of X applications.

Appendix A: Using Web-Enabled X
References instructions for accessing X applications through web browsers.

Appendix B: Product Support
Explains how to get product support for PC-Xware.

Glossary
Defines terms used in this online document.

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Related Information

For more information on PC-Xware, besides what is in this document, refer to the following resources:

For Information About...	See...
Performing specific tasks	Online help for PC-Xware
Installation	*PC-Xware Installation and Configuration Guide*
Location of Product License Key	*PC-Xware Installation and Configuration Guide*
System Administration	*PC-Xware System Administrator's Guide.*
Remote Configuration	*PC-Xware Configuration Reference Guide*.

For more information about X windows, see these resources:

For Information About...	See...
X Window System / User Level	*Volume 3: X Window System User's Guide*—Valerie Quercia and Tim O'Reilly. O'Reilly & Associates, Inc.
X Window System /Administration Level	*Volume 8: X Window System Administrator's Guide*—Linda Mui and Eric Pearce. O'Reilly & Associates, Inc.
X Protocol References	*Volume 0: X Protocol Reference Manual*—Robert W. Scheifler. O'Reilly & Associates, Inc.

For Information About...	See... (Continued)
C Library and X Protocols	*X Window System, C Library and Protocol Reference*—Robert W. Scheifler, James Gettys, Ron Newman. Digital Press.
X Reference	*X User Reference Guide*—Ira Chayut, Camille Cook, Anatole Olczak. A System Publications, Inc.

Terminology and Text Conventions

This online document uses the following text conventions:

tab	Refers to related information and settings grouped in a rectangular boundary within a dialog, and visually identified by a file folder-like tab at the top. This terminology conforms to Microsoft Windows 3.1 convention. It is retained for this Windows 95 NCD product (in favor of later Microsoft terms, such as “sheet” and “page”) because of user-familiarity with it.
<parameter>	Text within the angle brackets is a generic term designating the type of data to be supplied by you as input. For example, `transmit <string>` is a command-line consisting of the word, “transmit” and a unit of data of type “string” (that is, text), whose actual value is determined by you.
`input font`	This typeface designates literal text you would type, as when entering a command, or editing text in a text file.
→	Indicates a sequence of selections through menus, tabs and options. For example, the sequence for grouping all X applications in a single window is:

	Start ➔ Programs ➔ NCD PC-Xware ➔ PC-Xware Configuration ➔ General ➔ Run on the desktop. “Start” through “PC-Xware Configuration” are menu items, “General” is a tab, and “Run on the Desktop” is an option on the General tab.
click	Press the left mouse button.
right-click	Press the right mouse button.
glossary_term	Text in this blue color is a link in the online document to a definition in the Glossary. To jump to the definition, click on the term.

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Chapter 1
Overview of PC-Xware

Finding the Information You Need

PC-Xware delivers several levels of documentation in different ways, as shown in the following table.

Level of Information	Description	How Delivered	How to Get There
Conceptual Background	Extended discussions of PC-Xware capabilities and when you would want to use them.	This online document.	Navigate to the topics of interest through the Table of Contents, Index, or the Acrobat Reader Bookmarks (select View → Bookmarks and Page).
Terms	Words and phrases used in discussions of PC-Xware that you might not be familiar with.	This online document.	Go to the Glossary at the end of this document. If the term is highlighted in blue text, click it and you will jump directly to the Glossary page where it is defined.
Procedures	Step-by-step instructions for performing specific tasks.	Online Help	Click the PC-Xware Services icon  . In the resulting menu, select Help. Select the Contents tab, and navigate to the topic of interest.

Level of Information	Description	How Delivered	How to Get There (Continued)
Field descriptions.	Brief descriptions of individual input and output mechanisms in PC-Xware's dialogs.	Context-sensitive help built into the PC-Xware's dialogs.	Click on the ? in the upper-right corner of the dialog box, then click on the item of interest in the dialog.
Technical support	How to contact the technical support staff.	This online document.	Go to Appendix B, "Product Support."

What Is PC-Xware?

PC-Xware is a set of software utilities that lets you run applications on remote host computers from your PC. It enables your PC to communicate with UNIX or Linux servers through network connections, and run X Window-based and character-based applications.

For a roadmap that shows how to access the various PC-Xware utilities and features, see "Navigating PC-Xware" on page 1-18.

X Window Protocol, X Servers and X Clients

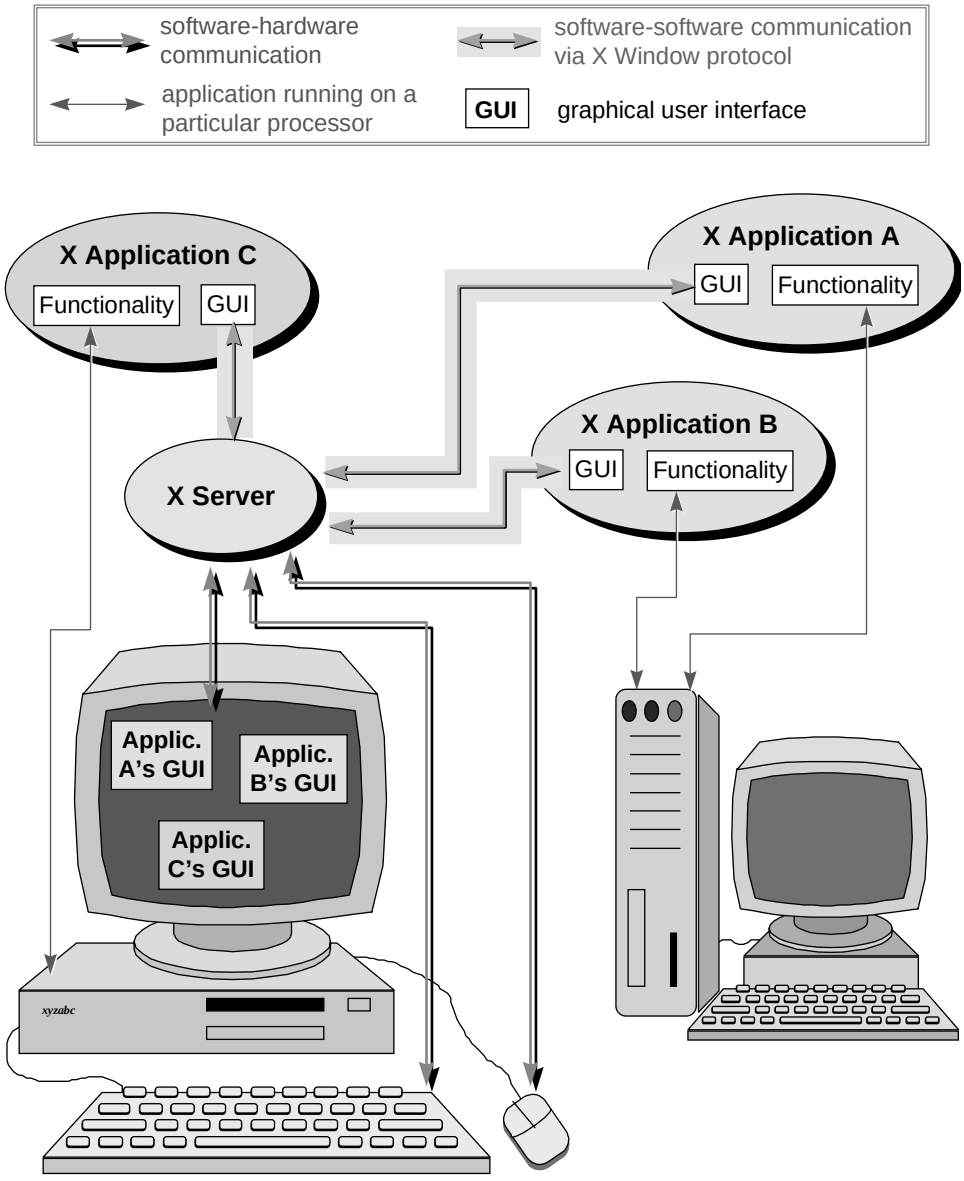
PC-Xware capabilities are based on the X Window protocol, a system for specifying the exchange of graphical user interface data between two computer systems. This protocol was developed to allow a person to run UNIX or Linux X11 applications on one machine, while performing input and output functions through the application's graphical user interface on another machine over the network.

To enable an application to run on one machine and its user interface appear on another machine requires several different types of software modules. To understand PC-Xware, we need consider only two:

- X applications (also called X clients)
  These are graphics-based applications written to communicate with the X server (described below) instead of with one particular display device.

- X server
  Its job is to detect attributes of the display, keyboard and mouse on the operator's machine, interpret input, and generate output to display the X application.

This paradigm is illustrated in the next figure.



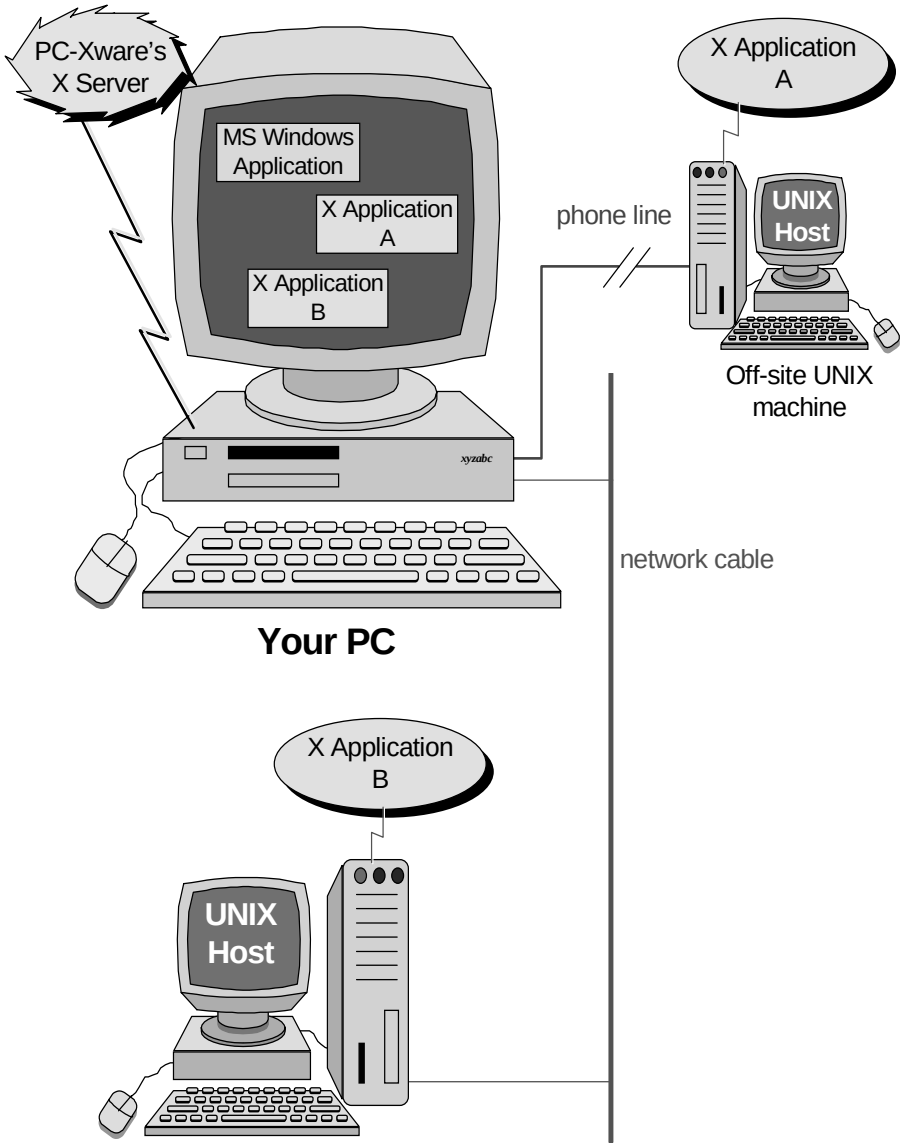
The X Window Paradigm

You might have noticed that in X Window discussions, the terms "server" and "client" are used in a way that may seem counter-intuitive. In the context of file serving, the file server software resides on a host machine, and the client resides on the machine you are operating.

However, in X Window implementations, the X server resides on the machine that draws the application on the display screen. The X applications themselves (the clients) typically reside on host machines (though they can also reside on the same machine as the X server).

PC-Xware's X Server

PC-Xware provides an X server that runs on PCs, allowing you to run X applications from UNIX or Linux machines to your PC. By default, the X applications appear alongside your Microsoft Windows applications in separate windows. This is illustrated in the next figure.


PC-Xware's
X Server
MS Windows
Application
X Application
A
X Application
B
xyzabc
Your PC
X Application
A
phone line
UNIX
Host
Off-site UNIX
machine
network cable
X Application
B
UNIX
Host

PC-Xware Features

The heart of PC-Xware is the PC based X server (introduced in the previous section), which enables you to run X applications from other machines to your PC. However, PC-Xware provides a number of additional utilities to help you perform network-related tasks easily and efficiently:

- Connection Wizard
  Steps you through the process of defining connections (links to your X applications on other machines).
- Local telnet/terminal emulator
  Enables you to emulate VT320 character based terminals. See "Configuring the Terminal Emulator" on page 3-39.
- Graphical Key Mapper
  Makes it easy to remap your PC keyboard for X applications that need host-style keyboard functionality. See "Customizing the Keyboard" on page 6-67.
- Copy and Paste Capability
  Lets you copy and paste text and graphics between Microsoft Windows and X applications. You can copy a selected rectangle or entire window between two applications, or to a printer. See "Copying and Pasting" on page 5-63.
- Login Scripting
  Lets you write scripts to automate the startup of X applications using PC-Xware's terminal emulator, or automate the dialup process over a serial connection. See Chapter 7, "Login Scripting."

PC-Xware Configurability

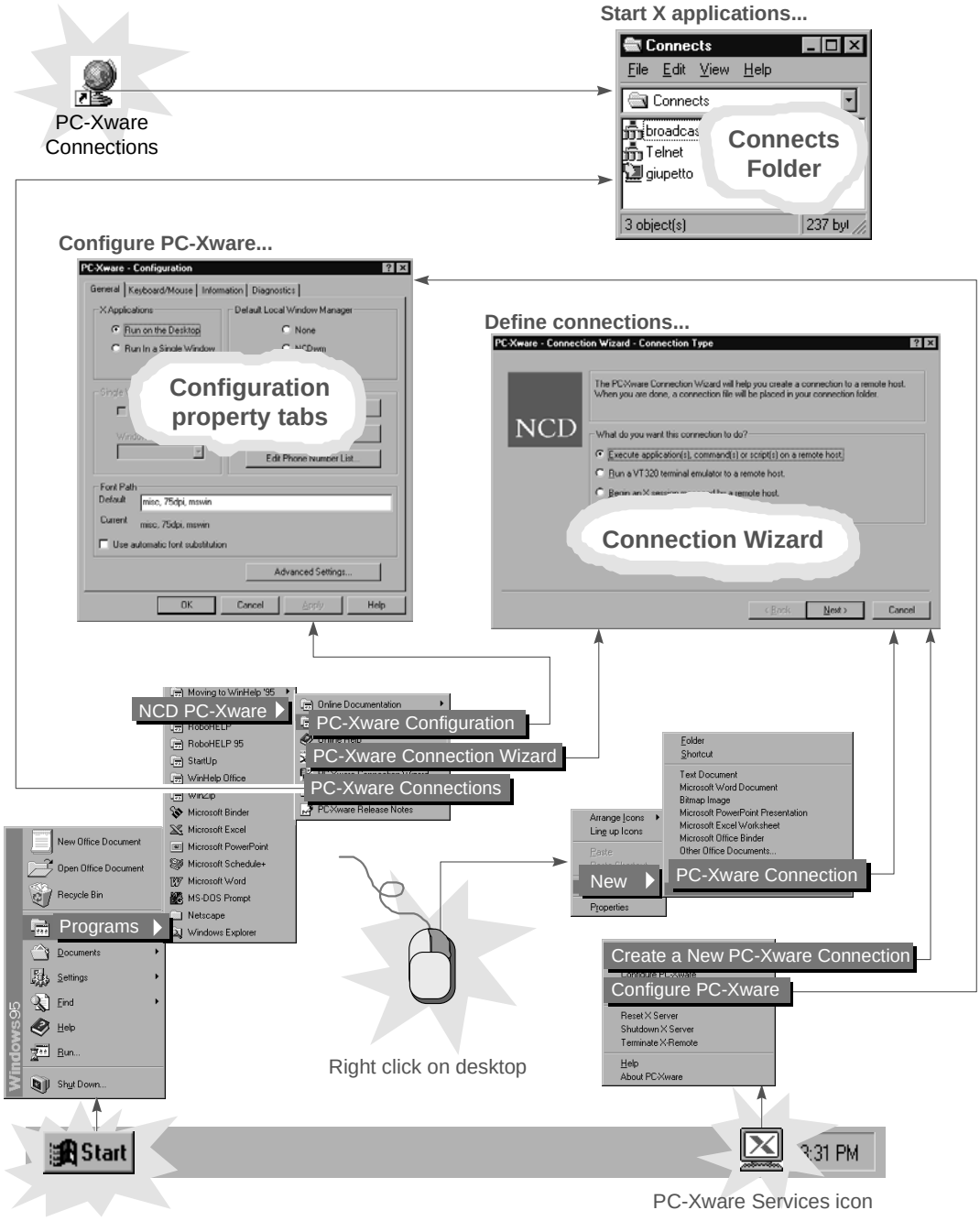
PC-Xware gives you a range of options for conducting network operations:

- Connectivity options
  You can create network connections using various communication protocols:
  - You can create network connections that use the rsh, rexec, rlogin, XDM, telnet or ssh protocol. To learn about the different connection protocols and their relative merits, see "Which Connection Protocol to Use" on page 2-26.

- Window managers
  You can choose one of two local window managers (a Motif-style or a Microsoft Windows-style), or the window manager supplied by your host machine. See "Managing Windows" on page 5-57.
- Display modes
  You can display X applications as individual items on the Microsoft desktop, or grouped together in a single window. See "Managing Windows" on page 5-57.
- Fonts
  PC-Xware provides a variety of mechanisms for using fonts provided by an X application, including a font compiler and the ability to use font servers on host machines. See Chapter 4, “Managing Fonts.”
- Configuration facilities
  You can customize many aspects of X server behavior and X application appearance. Configuration data can reside on a server, on individual PC’s, or be split between them. See Chapter 3, “Configuring PC-Xware.”

Navigating PC-Xware

PC-Xware is a set of utilities that together let you perform many network or serial connection tasks. These include defining connections, starting X applications, mapping keys, managing fonts, and configuring the X server. You can access PC-Xware utilities in several ways. The roadmap below shows the routes to the core utilities of PC-Xware.


PC-Xware Connections
Start X applications...
Connects
File Edit View Help
Connects
broadcas
Telnet
giupetto
Connects Folder
3 object(s)
237 byt
Configure PC-Xware...
PC-Xware - Configuration
General | Keyboard/Mouse | Information | Diagnostics
X Applications
Run on the Desktop
Run In a Single Window
Default Local Window Manager
None
Configuration property tabs
Edit Phone number List...
Font Path
Default
misc, 75dpi, mswin
Current
misc, 75dpi, mswin
Use automatic font substitution
Advanced Settings...
OK
Cancel
Apply
Help
Define connections...
PC-Xware - Connection Wizard - Connection Type
NCD
The PC-Xware Connection Wizard will help you create a connection to a remote host. When you are done, a connection file will be placed in your connection folder.
What do you want this connection to do?
Execute application(s), command(s) or script(s) on a remote host.
Run a VT320 terminal emulator to a remote host.
Connection Wizard
< Back
Next >
Cancel
NCD PC-Xware
Moving to WinHelp '95
RoboHELP
RoboHELP 95
StartUp
WinHelp Office
Online Documentation
Online Help
PC-Xware Release Notes
PC-Xware Configuration
PC-Xware Connection Wizard
PC-Xware Connections
WinZip
Microsoft Binder
Microsoft Excel
Microsoft PowerPoint
Microsoft Schedule+
Microsoft Word
MS-DOS Prompt
Netscape
Windows Explorer
New Office Document
Open Office Document
Recycle Bin
Programs
Documents
Settings
Find
Help
Run...
Shut Down...
Windows95
Folder
Shortcut
Text Document
Microsoft Word Document
Bitmap Image
Microsoft PowerPoint Presentation
Microsoft Excel Worksheet
Microsoft Office Binder
Other Office Documents...
Arrange Icons
Line up Icons
Paste
New
Properties
PC-Xware Connection
Create a New PC-Xware Connection
Configure PC-Xware
Reset X Server
Shutdown X Server
Terminate X-Remote
Help
About PCXware
Right click on desktop
Start
3:31 PM
PC-Xware Services icon

The starred items in the preceding figure are the entry points to various PC-Xware functions. The table below summarizes the functions you can reach through these entry points.

Operation	Entry Points
Create a new connection.	Start ➔ Programs ➔ PC-Xware ➔ PC-Xware Connection Wizard
	Click PC-Xware Services icon  in the right end of the task bar. Select Create a New PC-Xware Connection.
	Right click mouse on desktop to get menu. Select New ➔ PC-Xware Connection.
Access existing connections.	Start ➔ Programs ➔ PC-Xware ➔ PC-Xware Connections
	Click the PC-Xware Connections menu  .
Configure PC-Xware.	Start ➔ Programs ➔ PC-Xware ➔ PC-Xware Configuration
	Click PC-Xware Services icon  in the right end of the task bar. Select Configure PC-Xware

Note The PC-Xware Services icon is displayed when the PC-Xware X server is running, or all the time, if during installation, you chose to start PC-Xware whenever you start Windows.

The rest of this Guide provides additional conceptual background, and some basic procedural information you need to use PC-Xware effectively.

Starting, Resetting, Shutting Down PC-Xware

Starting PC-Xware

The installation program offers the option of starting PC-Xware automatically whenever you start your PC. For details, refer to the PC-Xware Installation and Configuration Guide. If your copy was installed this way, PC-Xware is always running, unless you explicitly shut it down.

If PC-Xware is not already running on your PC, it starts any time you start a utility or connection that requires it.

For more details on starting connections, see "Starting Connections and X Applications" on page 2-33. For a thorough background on connections, see "Understanding Connections" on page 2-24.

Other ways to start PC-Xware are to create a connection (see "Creating a Connection" on page 2-32), or to Configure PC-Xware (see Chapter 3, “Configuring PC-Xware.”)

Resetting PC-Xware

Resetting closes any established connections, and restarts PC-Xware. You might want to reset PC-Xware if you made changes on the PC-Xware Configuration property tabs, and want those changes to take immediate effect.

To reset PC-Xware:

1. Click the PC-Xware Services icon  .
2. Select Reset X Server.

Shutting Down PC-Xware

To shut down PC-Xware:

1. Click the PC-Xware Services icon  .
2. Select Shutdown PC-Xware.

Shutting down PC-Xware also closes the connections to any X applications that are running at the time.

Note Not all X applications shut themselves down when their connection terminates. Therefore, it is advisable to exit your X applications before shutting down PC-Xware.

Chapter 2
Starting Your X Applications

Starting an X application through PC-Xware involves two tasks:

1. Creating a connection.
   A connection is a communication link that specifies how your PC will exchange commands and data with a particular host machine. Some connection types let you specify host commands as part of the connection setup, so that starting the connection automatically starts an X application.

   You perform this step to create a particular connection once only. Thereafter, whenever you want to use that connection, you simply perform step 2 below.

2. Starting the connection and X application.
   This means establishing real-time communication with a host machine, using the communication settings and instructions specified for a particular connection created in step 1. above. For applicable connection types, this action also invokes an X application.

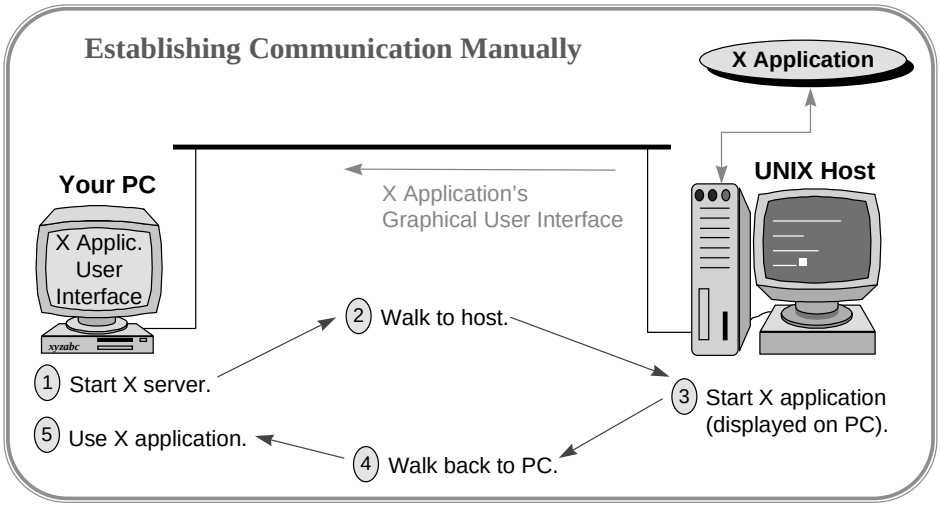
To define connections that best serve your purposes, you should understand the differences between the various connection protocol PC-Xware supports. This chapter provides the necessary background, covering the following topics:

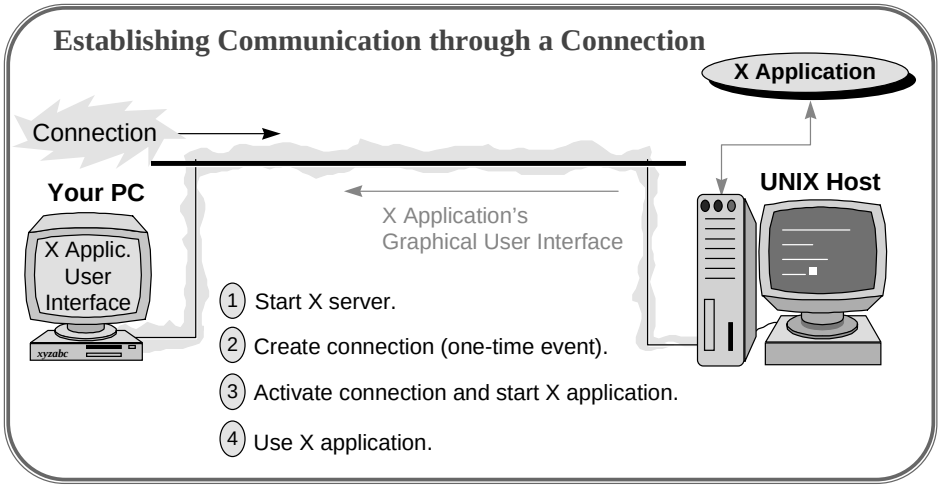
- Understanding Connections
- Creating a Connection
- Starting Connections and X Applications

Understanding Connections

What is a Connection?

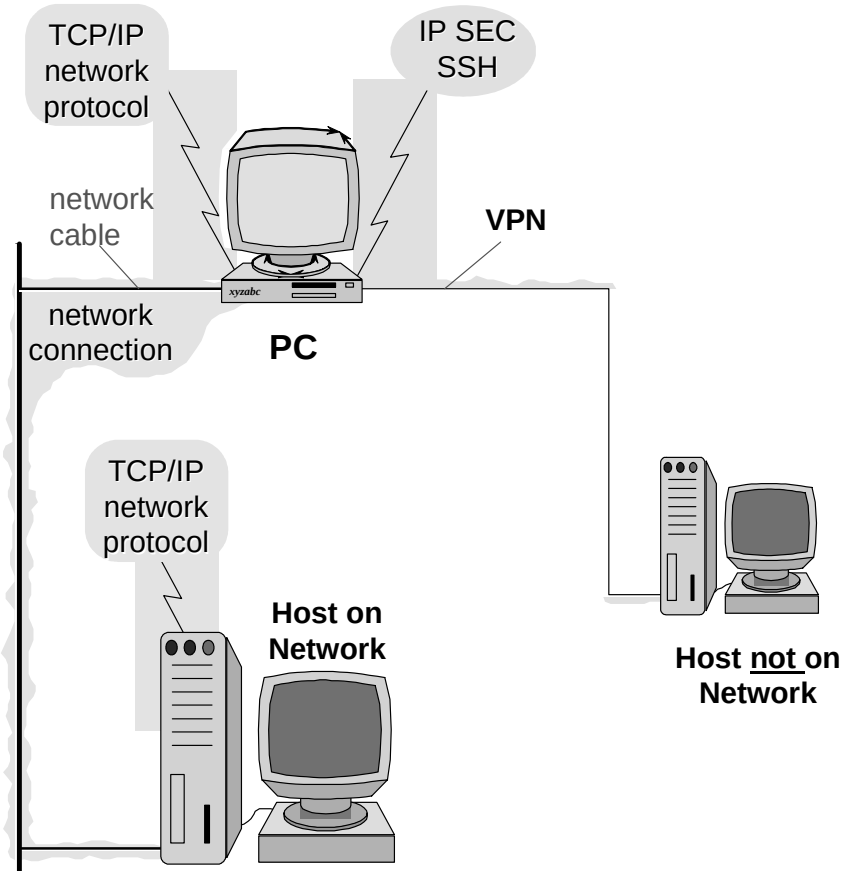
A connection is a kind of shortcut. It specifies commands and data that will establish communication with a remote host, and optionally run an X application on that host, all without leaving your PC.





Connections are based on communication protocols, sets of rules defining how machines package, send, receive and unpackage units of information over a cable.

Before you can define connections that actually work, software implementing an appropriate communications protocols must be running on both machines, as shown in the following figure. (Ensuring this is typically a system administrator's job).



PC-Xware version 6.0 only supports IP network connections.

What Is a Network Connection?

A network connection is one established over some type of network cable, and is based on a network communication protocol.

For making network connections, PC-Xware uses the TCP/IP and DECnet communication protocol. PC-Xware supports several connection protocols that operate over TCP/IP: XDM, telnet, rlogin, rsh, rexec. PC-Xware also supports one DECnet connection protocol, DECnet Launch. These are described in "Which Connection Protocol to Use" on page 2-26.

Which Connection Protocol to Use

In defining connections you want to make from your PC to other machines, you need to know which connection protocol will best serve your purposes. In general terms, the various connection protocols let you do three types of things, described in the following table:

To Do This	Use These Connection Types	Notes
Enter UNIX commands via a VT320 terminal emulator as you would at a UNIX workstation or terminal.	Telnet, rlogin	Once you login to the host, you type in the path and name of the X application, then set the DISPLAY environment variable or send the display back to the PC. Alternatively, you can use scripting commands to automate the X application startup.
Log into the host, specifying the initial X application to begin.	Telnet, rlogin, rexec, rsh	
Create an X Window environment.	XDM, Session	You can start multiple initial X applications on your PC.

PC-Xware's Connection Wizard helps you create connections, prompting you for the information required for the connection type you have chosen.

The following two tables show the types of information you need on hand to create the various connection types.

- The first table applies to connections for which you must manually enter commands to start X applications after connecting to the host.
- The second table applies to connections that can automatically start X applications on the host as soon as the connection is made.

Manual Application Startup

Protocol	Host name	User name	Password	Host-side software installed & configured	Script file on your PC	TCP/IP Connection
Rlogin	✔	✔	✔			✔
Telnet	✔	✔	✔			✔

Automatic Application Startup

Protocol	Host name	User name	Password	Applic. name	Applic. location on host	Script file on your PC	Script file set up on host
Rlogin + login script	✔	✔	✔	✔	✔	✔	
Telnet + login script	✔	✔	✔	✔	✔	✔	
rsh	✔	✔		✔	✔		
rexec	✔	✔	✔	✔	✔		
XDM	✔	✔	✔				✔

The following tables contrast in more detail the various connection protocols supported by PC-Xware.

TCP/IP Protocols	Description	Typical Uses/Advantages	Requirements/Limitations
XDM (vuelogin on HP UX machines)	A common X Window System display manager. Most UNIX hosts with X Window support XDM connections.	The easiest way to make the PC display resemble an X terminal or workstation. Manages a “session” or group of X applications. Provides easy login and security check.	Not necessarily set up on all systems. Requires host side daemon configuration. To configure properly, user and/or system administrator needs some familiarity with XDM protocol. XDM is often set up to run a desktop manager (such as hpvue or Open Look), which consume many PC resources (due to the large number of applications running all the time).
telnet	A simple remote terminal protocol supported by UNIX hosts and some TCP/IP-equipped VMS systems. Uses PC-Xware’s terminal emulator to display the login prompt from your host.	Familiar to most users. Easy to create. Provides basic terminal access to any system anywhere. Used for running character-based applications. You can write login scripts to automate login and application startup. Simple interface to UNIX command line. Lets PC-Xware start a host-based X application via a single UNIX command line.	Limited support for graphics. To start X applications, you must set the DISPLAY environment variable to the PC name after logging on. This means an additional step is required to start an X application (see "Manually Started X Applications" on page 2-34). Requires a telnet daemon running on the host.

TCP/IP Protocols	Description	Typical Uses/Advantages	Requirements/Limitations (Continued)
rlogin	Establishes a remote login session on a host from your PC. Uses PC-Xware's terminal emulator to display the login prompt for your host.	Familiar to most users. Easy to create. Provides basic terminal access to any system anywhere. Used for running character-based applications. You can write login scripts to automate login and application startup. Simple interface to UNIX command line. Lets PC-Xware start a host-based X application via a single UNIX command line.	Limited support for graphics. To start X applications, you must set the DISPLAY environment variable on the PC. This means an additional step is required to start an X application. You may need to create a .rhosts file to be able to login. See the rlogin man page on your host. Requires an rlogin daemon running on the host.
rsh	A remote shell connection between your PC and a host machine. Uses a "trusted" login process; no password required.	Lets PC-Xware start a host-based X application via a single UNIX command line. Can simply click on the connection listing, and it starts. Displays the application's interface on the PC screen. For users lacking XDM support, provides a more automated way to start X applications than telnet. You can specify a host shell script file as the initial (single) application, and thereby start a list of applications all at once (similar to the effect of an XDM connection).	Requires an rsh daemon running on the host machine. Ability to log in without a password may conflict with security requirements at your site. (To disable rsh, at a DOS command prompt, run the ***norsh.exe*** utility, found in your PC-Xware installation directory.) To allow rsh connections from PC-Xware, your UNIX host must grant access to your PC and/or username. See the rsh man page on your host.

TCP/IP Protocols	Description	Typical Uses/Advantages	Requirements/Limitations (Continued)
rexec	After establishing a connection, automatically executes an X application on a remote host, similar to an rsh connection. Unlike rsh, however, the host requires a password before invoking the X application.	Lets PC-Xware start a host-based X application via a single UNIX command line. Always available by default on UNIX systems. Displays the application's interface on the PC screen. For users lacking XDM support, provides a more automated way to start X applications than telnet. You can specify a host shell script file as the initial (single) application, and thereby start a list of applications all at once (similar to the effect of an XDM connection).	Unlike, rsh protocol, requires password be supplied in order to login. Requires rexec daemon running on host machine.

DECnet Protocols	Description	Typical Uses/Advantages	Limitations/ Disadvantages
Session	Establishes a remote login session on a DECnet host and starts the DECwindows Session Manager on your PC. A predefined Launch starts the Session Manager.	The easiest way to make the PC display resemble an X terminal or workstation. Manages a "session" or group of X applications. Provides easy login and security check. Quickest way to access the common DECwindows interface.	You must set up the pcx$server object on the host. See "Preparing for DECnet Session and Launch Connections" on page 2-31.

DECnet Protocols	Description	Typical Uses/Advantages	Limitations/ Disadvantages (Continued)
Launch	Sends a command to a VMS host over a DECnet connection.	Starts single X applications, like DECterm, on a VMS host from your PC. A log file that records communication events is created in the home directory of the VMS host machine. Automatically sets the display for X applications to the PC.	You must set up the pcx$server object on the host. See "Preparing for DECnet Session and Launch Connections" on page 2-31.

Preparing for DECnet Session and Launch Connections

To use the Session or Launch protocols, you must first complete these preparatory steps on the VMS host(s) with which you want to establish PC connections.

1. Install the file ncd_serv.com (found in the PC-Xware installation directory) on the VMS systems you plan to use. You can do this by entering the Pathworks NFT command:

```
$NFT COPY ncd_serv.com VMSHOST"user password":: ncd_serv.com
```

2. Install the ncd_serv.com file as an NCP (Network Control Program) object. (You must have system account privileges to do so.)
   a. Copy ncd_serv.com to the system executables directory by entering:

      ```
      $copy ncd_serv.com sys$common:[sysexe]
      ```

   b. Set the protections to allow use of **ncd_serv.com** by entering:

```
$set protection=(S:RWED, O:RWED, G:RWED, W:RE) sys$system:ncd_serv.com
```

   c. Run the NCP program by entering:

      ```
      $NCP
      ```

   d. Define the object for the permanent data base by entering:

```
NCP>define object pcx$server file sys$system:ncd_serv.com number 0
```

e. Define the object for the current data base by entering.

```
NCP>set object pcx$server file sys$system:ncd_serv.com number 0
```

f. Exit the NCP program.

Creating a Connection

PC-Xware's Connection Wizard steps you through the process of creating connections. To start the Connection Wizard, select Start → All Programs → PC-Xware → PC-Xware Connection Wizard. For details on specific options the Connection Wizard offers, use the online help associated with it.

The following table shows the typical routes from the first page of the Connection Wizard to the various protocol choices. (In some cases, there are additional options after selecting the basic protocol. These subsequent options are not shown here.)

Selecting a Protocol with the Connection Wizard

Protocol	How to get there
Rlogin	Execute applications(s), command(s) or script(s) on a remote host → Host Type → Remote Login (RLOGIN)
Rlogin+ login script	Run a VT320 emulator to a remote host → Remote Login (RLogin) protocol → Advanced Terminal Settings → Use Login Script
Telnet	Execute applications(s), command(s) or script(s) on a remote host → Host Type → Telnet
Telnet + login script	Run a VT320 emulator to a remote host → Telnet protocol → Advanced Terminal Settings → Use Login Script
XDM	Begin an X session managed by a remote host
rsh	Execute applications(s), command(s) or script(s) on a remote host → Host Type → Remote Shell (RSH)
rexec	Execute applications(s), command(s) or script(s) on a remote host → Host Type → Remote Command Stream (REXEC)

Starting Connections and X Applications

Once a connection has been created, to start it:

1. Access the PC-Xware Connections menu: select Start ➔All Programs ➔PC-Xware Connections as shown below.

2. Click the icon representing the connection you want to start. PC-Xware makes that connection to your host, executing whatever instructions were specified for that connection when it was created.

   For example, if you start a connection that uses the rexec protocol, it automatically invokes the X application that was specified when the connection was created. Or if you start a simple Telnet connection that had no extra information built into it, you are prompted for login information before the connection is established.

Manually Started X Applications

Terminal emulator connections (telnet or rlogin) that do not have login scripts do not automatically start X applications. Once you start one of these types of connections, to start an X application, you must:

1. Set the DISPLAY environment variable to point to your PC's name or its IP address. For example:

   ```
   setenv DISPLAY joe_pc:0
   ```
   (C Shell)

   or

   ```
   DISPLAY=joe_pc:0;export DISLAY
   ```
   (K or Bourne Shell)

2. Type in the path and name of the X application. For example:

   ```
   /usr/bin/x11/xterm
   ```

Chapter 3
Configuring PC-Xware

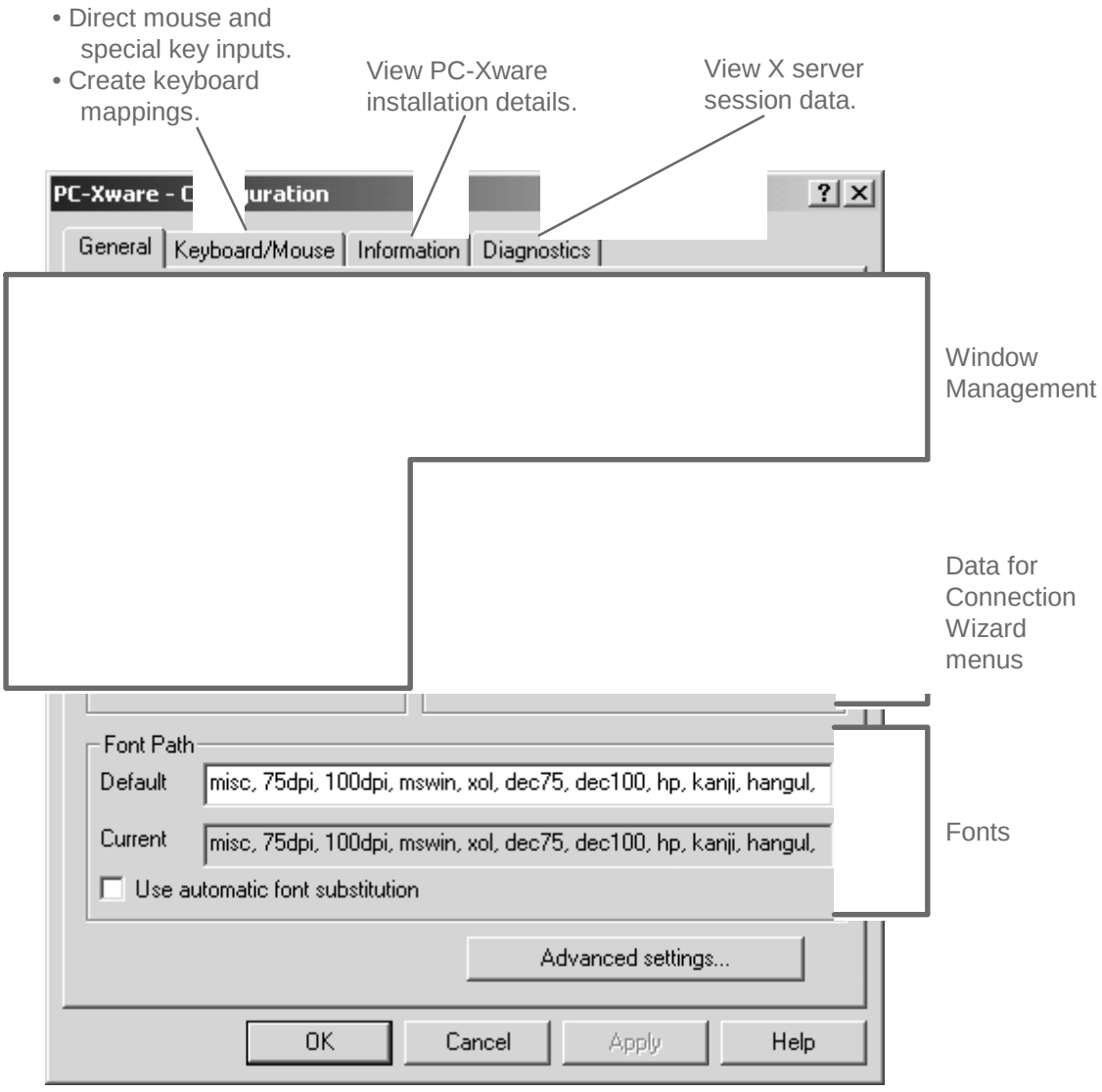
Many features of PC-Xware can be customized to meet your needs and preferences. This section provides an overview of these configuration facilities:

- Configuration Options
- Configuring the Terminal Emulator

Configuration Options

To access PC-Xware's configuration options, select Start →Programs → PC-Xware →PC-Xware Configuration.

The figure below shows the General tab of the Configuration dialog, but identifies the features configured through all four of the tabs.



The four configuration tabs are discussed below.

- General tab
  Window management items are discussed in "Managing Windows" on page 5-57.

  The Data Lists options let you create and modify lists of:

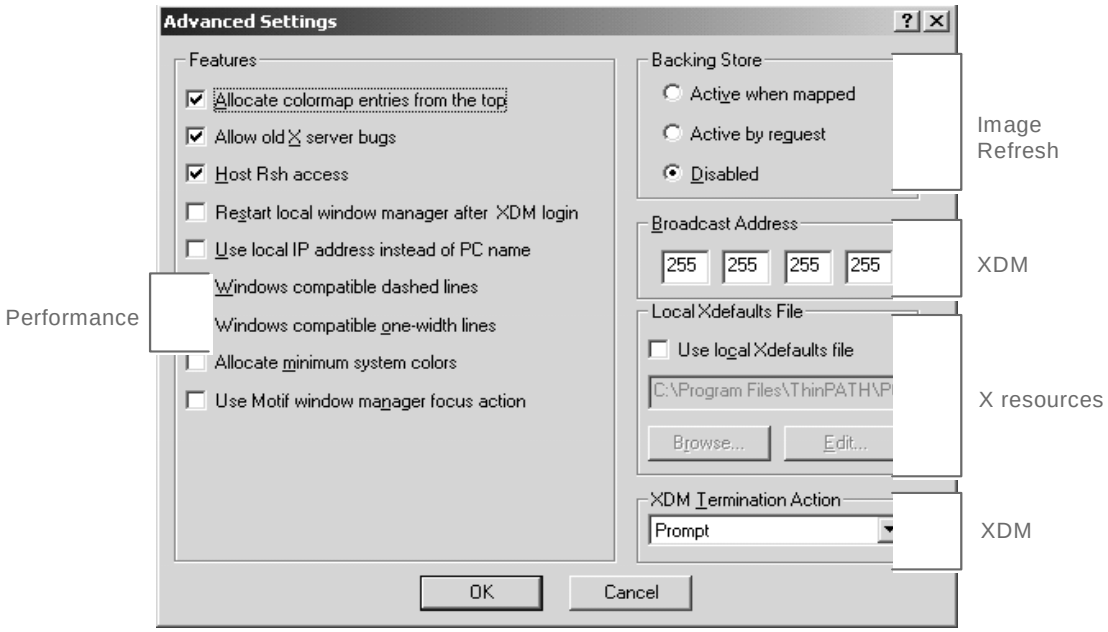
  - Host machines to which you might want to connect.
  - Commands for starting X applications.

  Changes made to these lists here are reflected in drop-down menus in the Connection Wizard. You can select items from those drop-down menus when defining connections.

  Font issues are discussed in Chapter 4, “Managing Fonts.”
- Keyboard/Mouse tab
  This tab is discussed in "Customizing the Keyboard" on page 6-67.
- Information tab
  This tab is discussed in "Viewing Installation Details" on page 5-61.
- Diagnostics tab
  This tab is discussed in "Viewing Diagnostic Information" on page 5-62.

  Clicking Advanced Settings on the General tab displays a dialog (shown in the following figure) that lets you adjust several miscellaneous features.

.



The Features settings govern various host and network specific settings. The Performance-related options toggle fast line drawing.

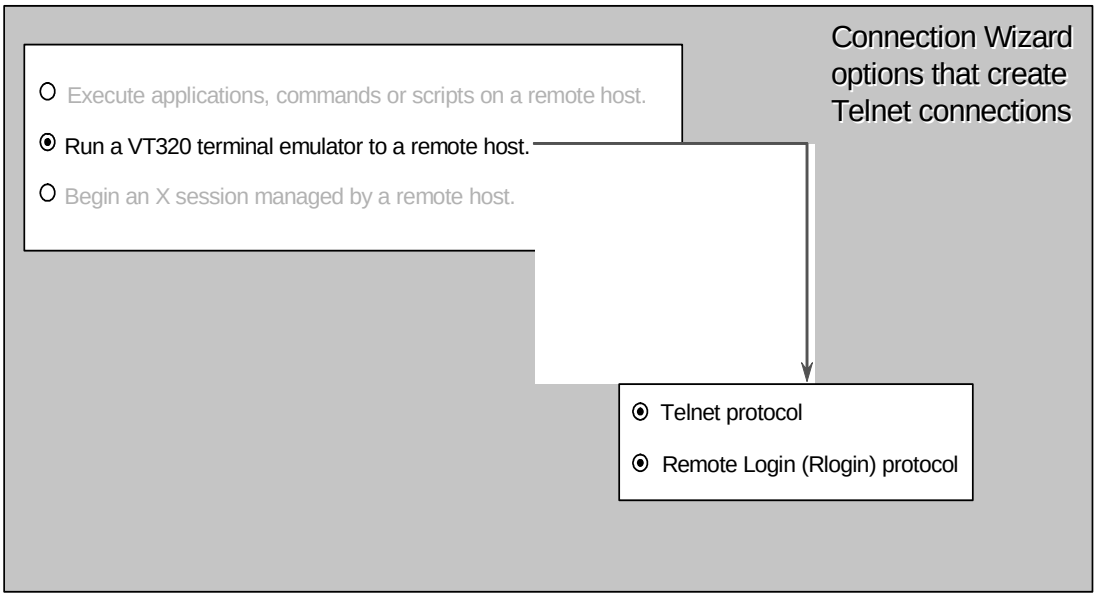
Backing Store settings govern whether PC-Xware (Active options) or the X application redraws overlapped window areas.

The Broadcast Address and XDM Termination action settings determine where XDM requests go and what happens when an XDM session ends.

For more information about these settings, use the What's This? help available in the Advanced settings dialog.

Configuring the Terminal Emulator

The terminal emulator makes host windows on the PC act like a VT320 terminal. You start the terminal emulator through connections that use serial-based communication protocols. You can create and configure such connections using the Connection Wizard. Follow one of the option paths shown in the following diagram.



You can configure several features of the terminal emulator. You can access these configuration options in two ways:

- Through menus in the banner of the terminal emulator window.
- Through the Connection Wizard, as described below.

To access the Configuration Wizard terminal emulator configuration options:

1. Select Start → Programs → PC-Xware → PC-Xware Connection Wizard.
2. Choose one of the connection types that invoke the terminal emulator, as shown in the previous figure.
3. To change the appearance or behavior of the terminal emulator window, when you get to the Terminal Emulator dialog, click Advanced Terminal Settings. For details on these settings, use the What's This? help associated with the Advanced Terminal Settings dialog.

Chapter 4
Managing Fonts

This chapter provides the information necessary to understand and manage the display of X application fonts.

Potential Font Problems

There are two typical font-related problems you might encounter:

- Sometimes, when you run an X application, you might get an error message indicating the application cannot find a certain font. Or, the application may start, but its text items look distorted. Such symptoms indicate that the X server displaying your application cannot find the font requested by the application.
- Some X applications support a -fn command line option that lets you specify some font other than default to be used. However, some applications accept only certain fonts, and this is not evident until you try one and get an error message.

The following sections provide background on how the X server displays fonts, and present several approaches to solving this problem.

How the X Server Displays Fonts

To mediate input and output between an X application and your PC, the X server needs several types of information which is not provided by the application, and which must reside where the X server can access it. Font data falls in this category.

PC-Xware provides a default set of standard PCF (Portable Compiled Format) X server fonts. PCF is a font format PC-Xware's X server can read directly. (PC-Xware can also read Microsoft Windows .fon files; however, most X applications do not use or know about these fonts.) To see the list of fonts supplied by PC-Xware, see "Font Reference" on page 4-50.

Font problems can arise if you run X applications that use custom fonts not provided by PC-Xware, or font formats other than PCF. To display those fonts on your PC, you need a way to make them available to the X server, and to translate them into Portable Compiled Format.

Note Microsoft Windows only recognizes font data in Windows font files, designated with a **.fon** extension. PC-Xware's X server converts PCF font files to **.fon** files as X applications request fonts.

PC-Xware creates the **.fon** files in the directory specified by the Windows TEMP environmental variable (if it has been set). If the TEMP variable has **not** been set, PC-Xware creates the **.fon** files in the root directory of your boot disk drive. These font files are temporary and are deleted by PC-Xware at termination.

If for some reason PC-Xware terminates abnormally, the existing font files will be deleted the next time PC-Xware runs. For further information on the Windows TEMP environmental variable, see your Microsoft Windows User's Guide.

Ways to Supply Missing Fonts

There are several ways to supply fonts an X application is requesting, but which PC-Xware cannot find on your PC. Which to use depends on whether and where you can locate a font the X application can use.

Copy Fonts to Your PC

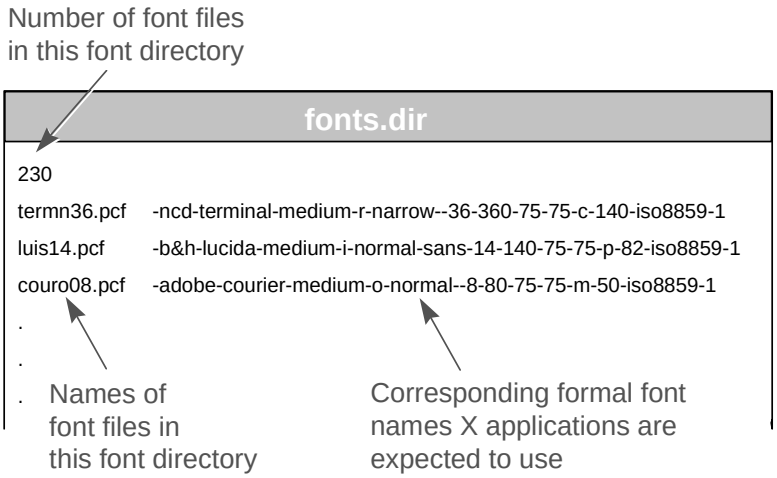
In one common scenario, a family of fonts required by the X application resides on some machine other than your PC. In this case, do the following:

1. Create a new font directory for the needed fonts on your PC in the PC-Xware installation directory. (This is where the installation program places the standard PC-Xware font directories.)
2. Copy the required fonts into the newly created directory.
3. Start the PC-Xware Font Tool. Select Start → Programs → PC-Xware → PC-Xware Utilities → Font Tool.
4. In the Font Tool's directories list, double click the new font directory you created in Step 1 above. By default, only fonts that are in .bdf font format will be displayed in the File list, and they will be selected.
5. Fonts in .bdf format must be converted to .pcf font format, so PC-Xware can read them. If .bdf fonts are displayed in the Font Tool's File list, ensure they are all selected, then click Convert. A. pcf file is created for each .bdf file.
6. Now you must tell PC-Xware how to access the .pcf font files in the new font directory.
   a. In the text entry box under File Name, type:

      *.pcf

   b. In the Directories list, double click the [..] entry to go up a level and list the font directories. Then double click the new font directory. The .pcf files in that directory will be displayed and selected in the File Name list.

c. Click Make Font Directory. This creates the index file, fonts.dir in the new font directory. The entries in fonts.dir map the filenames of the fonts in that directory to the font names by which X applications identify them. A few lines from the fonts.dir file in the 75dip font directory illustrates this:



For details on X Window font-naming confentions, see "Font Reference" on page 4-50.

Note Do not change Font Tool Options (Glyph Padding, Scanline Unit, Bit Order and Byte Order), unless you thoroughly understand your BDF files. These default settings create the smallest, most efficient PCF files.

6. You must add the new font directory to the font path PC-Xware searches to satisfy font requests by X applications.
   a. Select Start → Programs → PC-Xware → PC-Xware Configuration → General. The Font Path box lists the directories PC-Xware is currently set up to search. The font path entries listed (misc, 75dpi, mswin) are relative to PC-Xware's installation directory. (You can type in absolute pathnames if you put your font directory elsewhere.)

b. Type in the name of the new font directory you created in Step 1. above. Locations must be separated by commas.

Get the Font from a Host with a Font Server

If the required font is in some format other than PCF or BDF, or you want a central host location for your fonts, you can use a font server (a common X Window utility) on a UNIX host to supply the font to PC-Xware when it is requested.

Most operating system vendors provide a font server with their distribution. If not, there are many public domain versions available.

Tell PC-Xware to use a font server by specifying the font server's location in the X server's font path, much as you would specify a new font directory location. However, there is a special syntax for font servers in the font path; use:

```
tcp/host_name:port_number
```

where `host_name` is the name or IP address of the host where the font server resides, and `port_number` is an attribute of the font server assigned when it was set up.

- If your host is running the R5 version of the X Window System, the default port number is 7000.
- If your host is running the R6 version of the X Window system, this number is 7100.

Ask your system administrator to verify the port used by the font server on the host you have chosen.

The order of locations in the font path determines the order that the X server searches for fonts. If you want the font server to resolve most of your fonts, place the font server at the front of the font path.

For more details on configuring a host font server, refer to the PC-Xware System Administrator's Guide, available currently only through ThinPATH Systems, Inc.

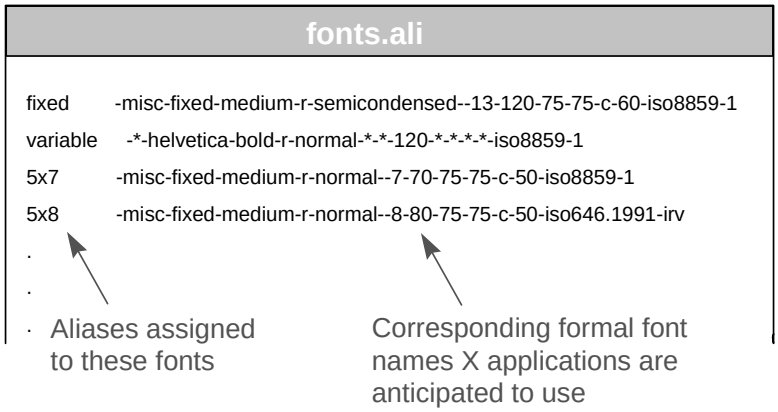
Automatic Font Substitution

The General tab in the Configuration dialog includes a check box for enabling or disabling automatic font substitution. If this box is checked and PC-Xware gets a request for a font it cannot locate, PC-Xware automatically substitutes the font with the name most closely resembling the requested font. For details on font naming conventions, see "Font Names" on page 4-52.

Create Font Aliases

Aliasing a font means assigning an alternate name to the formal font name recorded in the fonts.dir file (see "Copy Fonts to Your PC" on page 4-43).

Each font directory supplied with PC-Xware contains a fonts.ali file, used to alias the long, formal font names X applications typically use to short, simple font names. A portion of the fonts.ali file in the misc font directory, shown below, illustrates this mechanism:



This makes it easier to specify a particular font when invoking X applications that let you choose the font it will use.

You can create your own aliases in existing fonts.ali files, and you can create your own fonts.ali files in font directories you create.

In addition to providing font names that are shorter and easier to specify, aliasing can also be used to get an application to use one of the fonts you have available. If an X application requests a font you cannot locate, or translate to PCF or BDF font formats, or access via a font server, try one of the following two aliasing strategies:

- Alias the missing font name to the default font.
  a. Navigate to the <installation directory>\pcxware\misc folder (assuming misc is the first location in your font path).
  b. Open the fonts.ali file in a text editor, like Notepad.
  c. Copy the line that begins with the word "fixed." This line designates the default X font.
  d. Paste in a copy of that line, and change the word "fixed" to the name of the missing font sought by the X application, as shown below:

```
fixed          -misc-fixed-medium-r-semicondensed--13-120-75-75-c-60-iso8859-1
X_appl_fontname-misc-fixed-medium-r-semicondensed--13-120-75-75-c-60-iso8859-1
```

  When the X application requests the missing font, the X server will supply the default X font.

  e. Reset the X Server (a selection in the menu displayed with you click the PC-Xware Services icon ).

  Caution This action closes any connections using the X Server. First ensure any critical processes occurring over such connections are completed or properly terminated.

  f. Start the desired X application and see if the fixed font is acceptable.

- Find an acceptable font, and alias it to the missing font.
  a. Locate a font you already have that you think will look best with the X application you want to run. (To examine fonts and derive the names by which the X server identifies them, use the UNIX font utilities described in "Getting Font Information" on

page 4-48.) For details on font naming conventions, refer to "Font Names" on page 4-52.

b. Open the fonts.ali file in the font directory containing the font you have chosen.

c. Insert a new line of the following form:

```
X_appl_fontname      available_fontname
```

where X_appl_fontname is the font name requested by the application, and alternate_font is the name of the available font you want to use in its place.

d. Reset PC-Xware (a selection in the menu displayed when you click the PC-Xware Services icon  menu).

e. Start the desired X application and see if the selected font is acceptable.

Getting Font Information

When you are resolving font problems, you often need several types of information about the fonts available to you, and where the X server is currently set up to search for fonts. There are four UNIX utilities you can use to do this:

- xset(1)—displays information about the current font path
- xlsfonts(1)—lists the fonts known to the server
- xfd(1)—displays the characters in a font
- xfontsel(1)—displays samples of a font

This sections describes these utilities.

Viewing the Font Path

The xset command displays the font path and other current X server settings. After using PC-Xware to log into your host, type:

```
# xset q
.
.
.
Font Path:
    misc, 75dpi, 100dpi
```

Listing the Available Fonts

The xlsfonts(1) command lists the fonts currently available to the X server. It has many options for narrowing the search, but its basic form lists the names of all fonts known to the server.

```
# xlsfonts
```

When running with the argument -fn pattern, xlsfonts lists only fonts that match the pattern. The pattern may include the wildcard characters "*" (matches any sequence of characters) and "?" (matches any single character). Quote these characters to prevent the shell from expanding them. For example, the following command lists all fonts whose names include the word "helvetica".

```
# xlsfonts -fn '*helvetica*'
```

Displaying the Characters in a Font

The xfd(1) command displays all the characters in a font. The command's most basic syntax is:

```
xfd -fn font_name
```

For example, the following command displays all the characters in the 6x13 font.

```
# xfd -fn 6x13
```

The font specification can include wildcard characters as shown in the example above for xlsfonts.

Displaying Samples of a Font and XLFD Names

The xfontsel(1) client displays the fonts known to the server, allows you to examine samples of a font, and shows the XLFD (X Logical Font Description) name for a font. The command's basic syntax is:

```
xfontsel -pattern font_specification
```

The font specification may include wild card characters. For example, the following command displays a window in which you can select samples of various bold fonts.

```
# xfontsel -pattern '*bold'
```

Font Reference

Standard and Optional Fonts

After installation, the standard PC-Xware fonts reside in three subdirectories below the PC-Xware Installation folder.

PC-Xware includes most of the freely distributable fonts known at the time of product release. When you select the default installation components, the font directories containn the components in the following table.

Component	Folder	Contents
Misc fonts	misc	A variety of critical and obscure fonts. The most notable fonts in this folder are:
	cursor	Fonts used by PC-Xware and many X applications for cursors.
	6x13	The default fixed-width font. The file fonts.ali in the misc folder sets the “fixed” alias to this font when you install PC-Xware.
	7x14 8x16 12x24	Full ISO fixed-width fonts, meaning that these fonts define all 256 character values for international use. Most PC-Xware fonts are full ISO fixed-width fonts.
	fonts.ali	Aliases of non-existent fonts to existing fonts. When PC-Xware is installed, fonts.ali contains entries for fixed, variable, and other commonly requested fonts.
75 DPI fonts	75dpi	Contains low-resolution fonts required by most X applications.
Windows fonts	mswin	Accesses Microsoft Windows fonts.

The next table shows optional fonts you can install through the Custom branch of the PC-Xware installation program.

Component	Folder	Contents
100 DPI fonts	100dpi	Fonts for higher resolution displays.
Open Look fonts	xol	Fonts commonly used by Open Look X applications.
DEC 75 DPI fonts	dec75	75 dpi fonts used by DECWindows applications.

Component	Folder	Contents
DEC 100 DPI fonts	dec100	100 dpi fonts used by DECWindows applications.
HP fonts	hp	Fonts used by HP VUE applications.
Kanji	kanji	Japanese fonts.
Hangul	hangul	Korean fonts.
Hanzi Guobiao	hanzi	Chinese fonts.

Microsoft Windows Fonts

PC-Xware can recognize and use Microsoft Windows fonts. You can access Microsoft Windows fonts for use in X applications by having mswin in the font path (it is there by default).

To adhere to the X Logical Font Description Conventions (XLFD) for font names, MS Windows font names are converted to contain distinct entries for identifying Windows fonts. An XLFD name for a Windows font contains these fields:

Field	Description
Foundry	The developer of the font. `mswin` specifies Microsoft Windows as the foundry.
Font Family	Fonts from the Microsoft Windows font family such as `arial`, `ms sans serif`, `roman`, or `small font`.
Character Set	Identifies what displays for each character in a given font. Most fonts use ANSI. Some fonts use OEM and Symbol.

For more information on XLFD naming conventions, see the following section.

Font Names

In the X Window System, fonts are named using the X Logical Font Description (XLFD) conventions. XLFD names supply information about the developer of the font, the font family, and various characteristics of the font, including size, weight, and dots per inch.

An XLFD name consists of 15 fields separated by hyphens. For example, the bitmap font name:

```
-adobe-courier-medium-r-normal--8-80-75-75-m-50-iso8859-1
```

describes a font with the properties shown in the following table:

Variable	Field Description
adobe	Developer of the font, also called the foundry.
courier	Font family.
medium	Weight.
r	Slant (*r* stands for Roman).
normal	Width.
8	Size of the characters in pixels.
80	Size of the font in tenths of a point.
75	Horizontal and vertical resolution in DPI (dots per inch). This is the resolution of the device for which the font is designed and controls the size of the font when displayed.
m	Monospaced font (as opposed to proportionally spaced). Terminal emulators, such as the NCD local client terminal emulators and xterm(1) require monospaced fonts.
50	Average width in tenths of a pixel.
iso8859-1	Character set. Most fonts are in the ISO8859-1 character set (Latin-1, a superset of ASCII).

Wildcards in Font Names

Any field in a font specification can be replaced by a wild card. A wild card is a special character that allows any font to match the property represented by the wildcard.

- The asterisk (*) wildcard replaces an entire field.
- The question mark wildcard (?) replaces any single character.

For example, the font name:

```
-*-fixed-bold-r-normal--13-120-*-*-*-*-*-*
```

matches these fonts:

```
-misc-fixed-bold-r-normal--13-120-75-75-c-70-iso8859-1
-misc-fixed-bold-r-normal--13-120-75-75-c-80-iso8859-1
```

When searching for a font, the X server uses the first font it finds that meets all the criteria specified in the font name. If you use wild cards instead of specifying all properties, the server uses the first font that matches the properties you specify.

Wildcards provide flexibility because a usable font can be substituted if the intended font is not found. A complete font name specification with no wildcards may cause a client to fail if the X server cannot find the font that exactly matches the specification.

Bitmap Font Names versus Outline Font Names

Bitmap font names differ from outline font names in the amount of information specified. A bitmap font name has data in all fields. An outline font name has 0s (zeros) in all of the size fields: the size of the characters in pixels, the size in tenths of points, horizontal resolution, vertical resolution, and average width. Outline font names look similar to the following:

```
-*-courier-*-*-*--0-0-0-0-m-0-*-*
```

Specifying Fonts for X Applications

You can specify fonts for most X applications as X resources or in the X application command line with the -fn option. When specifying a font you must use the XLFD font name, or an alias for the XLFD font name, with or without wildcards. (For information on aliasing fonts, see "Create Font Aliases" on page 4-46.) Here is a sample Xresource setting:

```
xterm*boldfont: -adobe-courier-bold-r-normal--20-140-100-100-m-110-iso8859-1
```

Here is the same font specified on the command line:

```
% xterm -fn -adobe-courier-bold-r-normal--20-140-100-100-m-110-iso8859-1
```

If you are using a font name with asterisks in a command line, the font name must be surrounded by single quotes to prevent the shell from interpreting the asterisks. For example:

```
% xterm -fn '-*-courier-bold-r-normal--20-140-*-*-*-*-*-*'
```

For outline fonts, you must provide a well-formed font name in the font specification. A well-formed font name contains all 14 hyphens specified in the XLFD convention. Wild cards are permitted for any field. For example, this is not a well-formed name because it does not contain all 14 hyphens:

```
-*-helvetica-bold-o-*-*-*-120-*
```

But this is a well-formed name:

```
-*-courier-*-*-*--0-0-0-0-m-0-*-*
```

Chapter 5
Additional PC-Xware Tools

This chapter covers the PC-Xware features that support the following activities:

- Managing Windows
- Viewing Installation Details
- Viewing Diagnostic Information
- Copying and Pasting

Managing Windows

Choosing a Window Manager

A window manager is a special X application that defines the cosmetic features of the windows displayed on the screen, and the mechanisms for moving, sizing and iconifying them. Unlike other X applications, you can run only one window manager at a time on a given display.

PC-Xware provides several options regarding window managers. You can:

- Choose a local Motif-style window manager.
  Select Start → Programs → PC-Xware → PC-Xware Configuration, General Tab → NCDwm.

- Choose a Microsoft Windows-style local window manager. Select Start → Programs → PC-Xware → PC-Xware Configuration, select the General Tab, then Microsoft under Default Local Window Manager.
- Choose not to use a local window manager. This allows you to use your favorite X Window window manager from a remote host. Select Start → Programs → PC-Xware → PC-Xware Configuration, select the General tab, then None under Default Local Window Manager. (The methods for starting a remote window manager vary, depending on the type of connection, once you connect to the host.)

Note If you select a different window manager than the current one, you must restart PC-Xware or stop the current window manager (see below).

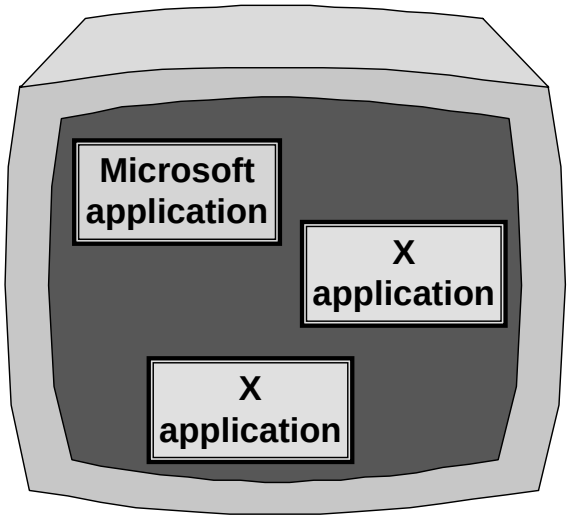
- Temporarily suspend use of the local window manager. This lets you use some other window manager, then resume use of the local window manager later. You could use this capability if you wanted to run some X application in a remote window manager, such as Motif, for a limited time. To toggle the use of the local window manager, click the PC-Xware Services icon  , and in the resulting menu, select Stop/Start Local Window Manager.

Window Managers and X Applications

PC-Xware lets you display X applications in two ways:

- Desktop mode
- Single window mode

In desktop mode, X applications are displayed side by side with your Microsoft Windows applications, as shown in the following figure.

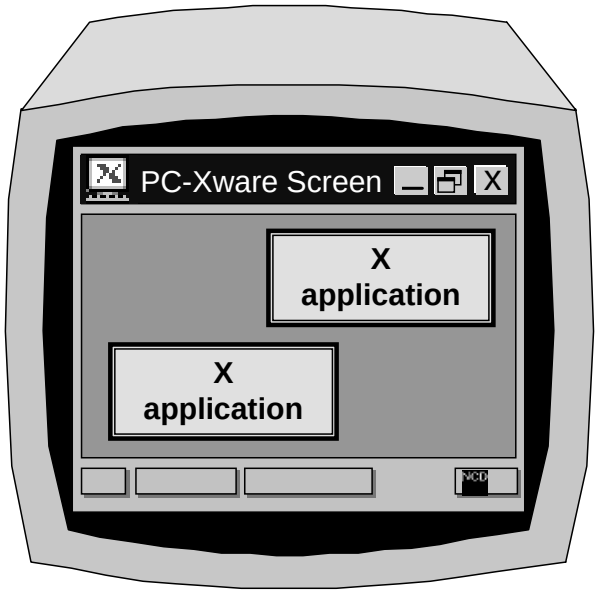


Desktop mode is the default state. If you have changed to single-window mode and want to return to desktop mode, do the following:

1. Select Start → Programs → PC-Xware → PC-Xware Configuration → Run on the desktop, then click Apply.
2. Click the PC-Xware Services icon and select Reset X Server.

In desktop mode, you have the choice of using PC-Xware's local window manager, or an X Window window manager from your host (see "Choosing a Window Manager" on page 5-57).

In single window mode, X applications are displayed in a single, full screen window, as shown in the following figure.



To run your X applications in single window mode:

1. Select Start → Programs → PC-Xware → Configuration → Run in a single window, then click Apply.
2. Click the PC-Xware Services icon and select Reset X Server.

In single window mode, you have the choice of running the local Motif-style window manager or an X Window manager from your host (see "Choosing a Window Manager" on page 5-57).

Choosing the Environment for Mouse Actions

Microsoft Windows and many X Window managers use a right mouse button press on the desktop to display a menu. When you press a mouse button, PC-Xware must decide if you want the Microsoft Windows menu or the X Window menu.

To specify this, select Start ➔ Programs ➔ PC-Xware ➔ PC-Xware Configuration ➔ Keyboard/Mouse. Go to the Special Settings region of this tab.

- To send mouse button presses on the desktop to the X Window environment, put a check in the box labeled Send mouse events to X instead of Windows.
- To send mouse button presses on the desktop to Microsoft Windows, uncheck this box.

Note If this box is unchecked, you can send mouse button presses to X only by simultaneously pressing a modifier key (Control or Alt for example). You may need to change your X Window window manager default resources to expect a modifier key and a mouse button press as the menu activating keystroke.

Viewing Installation Details

Click the PC-Xware Services icon  at the right end of the taskbar. In the resulting menu, do one of the following:

- To just see which version of PC-Xware you are running, select About PC-Xware.
- To get complete information about the copy of PC-Xware you are running, select Configure PC-Xware ➔ Information. The Information tab displays the following information:

Option	Description
License Information	The licensing string that enables PC-Xware to operate..
User	Name of the person registered to use this copy of PC-Xware.
PC-Xware Version	PC-Xware's release number.
Built	The date and time when this copy of PC-Xware was built.

Option	Description (Continued)
Installed in	Pathname to the *installation folder* (the directory into which your PC-Xware software was installed).
Personal Directory	Directory where individual connections are stored.
Screen	The dimensions of your display (for example, 1024 x 768), and color format (8-bit color, 16-bit color, and so on).
TCP/IP Name	The network name and IP (internet protocol) address identifying your PC for network connections.
DEC Name	The DECnet node number for your PC. (optional entry)
Enabled Features	PC-Xware capabilities enabled in the copy of PC-Xware you are running. By default, the list includes: • network: Network connection capability. • xremote: Serial connection capability through PC-Xware's XRemote utility. • rsh: Ability through remote shell protocol to issue commands to a host without first supplying a user name and password.
X Extensions	Optional X Window capabilities enabled with the copy of PC-Xware you are running.
Network Software	The network software your copy of PC-Xware uses for inter-machine communications.

Viewing Diagnostic Information

PC-Xware logs X server events to assist you in pinpointing problems, should they arise. You can:

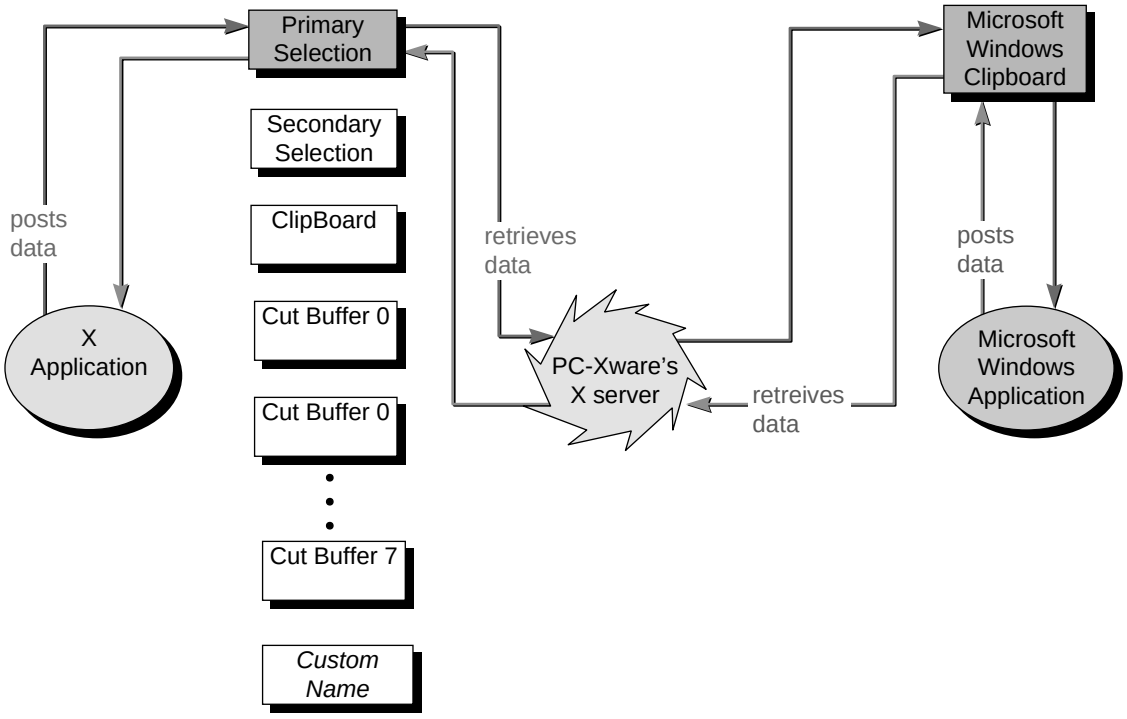
- View the events that occurred during an X server session.
- Adjust what events get logged.
- See what types of network connections are currently active.

To get this information, Start → Programs → PC-Xware → PC-Xware Configuration → Diagnostics. This tab contains the following elements:

Option	Description
Server Message Log	This window displays the events and status messages issued by the X server during the current session.
Time Stamps	Enabling this option makes the X server record the time, following each logged event.
Extended File Diagnostics	Enabling this option makes the X server record the full pathname of each file it tries to open, and whether the attempt was successful.
Extended Font DIagnostics	Enabling this option makes the X server record the font name and font file name for opened fonts.
TCP/IP UDP X client	These three boxes show the number and types of network sockets used by PC-Xware. X client shows the number of X applications running.
Clear log	Deletes all previously recorded information from the Server Message Window.
Create diagnostic file	Saves the information in the Message Server window to the file support.xsu in your PC-Xware installation directory.

Copying and Pasting

PC-Xware's X server can monitor the copy and paste buffer used by an X application, and transfer its contents to the Windows Clipboard, so it can be pasted into Windows applications. Similarly, the X server monitors the Windows clipboard, and can copy data to the paste buffer being used by the X application, as illustrated below.



As suggested by the preceding illustration, the X Window System supports multiple cut/paste buffers for transferring text and graphics between applications. Which of these holds the data you copy or cut from the X application is determined by the design of the X application you are running. Most X applications use the Primary Selection buffer.

Historically, several names have been used for X Window buffers:

- Primary selection
- Secondary selection
- Clipboard
- Cut buffer 0 - Cut buffer *7*

Further, some X applications may use custom buffers.

In contrast to the X Window scheme, Microsoft environments provide only one paste buffer, the Clipboard.

By default, PC-Xware monitors the X buffer called “Primary selection.” If your X application uses some other buffer, this default arrangement will not work. You must explicitly tell PC-Xware which X buffer to monitor. (You must get the correct buffer name from the X application’s documentation).

PC-Xware provides a Copy and Paste menu for specifying an alternate X buffer to monitor. This menu provides additional options to give you flexibility in selecting the copied material.

To access PC-Xware’s copy and paste options:

1. Click the PC-Xware Services icon  at the right end of the task bar.
2. Click Copy and Paste Graphics or Text.
3. In the Copy and Paste dialog, click the type of Copy or Paste operation you want.
4. To specify an X application buffer to monitor other than the default Primary selection buffer, click XSelections. In the resulting dialog, click the X buffer you want PC-Xware to monitor.

Because Microsoft Windows and the X Window System use different paradigms for their copy-and-paste facilities, you can copy and paste ASCII text and bitmapped images only between Microsoft Windows and X applications. Further, you can copy text or graphics--not both--in a single operation.

For details on the options available, see find the topic “Copy and paste options” in PC-Xware’s online help.

Chapter 6
Customizing the Keyboard

What Is Key Mapping?

Key definitions determine the function of the keys on your keyboard. Keyboard mapping is the method for changing key definitions to make your PC keyboard behave like the keyboard expected by your X application. Keyboard maps are saved in a file (keymap.xkb) and take effect the next time PC-Xware starts (or when you reset PC-Xware's X server).

Note Any changes to keyboard mapping only affect the X applications and not the Microsoft Windows or PC-Xware terminal emulator applications.

Here are some terms and definitions used in the following discussion of keyboard mapping:

This term...	Means...
keysym	Either the visual display associated with a given key, or a descriptive word designating the key's action (such as "backspace"). The keysym for a given key is the same for all X servers, so keysyms are the recommended means for redefining keys.
keycode	The numeric identifier for a given key. The keycode for a given key varies among X servers.
modifier or mode	A key that can be used in combination with other keys to perform a distinct action. Examples include the Shift and Ctrl keys.

Overview of Key Mapper

Key Mapper is a graphical utility that lets you redefine PC keyboard keys for operations in windows managed by an X server. Key Mapper lets you select from a wide range of keysym sets as the source for your key definitions. Its graphical interface lets you redefine multiple keysyms in a single session without having to directly edit a key definition file.

Note Key Mapper's capabilities are based on the UNIX xmodmap application. To get detailed technical information on xmodmap, invoke the UNIX man page for xmodmap.

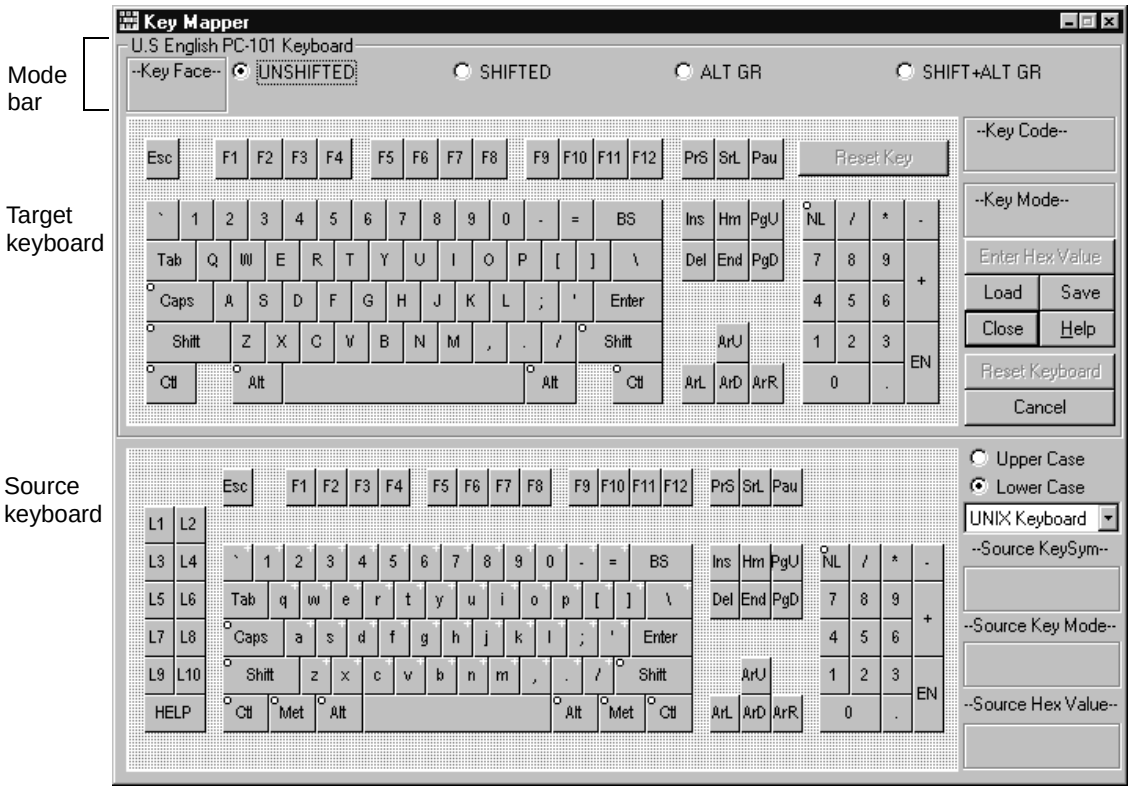
To see the characters associated with keysym names, refer to The X Window System by Sheifler and Gettys.

You can start Key Mapper in either of two ways:

- Through the PC-Xware Utilities menu item.
  Select Start → Programs → PC-Xware → PC-Xware Utilities → Key Mapper.

- Through the Configuration dialog.
  Select Start → Programs → PC-Xware → PC-Xware Configuration → Keyboard/Mouse → Run Key Mapper.

The Key Mapper is shown below:



The PC-101 keyboard at the top is a representation of your PC's keyboard—it is the target for key definitions. The keyboard at the bottom is the source of alternate key definitions.

You select the set of keys represented in the source keyboard from an extensive list of terminal keyboards and key sets, which includes:

- Keyboards for particular host environments, such as UNIX and Sun.
- Keys grouped for easy access, such as function keys and mode keys.

- Keys from other languages, such as Greek and Latin.

To map a source key to a PC target key, you can either click on one key, then the other (in either order), or drag one key over the other.

When you're finished redefining keys, you save your changes to a .xkb keymap file. To apply a particular keymapping to your PC keyboard, you tell PC-Xware which keymap to use. You can also load standard XMODMAP files as input.

Redefining Keys

To redefine keys using Key Mapper:

1. Start Key Mapper (as described earlier).
2. (Optional) To load a file that contains key definitions, click Load and use the Load dialog to select a file.
3. Select the source keyboard or key set from the list to the right of the lower keyboard.
4. Associate a key definition in the source (lower) keyboard with a key in the target (upper) keyboard by doing the following:
   a. In the mode bar at the top of the interface, select the mode of the target key whose definition you want to change—Shifted, Unshifted, Alt GR, or Shift+Alt GR. For example, if you want to change the value of the capital T, click Shifted.
   b. Make sure that the correct case (upper or lower) is selected for the source keyboard. To do this, select either Upper Case or Lower Case in the top right of the lower keyboard. A white plus sign (+) on a key indicates that its case can be changed.
   c. Click the key you want to change in the target keyboard.
   d. Click the key whose keysym you want to use from the source keyboard. The mode bar at the top of the application indicates the key's new value under the mode that you selected in step a.

Note The order in which you perform steps c and d is irrelevant. You can also redefine keys by dragging a target key to a source key, or vice versa. You cannot associate two keys from the same keyboard.

5. Click Save to save your key definitions to the file keymap.xkb in your user folder. For portable key mapping files, select Keysym File and All Keys in the Save dialog.
6. To initiate your new key mapping, select Start → Programs → PC-Xware → PC-Xware Configuration → Keyboard/Mouse, and check Enable keymap.
7. Exit and restart PC-Xware to get the new keymap file to take effect.
   - If the PC-Xware Services icon  is in the taskbar, left click the icon and select Shutdown PC-Xware. Then start your X application connection from the PC-Xware Connects folder.
   - If the PC-Xware Services icon is not in the taskbar, simply start your X application connection from the PC-Xware Connects folder.

Tips for Using Key Mapper

- If you accidentally select the wrong key in either keyboard, click anywhere outside of the current keyboard to deselect it.
- To reset all of the keys you've redefined to their default values and start over, click Reset Keyboard.
- Even if you cannot find the source keysym that you want to use in any of the keysym sets, you can still redefine a key with that keysym if you know its hexadecimal value. To do this, click the key to redefine in the target keyboard, then click Enter Hex Value to enter the value in hexadecimal notation.
- To view a source key's keysym, mode, and hex values, click the key and look at the entries in the Source KeySym, Source Key Mode, and Source Hex Value fields to the right of the source keyboard.
- To view a target key's key code and mode value, click the key and look at the entries in the Key Code and Key Mode fields to the right of the target keyboard.

Key Mapper Options and Indicators

Key Symbols (in upper-left and upper-right corners of keys)

This symbol...	Indicates...
Rectangle	A key in the target keyboard whose keysym value has been redefined.
Circle	A mode key.
Plus sign (+)	A key that has both upper and lower case values.

Mode Bar

Option	Description
Key Face	Displays the string or character shown on the corresponding key cap of a typical keyboard.
UNSHIFTED	Selects the unshifted keysym value of the key that will be redefined.
SHIFTED	Selects the shifted keysym value of the key that will be redefined.
ALT GR	Selects Alt GR mode for the keysym value of the key that will be redefined. For keyboards that support this mode, the redefined key will only produce the new value when the key Alt GR is pressed.
SHIFT+ALT GR	Selects SHIFT+Alt GR mode for the value of the key that will be redefined. For keyboards that support this mode, the redefined key will only produce the new value when the keys Shift+Alt GR are pressed.

Upper (Target) Keyboard

Option	Description
Key Code	Displays the key code value for the selected key in the target keyboard.
Key Mode	Displays the mode value of the selected key in the target keyboard.
Enter Hex Value	Lets you enter the hex value of a keysym instead of selecting a key in the source keyboard. Use this button if you can't find the source key in any of the keysym sets.
Load	Reads in an existing keymap file containing keysym definitions. The definition syntax must conform to XMODMAP standards.
Save	Saves the complete key set or only keys that have been redefined.
Reset Key	Restores the currently selected key to its default value. This button is only enabled when a key is selected.
Reset Keyboard	Restores all keys to their default values. This button is only enabled if at least one key has been redefined. If you used Load to install key definitions, Reset Keyboard reverts to the state before the key definitions were loaded.

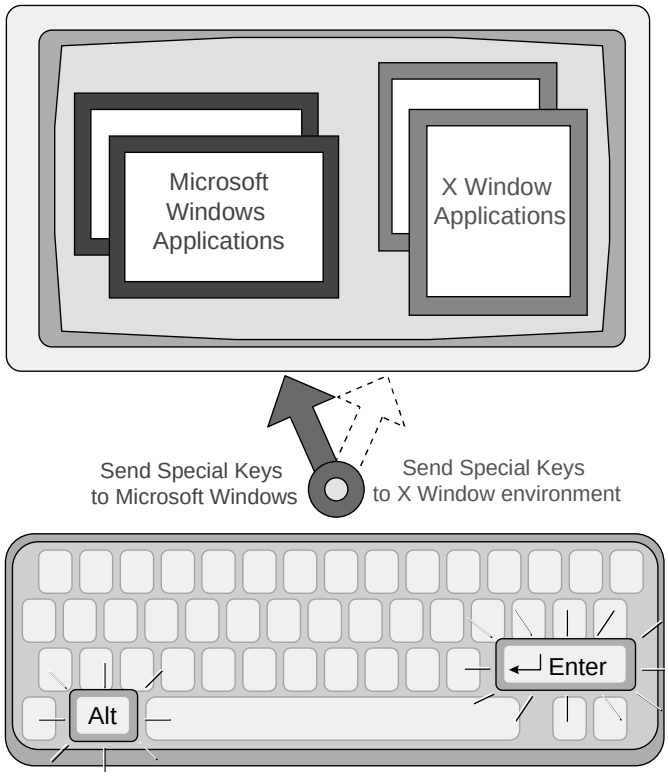
Lower (Source) Keyboard

Option	Description
Upper Case	Selects upper case for the selected key. This option is only enabled if the selected source key accepts upper and lower case values, indicated by a white + on the key.
Lower Case	Selects lower case for the selected key. This option is only enabled if the selected source key accepts upper and lower case values, indicated by a white + on the key.

Option	Description (Continued)
keyboard and key set list	Displays a list of alternate key definition sources, including UNIX and DEC keyboards, mode and function keys, a 'NoSymbol' definition useful for disabling keys, and keysym definitions for other languages.
Source KeySym	Displays the keysym value for the selected key in the source keyboard.
Source Key Mode	Displays the keyboard mode name associated with the selected key in the source keyboard.
Source Hex Value	Displays the hex value of the selected key in the source keyboard.

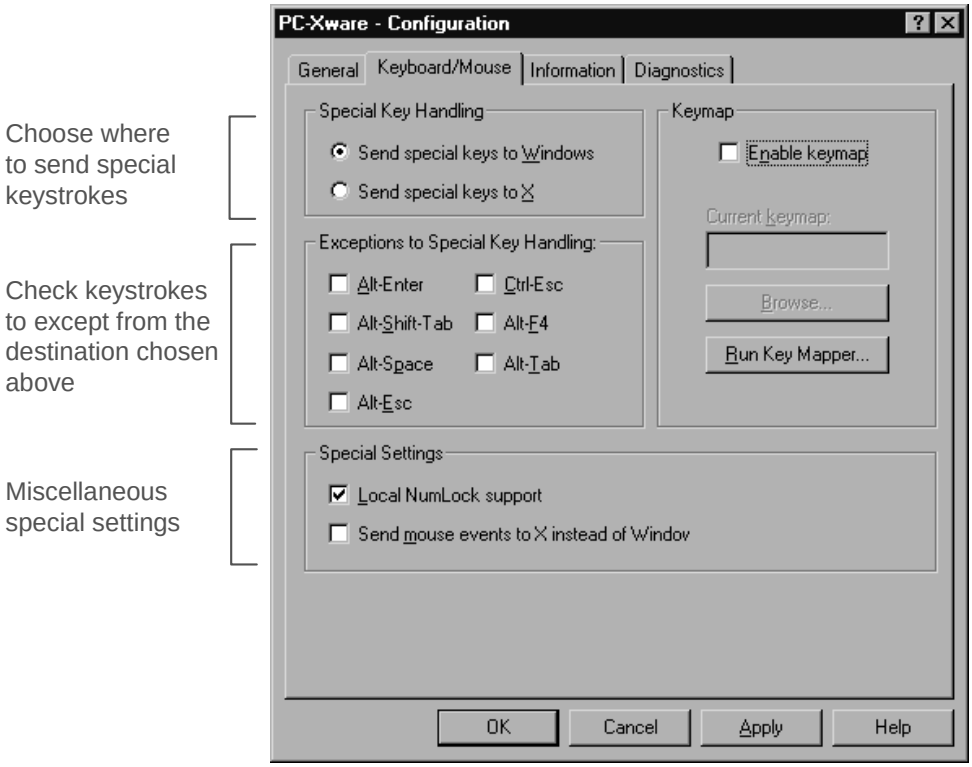
Managing Special Key Assignments

Certain key definitions, typically combinations of two or more keystrokes, have special effects in Windows and X applications. However, a special key combination probably has a different definition in an X application than in a Windows application, as illustrated in the following figure.



PC-Xware provides a mechanism for selecting which environment (X Window system or Microsoft Windows) will interpret and execute special key combination keystrokes.

To access the special key options, Select Start → Programs → PC-Xware → PC-Xware Configuration → Keyboard/Mouse, shown in the following figure.



For more on special key handling, see the online help for this tab.

Restoring the Default Keymap

To return to PC-Xware's default keymap:

1. On the Keyboard/Mouse Configuration tab, ensure that Enable keymap is not checked.
2. Restart PC-Xware.
   - If the PC-Xware Services icon is in the taskbar, left click the icon and select Shutdown PC-Xware. Then start your X application connection from the PC-Xware Connects folder.

- If the PC-Xware Services icon is not in the taskbar, simply start your X application connection from the PC-Xware Connects folder.

Chapter 7
Login Scripting

What Is a Login Script?

A login script is a text file consisting of commands that logs you in to a remote machine, and perhaps performs other startup tasks, such as invoking an application. Login scripts are useful if you always issue the same sequence of commands when you log into a remote host. Putting all these commands in a login script gives you a way to automate your standard login process.

PC-Xware supports the use of login script with PC-Xware's terminal emulator (telnet, and rlogin) connections. For making telnet and rlogin connections, PC-Xware provides generic login scripts for various computer systems. These scripts use data provided by users creating connections through PC-Xware's Connection Wizard.

However, some special cases may not be adequately addressed by these generic scripts. In such cases, you might want to write your own login scripts. In your custom scripts, you can use the same set of instructions and macros used by the generic scripts.

The rest of this section explains how to create login scripts. It also documents the login scripting language and provides example scripts.

Creating and Editing Login Scripts

PC-Xware's Connection Wizard guides you through the process of including a login script for a connection. This includes creating or modifying the script file using your PC's text editor.

To add a login script to a connection's startup sequence:

1. Start the Connection Wizard.
   Select Start → Programs → PC-Xware → PC-Xware Connection Wizard.
2. In the Connection Type dialog, select Run a VT320 terminal emulator to a remote host, then click Next.
3. In the Terminal Emulator dialog, select the connection protocol. For typical Telnet connections, leave the default port number (23) unchanged. Then click Advanced Terminal Settings.
4. In the Advanced Terminal Settings dialog, select Use login script file.
5. Specify the name of the file you want to create or modify.
   - To open an existing script file for modification, click Browse. Select the file, then click Open. The filename fills the login script text box.
   - To open a new script file, enter its name in the login script file box, then click Edit.

   Microsoft Windows Notepad opens the file you specified.
6. Type in and modify script commands in the file.
7. When finished, save your work by selecting File → Save in the Notepad editor.
8. Complete the rest of the Connection Wizard dialogs, as you would for any other connection.

Login Script Language

PC-Xware supports a login script language, consisting of two basic elements:

- Login instructions
  These are directives issued to the PC. Some have arguments which can be used to issue commands to a host, or detect responses from the host.
- login macros
  These are symbolic terms which can be assigned values, and which expand or interpret those values when used as arguments to certain login instructions. Login macros are prefixed with the $ character.

Data Types

Login instructions can have two types of arguments:

- number
  A whole number.
- string
  A sequence of characters delimited by double quotes (“) at each end. Text strings can contain one of the supported login macros.

Login Macro Descriptions

Using these macros, you can write a login script that is independent of the user who invokes the script, and independent of the PC on which it is being run. When a user defines a new connection, the Connection Wizard captures the user- and PC-specific values for use by the appropriate macros.

$ipaddr
This macro holds the IP (internet protocol) address of the PC on which you are running PC-Xware.

$application
This macro holds the command line you want to execute on the remote host. When used in a text string, this macro is replaced by the command so it can be translated to the host.

$password
This macro holds the encrypted text string generated from the password supplied when creating a connection through the Connection Wizard. When used in a text string in a script, this macro decrypts the password so it can be transmitted to the host.

$username
This macro holds the user name supplied when starting a connection to a host. When used in a text string, this macro is replaced by the user name so it can be transmitted to the host.

Note These macros pertain only to Connections with defined application commands, user names and passwords. If you use the macro with a connection that did not define the application, user name or password, the value of $application, $username or $password is the null (empty) string.

Login Instruction Descriptions

; (semicolon)
Indicates a comment. All text following a semicolon to the end of the line is not read as script commands.

alarm
Sounds the alert tone on your PC. You might use this command to indicate when a connection has been successfully started.

break
Sends a `break` signal to the host. Some computers use the `break` signal as an attention character on a serial line. (The `break` signal has limited use in scripts for network connections.)

command <string>
Sends the specified string. Use this command for modem control. Thus, the string specified must be a command recognized by a modem.

Use this command to request pauses between characters in commands sent to modems. For faster communications to devices other than modems, use the `transmit` command.

Note Even though the PC communicates with a host through a modem, you can use the transmit command to send commands directly to the host once the connection has been started.

pause <number>
Makes the PC wait the specified number of seconds before executing the next command. Some actions require a pause. For example, if you send commands that take the host several seconds to execute, you can use the Pause command to make the PC wait for the host to catch up.

prompt<string>
Displays a dialog with the specified string as a prompt, then transmits the input the user enters at the prompt.

transmit <string>
Sends the specified string as fast as possible, with no pauses between characters. This command does not work well for sending commands to modems. Use command instead.

waitfor <string> <number>
Makes the PC wait the number of seconds (specified by <number>) to receive the text string (specified by <string>) from the host, before issuing the next line of the login script. This command is not sensitive to the case of the incoming text. If that text string does not arrive in the specified interval, the login script aborts, and an error message advises you to check the Server message log. The Server message log records the error as follows:

```
Script Reader: Waitfor timeout
```

waitforany <string> <number>
Makes the PC wait the specified number of seconds (specified by <number>) to receive any character in the text string (specified by <string>) from the host, before issuing the next command in the login script. This command is not sensitive to the case of the incoming text. If no character from the specified text string arrives in that interval, the login script aborts, and an error message advises you to check the Server message log. The Server message log (located on the Diagnostic tab of the Configuration dialog) records the error as follows:

```
Script Reader: Waitforany timeout
```

Restrictions

Note the following limits when you build login scripts.

Feature	Limit
Max. line length	80 characters.

Max. string length	50 characters.
	You can surmount this restriction by continuing a single statement on multiple lines. For example:
	
	`transmit “xemacs -i -display bobs_pc:0”`
	`transmit “-fg white -bg black”`
	`transmit “-font 6x13 &\r”`

Max. commands per file	75
“command” statement	Send characters at the rate of one character per 155 ms.
Sending non-printable characters to host	Use either: • The numeric decimal code for the character, preceded with a backslash (\). • An escape character (described below).

To send non-printable characters, use the characters listed in the Alpha Code or Numeric Code column in the following table. For other non-printable characters, use a backslash (\) followed by the decimal value of the character.

Meaning	Alpha Code	Numeric Code
back space	\b	\8
form feed	\f	\12
line feed	\n	\10
carriage return	\r	\13
tab	\t	\9
vertical tab	\v	\11
backslash \	\\	\92

Meaning	Alpha Code	Numeric Code
dollar symbol $	\$ or $$	\36
numeric character n to be interpreted as a decimal code		\n

Case Sensitivity

For commands that send arguments to the host machine, case sensitivity of those arguments depends on the operating system or application on the host. Typically, host machines running UNIX operating systems are case sensitive, whereas machines running VMS operating systems are not.

By contrast, command arguments specifying text strings received from the host are not case sensitive.

Login Script Examples

The following examples will give you an idea of how to create a script. If you use these examples as a base for your script, be sure to modify all areas that will differ in your environment. For example, login and password prompts, hosts names, and user names.

Example: Telnet Login

This example is for a telnet session. It tells the host to open an EMACS window on the PC running PC-Xware.

Telnet Script

```
pause 1
transmit "bob\r"          ;Login as bob.
waitfor "word:" 20
prompt "Hood Password\r"  ;Prompt for password.
waitfor "hood(1)" 20      ;Wait for user's host shell
                          ;prompt.
transmit "xemacs -DISPLAY bobs_pc:0 >& /dev/null\r"
```

```
                                ;Start emacs on user's pc.
waitfor "hood(2)" 20            ;Wait for user's host shell
                                ;prompt.
transmit "exit\r"               ;Logout from host.
```

Example: Automated Login

Using three macros, this script issues user name, password and IP address of the PC to the host machine. It directs the host to start an xterm window and display its user interface on the PC.

Automated Login Script

```
waitfor "login:" 15             ;Wait up to 15 seconds to
                                ;receive the string login
                                ;before issuing next line.
transmit "$username\r"          ;Login as georgej.
waitfor "word:" 15
transmit "$password\r"          ;decrypt the encrypted
                                ;password string,
                                ;A80162566E6E, submit it
                                ;to host as the password.
waitforany "?>:)" 15            ;Wait up to 15 seconds to
                                ;receive the shell prompt
                                :character ?,>, or :
                                ;before issuing next line.
transmit "xterm -display $ipaddr:0 &\r"
                                ;invoke the xterm
                                ;program on this PC
                                ;(whose IP address is
                                ;identified by the macro
                                ;$ipaddr).
transmit "exit\r"               ;Logout from host.
```

Appendix A
Using Web-Enabled X

PC-Xware includes Web-Enabled X™, the standard for enabling access to X applications through World Wide Web browsers.

What Is Web-Enabled X?

Web-Enabled X lets users start X applications on remote hosts by activating hot links or icons on your Web pages.

Web-Enabled X enables you to:

- Centralize administration for X application connections. Because the connection information is stored on your Web pages, the administrative tasks occur in a centralized, controlled location—not on each user's PC.
- Simplify end-user access to X applications. PC-Xware users can use their favorite Web browser to launch X applications. Starting an X application is as easy as clicking an icon or hot link, which prevents end-users from having to know X application commands.

Setting Up Web-Enabled X

Web-Enabled X is easy to set up for your corporate or workgroup intranet. For instructions on setting up and using Web-Enabled X, go to ThinPATH System's web site at http://www.tp-sys.com and look in the Documentation link under the Support Tab.

Appendix B
Product Support

Support for PC-Xware is provided by ThinPATH Systems, Inc. This appendix explains how to contact the product support staff. Before you request product support for this product, please return your product registration card.

Note If you purchased your product from an distributor or a value-added reseller (VAR), ask that distributor or reseller whether they provide product support before you contact ThinPATH Systems directly.

When you encounter a technical problem or have a question, consult PC-Xware's online documentation and online help. If you cannot find an answer or a solution in the documentation, check ThinPATH System's Product Support.contact

Email support for PC-Xware is free during regular business hours (8-4, Pacific Time) for 30 days after purchase. Beyond 30 days, please contact ThinPATH Systems, Inc. at the telephone numbers below in "World-wide Product Support" for information about support contracts:

If you prefer, you can get the latest information on PC-Xware support on the World Wide Web at this address:

```
http://www.tp-sys.com/support
```

Contacting Product Support

Web Support

ThinPATH Systems' World Wide Web site provides updates, product information, technical notes, and the KnowledgeBase, containing technical information for PC-Xware. You may also submit a support request or comment.

The ThinPATH Systems, Inc. web site is located at:

```
http://www.tp-sys.com
```

Electronic Mail Support

To contact ThinPATH Systems, Inc. via e-mail, send a mail message to:

```
comcenter@tp-sys.com
```

Please include this information in your e-mail message:

- Your name and company.
- Your telephone number, fax number, and e-mail address.
- Product version and serial numbers.
- A short description of the problem.
- Information about the PC environment (names and versions of the operating system and applications in use).
- Network software configuration.

Telephone Product Support

For direct technical assistance:

- Follow the international dialing instructions appropriate for your location. Then call one of the following numbers and ask for Product Support:

Americas/Asia

ThinPATH Systems, USA	971-404-3285

Europe/Middle East/Africa

GM3 GmbH, Germany	+49 7264 2069-0

Glossary

active window	The window that has the input focus. The active window is distinguished from other windows by different frame color or shading.
application	A program for a specific purpose, such as accounting or word processing. (See also X application.)
background	The solid color or tile pattern that usually underlies the characters or graphics in a window or menu.
Backing Store	When an X server maintains the contents of a window, the pixels saved off screen are called a backing store.
click-to-focus	The focus policy under which directing input to a window (making it the active window) is accomplished by clicking in the window. Click-to-focus is the default under most window managers, including ncdwm (See also “Focus”).
client	A program that depends to some extent on the services of another program or system, termed a “server.” (See also “X client.”)
configuration	In the context of PC-Xware, the ability to customize the way PC-Xware looks and performs network communications tasks. Accomplished through PC-Xware’s Configuration dialog.

connection	A named set of instructions that automatically establish connectivity between your PC and a host machine. Some connection types can be defined to perform additional initialization tasks and to start X applications. See Connection Wizard.
Connection Wizard	A sequence of dialogs that step you through the process of creating new connections. See Connection.
daemon	A system process that acts without the user requesting it. Certain connection protocols require their own daemons running on the host computer. Meeting this requirement is typically a system administrator's responsibility.
DECnet	DEC networking software that runs over Ethernet in local area networks and wide-area networks.
DECwindows	DEC's implementation of the X Window System. A software interface for video displays.
default	A function dependent parameter assigned when you do not "specify" a value.
display manager	A client used to start and manage X sessions (See also "X Display Manager").
DNS	Domain Name Server. An optional network utility serving as a centralized name-to-IP address mapping device.
ethernet	An industry standard for specifying non-serial network communications.
ethernet address	The address identifying a network adaptor on the Ethernet network.
explicit focus	A focus method supported by ncdwm. Under explicit focus, a window becomes active when you click it. It is different from click-to-focus only in that a newly opened window is not automatically the active window (See also "Focus").

focus	To direct keyboard input to a specific window. The window to which focus is directed is called the active window or the focus window. If the window manager is set to have pointer focus, keyboard input is directed to the window under the pointer. If it is set to have click-to-focus, the input is directed to a window in which you have clicked (See also “Click-to-Focus”, “Pointer Focus”, and “Explicit Focus”).
font server	A program that provides X fonts and scalable X fonts to X servers on the network.
foreground color	The displayed color of window or menu text, or graphics output.
graphical user interface	Software that facilitates the interaction between the computer and the user. Often abbreviated as “GUI.”
GUI	See “Graphical User Interface”.
host	A computer system which provides a set of services for a remote system.
input device	A device used to direct data and instructions to an X server. The keyboard and a mouse are the standard input devices used with the X server.
IP address	Internet Protocol Address. The address identifying a module on a network using TCP/IP protocol.
keycode	The number (ranging from 8 to n) that uniquely identifies each key on the keyboard. Keycodes are X server dependent.
keymap	The mapping of keycode to a keysym.
keysym	The fully translated key symbol that X client programs typically use for programming keyboard input operations.
local terminal emulator	See “terminal emulator.”
local window manager	A program that runs on the PC, providing window manipulation services, such as positioning and resizing.

magic cookie	A secret password used under XDM to control access to an X server and protect a user's display from unauthorized access.
meta key	The Alt key on the keyboard.
modifier keys	Keyboard keys such as Shift, Control, Alt and CapsLock, which when pressed along with a second key, modify the function of the second key.
NCDware	NCD's software for Network Computers.
ncdwm	NCD's local window manager program (See also "Local Window Manager").
network	In the most general sense, any system of computers connected in a way that enables communication between them. Often used to refer to non-serially connected systems. (See also "ethernet" and "serial.")
OPEN LOOK	A graphical user interface specification developed by Sun Microsystems and registered by UNIX Systems Laboratories, Inc.
OpenWindows	Sun Microsystem's X-based user environment.
OSF/Motif	Open Software Foundation's graphical user interface; used by the NCD local window manager, ncdwm.
PCF	Portable Complied Format. An X server font format supported by PC-Xware.
pointer focus	A focus method supported by ncdwm. Under pointer focus, a window becomes active when you place the pointer on it (See also "Focus").
protocol	A set of rules used in the exchange of information between computer systems.
remote configuration	A method of configuring PC-Xware, such as changing operational parameters from another machine.

rexec	Remote Execution. A UNIX protocol which runs on networked computers and permits response to a request containing a valid user name, password and command from another machine. It requires a remote execution server (often called an rexec daemon) to be running on the target computer.
rlogin	Remote Login. A UNIX protocol that establishes a remote login session on a host from a terminal. In the case of a PC running PC-Xware, the login prompt is displayed on PC-Xware's terminal emulator. The .rhosts directory in your home directory on the host machine contains a list of hostnames to which you can connect without using a password.
rsh	Remote Shell. A UNIX protocol which runs on networked computers and permits response to a request containing a valid user name and command from another machine. It differs from rexec protocol in that no password is required. It requires a remote execution server (often called an rsh daemon) to be running on the target computer.
server	A system which provides a specific set of services (such as input or display) to a client program or system. Also a device on a network providing a service, such as a boot server or a print server. (See also "X Server.")
Services icon	 Displays in the status region of the Microsoft Windows taskbar when PC-Xware is running. If the status region is in its default location, the Service icon appears at the opposite end of the taskbar from the Start menu. Right click the icon for a menu to access PC-Xware. (See also "taskbar.")
session	See "X Session."
Session Manager	The DECwindows client used to control DECwindows sessions.
TCP/IP	See "Transmission Control Protocol/Internet Protocol".
telnet	The Internet standard protocol for remote terminal connection services.

taskbar	The region on a Microsoft Windows desktop that shows the Start menu and any iconified processes. When PC-Xware is running, the PC-Xware Services icon  is displayed in the Status Area of the taskbar.
telnet client	The local client that provides VT320 terminal emulation for connecting to a host using telnet.
terminal emulator	A client used to emulate the function of a terminal. Xterm, the standard X terminal emulator, emulates a VT102 terminal. PC-Xware's local client terminal emulators (telnet, rlogin and serial), emulate a VT320 terminal.
terminal server	A device that connects X terminals to services or hosts in a local area network.
Transmission Control Protocol/Internet Protocol (TCP/IP)	Two networking protocols commonly used for communication over local area networks.
VMS	Virtual Memory System; the operating system for a VAX computer.
VT320	A widely used terminal emulation standard defined by DEC.
What's This? help	A form of online help you can get about items in dialogs that have a **?** icon at the right end of the dialog banner. Click on the **?**. The cursor becomes a **?** shape. Move the cursor to the item of interest in the dialog and click.
window manager	An application that allows you to manipulate the cosmetic features of the windows displayed on the screen, and the mechanisms for moving, sizing and iconifying them. (See also "X Window window manager.")
X	See "X Window."
X application	An application or other program implementing X Window protocol. In most cases, interchangeable with "X client." (See also "X server.")

X client	An X Window System application program that is dependent on the services of an X server program. In most cases, interchangeable with X application. (See also “X server.”)
X 11 Release 6 (X11R6)	The current release of the X Window system, implemented by NCD in PC- Xware.
X Display Manager	A protocol that provides automatic X protocol connection to a specified host when an X server starts or restarts.
X server	The software that provides display services for clients and handles keyboard and pointer input. This is part of PC-Xware. (See also “X client.”)
X session	All the processing that goes on from the time you log in to use the X Window System until you log out.
X Terminal	A display monitor, keyboard, base containing processors, and a mouse. The X terminal processors are dedicated to running the X server.
X Window	A network-based graphical window system that lets you interact with applications running on multiple hosts.
X Window window manager	A special X application that provides window management capabities. Unlike other X applications, you can run only one window manager at a time on a given display. (See also “window manager.”)
XDM	See “X Display Manager.”
xterm	The standard X terminal emulator. (See also “Terminal Emulator and Local Client.”)

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