



**PC-Xware Classic
for Windows 95 and Windows NT**

Installation and Configuration Guide

**NCD PC-Xware Classic
Part Number PC6710-2
December 1996**

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Document History

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About This Guide

This guide explains how to install this product on a Windows 95 or Windows NT 4.0 platform.

Chapter 1: Before You Begin

Describes the NCD software product requirements, and explains how to prepare your system for installation.

Chapter 2: Key Concepts

Presents basic concepts that will help you perform installation and configuration tasks.

Chapter 3: Installation Procedures

Explains how to install this product, including single copy installations, site installations, and XRemote host software installations.

Chapter 4: Configuration Procedures

Explains how to configure the installation of this product to meet the needs at your site. This includes such features as setting defaults for client PCs, creating user classes to streamline client PC installations, setting up XRemote for running applications over serial lines, and setting up fonts.

Appendix A: Troubleshooting Connections

Explains how to check serial and network connections, should you experience problems.

Appendix B: Product Support

Explains how to get technical support for this product.

Text Conventions

This guide uses the following text conventions:

- Indicates the movement through menu options. For example, the sequence for requesting extended font diagnostics is:
General → Font Path → Default
- bold** Indicates a directory or a file. For example:
/usr/lib/X11/config
- bold italic*** Indicates a program or utility. For example:
ncdwm is the NCD Window Manager.
- courier* Indicates information that displays on the screen. For example, the date command displays:
Monday December 2 03:05:12 PTD 1996
- courier italic* Indicates a variable for which you can substitute one or more parameter values, group names, or file names.
- courier bold*** Indicates information you type. For example, to display characters in a 6 x 13 font, type:
% xfd -fn 6x13
- [] Square brackets indicate command options.
- | A vertical bar separates each option within square brackets. If you specify an option, choose only one value within the square brackets.

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Chapter 1

Before You Begin

This chapter explains how to prepare for installing this product.

Requirements

The tables below show the hardware, software, and host requirements for the installation procedure.

Hardware	Requirements/Recommendations
Personal Computer	386DX 20 Mhz or higher processor (Windows 95) 486/33 Mhz or higher processor (Windows NT)
Graphics adapter	Any supported by Microsoft Windows 95 or Windows NT
Graphical input device	Any mouse (or other input device) supported by Microsoft Windows 95 or Windows NT
Storage capacity	Hard disk with at least 20 MB of available space. (You will need more space if you install additional fonts.)
Extended memory	At least 8MB, 16MB recommended (Windows 95) At least 16MB (Windows NT)

Chapter 1: Before You Begin

Hardware	Requirements/Recommendations
Temporarily available space	At least 1.5 MB on the disk where Microsoft's temporary directory resides.
Additional drives	CD-ROM, or 1.44MB 3.5" floppy drive
Network interface board	One supported by your network software
Serial comm. port	One with a 16550 UART or equivalent (optional)
Modem	<ul style="list-style-type: none">• Supports full-duplex transmission at 9600 baud or faster.• Meets CCITT V.32 or V.32 bis standards (optional).• Incurs minimal delay in round-trip transmissions.• Data compression disabled (if an option).• Use hardware flow control if desired; do <i>not</i> use software flow control.
Cabling	RS-232C cable to connect serial port to host or external modem (optional)

Software	Requirements
Operating System	Microsoft Windows 95 or Windows NT 4.0
Network Software	Installed and functional TCP/IP network software. (Supported network software is described in <i>Appendix A</i> .)

Host Attribute	Requirements
Login account	A login account on a host machine in your network
Protocol setup	Rexec, telnet, rsh, rlogin or xdm protocol setup to support your PC; you will select one of these when you create PC-Xware connections.
TCP/IP setup	TCP/IP hardware and software, including an Internet address or node name for your PC; the PC's name or address must be included in the host's name data file
X Applications	X Window System Version 11 applications, such as xterm , xclock or twm
Remote serial connection application	Host-based XRemote software (optional)

Preparation

This section lists system and network information you must supply during installation of this product. If you're not familiar with the details of your network, work with your System Administrator to gather the information. (Examples are shown in brackets.)

Authorization data

Product serial number _____

Product authorization code _____

Network connections

Host machine name or IP address _____
rexec, serial, rsh, rlogin or *telnet* or
xdm capability _____
Directory path to X applications _____
PC Internet address [156.27.1.51] _____
PC name [pc_10] _____

Serial Information

COM port [COM2] _____
Baud rate [9600] _____
Flow control [Hardware] _____
Modem type [Hayes] _____
Telephone number of the host machine
(comma indicates a pause) [9,555-5555] _____
XRemote directory location on the host _____

Check the Release Notes supplied with your NCD product for additional information.



Chapter 2

Key Concepts

This chapter presents concepts that will help you install this product efficiently and configure it optimally for your environment and objectives.

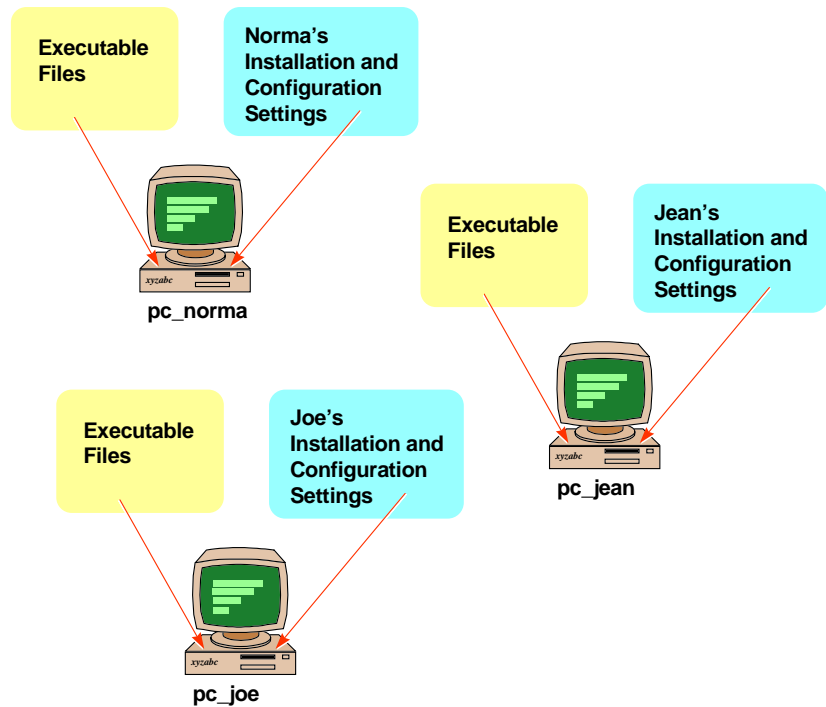
Installation Concepts

You can install this product in the following ways:

- Single Copy Installation
- Site Installation
- XRemote Host Software Installation

What is Single Copy Installation?

This involves installing and configuring the software entirely on an individual PC, with no dependences on other machines in your network, as illustrated below.



Single Copy installation allows PCs to perform network operations more quickly. However, it also requires significantly more storage space on each PC than is the case with a Site Installation.

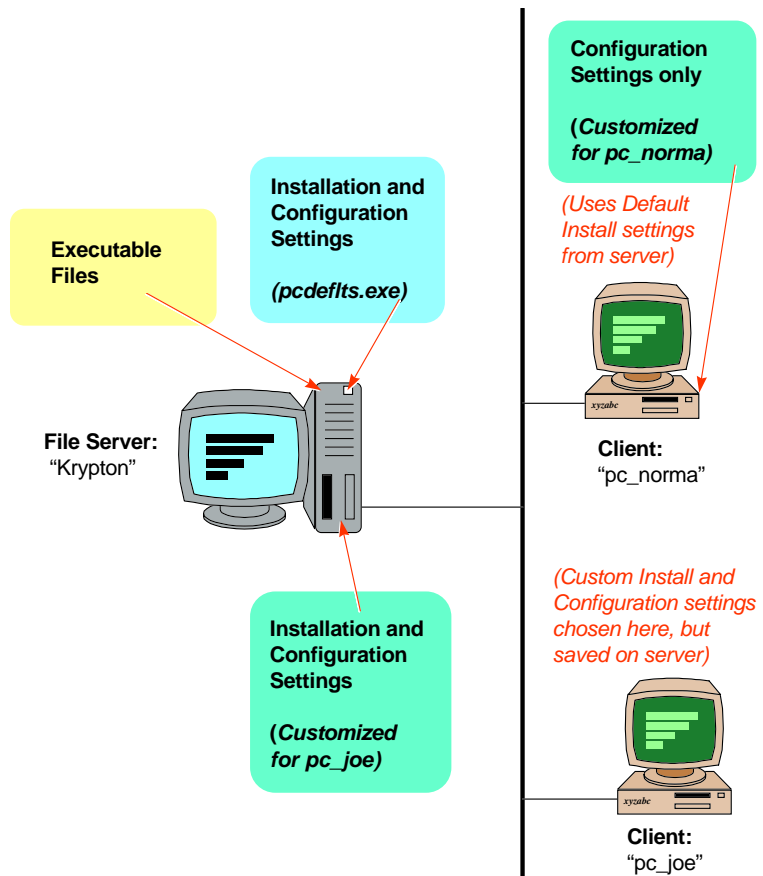
What is Site Installation?

This involves using one computer as a file server for other PCs in your network (termed *client PCs*). The product software may reside on the file server, and some or all of the installation and configuration settings may be controlled by the file server. The client PC's may be allowed to modify none or some of the installation and configuration settings, at the discretion of the system administrator.

Site installation involves the following tasks:

1. **File server installation**
involves installing this product on a computer you want to use as a file server in your network.
2. **Setting installation defaults for client PCs**
lets you specify the installation settings you want used by default whenever you perform a Client PC Installation. (Optional.)
3. **Creating user classes**
lets you specify installation settings you want used for groups of PCs. (Optional.)
4. **Client PC installation**
involves installing this product and/or establishing configuration settings on the client PCs in your network.

These elements of Site Installation, and the kinds of choices they make possible are illustrated in the following example.



Note the choices that have been made in the preceding example:

- The executable files reside on the file server, and are accessed by the client PC's over the network.
- A set of default installation and configuration settings have been established on the file server and reside there.
- A set of *configuration* settings customized for the client PC "pc_norma" have been made on that client PC, and also stored there. However, the *installation* settings used for this

client PC are the defaults established and residing on the file server.

- A set of installation *and* configuration settings customized for the client PC “pc_joe” have been *made* on the client PC, but *stored* on the file server.

These choices represent one of many possible ways to store the executable files and settings data. Advantages of keeping the executable files and the settings data on the file server include the following:

- Frees considerable storage on the client PCs.
- Provides means for streamlining installation and configuration tasks.
- Provides means for standardizing and controlling installation and configuration on the PCs in a network.

Disadvantages of keeping all the executable files and data on the files server are:

- Installation and configuration actions are slower.
- Configurations of client PCs are vulnerable to problems on the file server.

What is XRemote Host Software Installation?

If you plan to use XRemote (a PC-Xware utility for running X applications over serial lines), you must also install some host-specific XRemote files on the host machine to be serially accessed. This applies whether you perform a Single Copy Installation or Site Installation.

These XRemote host files initiate the XRemote session. The host files are different for each host operating system. You download them directly from the NCD FTP site. For details, read "Installing XRemote Host Software" on page 3-15.

Configuration Concepts

A variety of options and utilities let you install and configure NCD products in the way that best meets your needs. Some of these options present themselves during File Server installations, others during the Client Installation phase, and still others characterize Single Copy Installations. Further, some options apply to certain NCD products, but not to others.

The following discussion covers each of the options, noting the type of installation that offers them.

What is PC Defaults?

Applies to site installations of PC-Xware.

PCDefaults is a Windows-based utility that makes it easy for you to specify default installation settings to be used for Client PCs.

When you run ***pcdeflts.exe***, it presents a sequence of dialogs offering every option offered during a Client PC Installation. Only, instead of installing anything, the utility saves these settings in a file residing on the file server.

Thereafter, when you initiate a Client PC installation, a Summary dialog appears showing the default settings you specified through the ***pcdeflts.exe*** program. To perform the Client PC installation with these defaults, you simply click Install. (If you enabled user choice during File Server installation, you can also modify any of these default settings during the PC Client installation.)

For procedures on setting the defaults for Client PC Installations, see the online help for *PCDefaults*.

What Are User Classes?

Applies to site installations of PC-Xware.

User classes are named groups of client PCs that you want to use the same PC-Xware settings. Defining user classes is one way of streamlining the process of performing Client PC Installations.

By defining classes of PCs that share PC-Xware settings, you can streamline the process of configuring the PCs in your network. You can do this either as a step in your installation process, or any time thereafter.

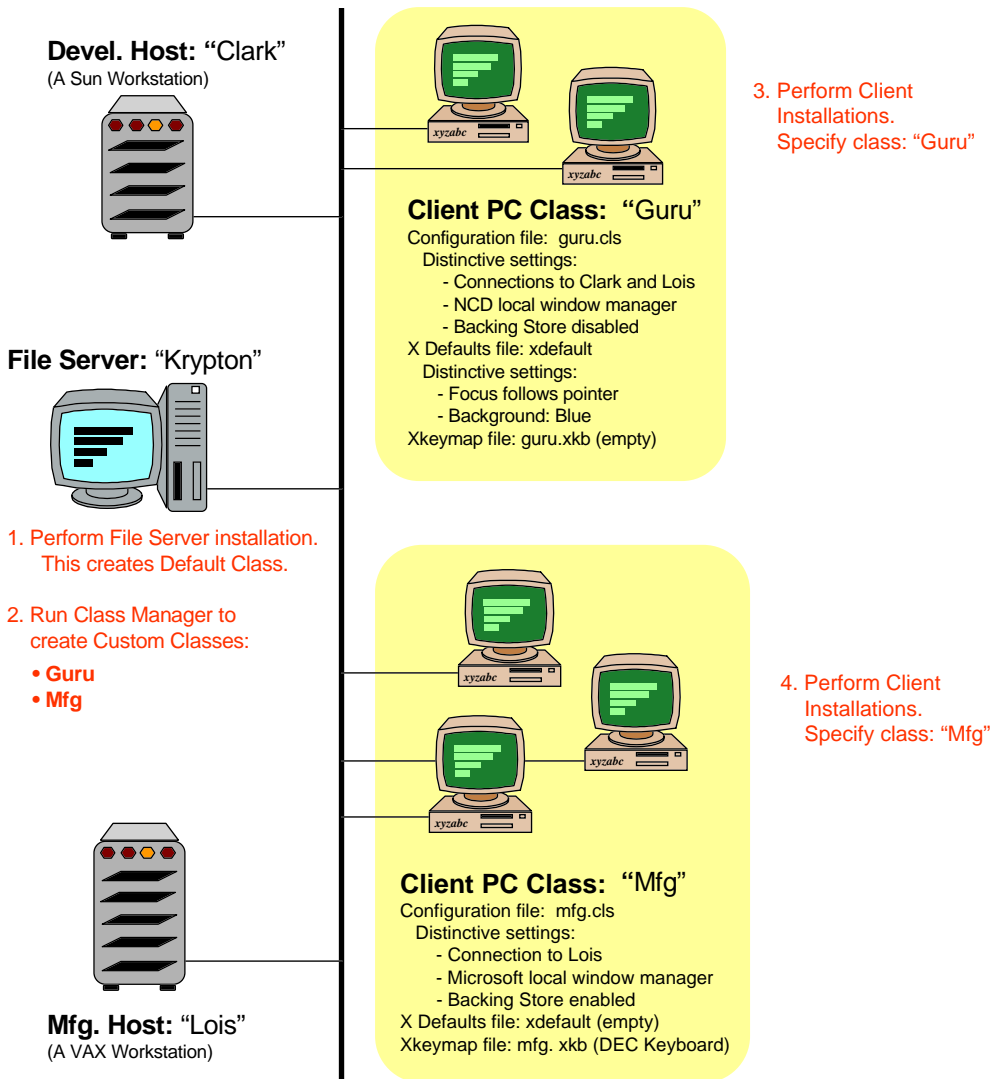
Class Manager (classmgr.exe) is a utility that lets you define *user classes* from a file server, for purposes of installing and configuring PC-Xware on groups of PCs in your network.

How Does Class Manager Work?

A File Server installation provides a default user class definition, called the “standard” class. You can redefine the standard class to reflect the standard PC-Xware settings at your site. You can also supplement the standard class with *custom* user classes reflecting alternate PC-Xware settings needed by one or more groups of PCs in your network.

When you perform the Client PC part of the installation process, you can specify whether a given PC will belong to the default user class, one of the custom user classes you defined, or to no class (meaning you want to adjust the settings for that particular PC individually). If you specify a particular user class, all of the settings previously specified for that class with Class Manager are automatically applied to the client PC.

This process, and the relations between server, hosts and client PCs, are shown in the following illustration:



What Settings Define a User Class?

A user class is defined by the following PC-Xware settings:

- **Configuration file**
(For information on the many configuration attributes and

how to specify them, refer to the *PC-Xware Configuration Reference Manual*.) When you create a custom user class, its name plus the suffix `.cls` form the configuration filename, `<class_name>.cls`.

A File Server installation provides a default configuration file, ***standard.cls***, in the standard class. It is similar to the standard PC-Xware configuration file installed during a Single Copy Installation.

Note You can edit the configuration file for a class directly, using a text editor accessed from Class Manager, or edit a generic configuration file through PC-Xware Configuration dialogs, and then copy it to the desired user class location. For details, see "Modifying Configurations for User Classes" on page 4-2.

- **Connections**

Applications residing on your host machines that you want accessible to your users. Create connections that are needed by a group (class) of users or all users.

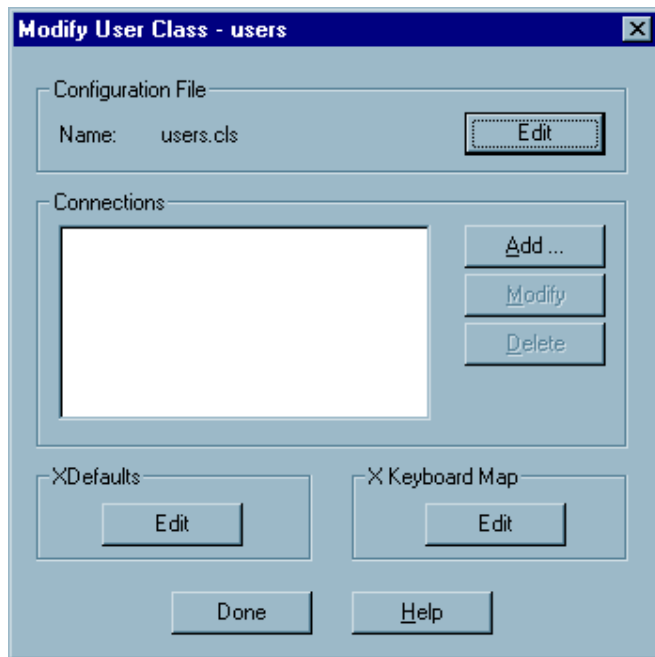
- **XDefaults**

X Window resource settings, stored in the ***xdefault*** file. A File Server installation provides an ***xdefault*** file in the standard class, but with all of the PC-Xware XDefaults statements commented out. You can then edit this file, uncommenting the statements you want executed.

- **X Keyboard Map**

Mapping of keys from an emulated terminal to a PC keyboard, stored in the `<class_name>.xkb` file. A File Server installation provides an empty keymap file in the standard class.

All these attributes are accessed through the Modify User Class dialog, which follows.



This dialog is displayed whenever you choose to add or modify a user class in the initial Class Manager dialog.

A File Server installation provides a default user class at the following location:

D:\ncdsoft\pcxware\configs\Standard.xcl

where *D* is the letter designating the hard disk drive, *ncdsoft* is the installation directory you select on the file server, and ***Standard.xcl*** is a folder/directory containing all of the information relevant to the standard class.

For details on Class Manager, read "Creating User Classes" on page 4-1.

Font Options in PC-Xware

Applies to single copy or site installation of PC-Xware.

Because PC-Xware Classic is based on X version 11, release 6, PC-Xware Classic supports and supplies a series of standard PCF (Portable Compiled Format) X server fonts.

In addition, PC-Xware Classic can use a number of other font styles including ASCII Bitmap Distribution Format (BDF) and native Microsoft Windows fonts. PC-Xware Classic can also add fonts or substitute fonts automatically when an application requests a missing font.

During Site Installations, and Single Copy Installations, setup offers the option of modifying the set of fonts PC-Xware will use. This procedure is covered in "Customizing PC-Xware Fonts" on page 4-3.

If the applications you run on your host machines use fonts not provided by PC-Xware, you can copy those fonts to your PC and use PC-Xware's **Font Tool** to compile them into a format PC-Xware can read. For more information on the **Font Tool**, read the PC-Xware online documentation.

What is XRemote?

Applies to single copy and site installation of PC-Xware.

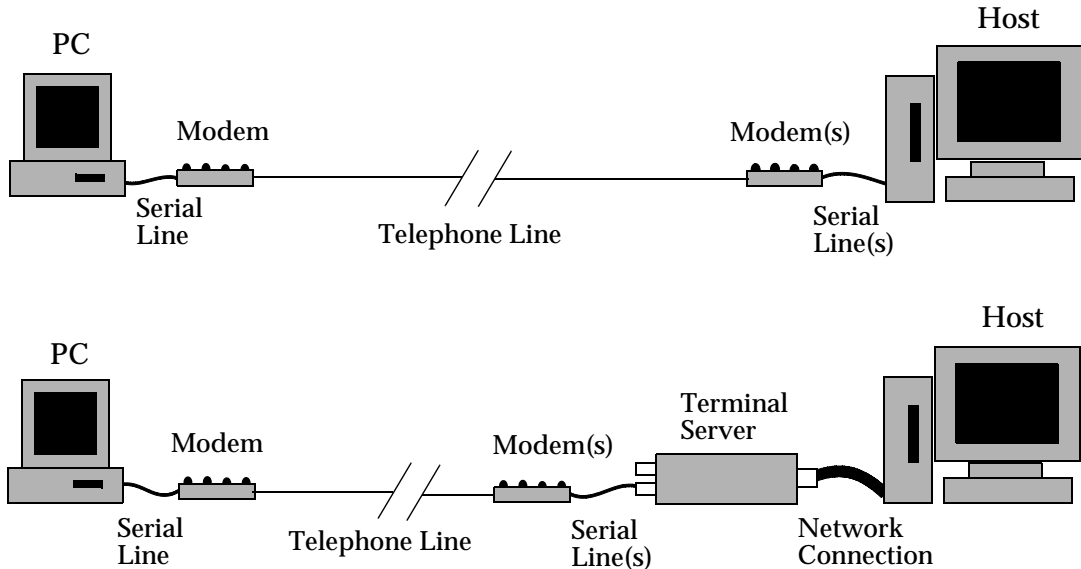
PC-Xware provides XRemote, a facility that lets you use the X Window System remotely or whenever a direct network connection is not available. The typical scenario for this is if you want to run X applications from remote sites that can be accessed by modem connection only.

If you anticipate a need for this capability at your site, you can set up XRemote sessions that will be available to users on their PCs.

These sections present XRemote concepts you should understand when installing the software and setting up your system to run it.

For specific instructions on installing XRemote, see "Installing XRemote Host Software" on page 3-15. For information on configuring a system for XRemote connections, see "Configuring a System for XRemote" on page 4-4.

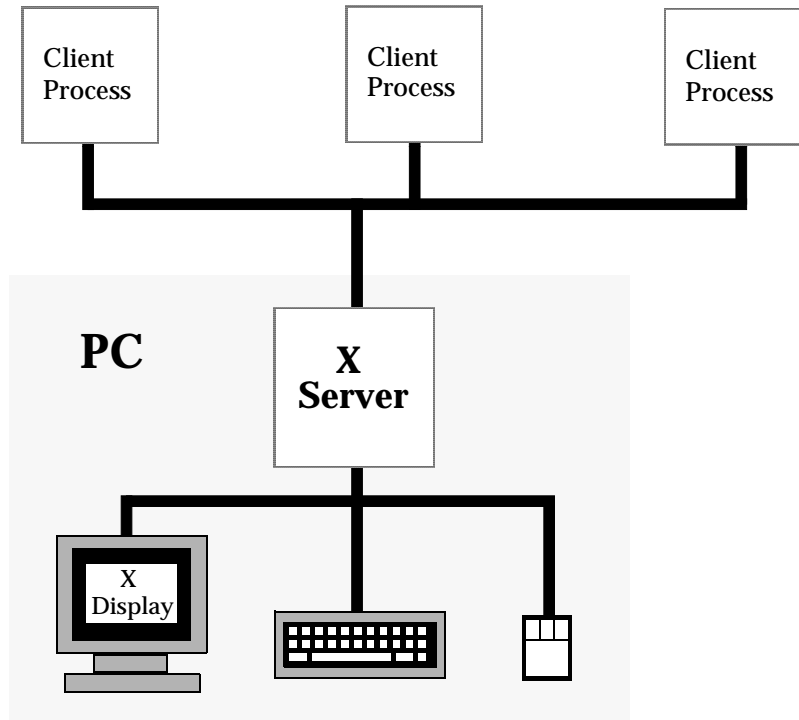
Typical physical configurations for an XRemote environment are shown in the following figure.



Configurations for Using XRemote

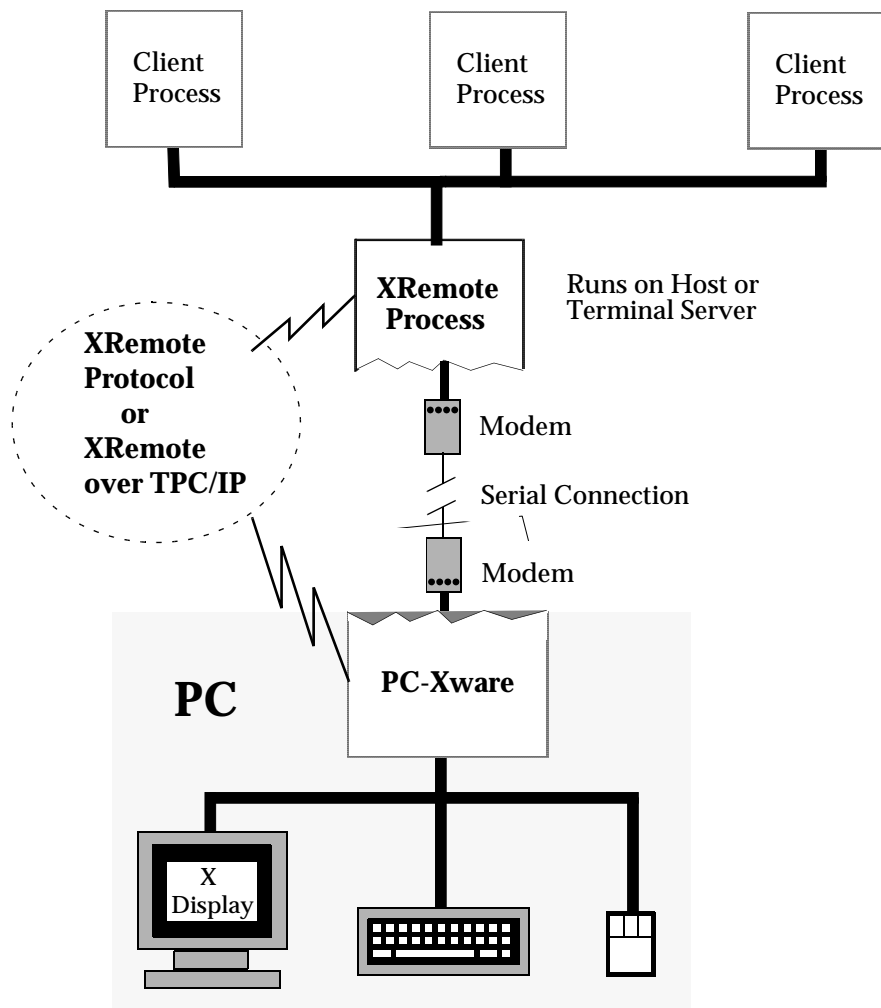
The XRemote host process handles communication between the X applications on the host and the X server on the PC.

In a typical network environment, X applications communicate through TCP/IP or DECnet host network ports across the network to corresponding network sockets on the PC, and to the PC X Server. This is shown in the following illustration.



Typical Network Environment (Logical View)

By contrast, in an XRemote environment, the XRemote protocol supplants and mimics TCP/IP or DECnet network ports. This is illustrated on the next page.



Typical XRemote Environment (Logical View)

In an XRemote environment, the X server tasks are divided among two processes:

- **PC-Xware**
PC-Xware sets serial communication or serial network parameters on the PC and displays data from the host machine. This is provided automatically by PC-Xware.
- **XRemote Process**
XRemote is the X helper process which runs on the host or terminal server hardware.

The XRemote Host Software connects to PC-Xware using a reliable, proprietary protocol, or TCP/IP, depending on your preference.

How Does XRemote Improve Serial Communications?

In addition to using a low-level transport mechanism similar to PPP/CSLIP (Compressed SLIP), XRemote removes redundancies in the X protocol by sending only changes from previous packets and optionally using LZW (a data compression mechanism) to compact the entire data stream.

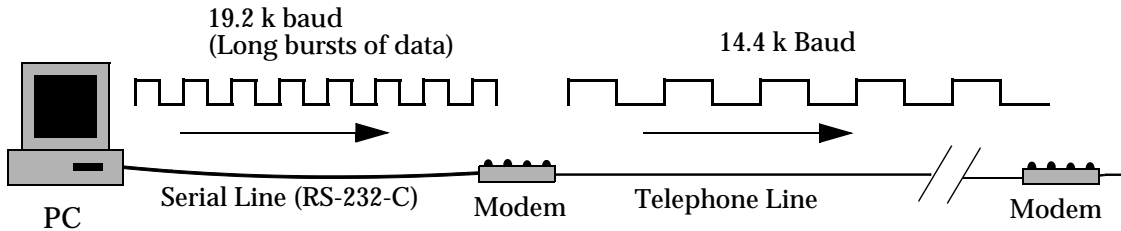
By performing compression outside the modem, XRemote offers several advantages:

- It reduces input/output overhead by reducing the number of bytes that must cross the serial interface.
- It reduces latency in delivering data packets because the modem does not have to buffer incoming data while it compresses blocks for transmission.
- You don't have to use compressing modems if you would not normally use them; for example, if you typically connect the PC directly to the host machine.

Flow Control

Ensuring the fastest, most reliable transmission of data between a PC and a host machine requires an understanding of flow control on serial lines and an understanding of when flow control becomes a critical factor in communications.

Consider a setup in which a PC transmits characters at a rate of 19.2k baud to a modem, which in turn transmits at a rate of 14.4k between two V.32bis modems over the telephone lines, as shown in the following figure.



Nodes with Different Baud Rates in a Communication Chain

The characters flow from the PC to the modem faster than the modem can pass them along through the telephone line, creating a bottleneck. The PC asks the modem to pass along approximately 200 characters per second, though the modem can send only 150 characters per second.

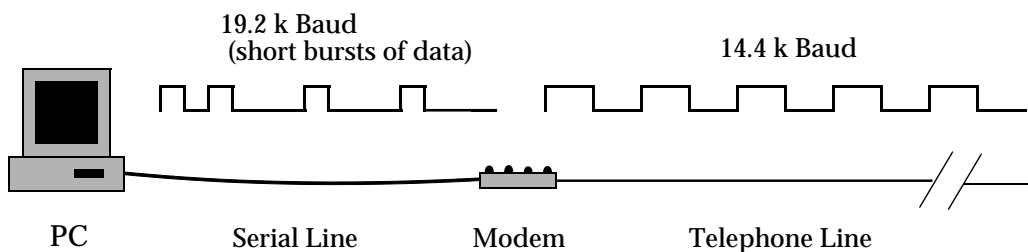
The solution to this problem is *flow control* (also called *handshaking*) in the modem. Handshaking lets the data receiver say when it is ready for data and when it is not.

Handshaking is required whenever there is a potential bottleneck between the PC and the host. Such bottlenecks can occur at a number of points, for example:

- A slow connection between modems.
- A slow connection between the host modem and the host, in other words, a slow serial connection, or a slow terminal server. A *terminal server* is a device that bundles serial bytes and sends them down a network cable in the form of a network packet.

Without flow control set up for your connected devices, a data transfer could occur faster than one or more devices can process it. The result is loss of data or repeated data transfer to obtain correct information.

Modern modems have buffers so that the PC (or host) can stay ahead of the other device. This means that only high-speed transmissions that proceed continuously for several seconds need handshaking. Bursts of high speed data do not cause problems, as long as there is an occasional pause to give the modem a chance to catch up, as shown in the following figure.



Modems Can Buffer Short Bursts of High-speed Data

The PC sends short bursts of characters punctuated by intervals of silence. The modem uses its buffer to average the flow and make the best use of the slower connection over the phone line. If the PC sends a very large series of packets, the modem may not receive enough pauses to average the data flow. Then, the modem must use handshaking to slow the PC down or data is lost.

There are two types of flow control, hardware and software, each of which is described below.

Software Flow Control (XON/XOFF)

Note Do *not* use XON/XOFF flow control with XRemote. XON/XOFF places characters in the data stream. These characters might be interpreted as X protocol data.

Software handshaking transmits special ASCII control characters that a device recognizes as transmission directives. These characters are sent down the same data wires as any other data transmitted between the devices. This is in contrast to hardware flow control, described in the next subsection, which requires the serial cable to contain wires dedicated to handshaking tasks.

When the receiver needs the sending device to stop sending data, it transmits the ASCII character, XOFF to the sender. (Typically, the Control-S key combination issues the XOFF character.) When the receiver is ready to process more data, it sends the ASCII character, XON. (Typically, the Control-Q key combination is defined as the XON character.)

Because software flow control uses the regular data lines to send the XON and XOFF signals, the byte values used to designate the XON and XOFF characters must not appear in the data sent across the serial line.

Worse yet, if line noise creates a bogus XOFF character in the data stream, it might halt the transmission. The receiver did not send the XOFF character and will not send an XON character.

Hardware Flow Control

As its name implies, hardware implements hardware flow control. It involves using two additional wires in the serial line, dedicated to passing transmission directives between sending and receiving devices. There are two types of hardware flow control:

- **RTS/CTS** (Request To Send/Clear To Send)
- **DTR/DSR** (Data Terminal Ready/Data Set Ready)

The two acronyms for each type designate the two handshaking wires. One wire is used for the sending device and the other for the receiving device.

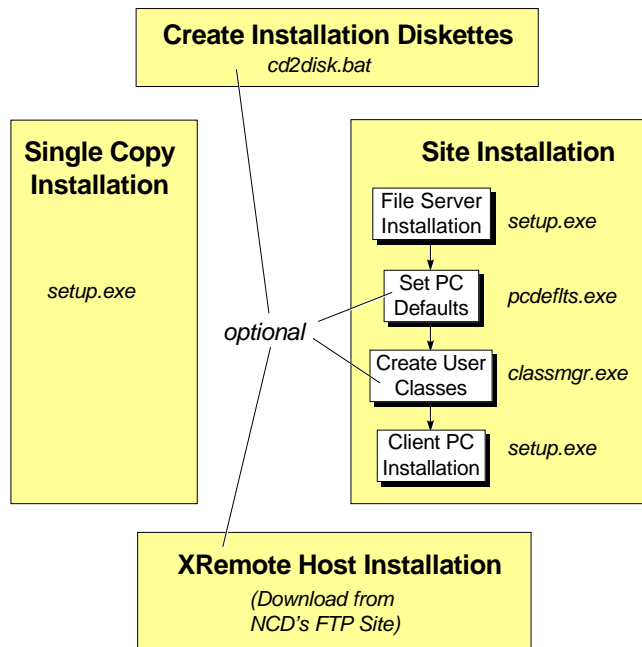
In RTS/CTS flow control, when the sending device is ready to send data, it *asserts* the RTS wire (sets the signal on the wire to a high signal state). When it is not ready to send, it drops the signal on the RTS wire to a low signal state. Similarly, when the receiving device is ready to receive data, it asserts the CTS wire, and when it is not ready, it drops the signal on the CTS wire.

DTR/DSR hardware flow control is implemented in much the same way as RTS/CTS. When ready to send, the sending device asserts the DTR wire; when ready to receive, the receiving device asserts the DSR wire.

Chapter 3

Installation Procedures

This chapter gives step-by-step instructions on installing this product. The possible installation tasks, and the programs to perform them are shown below.



Create Installation Diskettes

Your NCD product includes the *cd2disk.bat* utility, which copies files from your NCD compact disk and creates installation diskettes. This is useful if some of the PCs in your network do not have CD drives.

To perform this operation, do the following:

1. Insert your NCD product compact disk into the CD drive on a PC.
2. Select **Start** → **Run** and enter the following:
`D:\cd2disk`
replacing *D:* with the letter designating your CD drive.
3. Following the prompts, insert 3.5" diskettes into a diskette drive on the PC, until the utility notifies you it is finished.

Starting the Installation Program

To start the installation program:

1. Insert your NCD product compact disk into the CD drive on the PC from which you choose to install.
If you are installing for the first time, the installation will start automatically, and you can skip to step 4.
2. Select **Start** → **Run** from the Task Bar.
3. Enter *drive_letter:\setup.exe*.
The Installation background screen appears. The *setup* program displays its various dialogs against this background, stepping you through the installation process.

4. The buttons shown below are always displayed, so you can click them any time during the process.



Displays online help for the currently displayed dialog.



Suspends the installation program, iconifying the **Setup** program. To resume installation, click the setup icon in the taskbar.



Halts **setup** and closes the Installation screen without installing the product.

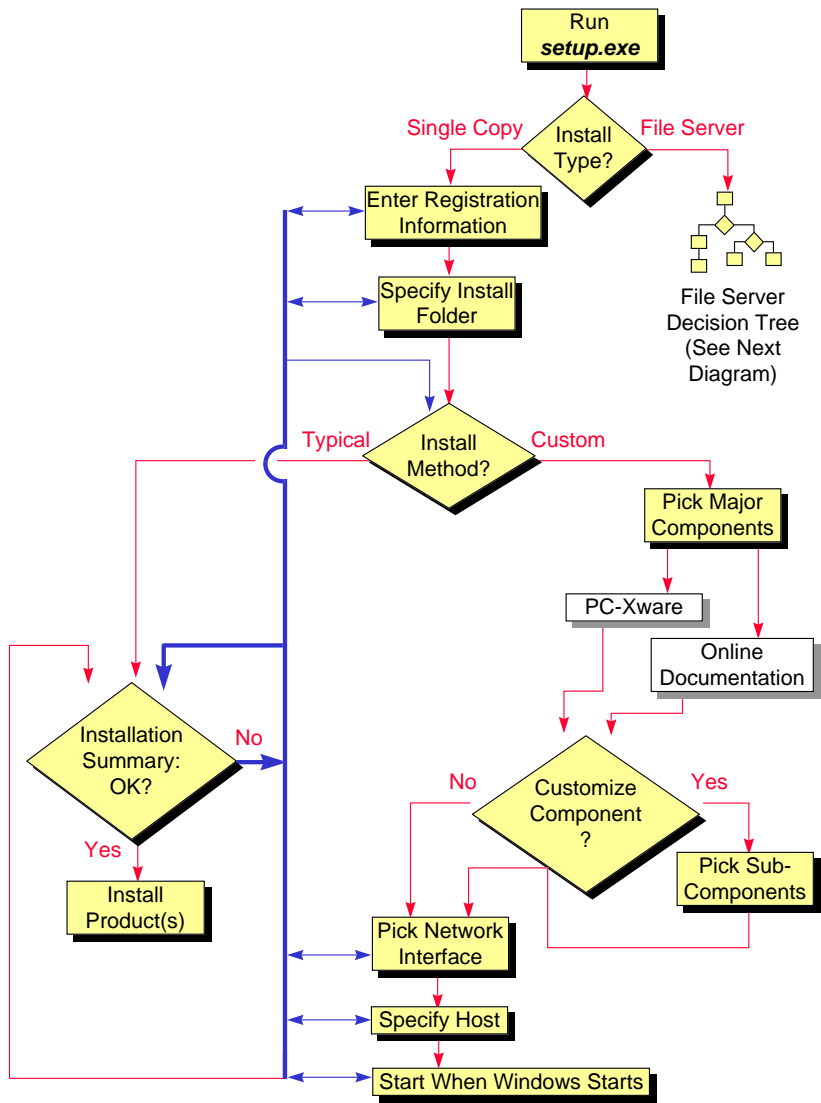
The first dialog prompts you to choose an installation type:

- **Single Copy Installation**
Choose this if you are installing on a PC that will operate as a stand-alone unit.
- **File Server Installation**
Choose this if you are performing a Site Installation, and are installing to a PC that will function as a file server for other PCs in your network.

The following sections deal with these two installation choices.

Single Copy Installation

The following figure shows the sequence of choices you make when installing your NCD product on a single PC.



Single Copy Installation

1. Run **setup.exe**, as explained in "Starting the Installation Program" on page 3-2.
2. On the first **setup** dialog, choose Single Copy Installation.
3. Fill out the **Registration** dialog to authenticate your copy of this NCD product. You can find the serial number and authorization code on the PC-Xware Support card.
4. On the **NCD Installation Folder** dialog, enter the path to the directory on the PC in which you want to install your NCD product. If you are changing an existing installation, this can be different than the location of the existing installation. (You can specify a non-existent directory; the **setup** program will create it.)

Note From this and successive dialogs, you can back up and change information by clicking the **Previous** button.

5. On the **Installation Method** dialog, select one of the following options:
 - **Typical**
to install all product components and subcomponents. Then continue with step 9.
 - **Custom**
to pick specific components or subcomponents to install.
6. If you selected Custom in Step 5, the **NCD Software Components** dialog appears, listing the products available for installation, each with its own check box. Check the boxes of products you want to install; uncheck the rest. To install particular subcomponents of these products, do the following:

- a. Click the check box of the product you want to affect, for example, **PC-Xware**, highlighting it.
 - b. Click the Customize Component button. A dialog appears, listing the subcomponents of the selected product, each with its own check box.
 - c. Click the check box of the subcomponents you want to install; uncheck the rest. (Click on the subcomponent names to get brief descriptions in the dialog.)
 - d. If you want to install the currently selected (that is, highlighted) product in a different location than the installation folder you specified earlier, click the Change Folder button and enter the path to the desired location.
7. On the **PC-Xware Network Interface** dialog, select one of the following three options to specify the type of network interface used in making connections with other machines:
- **DEC Pathworks DECnet and Winsock**
Supports DECnet, TCP/IP, and XRemote connections. DECnet must be supplied by Digital Equipment Corporation, and installed on Windows 95 or Windows NT.
 - **No Network - serial/XRemote only**
Supports Serial connections initiated through NCD's XRemote only. Choose this if you plan to make X connections but do not have TCP/IP support. If TCP/IP is available through SLIP or PPP, choose "Winsock compatible TCP/IP" (described below).
- Note** You can make serial connections with XRemote regardless of the Network Interface chosen. This means you could be connected on a LAN, be using TCP/IP through Winsock, have chosen "Winsock compatible TCP/IP", and still use XRemote through a serial connection to a remote host.
- **Winsock compatible TCP/IP**
Supports TCP/IP connections through the Winsock standard, and XRemote connections through serial or a

serial network (PPP, SLIP). Windows 95 and Windows NT both provide Microsoft TCP/IP through the Winsock standard. If your TCP/IP supplier provides a Winsock interface, PC-Xware can use it.

8. On the **PC-Xware Default Host** dialog, enter the IP address of a host machine with which you want to define a telnet connection. This connection will be presented whenever you start PC-Xware. If you prefer to define connections explicitly after you start PC-Xware, leave this entry blank.
9. On the **Start PC-Xware at Boot** dialog, select the check box if you want PC-Xware to start when Windows starts. If you do not select this option, select an entry from **Start** → **Programs** → **NCD PC-Xware** to start PC-Xware.
10. The **Installation Summary** dialog appears, displaying the settings you made in the preceding dialogs. Click on any you want to change, and the dialog affecting that setting appears. When you are satisfied with the settings, click **Install**. **Setup** performs the installation as specified, and displays a text file containing brief descriptions of the other installation tasks you can perform.

Note Single Copy Installation also initiates installation of the Acrobat Online Document Reader, which you need in order to read the online documentation provided with your NCD products. When prompted by the Acrobat Installation program, click **Accept** on its License Agreement dialog, and follow the instructions on the subsequent Acrobat dialogs.

Site Installation

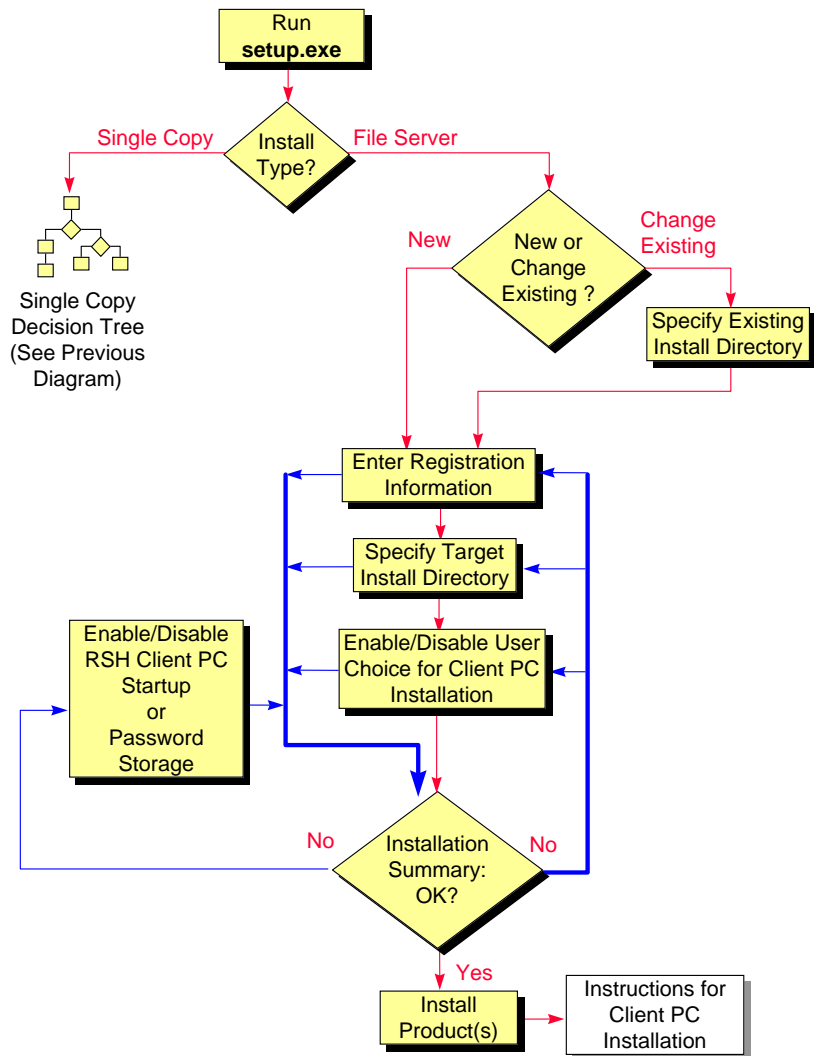
A site installation has two phases, which must be performed in the following order:

1. File Server Installation
2. Client PC Installation

The next two subsections walk you through the Installation process for each phase.

File Server Installation

The figure below shows the sequence of choices you make when performing a File Server Installation.



File Server Installation

1. Start **setup.exe**, as explained in "Starting the Installation Program" on page 3-2.
2. On the first **setup** dialog, choose File Server Installation.
3. On the next dialog (**Welcome to NCD Site Installation**), click one of the following buttons:
 - **Create a New Installation**
if NCD products have never been installed on this PC before. Continue with step 5.
 - **Change an Existing Installation**
if NCD products have been installed, and you want to update the software, or install it with different settings.
4. If you chose to change an existing installation, the **Existing File Server Installation** dialog appears. Enter the path to the directory where the existing installation resides.
5. Fill out the **Registration** dialog to authenticate your copy of this NCD product. You can find the serial number and registration code for your NCD products on the PC-Xware Support card.
6. On the **File Server Installation Folder** dialog, enter the path to the directory on your file server in which you want to install your NCD product. If you are changing an existing installation, this can be different than the location of the existing installation. (You can specify a non-existent directory; the **setup** program will create it.)

Note From this and successive dialogs, you can back up and change information by clicking the **Previous** button.
7. On the **Choice during Client PC Installation** dialog, click one of the following buttons:
 - **Allow users to choose**
if you want users to be able to override the default product settings when performing Client PC Installations. (Client PC Installation is defined in "What

is Site Installation?" on page 2-2, and the procedure detailed in "Client PC Installation" on page 3-11.)

- **Force use of defaults**
if you want to enforce use of the default product settings when user perform Client PC Installations.

8. On the **File Server Installation Summary** dialog, review the settings you have made. Click on any information you want to change, and **setup** displays the appropriate dialog.

Note Two of the settings shown on the summary dialog, **PC-Xware RSH Client Startup** and **PC-Xware Password Storage**, are set automatically the first time through the site installation program. *RSH* (Remote Shell protocol) allows one computer to connect to another without requiring login passwords. In some environments, this poses an undesirable security risk. However in others, it provides desired flexibility and openness.

PC-Xware provides the option to enable or disable client PCs from establishing RSH connections to the server. By default, **setup** enables this feature during File Server Installations.

Password storage allows users to store encrypted versions of their password with the application connections they create. By default, **setup** enables this feature during File Server Installations.

To change either current setting, click that item on the **Summary** dialog.

9. When you are satisfied with the settings shown on the **File Server Installation Summary** dialog, click the Install button. **Setup** installs the product software as you have specified, and displays a text file containing basic information about the other installation tasks you can perform after File Server Installation.

Explanations of the other File Server Installation Procedures follow.

Set Defaults for Client PC Installations

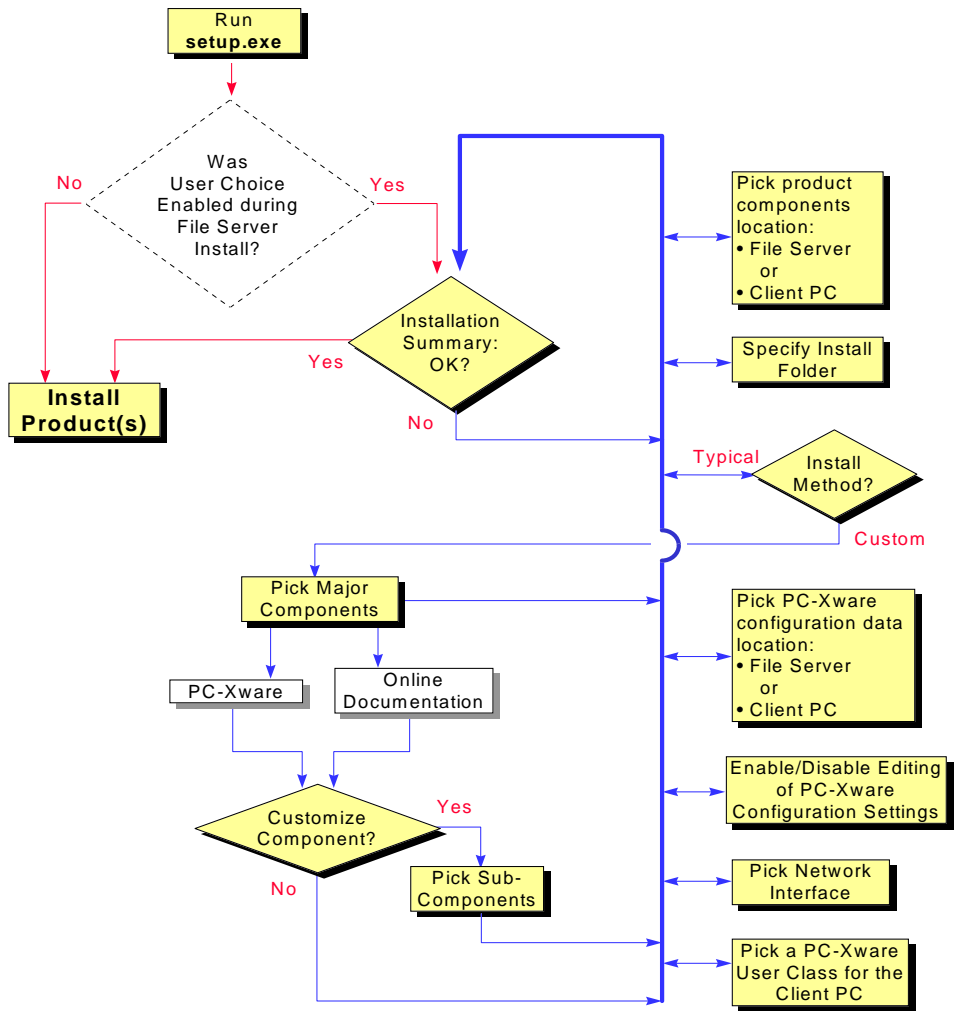
To specify a default set of user installation settings for each client PC using the NCD product, run the ***pcdeflts.exe*** utility. The sequence of choices you make is the same as for a Client PC Installation (illustrated in the following diagram). For instructions on using ***pcdeflts.exe***, see the online help for PCDefaults.

Create User Classes

To create groups of client PCs with similar settings (a *class*), run the Class Manager program, ***classmgr.exe***. This makes it simpler to perform Client PC Installations. For more information, read "Creating User Classes" on page 4-1.

Client PC Installation

To run File Server-installed products from individual PCs, perform a Client PC Installation. The following diagram illustrates this process, followed by step-by-step instructions.



Client PC Installation

1. On the client PC, navigate across your network to the installation directory created on the file server during File Server Installation (Step 6 on page 3-9), and run **setup.exe**.

If **Force use of defaults** was selected during File Server Installation, the next dialog presents the Install button only. Click it to install the software using the defaults specified during File Server Installation. In this case, installation is complete.

If **Allow users to choose** was selected during File Server Installation, the **Client PC Installation Summary** dialog appears, displaying the default installation settings that were specified for client PCs. Go on to Step 2.

2. Examine the settings in the installation summary. Click on any you want to change, and the dialog affecting that setting appears. Since you can display them in any order, they are described in the following table, rather than in sequential steps.

Products Affected	Setting	Action to Take in Dialog
All Products	Component Location	Choose whether to install the product components on the Client PC, or to access them from their location on the file server.
	NCD Installation Folder	Enter the path to the location on the Client PC where you want to install product components. (Relevant only if you chose to install on the client PC.)
	Installation Method	Choose Typical to install all product components and subcomponents. Choose Custom to pick specific components or subcomponents to install.
	Products Selected	This setting appears only if you pick the Custom installation method. Beneath it appear the products currently selected to be installed. Clicking this setting or any of the listed products displays the NCD Software Components dialog, listing the products available for installation, each with its own check box. Check the boxes of products you want to install; uncheck the rest.

Chapter 3: Installation Procedures

Products Affected	Setting	Action to Take in Dialog
All Products	Products Selected (<i>Cont.</i>)	To install particular subcomponents: <ol style="list-style-type: none">1. Click the check box of the product you want to affect, for example, PC-Xware.2. Click the Customize Component button. A dialog appears, listing the subcomponents of the selected product, each with its own check box.3. Click the check box of the subcomponents you want to install; uncheck the rest. (Click on the subcomponent names to get brief descriptions in the dialog.)
PC-Xware	Configuration Location	Choose whether to maintain configuration settings on the Client PC, or on the file server.
	Configuration Changes	Choose whether to allow users of the client PC to change configuration settings for PC-Xware.
	Network Interface	Choose the type of network interface the client PC will use in establishing connections with other machines: <ul style="list-style-type: none">• DEC Pathworks DECnet and Winsock Supports both DECnet, TCP/IP, and XRemote connections. DECnet must be supplied by Digital Equipment Corporation on Windows 95 and Windows NT.• No Network - serial/XRemote only Supports Serial connections initiated through NCD's XRemote only. Choose this if you plan to make X connections but do not have TCP/IP support. If TCP/IP is available through SLIP or PPP, choose "Winsock compatible TCP/IP" (described below). Note: You can make serial connections with XRemote regardless of the Network Interface chosen. This means you could be connected on a LAN, be using TCP/IP through Winsock, have chosen "Winsock compatible TCP/IP", and still use XRemote through a serial connection to a remote host.• Winsock compatible TCP/IP Supports TCP/IP connections through the Winsock standard and XRemote connections through a serial or serial network (PPP, SLIP) connection. Windows 95 and Windows NT both provide Microsoft TCP/IP through the Winsock standard. If your TCP/IP supplier provides a Winsock interface, PC-Xware can use it.

Products Affected	Setting	Action to Take in Dialog
	Class Membership	<p>If any user classes were created by <i>classmgr.exe</i>, the dialog box lists them.</p> <ul style="list-style-type: none">• Select one of these classes to use its installation settings.• Select Standard if you want to use the installation settings of the default class (determined during File Server Installation).• Select None if you prefer to specify installation settings manually for this particular PC.

3. When you are satisfied with the settings, click **Install**. Setup performs the installation as specified by the settings shown in the **Client PC Installation Summary** dialog, and displays a text file containing brief descriptions of the other installation tasks you can perform.

Note Client PC installation also initiates installation of the Acrobat Online Document Reader, which you need in order to read the online documentation provided with your NCD products. When prompted by the Acrobat Installation program, click **Accept** on its License Agreement dialog, and follow the instructions on the subsequent Acrobat dialogs.

Installing XRemote Host Software

Using XRemote, PC-Xware's ability to run X applications on serial lines requires NCD-supplied host software. You can get the XRemote host software in the following ways:

- Download binaries for a specific host and operating system from the NCD FTP site:

1. FTP to **ftp.ncd.com**.
 2. Log in as “anonymous” and use your electronic mail address as the password.
 3. Move to the `/pub/pcx/Archive/xr_hosts` directory.
 4. Review the Index file to determine which file you need. Files with a `.tar` or `.tar.Z` extension are UNIX tar or UNIX compressed tar files. Files with a `.exe` extension are compressed Microsoft Windows executables containing UNIX tar files or VMS executables.
 5. Download the appropriate file.
- For further information, contact NCD Technical Support department. See "Product Support" on page B-1.

Installing on UNIX Hosts

To install the software on a UNIX host, do the following:

1. If you downloaded a `.tar.Z` file, uncompress the file using the UNIX command:

```
uncompress filename.tar.Z
```
2. Extract the files from the `.tar` file with the UNIX command:

```
tar -xvf filename.tar
```
3. Place the files extracted from the `.tar` file (***Xremote***, ***xinitremote***) in a suitable directory for end users to access such as `/usr/local/bin`.

Note Root access may be required to move files to `/usr/local/bin`.

4. Change the permissions on the ***Xremote*** and ***xinitremote*** files. Provide execute permission for the group or others as you desire. For example, to allow ***Xremote*** use by anyone on your system, type:

```
chmod 0555 XRemote xinitremote
```


This completes the installation. You do not need to execute *xinitremote* or *XRemote*. Users execute these programs after connecting to the host with PC-Xware.

Installing on VMS Hosts

This section describes installation of XRemote for a VAX host running VMS.

Note The installation must be performed by the VMS system administrator since the installation adjusts **sysgen** parameters.

The PC file **VAX_VMS.EXE** is a compressed archive containing the VMS host files listed in the following table.

Several VMS file names are truncated to MS DOS limits. After you upload the files, they will be properly renamed by the host installation script contained in the file **INSTALL.COM**. The VMS file names include the directory pathnames to the locations on disk where they are installed. The VMS file name itself is in bold type to make it easy to distinguish.

PC File Name	VMS File Name - Destination	Description
install.com	sys\$login: install.com	Post installation script (DCL)
ncd_modp.dat	[ncdnds.examples] xremote_modparams.dat	MODPARAMS for tuning system
ncd_xrem.com	[ncdnds.bin] ncd_install_xremote.com	Script to install xremote.exe
xinitrem.exe	[ncdnds.bin] xinitremote.exe	Executable
xremote.exe	[ncdnds.bin] xremote.exe	Executable
ncd_syst.com	sys\$startup: ncd_syststartup.com	System startup for XRemote logicals
xinitrem.com	[ncdnds.bin] xinitremote.com	Starts XRemote

To install XRemote on a VMS host:

1. On the PC, create a temporary directory for decompressing the files.
2. Copy the DOS archive file **VAX_VMS.EXE** from the disk to the temporary directory on the PC.
3. Move to the temporary directory, and extract the VMS files from the DOS file by entering the following command on the PC:

```
C:TEMP> VAX_VMS
```

4. Use a file transfer utility such as TCP/IP's FTP or DECnet's NFT to transfer all the de-archived files to an account on the VAX host. For example, if you use NFT, enter a command similar to the following:

```
C:TEMP> NFT COPY *.* YOURVAX "username password" ::*.*
```

where **YOURVAX** is the node name of the machine to which you are transferring the files.

Note The VAX account must have sufficient privileges to allow you to perform all subsequent steps outlined in this section, including creating directories, setting protection, and adding entries to the install table.

5. Log in to the VAX and edit the following files to specify the disk where you plan to install XRemote:

ncd_xrem.com

ncd_syst.com

6. Also, in ***ncd_xrem.com***, edit the line that specifies transport protocols as needed to reflect the ones you want to make available, such as DECNET and TCPIP.

The logical **NCD_XREMOTE_SERVER_TRANSPORTS** contains a list of VMS DEC windows transport modules that are initialized by the XRemote helper when starting up.

By default, `NCD_XREMOTE_SERVER_TRANSPORTS` is defined to include the DECnet transport as part of the `NCD_ROOT:[BIN]NCD_XREMOTE_INSTALL.COM` procedure file, which is invoked during system startup. If this logical is undefined, only the local transport is initialized.

In step 4, you moved the VMS files into an account on the VAX host, but all in the same directory. However, to operate correctly, they must be in certain specific locations, as noted in the table on page 3-17.

7. To automatically transfer the VMS files to the appropriate directories, enter the following command:

```
$ @INSTALL
```

This executes the *install.com* script you transferred and perhaps customized in previous steps.

Removing an Installation

This section explains how to remove an installation of NCD products from a PC.

Removing a Single Copy or Client PC Installation

1. Run the “Add/Remove Programs” applet from **My Computer → Control Panel**. “PC-Xware” is displayed in the list.
2. Click on “PC-Xware,” and then on the “Add/Remove” button. The uninstall program will then start and ask whether you want to continue.

Removing a File Server Installation

Manually delete the installation directory on the file server and all its sub-directories.

Note The last NCD product uninstalled causes any cross product files, registry entries and program items to be deleted.



Chapter 4

Configuration Procedures

This chapter gives step-by-step instructions on configuring installation options for this NCD product.

Setting Client PC Defaults

For procedures on setting the defaults for Client PC Installations, see the online help for PCDefaults.

To run PCDefaults, navigate to your file server installation directory and double click *pcdeflts.exe*.

Creating User Classes

You create user classes with the Class Manager utility provided with PC-Xware. To use Class Manager, you must explicitly invoke the program, *classmgr.exe*, on your file server. By default, the install program places it in the following location on the file server:

D:\ncdsoft\pcxware\configs\classmgr.exe

where *D* is the letter designating the hard disk drive, and *ncdsoft* is the installation folder selected during file server installation.

For step-by-step procedures for creating, modifying and deleting user classes, see the Class Manager's online help.

Modifying Configurations for User Classes

Start Class Manager and select a class from the list. Click Modify.

Class Manager's Modify User Class dialog provides an Edit button that opens the configuration file for that class, using a text editor. You can then modify the configuration by editing the configuration file directly.

Alternatively, PC-Xware provides a user interface for modifying configurations, automatically making syntactically correct entries in the configuration file. To modify the configuration file for a class using this second method do the following:

1. Perform a Single PC Installation (it can be on the file server).
2. Using the PC-Xware Configuration (**Start → Programs → NCD PC-Xware → PC-Xware Configuration**), adjust the configuration options as desired. PC-Xware records these settings in a configuration file at the following location:

D:\ncdsoft\configs\changes.usr

where ***D*** is the drive letter, and ***ncdsoft*** is the installation directory.

3. Copy ***changes.usr*** to the following location on the file server:
D:\ncdsoft\pcxware\configs\<class_name>.xcl\<class_name>.cls
and change its name to ***<class_name>.cls***, where ***<class_name>*** is the name of the class whose configuration file you want to modify. (You will need to create the ***<class_name>.xcl*** folder.)

Customizing PC-Xware Fonts

Standard Fonts

PC-Xware Classic includes most of the freely distributable fonts known to NCD at the time of product release. When you select the default (typical) installation components, the font directories contain:

Component	Directory	Contents
Misc fonts	misc	Contains a variety of critical and obscure fonts. The most notable fonts in this directory are:
	cursor	Fonts used by PC-Xware Classic and many X applications for cursors.
	6x13	The default fixed-width font. The file fonts.ali in the misc directory sets the "fixed" alias to this font when you install PC-Xware Classic.
	7x14 8x16 12x24	Full ISO fixed-width fonts, meaning that these fonts define all 256 character values for international use. Most PC-Xware Classic fonts are full ISO fixed-width fonts.
	fonts.ali	Aliases of non-existent fonts to existing fonts. When PC-Xware Classic is installed, fonts.ali contains entries for fixed, variable, and other commonly requested fonts.
75 DPI fonts	75dpi	Contains lower-resolution fonts required by most X applications.
Windows fonts	mswin	Accesses Microsoft Windows 95 or Windows NT fonts.

Optional Fonts

The next table shows optional fonts you can install through the **setup** program, via a custom installation.

Component	Directory	Contents
100 DPI fonts	100dpi	Fonts for higher resolution displays.
Open Look fonts	xol	Fonts commonly used by OpenLook X applications.

Component	Directory	Contents
DEC 75 DPI fonts	dec75	75 dpi fonts used by DECWindows applications.
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.
Hungul	hangul	Korean fonts.
Hanzi Guobiao	hanzi	Chinese fonts.

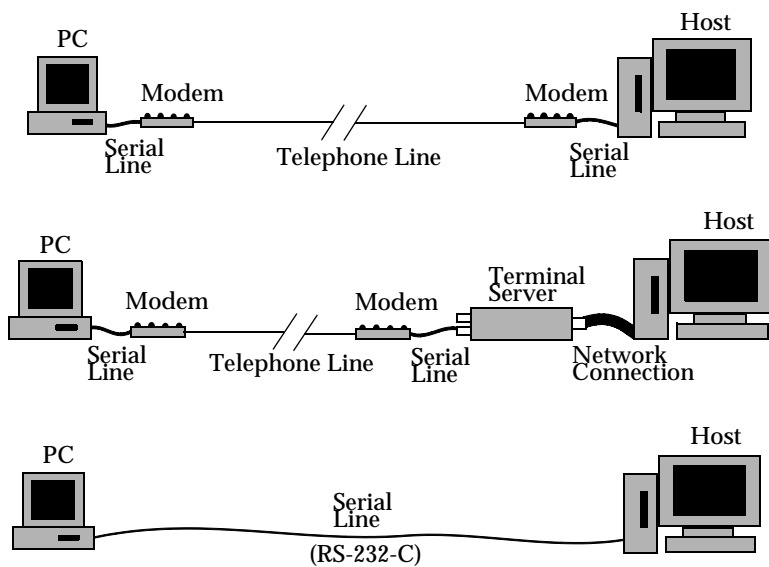
To modify the set of fonts available to PC-Xware through the installation program:

1. Run **setup**, as described in "Starting the Installation Program" on page 3-2.
2. When you reach the **Installation Summary** dialog, under Products Selected, click on PC-Xware. The NCD Software Components dialog is displayed, with PC-Xware selected.
3. Click the Customize Component button.
4. The **PC-Xware Components** dialog is displayed, listing all the fonts you can choose, each with its own check box. Check the boxes of the fonts you want to add. Uncheck those you want to remove.

Configuring a System for XRemote

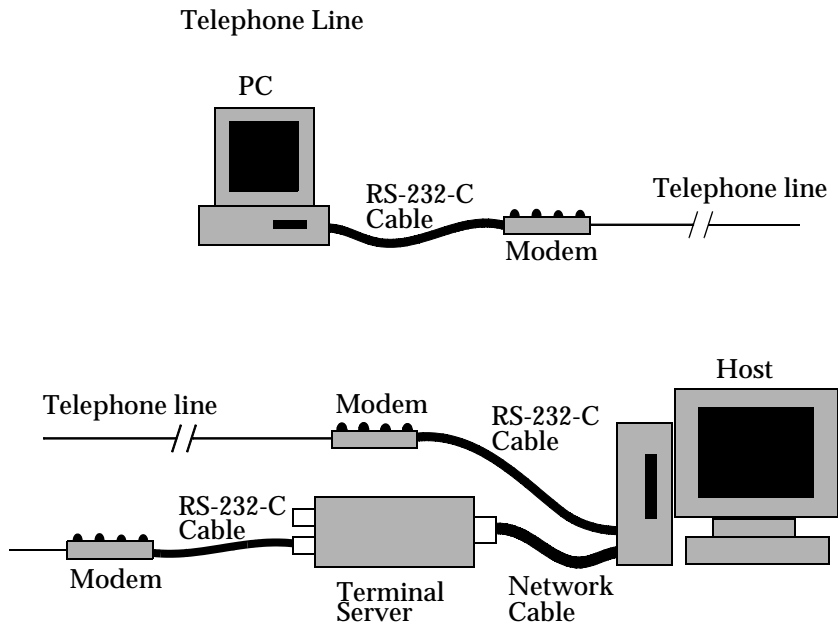
XRemote is an application that lets you run X Windows applications over serial lines. For background, read "What is XRemote?" on page 2-11.

You can set up your system for XRemote in several ways, depending on your equipment and objectives, as shown in the following figure.



Cabling Requirement

The cabling requirement for connections between elements of your hardware setup are shown in the following figure.



There are two types of connection characteristics that must be compatible for communication between two devices to occur over a cable:

- **Physical connection**

This refers to the pin configurations of the communication port(s) on the devices, and pin configurations on the cable connectors. The two most common connectors have 25-pin and 9-pin configurations. If your ports and cable connectors do not match, you can remedy the situation using a 9-to-25 or 25-to-9 pin adapter.

If the connector on the cable has the correct number of pins, but the wrong gender, you can convert it with a gender changer.

If you plan to use hardware flow control, the serial cable must contain at least five wires, two of which are dedicated to hardware flow control. Most modern serial cables are now built this way, but some older cables have only three wires.

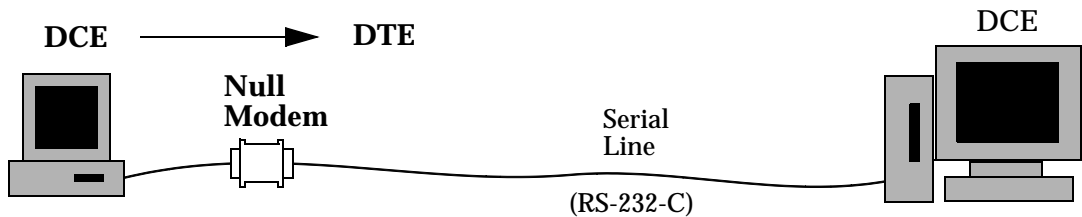
■ Logical connection

This refers to the logical identity of a device as a sender and receiver of data. The common terms for a pair of complementary devices are:

- DCE (Data Communication Equipment)
- DTE (Data Terminal Equipment)

For communication to occur, one of the connected devices must be DCE and the other DTE.

If both devices are DCE or DTE, you can convert one of them to its complement by connecting a null modem. This typically is necessary when you have a direct connection between the host and the PC, as shown in the following figure.



Enabling Hardware Flow Control

When using XRemote, if you want to enable flow control for a device, NCD recommends that you enable hardware *flow control* (also called *handshaking*), but not software flow control.

The procedure for enabling flow control is system-dependent. For specific instructions, refer to the manuals for your device.

Flow control ensures that a device in a communication chain, such as a terminal, modem, or terminal server, is not bombarded with data faster than it can accept it and respond or pass it on.

Setting Up Modems

The user manual for your modem has instructions for enabling and disabling the modem features and settings discussed in this section.

The modems used for XRemote must provide full-duplex (two-way) communications between the host and your PC. NCD strongly recommends a V.32 modem (9600 baud) or faster.

Multiplexing modems or any other data communication equipment that adds delay to the signal path will impede XRemote performance. (See step 4 of the following procedure.)

To set up modems for use with XRemote, do the following:

Note The modem's features and settings can be enabled/disabled either by setting DIP switches on the modem itself, by sending software commands to the modem from the connected device, or by some combination of both. Which method to use depends on the type of modem and your preferences. Consult your modem manual for specific details.

1. Connect a standard RS-232-C serial cable to the serial port on the modem and to the serial port on the PC, host machine, or terminal server. (Get a cable with connectors that fit the pin configurations on these ports, and/or use gender changers as necessary.)
2. Disable XON/XOFF software flow control for the modem. This averts the problem of noisy modem lines injecting spurious XOFF characters and causing the connection to hang.
3. Decide whether to enable hardware flow control. If you want the modem to perform dynamic speed conversions, you must enable some form of hardware flow control.

For example, suppose the host modem port is fixed at 19.2K baud and a connection is made at 9600 or 14.4 Kbaud. In this case, enable either RTS/CTS or DTR/DSR flow control (NCD recommends RTS/CTS).

In general, flow control is more crucial for host machines and terminal servers, which tend to have more fixed modem settings, than it is for PCs.

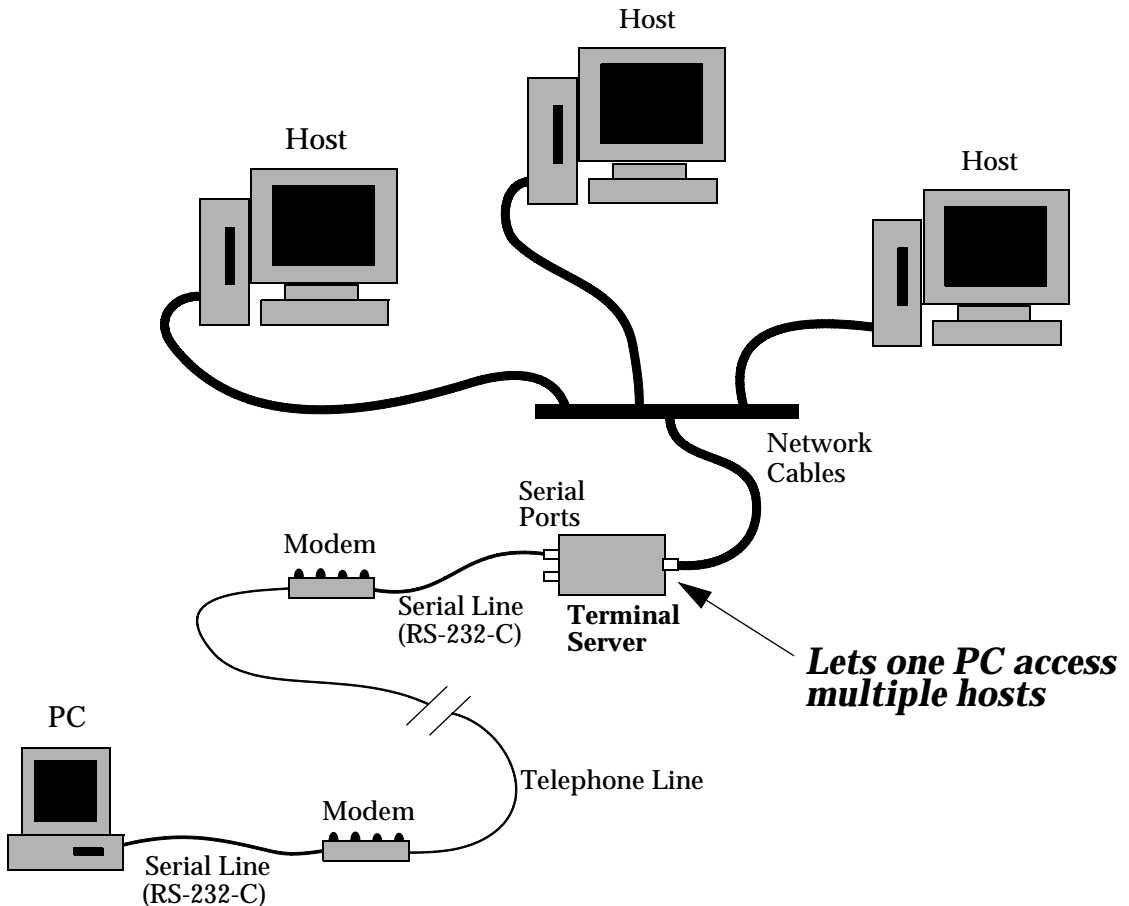
4. Decide whether to enable modem-supplied compression. The XRemote protocol is compressed by default in the host process software. If the modem is also compressing data, the transmission time is increased. The XRemote protocol allows the user to control the type of compression (or no compression at all) used during the transmission. The user must decide which approach provides the best performance:
 - Disable XRemote's software compression and use the modems' hardware compression.
 - Use XRemote's software compression and disable the modem's hardware compression. By default, XRemote assumes modem hardware compression is off and uses a software compression factor of 12 bits.
5. Decide whether to enable or disable error correction algorithms built into the modem. XRemote has its own built-in end-to-end error checking, which is always active. Whether to add the modem's error checking to XRemote's depends on the noise levels on the line.

If you anticipate very little "noise" on the line, disable the modem's error correction and let XRemote's built-in error correction handle the few glitches that occur. If you expect a fair amount of noise, enable the modem's error correction; this might be faster than XRemote's error correction.
6. Set the modem's communication parameters as follows:

Speed:	9600 baud (or 14.4 Kbaud for V.32 bis)
Data bits:	8
Stop bits:	1
Parity:	none

Terminal Server

A terminal server, such as a Cisco™ or Xyplex™, lets users access multiple hosts on a network. Thus, a modem attached to a terminal server allows dial-in to multiple host machines, as shown below:



Because the terminal server intervenes between the modem and the host, you might need to configure it to pass XRemote data from the host to the modem accurately.

Setting Up a Terminal Server

To set up a terminal server for use with XRemote, observe the following guidelines:

Pass-through or Pass-all Setting

Any combination of characters that could be interpreted by the terminal server as an interrupt could disrupt communication. To prevent this, configure the terminal server with a “pass-through” or “pass-all” setting.

Software Flow Control

Disable all software flow control.

Hardware Flow Control

Enable hardware flow control to prevent terminal server port buffer overflow.

Forwarding Character and Forwarding Timer

Some terminal servers support a “forwarding character” and a “forwarding timer.” Both of these parameters can help performance. When the terminal server detects the forwarding character, it sends all the data it has buffered to that point.

- Set the forwarding character to “-” or to “126,” the ASCII decimal code for the tilde (~) character. This is the XRemote framing character. It designates the end of a packet of data being sent over the line.
- Set the forwarding timer to “1” or the smallest allowable value. The objective is to forward each completed packet of data as promptly as possible to minimize latency.

Baud Rate

To minimize the possibility of swamping the modem with data, set the baud rate for the serial port on the terminal server equal to or just slightly higher than the baud rate at which the modems communicate. For example, if the modem speed is 14.4K baud, set the speed of the serial port to the next higher speed setting (19.2K baud).

A number of terminal server vendors build XRemote functionality into the terminal server itself, dedicating a processor to XRemote tasks for each serial port.

Running XRemote on your terminal server, rather than on your host machine, can improve performance by off-loading the XRemote compression/decompression activities. Refer to your terminal server manual to determine if it has XRemote capability.

Cisco Terminal Server

To set up a Cisco Terminal Server for use with XRemote, perform the following steps:

1. From the PC, dial into the terminal server.
2. To determine if your Cisco machine has XRemote Host Software built into it, list the Cisco commands by entering:

```
?
```

If your Cisco terminal server has XRemote, the displayed list will include:

```
xremote
```

If your Cisco machine has XRemote Host Software built in, skip to step 4. Otherwise, go to step 3.

3. Program your Cisco to transmit data to the host machine with:
 - 8 data bits,
 - no parity,
 - no escape characters.
4. View the settings for the modem port on the terminal server through which you dialed in. Enter the following command:

```
show terminal
```
5. Check whether the settings listed match those shown below:
 - Escape character:none (no escape character)
 - Dispatch timeout:1
 - Characters causing:immediate
 - data dispatching:~ (decimal 126)

If any of the current settings on your Cisco machine differ from the values shown above, use terminal commands to set those parameters as specified above. For example:

```
line 12
no escape-character
dispatch-timeout 1
dispatch-character 126
```

Note Terminal commands are privileged. For information on establishing rights to use them, refer to your terminal server manual.

6. After starting PC-Xware and dialing into the terminal server, start XRemote on the Cisco terminal server by entering the following command:

```
xremote xdm hostname
```

where:

hostname is the name of the machine where your X applications reside.

7. Log in to an account on a system that has the X applications you need. The XDM login window appears for the hostname specified.

Datability Terminal Server

Customers report that the Datability terminal server cannot support a true binary, non-software flow control mode. These customers have not used the Datability terminal server with XRemote.

DECserver 100 Terminal Server V2.0 (BL23) with LAT V 5.1

You must set binary passthrough mode on this type of terminal server.

1. From the connected PC, establish a terminal server session by dialing in and logging in to the host. Once you establish the

session, use control-backslash to revert back to the terminal server.

2. On the terminal server, enter the following command:

```
local> set session passall|psthru
```

The **passall** command establishes the passthrough mode and also disables software flow control (XON/XOFF).

3. Return to your host session by entering the following command:

```
local> resume
```

Your usual host prompt reappears.

3Com Terminal Server

1. To set proper terminal server characteristics, create the following macro

```
MACRO binary = (  
telnet $1 ecm  
set fcf=none fct=none  
set ecmc=dis breakchar=dis  
set bra=ignore bra=escdtm  
resume  
)
```

The variable settings used in the preceding macro are explained in the following table:

Variable Setting	Description
fcf=none	Turns flow control "from" the terminal server off
fct=none	Turns flow control "to" the terminal server off
ecmc=dis	Disables escape command character control sequences
breakchar=dis	Disables the break character
bra=ignore	When break is seen, turns off all the break bits
bra=escdtm	When break is seen, escapes to command mode

2. Install the macro settings for your host machine by entering the following command:

```
do binary hostname
```

Xyplex Terminal Server

1. From the connected PC, dial in and log on to your host.
2. List the supported protocols by entering the command:

```
show unit
```

Note You need RLOGIN capability to do this.

3. Display the port characteristics by entering the command:

```
show port #
```

where # is your port number.

Ensure the following communication parameter settings:

```
character size: 8
```

```
flow control: not XON/XOFF
```

4. Set the Xyplex up to pass all data through the terminal server in binary mode without flow control. Enter the following command:

```
set port # telnet binary session mode pass all  
set port # telnet transmit immediate
```

The PASSALL mode behaves somewhat differently, depending on the type of session, as described below:

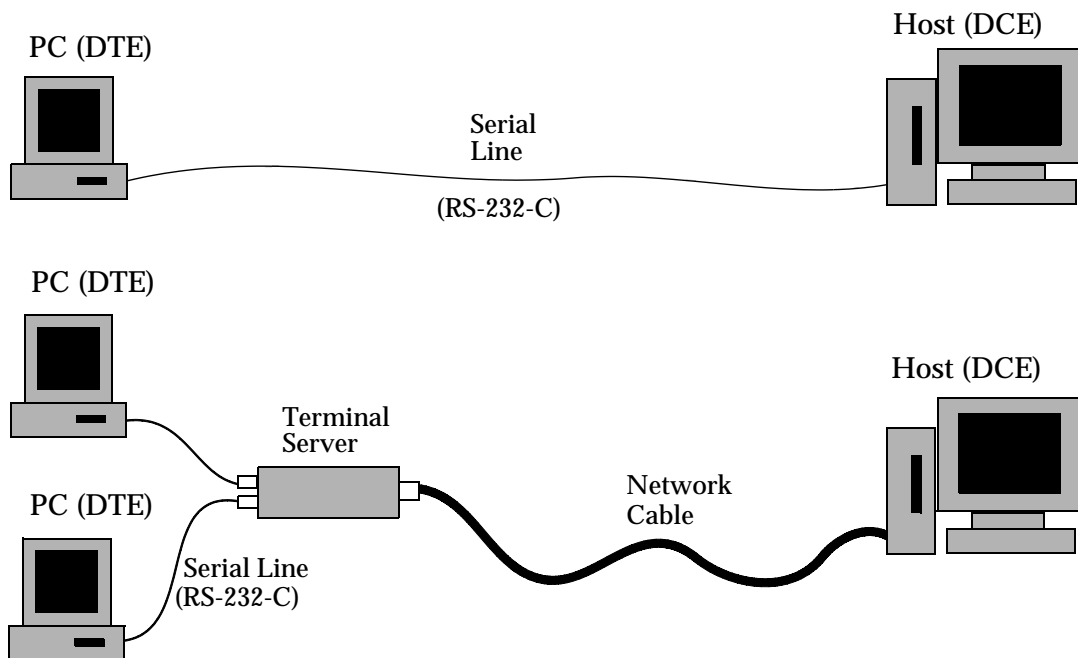
- telnet:the terminal server attempts to negotiate binary mode and also disable flow control.
- LAT:the terminal server tells the XRemote host it is in PASSALL mode. Flow control characters, XON/XOFF, are disabled.

The following Xyplex modes are incompatible with XRemote:

- interactive
- passthru
- transparent

Setting Up a Direct Host Connection

You can use XRemote to connect a PC directly to a local host over a serial line, as shown below.



This capability allows for:

- No network cabling: If you already have serial connections in place, you can run X applications over them; you do not have to route network cabling to all your PCs.
- Faster throughput: XRemote's internal data compression techniques provide faster throughput than you could ordinarily expect over a serial line.

In these configurations, the local host or terminal server functions as the DCE (Data Communication Equipment) device, as usual. However, the PC functions as a DTE (Data Terminal Equipment) device.

To set up a direct serial connection, perform the following steps:

1. Connect the PC and the host machine or terminal server with an RS-232-C cable. Use gender changer(s) and a null modem if necessary.
2. Configure the communication parameters on the PC and the host or terminal server as follows:

Speed:	9600 baud or faster
Data bits:	8
Stop bits:	1
Parity:	none

Configuring the Host

This section discusses how to configure host machines.

Note To configure your host machines for XRemote, you need superuser or system privileges.

General Configuration Tasks

You must enable the host to perform the following general tasks:

- Answer the phone (if using modems).
- Provide login prompt on the serial line.
- Set communication parameters on the serial line.

The following two examples show how to do this.

Example 1: Configuring a Sun Host

These two files, residing in the `/etc` directory, specify login capability:

- **ttytab**
This file contains terminal initialization data, specifying the system routines that control operations on each terminal line.

- **gettytab**

This file describes terminal lines. A simplified version of the terminal capabilities database, it defines the **tty** types that can be selected in the **ttytab** file. Each entry describes one class of terminals. (For more information on the terminal capabilities data base, refer to your on-line **man** page for **termcap(5)**.)

For each terminal line in the **/etc/ttytab** file, the following fields are specified:

Field	Description
name	Name of the device
command	Command to execute on the line. Normally, the command is getty(8) , followed by an index or keyword found in the /etc/gettytab file.
type	The type of terminal normally connected to the line. For PC-Xware, enter vt220 . The terminal types known by your Sun host are listed in the /user/share/lib/termcap file.
status	Turns login on or off on the line. This field should be on .
comments	Field used by gettyent(3) to set line characteristics. The field usually states local or remote to designate where the line terminates. If the field specifies secure , the root user may log in on the line.

For more information, read the on-line UNIX **man** page for **ttytab**.

A sample line from a `ttytab` file for use with XRemote is shown below:

```
ttytab "/usr/etc/getty 8bit.9600" vt220 on
```

Because XRemote needs an 8-bit data path, you must create a corresponding entry in the `gettytab` file, shown below:

```
8bit.9600:\
:p8:sp#9600:\
:ms=crtscts:
```

This entry sets the line to 8 bits (p8), 9600 baud, and CTS/RTS flow control.

Read the on-line UNIX **man** page on `gettytab`, and set parameters appropriately for your environment.

If you need automatic baud detection, in your `gettytab` file, create a series of entries that cycle through different baud rates via the `nx` option. Two examples of such entries are shown below:

```
8bit.9600:\
:p8:sp#9600:\
:ms=crtscts:nx=8bit.19200

8bit.19200:\
:p8:sp#192600:\
:ms=crtscts:nx=8bit.9600
```

Example 2: Configuring an SCO Host

1. Choose the RS-232-C serial port you want to use with the host modem. To find the system name for the serial port, refer to the SCO *Open Desktop Administrator's Guide*, "Administering the ODT-OS". The serial port system name should have the form:

```
/dev/tty $nn$ 
```

where nn varies according to the port you select. The first communication port corresponds to `/dev/tty1A`.

Note The SCO operating system uses capital letters to designate the modem connections and lower case letters (/dev/tty1a) to designate terminal and direct serial line connections.

2. The **/etc/inittab** file contains a script that initializes each serial port. Open the **/etc/inittab** file for editing and add a line similar to the following:

```
Senn:23:respawn:/etc/getty -t60 tty $nn$   $xx$ 
```

The elements of this line are described below:

<i>Senn</i>	Designates a serial port numbered <i>nn</i> .
23	The <i>run level</i> . For more information, refer to the man page for the inittab(F) command.
respawn	Tells the system to restart login on the line when you logout.
<i>/etc/getty</i>	Pathname to a file whose contents specify the terminal type, mode, and speed of the serial line.
t60	Puts a 60 second timeout on the line.
<i>ttynn</i>	The system name for the port, where <i>nn</i> is the port number.
<i>xx</i>	A value matching a label in the /etc/gettydefs file. The label marks a <i>section</i> (a statement in the file) that specifies the terminal settings to be used on the line. (See step 3.)

For example, if port **tty1A** is used for a modem connection, and a section labeled **3** is added to **/etc/gettydefs**, then the entry in the **/etc/inittab** file might be as follows:

```
Sel1A:23:respawn:/etc/getty -t60 tty1A 3
```

3. In the **/etc/gettydefs** file, create a section specifying the communication parameters of the serial port line. Begin the

entry with a label matching that used at the end of the entry in the `/etc/inittab` file (described previously in step 2).

For example, a `/etc/gettydefs` entry corresponding to the example above is shown below (lines beginning with # are comments):

```
3 # B19200 CS8 SANE HUPCL TAB3 ECHOE IXANY #\r\n@!login: #
```

where:

B19200	Sets the line to 19200 baud.
CS8	Sets the line to 8 data bits.
SANE	A composite flag setting multiple serial parameters. (For a complete description of all the flag settings, refer to the man page for gettydefs(F) .)
HUPCL	Hang up the modem connection at exit.
TAB3	Selects a horizontal tab style.
ECHOE	Echo erase character when backspace is typed.
IXANY	Allow only the DC1 character to restart output.

```
#\r\n@!login:
```

Sets the login prompt to be `login:`

4. If you need automatic baud detection, create a series of `/etc/gettydefs` entries that cycle through different baud rates as shown below:

```
1 # B4800 CS8 SANE HUPCL TAB3 ECHOE IXANY #\r\n@!login: # 2
2 # B9600 CS8 SANE HUPCL TAB3 ECHOE IXANY #\r\n@!login: # 3
3 # B19200 CS8 SANE HUPCL TAB3 ECHOE IXANY #\r\n@!login: # 1
```

The sample entries in `/etc/gettydefs` shown above say:

- Try to execute entry 3 (a 19200 baud connection).
- If that fails, attempt to execute entry 1 (a 4800 baud connection)

- If that fails, attempt to execute entry 2 (a 9600 baud connection).

XRemote and Window Managers

Using a local window manager is the most effective way to boost the performance of XRemote. You can use PC-Xware to choose between two local window managers.

Appendix A

Troubleshooting Connections

Checking the Serial Connection

Use the Windows *HyperTerminal* program to check your serial connection. Start *HyperTerminal* by selecting **Start → Programs → Accessories → HyperTerminal → Hyperterminal**.

- The first time you use *HyperTerminal*, dialogs walk you through setting up your modem. (On Windows NT, you must have administrative privileges to set up a modem.)
- After your modem is set up, use the **Connection Description** dialog to create an icon for your dialing location.
- Dial the location by selecting the **Connection Description** icon in your *HyperTerminal* folder or by selecting the connection from *HyperTerminal's File → Open* dialog.
- Record *HyperTerminal's File → Properties → Configure* connection settings to use with PC-Xware. Exit *HyperTerminal* after you verify these settings work correctly.

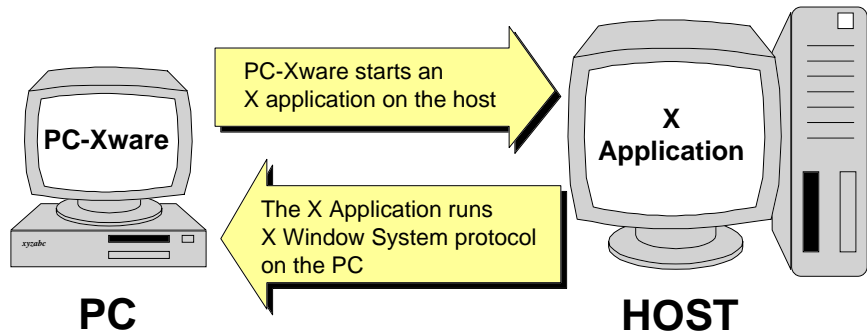
UART Chip Compatibility

All serial ports (“comm” ports) on IBM-type personal computers are based on chips called UARTs (Universal Asynchronous Receiver/Transmitters).

Microsoft recommends using the 16550A-based ports for reliable communication under Windows. This is even more important when running communications-intensive programs such as PC-Xware Classic.

Checking the Network Connection

PC-Xware and the UNIX host require two separate connections to communicate:



Configure your network software to allow both the PC and the host to initiate connections.

Checking the PC-to-Host Connection

Network software products usually include utilities that test the connection from the PC to the host. Not all products contain the same utilities. The utilities listed in the following table are probably included in your network software. The descriptions are specific to Microsoft TCP/IP on Windows.

Utility	Microsoft TCP/IP Description
<i>ping</i>	Sends and receives data packets to verify the connection on ICMP networks. Run <i>ping</i> from the Windows directory via the Start → Run dialog. Example: <code>ping <machine name></code>
<i>telnet</i>	Opens a terminal emulation window to a host. Run <i>telnet</i> from the Windows directory via the Start → Run dialog. Example: <code>telnet <machine name></code>

Checking the Host-to-PC Connection

Every X application uses a host-to-PC connection. This connection, the path for the X Window System protocol to reach PC-Xware, exists while the X application is open. The host-to-PC connection is harder to check than the PC-to-host connection because the host initiates the connection and the PC accepts it.

To test the host-to-PC connection, use the network server utilities (for example, **tftpd** or **ftpd**) that came with your PC network software package.

Checking XDM Connections

Verify that PC-Xware knows the correct name or address for your PC in the PC-Xware **Configuration → Information** tab.

FTP OnNet (Windows 95)

FTP OnNet is a WINSOCK-compatible TCP/IP network.

Installation Tips

If you move from Microsoft TCP/IP to FTP OnNet, OnNet installation detects Microsoft TCP/IP and prompts you to remove it. You should allow OnNet installation to remove Microsoft TCP/IP.

Name Resolution

PC-Xware obtains the PC name from the Name Server Configuration dialog's **Host name** field. Run OnNet's *Configure* utility, select **Name Server Configuration** and then **Modify**.

Troubleshooting

If you have difficulty using PC-Xware with OnNet:

1. Check the **Network Software** field on PC-Xware's **View → Installation** tab. Ensure that the Winsock listed has the correct vendor name and version number.
2. If you have multiple **WINSOCK.DLL** files on your PC, rename all the **WINSOCK.DLL** files except the one in the FTP OnNet directory.
3. Use FTP's *Ping* utility to check your network connection.

Microsoft TCP/IP

Microsoft TCP/IP is a WINSOCK-compatible TCP/IP network.

Installation Tips

Installing Microsoft TCP/IP on Windows 95

To install Microsoft TCP/IP, follow the steps below:

1. Select **Start** → **Settings** → **Control Panel** → **Network** → **Configuration**.
2. Click **Add**. The **Select Network Component Type** dialog displays.
3. Select **Protocol**, and click **Add...**. The **Select Network Protocol** dialog displays.
4. Select **Microsoft** from the **Manufacturers:** list and **TCP/IP** from the **Network Protocols:** list.
5. Click **OK**.

Installing Microsoft TCP/IP on Windows NT

To install Microsoft TCP/IP, follow the steps below:

1. Select **Start** → **Settings** → **Control Panel** → **Network** → **Protocols**.
2. Click **Add**. The **Select Network Protocol** dialog displays.
3. Select **TCP/IP** and click **OK**.

Reconfiguring Microsoft TCP/IP

By default, Microsoft TCP/IP is configured to obtain the PC IP address automatically from the network via DHCP or PPP. If your environment does not use DHCP, does not use PPP, or allocates unchangeable (static) IP addresses for machines, you'll need to reconfigure Microsoft TCP/IP.

To reconfigure Microsoft TCP/IP:

1. Select **Start** → **Settings** → **Control Panel** → **Network**. On Windows 95 select **Configuration**. On Windows NT select **Protocols**.
2. Select **TCP/IP** from the installed network components list.
3. Click **Properties**. The **TCP/IP Properties** dialog displays.
4. Select the **IP Address** tab.
5. Choose **Specify an IP address**, and enter the IP and subnet mask addresses in the appropriate fields.
6. Click **OK**.

Name Resolution

Domain Name Service (DNS)

DNS is available in the **DNS** tab of the TCP/IP Properties. When DNS is the only method used to resolve names, PC-Xware obtains the name of the PC from the **Host** field (Windows 95) or **Host Name** field (Windows NT) of the **DNS** tab.

If DNS and an automatic IP addressing method (DHCP or PPP) are used, PC-Xware still obtains the name of the PC from the **Host/Host Name** field of the **DNS** tab. This PC name is used as a replacement for the "\$DISPLAY" variable used in **rsh** and **rexec** application command lines. For example:

```
/usr/bin/X11/xterm -display $DISPLAY
```

Automatic IP Addressing

Microsoft TCP/IP can be configured to obtain the PC IP address automatically from the network via DHCP or PPP. If either DHCP or PPP is used, and DNS is not used, PC-Xware obtains the PC name from the **Computer name** field of the **Identification** tab in **Start** → **Settings** → **Control Panel** → **Network**. This PC name is used as a replacement for the "\$DISPLAY" variable used in **rsh** and **rexec** application command lines. For example:

```
/usr/bin/X11/xterm -display $DISPLAY
```

Hosts File

If a hosts file is used to resolve host names into IP addresses, that file is named **HOSTS**, and resides in the Microsoft Windows 95 directory.

If the hosts file is the only method used by Microsoft TCP/IP to resolve names, PC-Xware obtains the PC name from the **Computer name** field of the **Identification** tab in **Start** → **Settings** → **Control Panel** → **Network**. This PC name is used as a replacement for the \$DISPLAY variable used in **rsh** and **rexec** application command lines. For example:

```
/usr/bin/X11/xterm -display $DISPLAY
```


Troubleshooting

If you have difficulty using PC-Xware with Microsoft TCP/IP:

1. Check the **Network Software** field on the PC-Xware **Configuration → Information** tab. Ensure that the Winsock listed has the correct vendor name and version number.
2. If you have multiple **WINSOCK.DLL** files on your PC, rename all the **WINSOCK.DLL** files except the one you intend to use.



Appendix B Product Support

This appendix explains how to contact NCD's technical support staff. Before requesting product support for an NCD product, return your product warranty card.

When You Have a Question

If you have a question about an NCD product, first look in the product's online document or online help. You can also find late-breaking updates and technical information in the product *Release Notes*.

If you cannot find the answer in the product's documentation, contact NCD technical support. If you are located within the United States, see "Getting Product Support within the United States" on page B-2. If you are located outside of the United States, see "Getting Product Support Worldwide" on page B-2.

Getting Product Support within the United States

NCD provides product support through six different channels:

To do this...	Go to...
Access NCD's World Wide Web site	page B-3
Download updates from NCD's FTP site	page B-3
Download updates from NCD's Bulletin board	page B-3
Send a fax to Technical Support	page B-5
Send electronic mail to Technical Support	page B-5
Call NCD's Technical Support	page B-6

If you purchased your NCD product from an NCD distributor or a value-added reseller (VAR), contact that corporation to determine if they provide product support before contacting NCD directly.

Getting Product Support Worldwide

International customers should contact the distributor from whom they purchased the product. If this is not possible, or you need direct technical assistance, use the country code dialing appropriate for your location to access the numbers provided in the following sections.

Because NCD is in the Pacific time zone, World Wide Web, FTP, fax, and electronic mail are usually the best methods for international customers. Send electronic mail to:

intl_support@pcx.ncd.com

World Wide Web Support

NCD's World Wide Web site provides updates, product information, and technical notes. To access the NCD Web site, use your Internet browser to connect to the following:

For general information: <http://www.ncd.com>

FTP Support

The NCD FTP site provides the same updates as the Bulletin Board, plus most of the current NCD Contribution CD, and access to updates for other NCD products. To access NCD's FTP site, log into the following host:

ftp.ncd.com

When prompted, enter the following values:

User name: anonymous

Password: Your e-mail address

Go to the following directory to find subdirectories containing updates for NCD PC-Xware products:

/pub/pcx/Archive

Note Since most files are binary, remember to execute a binary command before getting a file.

Bulletin Board Support

The NCD bulletin board is provided as a service to our customers. The only charge for customers is the price of the phone call. The bulletin board may contain updates for:

- PC-Xware

- PC-Xware font files (*.PCF)
- PC-Xware font compiler
- XRemote host software
- Product technical notes

To log into NCD's bulletin board, use your PC communication software to dial:

1-503-646-1743

The default bulletin board configuration is:

9600 baud
8 data bits
1 stop bit
no parity
XON/XOFF flow control

You can use the bulletin board to post messages or data files as follow up information to previous phone, fax, or e-mail product support requests. However, do not leave product support requests on the bulletin board.

To download a file, make sure that the data transfer protocol of your PC communication software matches that of the bulletin board.

NCD supports the following data transfer protocols:

ASCII with DC2/CC4
ASCII only
XMODEM
XMODEM-1k
YMODEM (Batch)
YMODEM-G
SEALink
KERMIT
SuperKERMIT
ZMODEM-90

After selecting download and selecting a file, do whatever is necessary in your PC communication software to begin receiving a transferred file. The bulletin board will indicate when the file transfer is complete.

Fax Support

To send a fax to NCD, dial:

1-503-641-2959

If you send a fax describing your question or problem, our support engineers can often resolve complex issues more quickly and efficiently than if you contact NCD by telephone. Faxes enable the support engineer to analyze the question and prepare a solution before contacting you. When the support engineer is prepared, it takes less of your time to resolve the problem.

It is essential that you clearly describe your PC's software and hardware, and the environment that you use. This data is vital to the timely resolution of technical problems.

Electronic Mail Support

To contact NCD via electronic mail, send a mail message to:

support@pcx.ncd.com

Electronic mail is an easy way to reach technical support. 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.

The reply to your e-mail will contain a problem report number at the top of the message. Please make note of this number in subsequent e-mail messages to Product Support that pertain to this issue.

Telephone Support

To contact NCD by telephone, call the following number and ask for Technical Support:

1-503-641-2200

When you call, please be at your PC and have Microsoft Windows running. Often the support engineer requests data from the PC or asks you to perform tasks on the PC. Please have the following information available:

- 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.

After logging the problem with a support team member, you will receive a problem report number. Please give the problem report number to the support engineer for subsequent calls concerning the same issue.

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