



# MacX User's Guide

 Apple Computer, Inc.

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# Preface

*MacX User's Guide* describes how to install and use MacX, an X Window System™ display server for the Macintosh and Power Macintosh families of computers. MacX conforms to version 11, release 5 of the X Window System.

To help you use this guide effectively, this preface summarizes the contents of each chapter and suggests several approaches to reading this user's guide depending on your knowledge of computers and network communications. This preface also provides a list of related publications and resources for additional information about the X Window System.

## Who should read this guide

Anyone who plans to install and use MacX should consult this guide.

Although this guide tells you how to install and use MacX, it may not be sufficient for people who are unfamiliar with the X Window System. Because X applications, called *clients*, run on other mini- or mainframe computers under operating systems like UNIX® or VMS™, you may want to learn how to issue commands to run clients and perform other necessary work on those systems. Consult the documentation written for the systems on which your clients reside for more information. The section “Additional Reading” at the end of this preface lists a number of books that describe how to use X on UNIX.

---

## What you should already know

This guide assumes you know basic Macintosh techniques and operations. If you don't know how to drag and click with the mouse, open folders, or move and resize windows, for example, see the documentation that came with your Macintosh computer. It also helps if you are familiar with at least one other Macintosh application, such as MacWrite.

## How to use this guide

Your prior experience with X, computers, and networks will determine the way you should use the *MacX User's Guide*.

### For the beginner

If you are not familiar with the X Window System, you may want to read Appendix A, “X Window System Overview,” before installing MacX. Appendix A briefly covers what X is, how it works, and how MacX differs from traditional implementations of X.

After reading about X, go to Chapter 1, “Installation,” for step-by-step instructions on installing MacX.

Once you have installed MacX, you can read the other chapters that explain the essentials that you need to work with clients on your Macintosh computer. After learning the basics, you can browse through the guide at your convenience to learn about other MacX features. See “What's Covered in This Guide” later in this preface for brief descriptions of the chapters and appendixes in this guide.

### For the expert

If you have extensive X experience or a technical background, you will probably want to go directly to Chapter 1, “Installation,” to install MacX.

After installing MacX, you have several options:

- Go to Chapter 3, “Overview,” to learn how MacX differs from standard X implementations.
- Go to Chapter 5, “Getting Started,” to learn how to start MacX. This chapter includes information about mouse and keyboard settings that are specific to MacX.

- Go to Chapter 6, “Using Remote Commands,” for instructions on creating remote commands.
- Go to Chapter 7, “Using `xdm`,” to learn how to automatically initiate an `xdm` session.

### Terminology used in this guide

If typing the first letter of a command is an acceptable command (in addition to typing the whole command), square brackets will be used around the first letter:

```
[F]ile
```

This notation means that you may type just the letter F and press the Enter key.

A typeface called Courier indicates characters you type.

Courier looks like this.

The Command, or Apple, key will be denoted by its graphic character, “⌘.” For example, to copy selected text, press ⌘ and the letter C key simultaneously. “⌘-C” will denote this in the text.

### What’s covered in this guide

- Chapter 1, “Installation,” covers the software, hardware, and network requirements for MacX. It also guides you step-by-step through the installation process. The installation process takes approximately 10 minutes. Instructions are also given for a custom installation of MacX.
- Chapter 2, “Network Considerations,” discusses configuration and networking issues.
- Chapter 3, “Overview,” defines the major components of MacX and explains how MacX works with a visible or invisible root window and with multiple screens.
- Chapter 4, “Menu Commands,” is a high-level overview of all the MacX menus and their menu items.
- Chapter 5, “Getting Started,” covers the basic information you need to know to work in an X environment using MacX. It describes how to open MacX, create a remote command to start a terminal emulator, close clients, and exit from MacX.

- Chapter 6, “Using Remote Commands,” describes how to create, execute, and edit remote commands using the Remote menu and the Remote Command dialog box. It also covers security features and various ways to set the `-display` option. Remote commands allow you to start an X11 client on a remote host.
- Chapter 7, “Using `xdm`,” gives you step-by-step instructions for initiating an `xdm` login session on a host using the Direct, Indirect, and Broadcast methods.
- Chapter 8, “Handling Windows,” explains how to move, resize, and iconify windows. It explains how to select different window styles and how to select a default window style. It includes a section about using and setting preferences for visible root windows.
- Chapter 9, “Managing Colors and Fonts,” describes procedures for adding and removing colors and fonts. It covers how to use the Color Namer and includes a detailed discussion about using X11 fonts and a font server.
- Chapter 10, “Copying and Pasting,” gives step-by-step instructions for printing using the Macintosh Clipboard and for moving text and images between Macintosh and X windows.
- Appendix A, “X Window System Overview,” provides an overview of the X Window System.
- Appendix B, “Network Troubleshooting,” describes two troubleshooting features—duplicate address notification and MacTCP Ping.
- The glossary provides definitions of Macintosh and X Window System terms.

## The Read Me file

See the Read Me file for late-breaking information about MacX. It includes information about where to find technical support for MacX. The Read Me file is located on the MacX CD-ROM disc. You can view the Read Me file by using the SimpleText application.




## MacTCP Administrator's Guide


The *MacTCP Administrator's Guide* provides information about MacTCP, Apple's TCP/IP product. You may want to refer to the guide to learn about setting up MacTCP and using Hosts files.

The *MacTCP Administrator's Guide* is located on the MacX CD-ROM. You can view the guide online using the Adobe™ Acrobat™ Reader, which is also included on the MacX CD-ROM.

## Balloon Help

MacX provides extensive online help through Apple Balloon Help.

Choose Show Balloons from the  menu to turn on Balloon Help. While Balloon Help is turned on, online context-sensitive help will appear in balloons as you move the pointer to various objects on the desktop.

To turn off Balloon Help, choose Hide Balloons from the  menu.

## Additional reading

Information about the X Window System is widely available from a variety of sources. This section lists some of the publications that discuss X. The following publications can be found in technical bookstores.

*Note:* O'Reilly & Associates, Inc. is a well-known publisher of X Window System documentation. To view a current list of available documents published by O'Reilly & Associates, see <http://www.ora.com> on the World Wide Web.

## Tutorial

For a tutorial on starting a server and running standard clients on the UNIX operating system, read *X Window System User's Guide, Volume Three (Standard Edition)*, by O'Reilly & Associates, Inc. This guide contains much useful information, including command reference pages for clients and an appendix illustrating standard fonts. There is also a Motif edition of the guide.

## Technical

*X User Tools* by Linda Mui and Valerie Quercia, published by O'Reilly & Associates, contains hundreds of tips, tricks, scripts, techniques, and programs to make X more user-friendly.

The *X Window System Administrator's Guide, Volume Eight*, by O'Reilly & Associates, Inc. covers system administration issues for X and X-based networks. It contains a comprehensive overview of X and provides an excellent source of information on fonts and `xdm`.

For X programmers, O'Reilly & Associates, Inc. publishes the following books:

- *Xlib Programming Manual, Volume 1*
- *Xlib Reference Manual, Volume 2*
- *X Toolkit Programmer's Guide*

Another source of X documentation is the X Consortium, Inc., located in Cambridge, Massachusetts. It publishes the following documents, which you can order directly from the consortium:

- *Using the X Toolkit*
- *X Toolkit Intrinsic*s
- *Inter-Client Communications Conventions Manual*

*Note:* To view the current list of available documents published by the X Consortium, see <http://www.x.org> on the World Wide Web.

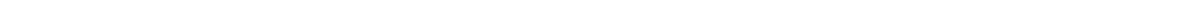
# 1

## Installation

This chapter describes the hardware, system software, and communications software that you need to use MacX. MacX runs on a wide range of Macintosh computers and communicates through selected network protocols supported by the Macintosh Communications Toolbox (CTB).

Your MacX package includes:

- license agreement and software registration card
- *MacX User's Guide*
- MacX CD-ROM disc



## What you need to run MacX

Read this section to verify that you have the system software, equipment, and communications software required to run MacX properly in your network environment.

### Software requirements

- System software version 7.0 or higher of the Macintosh Operating System

### Hardware requirements

- Power Macintosh or 68K system (68030 or higher microprocessor)
- 5 megabytes (MB) of random-access memory (RAM)
- Hard disk drive with 7 MB of free space for minimum installation—14 MB of free space for full installation
- CD-ROM drive (internal or external)
- Supported network connection

### Communications requirements

MacX uses the Macintosh Communications Toolbox to manage communications and to install connection tools. (The Macintosh Communications Toolbox manages how your Macintosh communicates using serial lines and networks.) MacX is packaged with Apple's MacTCP and MacTCP Tool products, which provide network and transport-layer protocol support for industry-standard TCP/IP protocols. DECnet™ connections are also supported.

*Note:* MacX can also use Apple's Open Transport software. See the documentation that came with your Open Transport software or your computer for information.

The TCP/IP and DECnet tools support the following physical connections:

- direct Ethernet or Token Ring
- LocalTalk bridged to Ethernet
- remote access via PPP, SLIP, or ARA

If you plan to communicate over an Ethernet network, make sure your Macintosh has either built-in Ethernet capability, or an Apple Ethernet card or an equivalent card from another company. With the appropriate Apple Ethernet Media Adapter (or other compatible media adapter), you can connect your Macintosh to an existing Ethernet network.

## Preparing for installation

### MacTCP

Make sure that MacTCP is installed on your system. For systems running system software version 7.5 or higher, MacTCP comes with the operating system. You also may have installed MacTCP as part of another software package.

To check if you have MacTCP on your system, choose Control Panels from the Apple menu. If MacTCP is on your system, you will see its icon in the Control Panels window.

MacX is packaged with MacTCP version 2.0.6. If a newer version of MacTCP is present on your system, the Installer will not install MacTCP.

**WARNING** If you have Open Transport on your computer, do *not* install MacTCP.

### Hosts file

If MacTCP is on your system, you may have a customized “hosts” file in your System Folder. This file is used to store the names and IP addresses of the host systems that may be used by MacTCP to perform name to address translation.

If your system has this file, the Installer will not create a new one.

## Installing MacX

Installing MacX takes approximately 10 minutes.

- 1 Restart your Macintosh with system extensions disabled.**

Some system extensions and virus-detection software interfere with the MacX Installer. Before installing MacX, choose Restart from the Special menu to restart your system. While the Macintosh is restarting, press and hold down the Shift key until the “Extensions off” message is displayed. This will disable all system extensions.

- 2 Insert the MacX CD-ROM.**

A window similar to the one shown in Figure 1-1 appears.



**Figure 1-1** MacX CD-ROM window

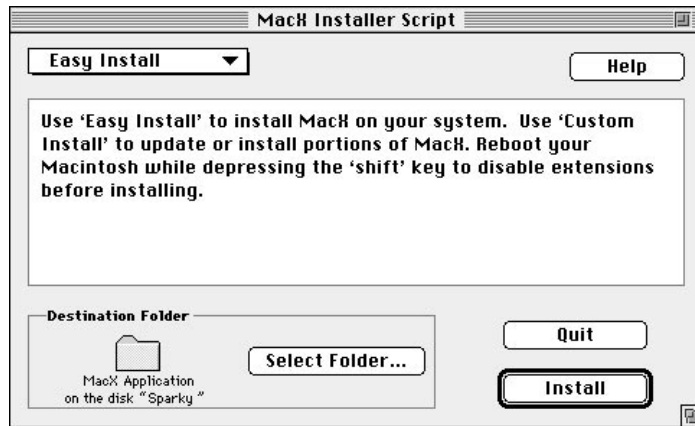
- 3 Double-click the MacX Installer Script icon to start the Installer program.**

Make sure you double-click the Installer *Script*, not the Installer.

The MacX startup screen appears.

- 4 Click Continue in the MacX startup screen.**

The Installer main window appears, as shown in Figure 1-2.



**Figure 1-2** MacX Installer main window

The pop-up menu located in the upper-left corner of the Installer window offers two types of installations: Easy Install and Custom. The default setting is Easy Install. See the following descriptions for information about these two installation options.

- Easy Install

The Easy Install option causes the Installer to copy the whole MacX package onto your hard disk. The default destination folder is *MacX Application*.

An Easy Install is recommended if you have at least 14 MB free disk space.

If you are short on disk space, you may want to choose the Custom Install option.

- Custom Install

The Custom Install option lets you choose which software packages you want to install. Table 1-1 lists the packages available for installation. The table specifies which packages are required in order to run MacX. Click the **[i]** buttons in the Installer window to see a description of each package.

**Table 1-1** MacX installation packages for a Custom Install

Name of package	Is it required?
MacX Application	Required
MacTCP 2.0.6	Required*
MacTCP Tool 1.2	Required*
MacTCP Token Ring Extension	Optional
Hosts	Optional
Misc fonts	Required
75 dpi fonts	Optional
100 dpi fonts	Optional
X Image Extension	Optional

\* These items are not recommended if you are running Open Transport on your computer.

**WARNING** If you have Open Transport on your computer, do *not* install MacTCP.

A font package is needed by the X clients, so you must install the Misc (miscellaneous) fonts package. The 75 dpi fonts and the 100 dpi fonts may also be used by X clients.

See Table 1-2 for information about choosing a font set that best suits your hardware configuration. If an X client looks for a font and it is not available, generally it will substitute a font that may be harder to read. So if you have enough disk space, install both of these font sets.

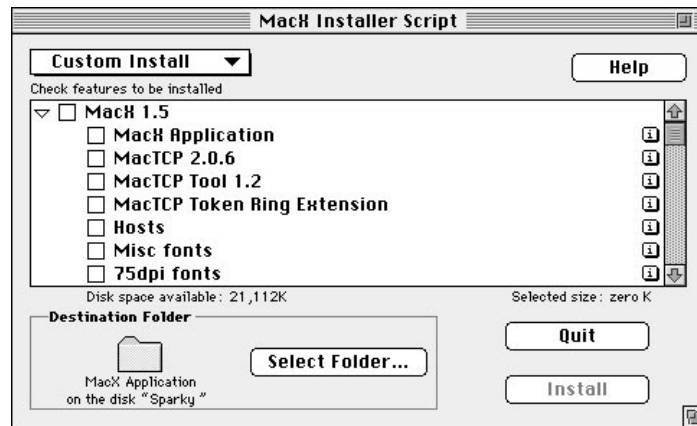


**Table 1-2** Font sets based on display size and resolution

Display size	Display resolution	Font set
13-inch, 14-inch, 15-inch	640 x 480	75 dpi
	832 x 624	100 dpi
	1024 x 768	100 dpi
16-inch, 17-inch	832 x 624	75 dpi
	1024 x 768	100 dpi
19-inch	1024 x 768	75 dpi
	1152 x 872	100 dpi
	1280 x 1024	100 dpi
21-inch	1152 x 872	75 dpi
	1280 x 1024	75 dpi

**5 Choose either the Easy Install or Custom Install option.**

If you choose to perform a Custom Install, the Installer window displays the items shown in Figure 1-3. Make sure that you select the required packages, shown in Table 1-1, by clicking their checkboxes in the Installer window.



**Figure 1-3** The Installer window with the Custom Install option selected

## 6 Choose the Destination Folder.

The Destination Folder setting appears in the lower-left corner of the Installer window. You will see the name of your hard drive and the name of the folder that the Installer will create for the MacX components.

The default destination folder is *MacX Application*. If you need to change the volume or folder that the Installer program will install to, click Select Folder. Use the dialog box that appears to select an alternate folder, or create a new destination folder. To dismiss the dialog box, click the Select or Cancel button.

If an earlier version of MacX is currently installed on your system, you should choose another destination folder, and delete the fonts folder residing on your system.

## 7 Click Install to start the installation.

After you have chosen the type of installation and the destination folder, clicking the Install button starts the installation.

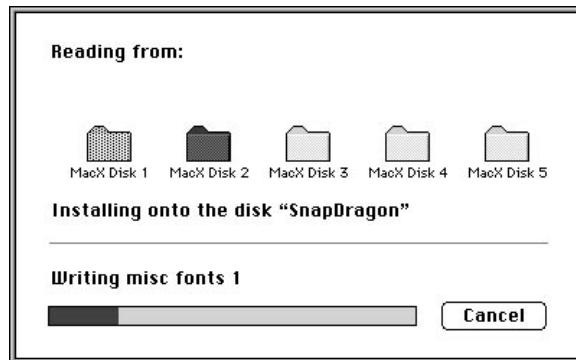
If there are any other applications running, a window with the following message appears next:

```
Installation on the active start-up disk "name of your
system's hard disk" cannot take place while other
applications are running. Click continue to automatically
quit all other running applications. Click Cancel to leave
your disk untouched.
```

This message informs you that all applications currently running need to be exited. Applications that have open documents will ask if changes should be saved. Pre-System 7 applications that do not support Apple Events will require that you close or save documents and exit the application manually.

When all applications have been exited, the Installer starts installing MacX. The Installer closes all open windows and displays a "Reading from" window that displays the status of the installation process. The Installer does its work in two steps: step one copies the packages to the destination folder, and step two decompresses the packages.

You may cancel at any time by clicking the Cancel button in the "Reading from" status window.



**Figure 1-4** Installer copying files from the folders on the MacX CD-ROM

### **If you see the “file already exists” message**

After the Installer has copied the files from the MacX CD-ROM to your hard drive (step one of the installation), the Installer will then decompress each file. As the Installer decompresses the files, if it determines that a file or folder it is decompressing will replace an older, existing file, a dialog box will appear and ask the following:

```
'filename' already exists. Do you wish to replace it with  
the file/folder from the archive?
```

The term “archive” refers to the packages on the MacX CD-ROM. Click “Replace This File,” and the Installer will replace the file and continue. This dialog box will appear for each duplicate file that the Installer discovers.

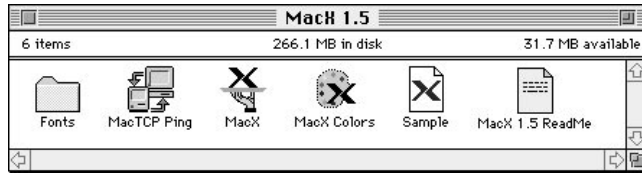
If you click “Replace All Duplicates,” all the files in the package with which the Installer is working will be replaced. Again, the above message will be repeated as duplicate files are discovered in other packages during the Installer’s decompression step.

At this time, you may also choose to stop the installation process. Click the Stop button to do this.

### **8 Restart your Macintosh.**

After the Installer has completed the installation, a dialog box may tell you to restart your Macintosh. Click Restart. The system ejects the MacX CD-ROM and restarts.

The following section describes the contents of the MacX Application folder after installation. You can also refer to Figure 1-5, shown below. (Depending on whether you performed an Easy or a Custom Install, your window may look slightly different.)



**Figure 1-5** MacX folder contents

Go to Chapter 5, “Getting Started,” for information about starting MacX and connecting to a host computer.

## MacX folder contents

After the Installer has installed MacX and you’ve restarted your system, you will see a folder called “MacX Application” on your hard disk. Double-click the folder to open it. Depending on whether you performed an Easy or Custom Install, you may see all or some of the following items in the window.

<i>Fonts</i>	Font packages used by MacX. After an Easy Install, the folder will contain folders for 100 dpi, 75 dpi, and Misc (miscellaneous) font packages. After a Custom Install, the folder will reflect your choices.
<i>Read Me</i>	A SimpleText file containing late-breaking information about MacX.
<i>Sample</i>	A sample settings file.
<i>SimpleText</i>	A text editor that lets you read the Read Me file.

<i>MacX Colors</i>	A database file containing standard X11R6 colors and names.  When you use the Color Namer, any custom colors you design and any changes you make to existing colors are captured in this file.
<i>MacX</i>	The application software. Double-click the icon to start MacX.

## Quitting the installation

You may stop the installation at any point in the process.

If you want to stop the installation while the Installer main window is on your screen, choose Quit from the File menu.

If you want to stop the installation while the Installer is copying files from the MacX CD-ROM, click Cancel. A message will tell you that the installation was canceled. Click OK and the Installer main window will be left on your screen. You may choose to install again, or quit the Installer.



# 2

## Network Considerations

MacX depends on network connections to communicate with X client applications on UNIX or VMS hosts. The most typical case involves using MacTCP to communicate with TCP/IP over Ethernet. MacTCP also supports other connection methods, such as LocalTalk and Token Ring. In addition, MacX can also run on top of third-party DECnet packages or use Apple's Open Transport software. For information about Open Transport, see the documentation that came with your Open Transport software or with your Macintosh computer.

MacTCP is a standard component of Macintosh system software version 7.5 or later. MacTCP 2.0.6 is bundled with MacX and can be installed on a Macintosh running system software version 7.0 or greater. The installation process does not overwrite newer versions of MacTCP. It also preserves current MacTCP settings files if any exist.

*Note:* For more information about MacTCP, see the *MacTCP Administrator's Guide*, which comes on the MacX CD-ROM.

**WARNING** If you have Open Transport on your computer, do *not* install MacTCP.

---

## Simple MacTCP setup

If this is first time you have used MacTCP and you have a standard Ethernet connection, you should be able to use the MacTCP control panel to easily set your network parameters. Typically, you use the More button to display the Administrator's dialog box. Click the Manual button, type your gateway and domain server information, and then type your IP address in the main MacTCP control panel. See the *MacTCP Administrator's Guide* for detailed instructions about setting up MacTCP.

## MacTCP 2.0.6

MacTCP is a software driver for the Macintosh Operating System that implements the TCP/IP protocols. These protocols provide core transmission services that are used by third-party applications such as X servers and by electronic mail, remote login, file transfer, remote printing, and database access applications.

The MacTCP driver includes these features:

- a control panel interface for configuring the driver
- a driver-level interface that allows the implementation of application protocols such as the File Transfer Protocol (FTP) and Telnet
- a domain name resolver that maps domain names to internet addresses (The domain name resolver is compatible with domain name server implementations that comply with RFC 1034 and 1035.)
- notification to the user of the occurrence of a duplicate IP address



## MacTCP Token Ring Extension

The MacTCP Token Ring Extension is an alternate link access protocol module for the MacTCP driver. It allows Macintosh computers to run the MacTCP driver in a Token Ring network and to access TCP/IP hosts and services available on that Token Ring.

The MacTCP Token Ring Extension is a MacTCP device (mdev) file that resides in the Extensions folder in the System Folder on computers running system software version 7.0 and later. The MacTCP Token Ring Extension can work with 4 megabits-per-second (Mbits/s) as well as 16-Mbits/s Token Ring networks.

*Note:* If you plan to install the MacTCP Token Ring Extension, you must have installed either an Apple TokenTalk NB Card, an Apple Token Ring 4/16 NB Card, or a third-party Token Ring card that includes a driver that conforms to the .TOKEN interface specification. Follow the installation instructions that came with the card.

## MacTCP Ping

MacTCP Ping is a network testing tool that can be used for network fault isolation, measurement, and management. Appendix B describes this tool in detail.

## System requirements

To use MacX with MacTCP, you need the following hardware and software:

- On a LocalTalk network, you need an 030/040 or Power Macintosh computer or later model connected to the LocalTalk cable.
- On an Ethernet network, you need an 030/040 or Power Macintosh computer or later model with an Ethernet connection such as the Ethernet NB Card, a built-in Ethernet interface, or a third-party Ethernet device. Apple Ethernet connections require EtherTalk software version 2.5 or later. Third-party Ethernet devices must be compatible with the MacTCP driver.

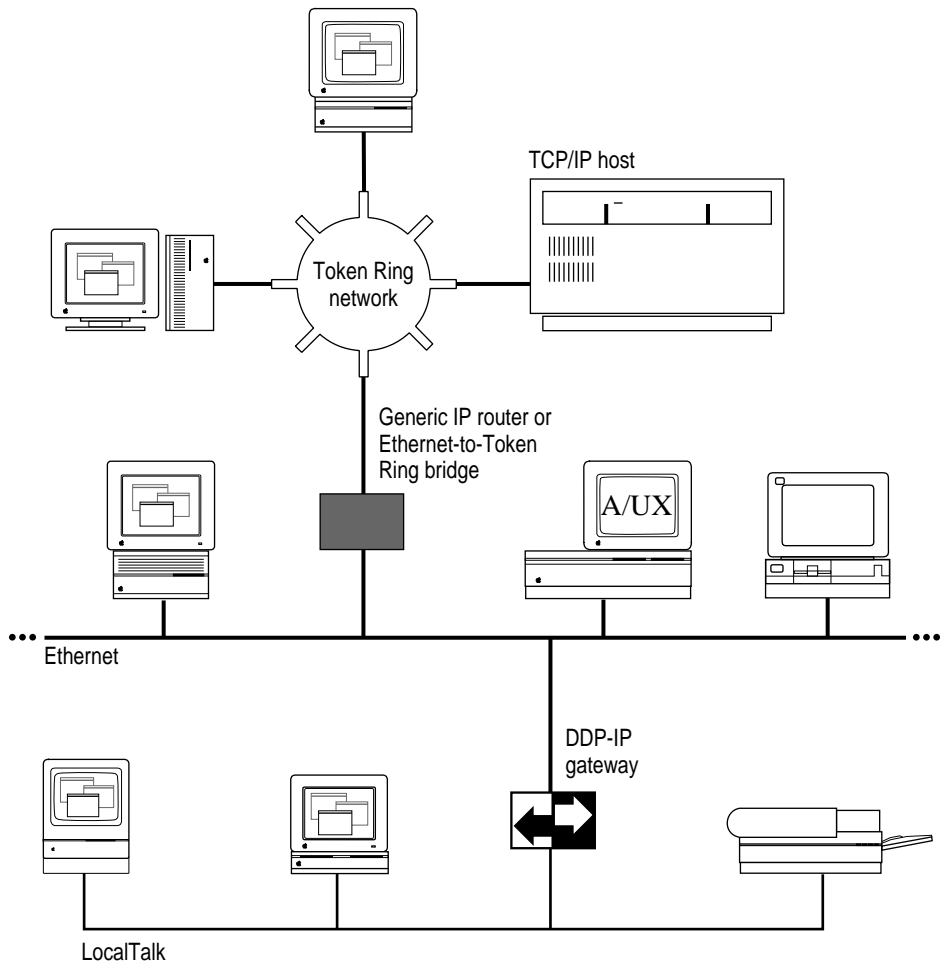
- On a Token Ring network, you need an 030/040 or Power Macintosh computer that has an appropriate networking card, such as the TokenTalk NB Card, the Token Ring 4/16 NB Card, or a third-party Token Ring card that supports the .TOKEN interface specification. Apple Token Ring connections also require TokenTalk Phase 2 and TokenTalk Prep software, version 2.5 or later (the software for the Token Ring card) and the MacTCP Token Ring Extension software contained in this product. Third-party Token Ring cards must be compatible with Apple Computer's MacTCP Token Ring Extension software, or the manufacturer must provide its own extension software that is compatible with the MacTCP driver.
- To use the AppleTalk encapsulation feature of MacTCP to connect to systems outside of the AppleTalk internet, the AppleTalk network must contain a Datagram Delivery Protocol-Internet Protocol (DDP-IP) gateway.

## Network environment

MacX with MacTCP runs over LocalTalk, Ethernet, and Token Ring-compatible network environments.

The MacTCP driver is co-resident with AppleTalk protocols so that there can be concurrent TCP/IP and AppleTalk operation. For example, you can run a MacX session while a print job is being sent to an Apple LaserWriter printer over LocalTalk. AppleTalk and MacTCP software can run over the same medium, or one protocol can run over one medium while another protocol runs over a different medium.

Figure 2-1 shows a MacTCP network running over LocalTalk, Token Ring, and Ethernet network environments.



**Figure 2-1** A MacTCP network configuration

*Note:* Before issuing a remote command that specifies MacTCP as the connection method, contact your system administrator or consult your host documentation to verify whether an entry identifying your Macintosh needs to be recorded on the host you want to log in to. (For UNIX hosts, this entry is often recorded in the `/etc/hosts` file.) In some cases, without this entry, the host will refuse to establish a connection with your Macintosh, and it will not be able to send you an error message.



# 3

## Overview

MacX is an X server for the Macintosh. By permitting a Macintosh to act as an X display server, MacX seamlessly combines the capabilities of the X Window System with the benefits of the Macintosh. With MacX, you have the ability to cut and paste text between Macintosh and X applications. What's more, MacX adds new features to the standard X environment and makes many X tasks—like adding new colors—quicker and easier. Besides being a compliant X11R5 server, MacX also acts as a window manager, supporting the *Inter-Client Communications Conventions Manual (ICCCM)* standards.

---

## X with a Macintosh flair

MacX is designed to blend in with your Macintosh working environment, adding another dimension to your desktop while allowing you to use familiar Macintosh features and capabilities. While MacX is running, you can access the Finder and desk accessories. You can run Macintosh applications and X clients simultaneously, as shown in Figure 3-1. Menu items such as Cut, Paste, Save, and Quit operate the same way, and you can cut and paste text and graphics between Macintosh and X applications.

MacX uses the Macintosh method for handling windows, but also gives you the option of using a different window manager for rooted mode.

Like standard X servers, MacX supplies a variety of colors, but makes them easier to specify. For instance, the Color Namer shows an example of each color available so that you do not have to imagine what they look like. You can create new and remove existing colors, change color names, and copy color names into X commands in client windows.

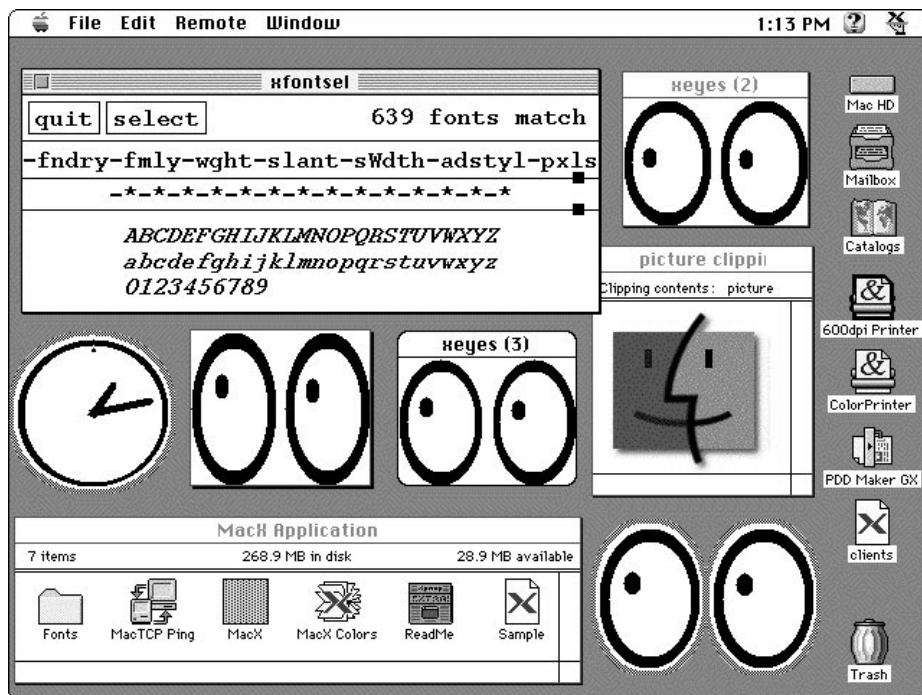


Figure 3-1 Clients and windows on a typical desktop

## What you get with MacX

In addition to the X server, MacX software includes:

- **MacX Window Manager**

The MacX Window Manager allows you to use X windows as you would Macintosh windows. It also supplies a selection of five window styles and lets you change windows into icons. This window manager handles windows in rootless style, which means that the root window is invisible and X windows share your desktop with Macintosh windows.
- **MacX Fonts Folder**

This folder contains font folders for standard X11R6 fonts including 75 dpi, 100 dpi, and Misc (miscellaneous) fonts.
- **MacX Colors File**

This file contains an array of colors that you can add to, modify, or delete from using the MacX Color Namer.
- **MacTCP**

Located in the Control Panels folder, MacTCP is Apple Computer's TCP/IP product. It comes bundled with MacX.

## What you see on the screen

Each time you start up MacX, it creates a settings file in which you can store commands and preferences. If you name and save this file when you quit MacX, a MacX document icon labeled with that name appears in the MacX application folder. This feature allows you to have your own personalized X environment to which you can return at any time by double-clicking the document icon. It also enables you to tailor X environments to different hosts, clients, types of tasks, or working styles.

MacX offers an alternative to the standard X root window display. Although the option for displaying the root window exists, MacX is preset to hide the root window and display the Macintosh desktop instead. Figure 3-2 and Figure 3-3 illustrate both cases.

For instructions on changing the root window setup, see “Root Window Preferences” in Chapter 8.

## Invisible root window (rootless)

When you start MacX, a root window does not appear. Instead, the MacX splash screen appears on the screen until MacX finishes loading. When MacX has loaded, the MacX menu bar appears at the top of the screen and the MacX icon appears in the upper-right corner. As Figure 3-2 shows, the desktop is visible. Since a root window does not appear, this style of operation is called rootless. MacX, by default, hides the root window unless a client requires a visible one or you select the black and white or color root window mode from the Window Preferences dialog box. MacX defaults to rootless mode so that you can manipulate X windows like Macintosh windows. Because your desktop is readily accessible, rootless mode also makes using other Macintosh applications and desk accessories easier.

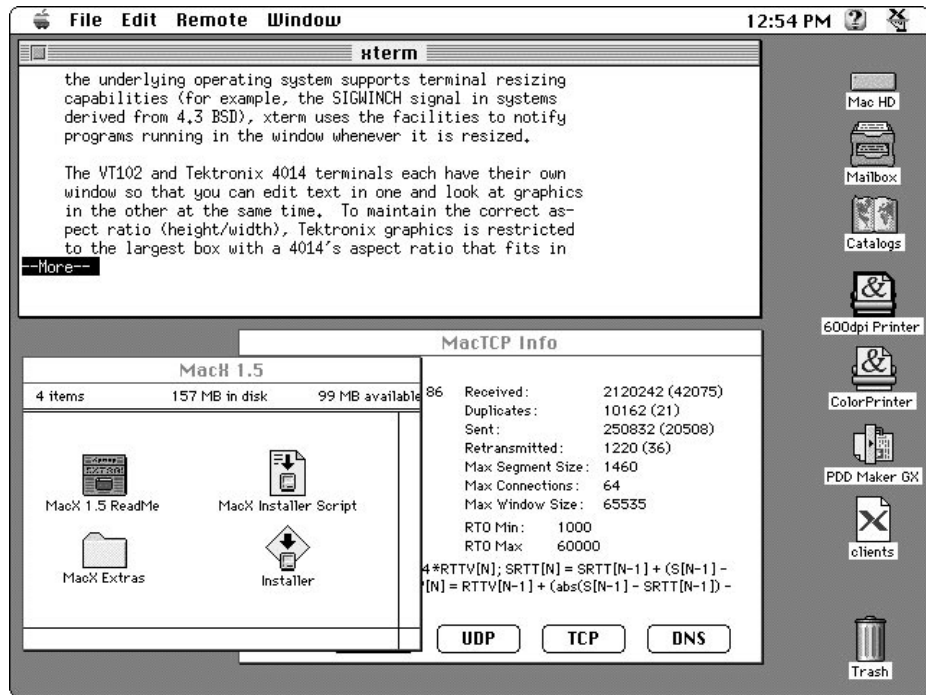


Figure 3-2 MacX on the desktop in rootless mode



## Visible root window (rooted)

For people who prefer the traditional X Window System environment, MacX provides a style of operation, called rooted, which displays the root window. In this style, you must run a window manager, such as `twm`, that resides on a host, because the MacX Window Manager runs only in rootless mode.

Figure 3-3 shows what a desktop looks like with the root window visible, assuming the Macintosh has just one screen attached. (Read “Using Multiple Screens” later in this chapter if you have more than one screen.) Usually, the window covers the entire screen. Although labeled root, this window is really a Macintosh window which represents the root window found on more traditional X servers. Because the root window is a Macintosh window, you can move and resize it without disrupting any clients running in the window. You can also use WindowShade to collapse the window. For more information about using a visible root window, see “About Root Windows” in Chapter 8.

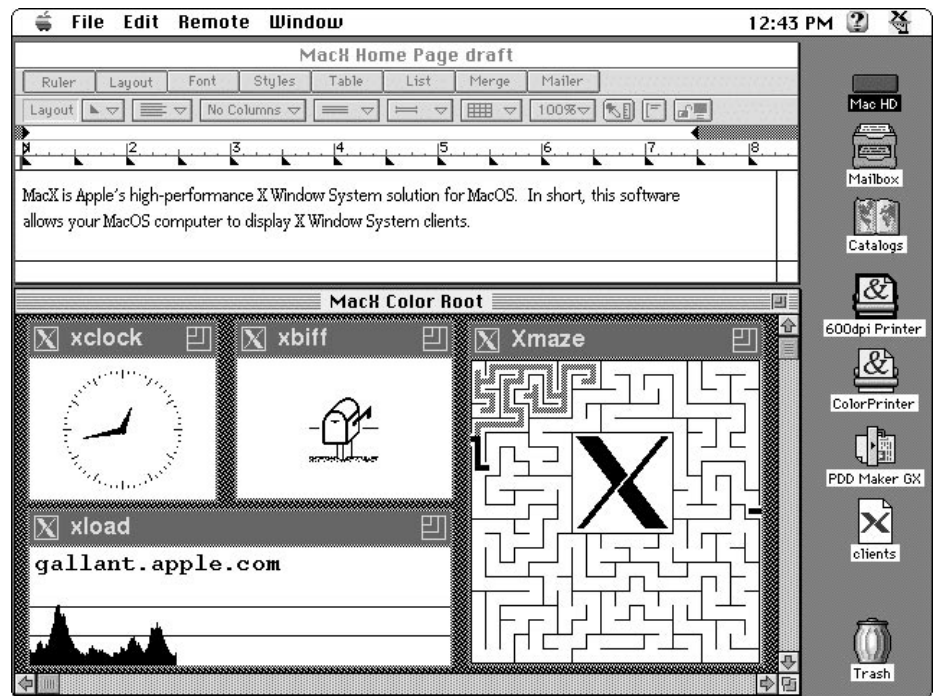
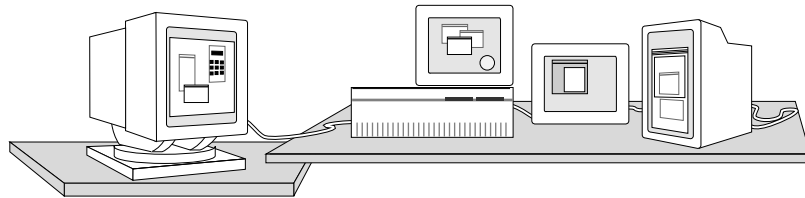


Figure 3-3 MacX on the desktop in rooted mode

In MacX, the rooted and rootless styles may coexist. When issuing a command to display a client, you can specify whether you want it to appear in rooted or rootless style by adding a screen number to your command. Chapter 6, “Using Remote Commands,” describes how to issue remote commands.

## Using multiple screens

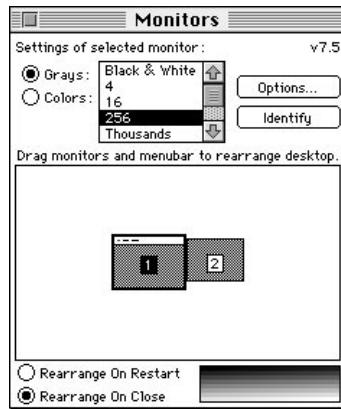
MacX supports single or multiple screens. The screens can be color, grayscale, or monochrome in any combination. Figure 3-4 illustrates a multiple screen setup.



**Figure 3-4** A Macintosh with multiple screens attached

If you are familiar with using multiple screens on a Macintosh, you know that when you move a window halfway between two screens nothing in the middle of the window gets lost, despite the physical separation between the screens. The screens act as if they are continuous because the Macintosh Operating System joins multiple screens edge-to-edge into one big screen.

To see what this arrangement looks like, choose Control Panels from the Apple () menu and open the Monitors control panel by double-clicking its icon. Figure 3-5 shows the Monitors control panel with two screens configured. The screens in the control panel should be arranged like the monitors on your desk, except with no spaces in between them.



**Figure 3-5** Monitors control panel (two screens configured)

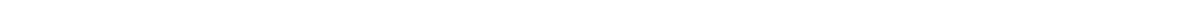
Now imagine a rectangle drawn around the screens in the Monitors control panel. You will notice some blank areas if the screens are different sizes. MacX treats the entire contents of this rectangle, *including the blank areas*, as one continuous screen on which it can display windows. That's why part of a window can disappear when you move it from a taller screen to a shorter one.



# 4

## Menu Commands

This chapter provides a summary of MacX menu commands.



## The File menu

File	
New	⌘N
Open...	⌘O
Close "Untitled"	
Save	⌘S
Save As...	
Page Setup...	
Print Clipboard...	⌘P
Quit	⌘Q

**Figure 4-1** The File menu

### New, Open, Close, Save, and Save As commands

The File menu contains a number of commands that function in the familiar Macintosh way.

The New command creates a new settings file in which you can create and save new commands and preference settings.

The Open command allows you to open an existing file, provided that one is not currently open.

The Close command closes the file currently open. If you've made changes to the file, an alert box appears asking if you want to save your changes. Click Yes to save your changes in a settings file. A dialog box appears. Type a name for your file in the Save As field and click Save. Click Cancel to return to your file without closing it. For more information about the settings file, read Chapter 5, "Getting Started."

### Page Setup and Print Clipboard commands

The Page Setup and Print Clipboard commands in the File menu are used for printing. Print Clipboard is dimmed until you copy something to the Clipboard. See Chapter 10, "Copying and Pasting," for information about copying items to the Clipboard.

Before printing, choose Page Setup. This dialog box allows you to specify the page size and orientation.

Choose Print Clipboard to print. MacX prints text or PICT-style graphics. When printing text, MacX includes spaces, carriage returns, and line feeds, but omits any other formatting. Chapter 10, “Copying and Pasting,” provides step-by-step instructions for using these commands.

## Quitting MacX

Please refer to the section “Quitting MacX” in Chapter 5 for instructions on quitting MacX.

## The Edit menu

Edit	
Undo	⌘Z
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
Color Namer...	⌘K
Fonts...	⌘F
B&W Root Preferences...	
Color Root Preferences...	
Window Preferences...	
Display Preferences...	
Misc. Preferences...	
XDMCP Preferences...	

**Figure 4-2** The Edit menu

Figure 4-2 illustrates the Edit menu. Like the File menu, the Edit menu contains a number of commands that function in the familiar Macintosh way. This menu includes several preference settings and the Color Namer. The last item in the menu, XDMCP Preferences, is covered in detail in Chapter 7, “Using xdm.”

## Undo and Clear commands

Undo and Clear both perform their familiar Macintosh functions. Undo undoes the last change, but functions only with desk accessories. Clear erases a selected item without saving it to the Clipboard.

## Cut, Copy, and Paste

MacX enables you to cut, copy, and paste text between a Macintosh application or desk accessory and a MacX window that contains text, such as a Remote Command dialog box or an `xterm` window. MacX also allows you to cut, copy, and paste graphics in PICT format. For more information see Chapter 10, “Copying and Pasting.”

## Color Namer

Choosing Color Namer from the Edit menu opens the Color Namer dialog box shown in Figure 4-3. This dialog box displays a sample of every color in the MacX Colors file, providing you with a complete visual inventory of the colors you can use with color clients. Each color has a name, which you can type in a command to display a client with that specified color. For example, you can type `xclock -display @display -fg red` in a Remote command field to start `xclock` with a red foreground. You can also create new colors and remove existing colors. When you do, the Color Namer automatically sorts the new colors by name, so they remain in alphabetical order. For more information, see Chapter 9, “Managing Colors and Fonts.”

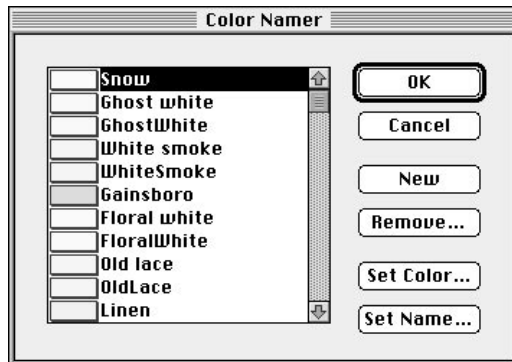


Figure 4-3 Color Namer dialog box

## Fonts

This menu item displays the Set Default Font Path dialog box. See Chapter 9, “Managing Colors and Fonts,” for information on how MacX works with fonts.



## Preferences under the Edit menu

### Root Preferences

A list of preferences, located at the bottom of the Edit menu, allows you to select session default settings. Choosing either of the first two items (B&W Root Preferences or Color Root Preferences) displays a Rooted Screen Setup window, which allows you to set the size of the color or monochrome root window.

Typically, you do not need to alter the default root window preferences. Unless you are an experienced user of X or plan to run memory-intensive color clients on machines with a small amount of RAM, you probably do not want to change the default root window size. For more information, see “About Root Windows” in Chapter 8.

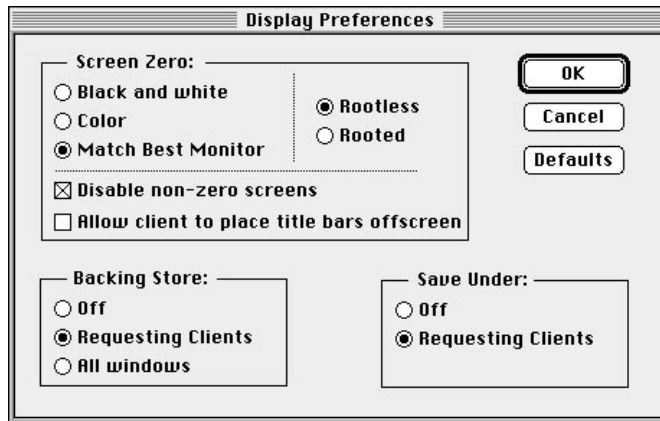
### Window Preferences

Window Preferences permits you to choose a default window style for client windows. The next time you start a client, its window will appear in that style. Window styles apply only to client windows in rootless style. In rooted style, different window managers control the style, or adornment, of client windows.

One window style choice, called Client Specified, is not actually a window style, but enables the client to indirectly influence the window style selected. If you choose Client Specified, MacX will convert a client’s border width request into one of the five window styles. See “Styling and Manipulating Windows” in Chapter 8 for additional information.

### Display Preferences

Figure 4-4 shows the Display Preferences dialog box with the default settings displayed. The default settings will map the logical Screen Zero to rootless color operation (assuming you have a color monitor). If you want to display a client in anything other than Color Rootless mode, you must first deselect the “Disable Non-Zero Screens” option.



**Figure 4-4** Display Preferences dialog box showing defaults

**Screen Zero** When setting information for Screen Zero, see the sections “About Root Windows” and “Allowing Clients to Place Title Bars Offscreen” in Chapter 8.

**Backing Store and Save Under** Backing Store is the ability of an X server to retain the contents of unmapped windows that become partially or totally obscured by other windows. By redrawing the contents of such windows from Backing Store, MacX avoids generating the network traffic required by a client to send information to repaint the window. Save Under is similar to Backing Store except that it saves only what is covered by a window or menu, rather than the contents of all partially or totally obscured windows. Save Under is used primarily with pop-up menus to save the information in the window that is covered temporarily by the menus.

By default, Backing Store and Save Under support is set to “Requesting Clients.” This setting provides support for those clients that require the MacX server to preserve window contents. Typically, these clients create complex graphic images that can take a substantial amount of time to refresh. By taking advantage of Backing Store and Save Under, clients can greatly reduce the time they need to refresh their windows.

If you are running in rooted mode, these features may incur an additional memory cost to your MacX application because the MacX server must set aside additional memory to preserve portions of client windows.

### ***Backing Store settings***

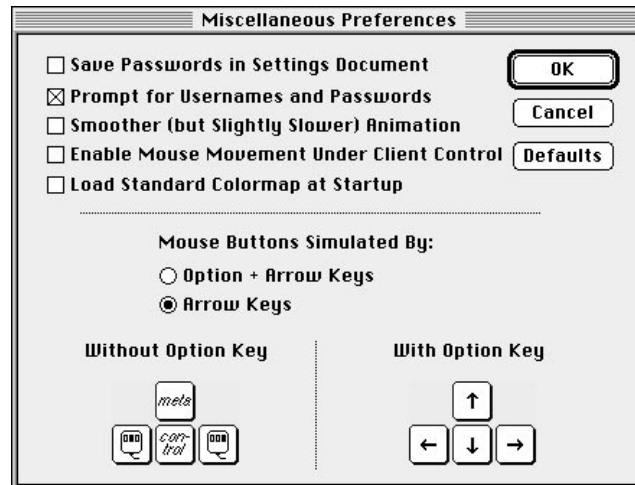
- Off Disables this feature.
- Requesting Clients Enables feature only for clients that request it.
- All windows Forces backing store to be used for all X windows.

### ***Save Under settings***

- Off Disables this feature.
- Requesting Clients Enables feature only for clients that request it.

### Miscellaneous Preferences

Figure 4-5 depicts the Miscellaneous Preferences dialog box, which contains five options.



**Figure 4-5** Miscellaneous Preferences dialog box

***Password Prompting and Saving*** Clicking the first checkbox saves passwords entered in the Remote Command dialog box so that you do not have to retype your password every time you execute a remote command. The passwords are saved in the settings file and are encrypted to provide a measure of security adequate for most business needs. In cases where passwords aren't saved with remote commands, clicking the second checkbox will cause MacX to prompt you for these passwords when you run such commands. Typically, either one or the other option is selected.

***Smoother (but Slightly Slower) Animation*** This option refreshes graphics on the screen more often for a smoother redraw look, but will slow the performance. Generally, this option is not checked.

***Enable Mouse Movement Under Client Control*** This option allows X clients to *warp*, or move the pointer via X protocol. Although not usually needed, some X clients use this feature.

***Load Standard Colormap at Startup*** The option, “Load Standard Colormap at Startup,” is unchecked as the default. At startup time, the MacX server will create several Standard Colormaps, which include RGB\_DEFAULT\_MAP and RGB\_BEST\_MAP. Clicking this checkbox causes MacX to preallocate X color cells in the server default colormap as though the colormap were an RGB\_DEFAULT\_MAP colormap. If unchecked, MacX will only preallocate BlackPixel and WhitePixel from the default colormap, with the remaining cells not allocated and available for client use.

***Setting alternate mouse buttons and scroll keys*** The lower part of this dialog box lets you choose whether to use the Option key with the Arrow keys to scroll or to simulate extra mouse buttons and modifier keys. See “Mouse Differences” in Chapter 5 for an explanation.

## XDMCP Preferences

You may set MacX to automatically initiate an `xdm` session when you start MacX. See Chapter 7, “Using `xdm`,” for instructions about using the XDMCP Preferences dialog box.

## The Remote menu



**Figure 4-6** The Remote menu

When you use MacX on the Macintosh Operating System, X clients run on (typically) UNIX host machines and display windows on your Macintosh. You can use the Remote menu to start up X clients on a remote host.

To display X clients on your screen, you issue a remote command to a host where the clients that you want to use reside. Typically, you create a command and save it in your settings file. The name of command appears in the bottom section of the Remote menu; you can invoke the command by choosing its name from the menu. You may also decide how to be notified of the results of your command, and whether MacX will use `rexec` or `rsh` to log in to the host. See the sections “Output” and “Method” in Chapter 6 for more details.

## New command

Choosing New Command from the Remote menu opens a dialog box in which you can type a new command, specify if and how to view its output, and run or save the remote command.

*Note:* Use remote commands sparingly. Remote commands are a time-consuming and memory-intensive way of starting up clients. For quicker results, start up a client like a terminal emulator or a window manager that allows you to issue commands through it to start other clients.

## Edit command

The Edit command displays a dialog box with a list of existing remote commands that you may have created and allows you to edit, execute, or remove them. The menu item appears dimmed if you haven’t created any commands in your current session.

## Command Output

The Command Output menu item, if not dimmed, will display a list of commands that are currently running or that have command output. Choosing a command from the output list displays an output window that shows any information generated by the host about the command’s execution.

## Access Control

The menu item Access Control is a security precaution that prevents access to your computer by an unauthorized client. If Access Control is on, a check appears next to its name in the menu; by default, Access Control is off. The section “Access Control” in Chapter 6 covers how MacX informs you if someone is trying to access your system.

## For more information

For step-by-step instructions on how to display a terminal emulator, like `xterm`, on your screen, read Chapter 5, “Getting Started.”

For more information about remote commands, read Chapter 6, “Using Remote Commands.”

## The Window menu



Figure 4-7 The Window menu

The top section of the Window menu provides commands that control the topmost MacX window, providing window manager-like facilities including shrinking client windows to icons, choosing a different style for a client window, and moving or resizing a window that doesn’t have a title bar or size box.

The middle section of the Window menu allows you to hide or show existing rooted windows.

The bottom section of the Window menu displays existing MacX clients and windows. Choosing an item from the menu brings the client or window to the front.

## Iconify/Uniconify

Choosing Iconify from the Window menu lets you shrink a client's window into an icon. This does not kill the client or suspend its process. You can iconify more than one client at a time.

Double-clicking the icon returns the client's window to normal size and position. You can also choose Uniconify from the menu.

## Set Window Style

This command allows you to select how you want a window to look when you display it on your screen. Figure 8-2 in Chapter 8 illustrates how the `xeyes` client displays in each of the window styles. To learn more about these features, read Chapter 8, "Handling Windows."

## Temporarily Adorn

Temporarily Adorn allows you to move and resize a window that does not have a title bar or a size box by temporarily converting the window to the style that has these elements. You have one opportunity to either move or resize the window, after which it reverts to its former style.

## Copy Screen to Clipboard

Copy Screen to Clipboard changes the pointer into a crosshair, allowing you to select all or part of the contents of your screen. To see the contents of the Clipboard, choose the Show Clipboard command from the Edit menu in the Finder. For step-by-step instructions, see "Cutting and Pasting Graphics" in Chapter 10.

## Close Window

The command Close Window changes depending on the type of window that is in the foreground. Close Window closes the frontmost window, such as the Remote Command dialog box or the Color Namer dialog box. Read “Closing Windows and Killing Clients” in Chapter 8 before closing a client’s window.

## Circulate Up/Circulate Down

These commands help you manage the hierarchy of windows on your screen. For more information, see the sections “Circulate Up” and “Circulate Down” in Chapter 8.

## Maximize Height/Restore Height

The Maximize Height command makes the frontmost window taller by extending its bottom edge to the bottom of the screen. The command is only enabled when the frontmost window is a rootless client window displayed at its original size. If the frontmost window has already been extended using the Maximize Height command, the Restore Height command restores the window’s original height.

## Show/Hide root window

The last two commands in the Window menu enable you to show or hide the black and white or color root window. When a root window is visible, the word Show changes to Hide. Hiding a root window also hides any client windows running in it. These commands are dimmed if a root window is not enabled in Display Preferences.

## Window list

When you start a client, MacX displays a window and adds the client’s name in alphabetical order at the bottom of the Window menu. A bullet identifies the window that is frontmost or “active.” You can make a window active by choosing its name from the menu.



# 5

## Getting Started

Now that you have installed your communications software and MacX, you are ready to learn the basics about MacX.

This chapter covers the minimum you need to know to function in an X environment with MacX. You'll learn how to start MacX, log in to a host and start a terminal emulator on your screen, log off the host, and, finally, quit MacX. Once you feel comfortable with these fundamentals, you can consult the remaining chapters to customize your X environment and learn about more advanced features.

---

## Starting MacX

There are two ways to start MacX. After opening the folder where MacX was installed, you can

- **Double-click the MacX icon, or click the icon once and choose Open from the File menu.**



- **Double-click the Sample icon, or click the icon once and choose Open from the File menu.**

The Sample file is a settings file and may be used to create other settings files that specify different settings for each host you access and client commands you run.



After starting MacX, your desktop should look similar to the one shown in Figure 5-1. You should see the MacX menu bar at the top of your screen and the MacX icon at the far right. For an explanation of the MacX menus, see Chapter 4, “Menu Commands.”



**Figure 5-1** The MacX desktop

## MacX files






Although you don't see a window for it, when you start MacX, MacX always opens a settings file. The settings file captures a user's preferred working setup: rooted or rootless, `xdm` inits, and remote commands. There may be several settings files. By default, each settings file appears in the MacX folder; you can move the files to a different folder.

If you have made changes, when you quit MacX, it will prompt you to save and name your settings file. If you don't save your settings file, MacX will discard everything you've set up. If you do decide to save your settings file, MacX will create a document icon labeled with the name you have entered. Later, you can double-click the icon and return to that environment exactly as you left it.

This feature enables you to customize environments for different hosts, clients, types of tasks, or working styles. For example, you might create an environment for doing budgets—in which a spreadsheet client automatically opens in the middle of your screen and a calculator appears in the upper-right corner—and save it in a settings file called “budget.”

## Mouse differences

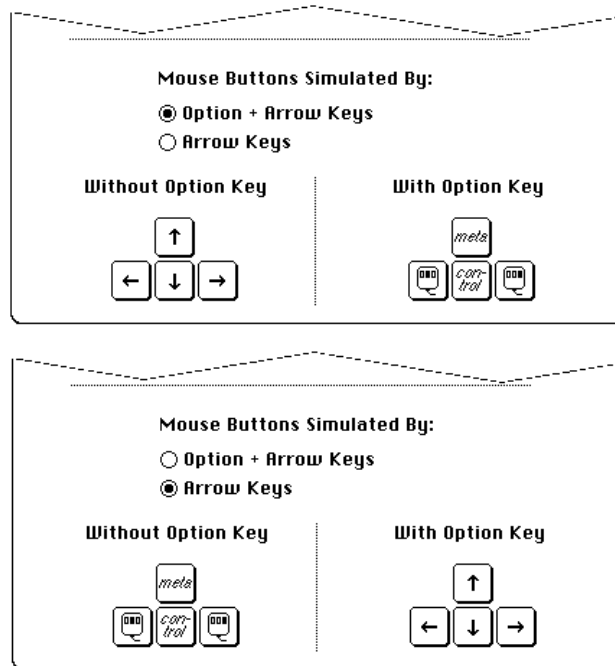
Because the Macintosh typically uses a one-button rather than a three-button mouse, you may want to consider using the arrow keys as an alternative for the missing two buttons. See Figure 5-2.

Macintosh key	MacX function
	Left mouse button
	Middle mouse button
	Right mouse button
	Meta modifier (mod1)
	Control key

**Figure 5-2** Substitute mouse buttons

*Which mouse button?* References to the mouse button in this document (for example, “depress the mouse button...”) apply to the mouse button on the Macintosh mouse, which serves as the left mouse button in MacX. The other mouse buttons are specifically identified as the middle mouse button or the right mouse button.

If you would rather press the Option key together with an Arrow key to get extra mouse buttons, you can select the Option + Arrow Keys button in the Miscellaneous Preferences window, as shown at the top of Figure 5-3.



**Figure 5-3** Arrow keys preferences option

You can find the Miscellaneous Preferences menu item near the bottom of the Edit menu.

## Starting a terminal emulator

This section describes one way to establish a connection with a remote host computer so that you can run clients and open windows on a host.

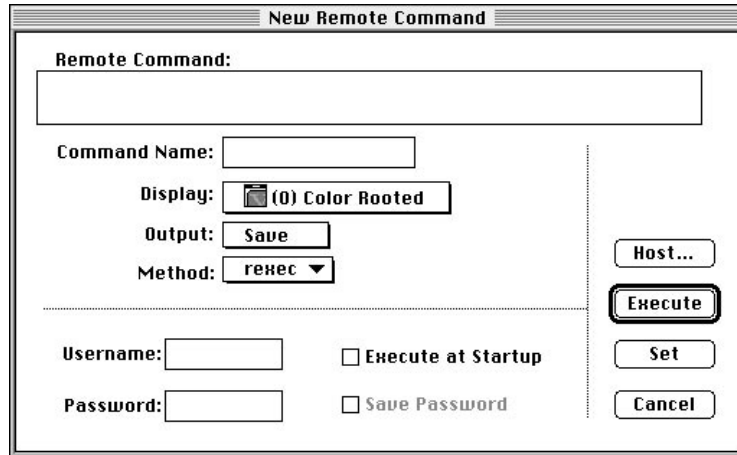
After opening MacX, the next step is to create a remote command that logs in to a host, starts up a terminal emulator, and displays a window on your screen. This section covers an example of this procedure for a host running the UNIX operating system.

## Starting `xterm`

The `xterm` client is a terminal emulator that operates on UNIX. To start `xterm`, follow these steps.

- 1 **Choose New Command from the Remote menu or press `⌘-R`.**

The New Remote Command dialog box, illustrated in Figure 5-4, appears.



**Figure 5-4** New Remote Command dialog box

*Note:* You may need to set up MacTCP before MacX allows you to create a remote command. For instructions, see the *MacTCP Administrator's Guide*, which comes on the MacX CD-ROM.

- 2 **Enter the remote command to start `xterm`.**

Type the command exactly as shown in the Remote Command field in Figure 5-5. Here is the layout of a command:

```
/usr/bin/X11/xterm -display @display
```

- `/usr/bin/X11/xterm` (begun with a slash and typed as one word) is the pathname that identifies the directory where `xterm` and other clients are located. Unless your UNIX login files already specify this path, remember to include this pathname when issuing a remote command to start up *any* client.
- `-display` indicates that the next string is the destination display.
- `@display`, a macro, lets you reuse the command on another Macintosh. (See the next section, “`@display` and `@host` Macros.”)

When you have finished typing the command, press the Tab key. Do not press the Return key to insert carriage returns; characters automatically wrap to the next line. Your UNIX or host documentation should explain `xterm` and all its options.

*Note:* For more information about `xterm`, you can use online man pages. Most UNIX machines provide an online manual that describes UNIX commands and X11 clients. To display information on a particular client, type `man` and the client name in an `xterm` window. For example, typing `man xterm` will display information about `xterm`.

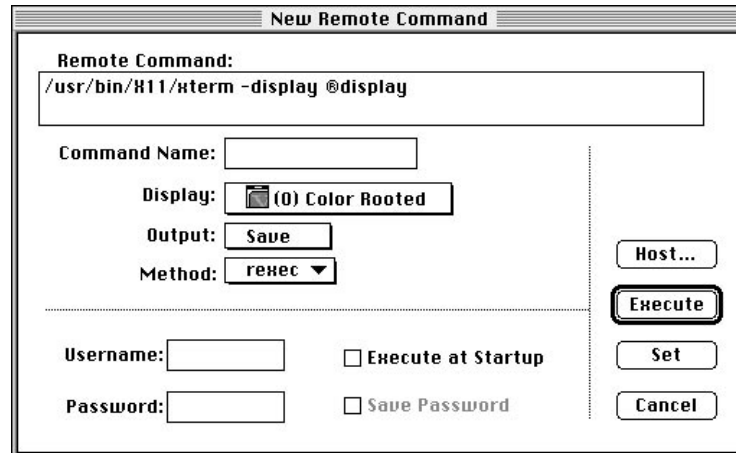


Figure 5-5 New Remote Command dialog box with a command

**3 Complete this `xterm` command by following the instructions for each field and checkbox listed below.**

**Command Name** Enter an abbreviated name for your command here. This name appears in the Edit, Execute, or Command Output menus so that you can select it later when you want to edit, execute the command, or view command output.

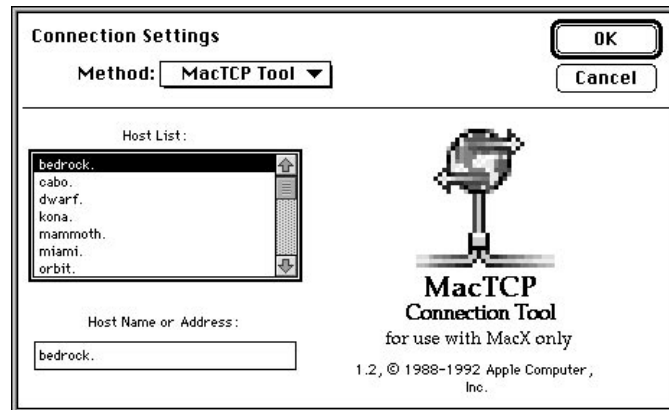
**Display** This pop-up menu contains a list of four types of screens on which you can display your remote command. For this `xterm` command, choose B&W Rootless if you have a monochrome monitor or Color Rootless if you have a color monitor. See “Specifying Screen Numbers” in Chapter 6.

Output	Choose Save or Notify from this pop-up menu to retain any system or error messages generated. For more information on the other output options, see Chapter 6, “Using Remote Commands.”
Username	Enter the user or login name assigned to you on the host receiving this command.
Password	Enter your password for the host receiving this command. Each character typed appears as a dimmed, gray box for security purposes. If you choose to leave this field blank, MacX will prompt you for your password.
Execute at Startup	Generally left unchecked; click this box to make the <code>xterm</code> window automatically appear when you open your MacX settings file.
Save Password	This checkbox should be dimmed. If not, leave it unchecked for now. For more information, see “Saving Passwords” in Chapter 6.
Host	Click this button to display the Connection Settings dialog box illustrated in Figure 5-6. At the top-left side of the box, a pop-up menu labeled Method contains a list of communications protocols, called <i>connection settings</i> , which enable you to communicate with hosts that have clients residing on them. Select the one appropriate for the host that will receive this <code>xterm</code> command. If you don’t know which connection method to select, contact the host’s system administrator. In Figure 5-6, the connection method chosen is MacTCP, Apple’s implementation of the TCP/IP communications protocol for the Macintosh.

You’ll notice when you select a different connection tool that the lower part of the Connection Settings dialog box changes. That’s because each connection tool has a different method for selecting hosts and zones or domains. The instructions in this section explain the method used with MacTCP. For instructions on using the Connection Settings dialog box presented by other connection tools, refer to the user’s guide for that tool.



*Note:* For information about using Apple's Open Transport, see the documentation that came with your Open Transport software or with your Macintosh computer.



**Figure 5-6** Connection Settings dialog box

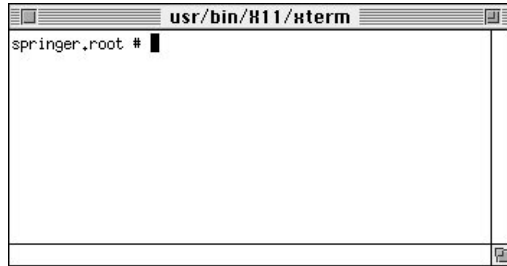
The lower part of the Connection Settings dialog box contains a scrolling field from which you can select a host. The host and domain names that appear in this box come from the hosts file in your System Folder. Simply click a host name to select it. (After you have selected a host, its name will appear highlighted.) Then press the Return key or click OK to return to the New Remote Command dialog box.

If the Host List field is empty, you either don't have a Hosts file or the file is empty. In this case, type the IP address or domain name of the host in the Host Name or Address field and click OK to return to the New Remote Command dialog box.

*If you select MacTCP Tool:* Before issuing a remote command that specifies MacTCP as the connection method, contact your system administrator or consult your host documentation to verify whether an entry identifying your Macintosh needs to be recorded on the host you want to log in to. In some cases, without this entry, the host will refuse to establish a connection with your Macintosh and will not be able to send you an error message.

- 4 In the New Remote Command dialog box, click the Execute button or press the Return key to execute your command.

Within a few moments, an `xterm` window similar to the one in Figure 5-7 should appear on your screen.



**Figure 5-7** Sample `xterm` window

If an `xterm` window does not appear after a few seconds, you may have made an error typing the command, your username, or your password. If the Output box was set to save, the name of your command will appear in the Command Output submenu in the Remote menu. Choose Command Output from the Remote menu and, while holding down the mouse button, choose the name of the client that you wish to view output about.

For other types of problems, such as network malfunctions, alert boxes will appear on your screen stating the type of error. See your system administrator if you need more help.

### `@display` and `@host` macros

Two of the strings (`@host` and `@display`) used in the remote command are MacX enhancements, which require explaining.

Putting these macros in remote commands is useful when you want to reuse a command for another host or another Macintosh. You don't have to change the host or display name in the command line.

*Note:* To type ® (the registered mark), hold down the Option key and press r.

```
-display @display
```

The `@display` option points to the name or network address used by the host to identify your Macintosh.

Alternatively, you can enter the actual name or IP address of your Macintosh.

```
-title @host
```

The option, `@host`, is substituted for the name of the host you want to contact. With the `-title` option, it will include the host name in the title bar of the `xterm` window that will appear on your screen.

Please note that you can always enter the actual host name instead of `@host`.

## Where to go from here

You have now successfully transmitted your first remote command to a host computer using MacX. The `xterm` window displays a system prompt at which you can enter commands just as you would from any terminal logged in to this host. At this point, you have a number of options. You can:

- Start up other clients

You can enter commands in your `xterm` window to start up other clients stored on the host. You'll find starting up clients this way uses less system memory than issuing remote commands. For information on starting up other clients, consult your UNIX host's online manual or other publications about the X Window System. See the Preface for suggested publications.

*Starting color clients:* Remember to use the `-display` option when starting a color client from an `xterm` window that is on a monochrome monitor.

- Learn more about windows

Notice that the `xterm` window is a Macintosh window with a title bar, which allows you to move it around. To learn more about manipulating windows in MacX, read Chapter 8, "Handling Windows."

- Learn more about remote commands

To learn more about creating and editing remote commands, read Chapter 6, "Using Remote Commands."

- Quit from MacX

When you are ready to exit from MacX, read "Quitting MacX" later in this chapter.

## Tips for enhancing `xterm`

Among the numerous options for the `xterm` command, a few (such as the option that turns on the scroll bar) are especially handy to use. Although you could learn about these options by reading the online manual pages for `xterm`, the tips in this section provide a quick way for you to set up some of these basic, handy features.

**Table 5-1** Handy `xterm` command options

Option	Description
<code>-ls</code>	Tells your host to execute your shell as a <code>login shell</code> while starting <code>xterm</code> . This process activates the commands and other features you expect to have when you use that host.
<code>-title name</code>	Specifies a name for the <code>xterm</code> title bar.
<code>-sb</code>	Creates a scroll bar on the left side of the <code>xterm</code> window and enables you to scroll back through the most recent 64 lines of text displayed on your screen.
<code>-sl number</code>	Allows you to specify the number of lines you want to scroll back and see. For example, specifying <code>-sl 100</code> lets you scroll back and see the last 100 lines displayed on your screen.

An example using some of the options presented in Table 5-1 is shown below:

```
/usr/bin/X11/xterm -ls -title "@host xterm" -sb -display  
"@display"
```

You can also use `xterm` pop-up menus to select features, such as the scroll bar. To display these menus, hold down the Control key and press the mouse button or the left Arrow key (middle mouse button).

Another item to check after your `xterm` window opens is whether or not the Delete key actually deletes characters. If it doesn't, type this command at a system prompt:

```
stty erase
```

And press the Delete key.

These tips don't begin to cover all of `xterm`'s features, but they're enough to get you started.

## Quitting MacX

When you want to exit from MacX, follow these steps:

**1 Save your work.**

Be sure to exit from any clients that contain information you want to save. Specifically, make sure to log off the host session running in your terminal emulator (`xterm` or equivalent) so that you don't lose any work you've done.

**2 Choose Save or Save As from the File menu.**

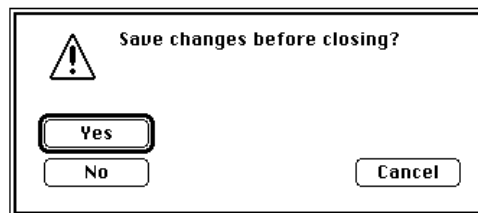
MacX creates a settings file to preserve your remote command and any other settings you have made. Unless you save the settings file, MacX will discard your current settings.

**3 Name your settings file.**

MacX will create a document icon labeled with the name you have entered. Later, you can start MacX by double-clicking the icon for the settings file and return to the same environment you just created.

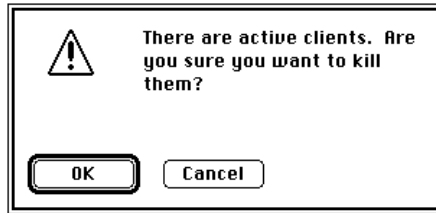
**4 Choose Quit from the File menu or press Command (⌘)-Q to exit from MacX.**

If you did not save your document before quitting, MacX will display the alert box shown in Figure 5-8. Simply click Yes to display the Save As dialog box and continue as described earlier.



**Figure 5-8** Save Changes alert box

If clients are still running when you quit from MacX, the alert box in Figure 5-9 appears. Clicking the OK button will disconnect all clients and may jeopardize any unsaved work.



**Figure 5-9** Active Clients alert box

## Closing a settings file without quitting MacX

To leave your current work environment without quitting MacX, save your document and choose Close “filename” from the File menu. The Save As dialog box appears as described above. Follow the same procedure to save and rename your untitled settings file. MacX will create a document icon labeled with the name you have entered, just as it does when you quit MacX. But unlike when you quit MacX, closing a MacX settings file still leaves the MacX application running. The MacX menus will still be there; however, you won’t be able to use most of the features unless you open an existing MacX settings file or create a new file by choosing New from the File menu.

# 6

## Using Remote Commands

Chapter 5, “Getting Started,” introduced remote commands by describing how to start the X client `xterm` (a terminal emulator used with UNIX). This chapter covers remote commands in depth. It describes all of the options available as well as how to create new commands, edit and execute commands, and view command output.

---

## The Remote menu

The Remote menu is shown in Figure 6-1. For your convenience, many of the same operations are available in more than one menu or dialog box.



**Figure 6-1** The Remote menu

Remote commands are stored in the currently opened settings file. Each settings file can hold multiple remote commands. The command names, if any, that appear at the bottom of the menu reflect the currently defined commands. Choosing one of these names will execute the specified remote command. (Figure 6-1 shows an example of how command names appear in the Remote menu; your Remote menu may look different.)

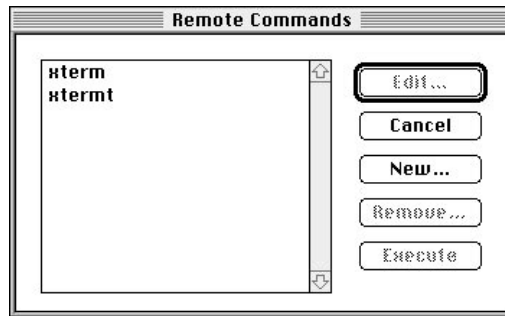
*Note:* Pressing the Option key while choosing one of remote commands from the menu provides a shortcut to the remote command editor.

## Viewing, editing, and executing commands

Choose Edit Command from the Remote menu and use the dialog box shown in Figure 6-2 to edit a command. Each item listed in the dialog box's scrolling field is the name of a command.

To edit a command, double-click its name in the list. Alternatively, select an item and click one of the right-hand buttons to achieve the corresponding action.





**Figure 6-2** Edit Remote Command dialog box

After you have created and executed a command, choosing its name from the Command Output submenu displays the command's Output window (see Figure 6-4). For more information about the Output window, read the section "Command Output Submenu" later in this chapter.

## Creating and editing commands

To create a new command, choose New Command from the Remote menu. The New Remote Command dialog box, illustrated in Figure 6-3, appears.

If you have not previously edited a command, the fields will be blank. Otherwise, they will contain information from the last command that you entered or edited. You can edit the existing information and enter a new command name to create a new remote command. Click the Execute button to save the command and run it. (The Execute button lets you make sure that the client launched as specified in the remote command.) Or, click the Set button to simply save the command without running it.

The following sections explain the use of each field and pop-up menu in the New Remote Command dialog box.

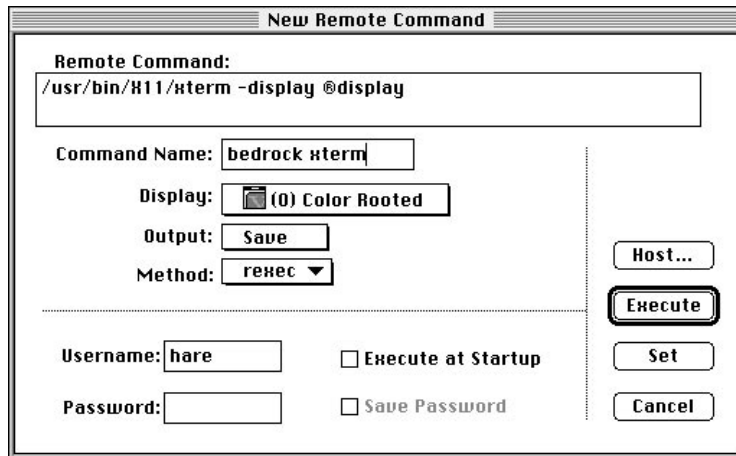


Figure 6-3 New Remote Command dialog box with command

## Remote Command

The Remote Command text field allows you to enter up to 255 characters. Like other text fields, you can use the arrow keys or mouse to move around in the field. Type the command the way you normally would for the host's shell, using syntax required by the host that will receive the command.

Or, as discussed in the section “@display and @host Macros” in Chapter 5, substitute the following macros for the relevant command options. If you avoid specifying a particular host or display by using these macros, you can create generic commands which can be executed by one or more Macintosh systems. Be sure to include the registered mark (®) when using these macros so that the MacX server can distinguish the macro name from regular text.

- The @display macro represents the MacX display station address of your Macintosh. The information is composed from your network host address and the screen number specified in the Display pop-up menu described below. When you use the @display option, you don't have to enter your IP address in the remote command field.
- The @host macro represents the target host name selected in the Connection Settings dialog box (see Figure 6-5).

*Note:* To type ® (the registered mark), hold down the Option key and press r.

## Command Name

Use this field to assign a name for the command you've entered so that you can select it later from the Remote menu, the Edit Command dialog box, or Command Output submenus. You must supply a command name to execute or save a remote command.

## Display

This pop-up menu contains a list of four types of screens on which you can display your remote command. The screen types available depend on the settings made in the Display Preferences dialog box (choose Display Preference from the Edit menu). The screen number (0 through 3) preceding each screen type is the X screen number for the specified characteristics. In Figure 6-3, the number zero (0) specifies a color screen in which the root window does not appear (rootless).

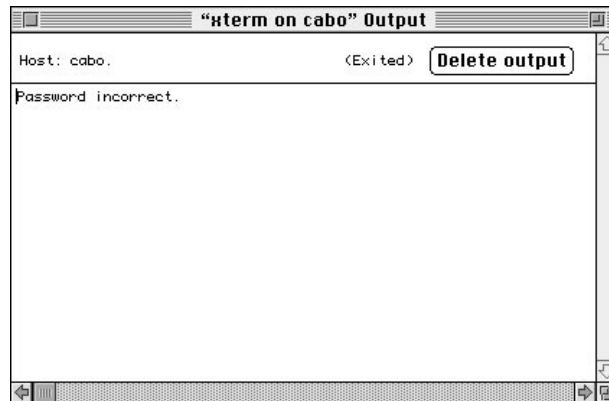
*Note:* By default, the “Disable Non-Zero Screens” option is selected in the Display Preferences dialog box. Unless you deselect this option, you will only be able to choose Color Rootless from the Display menu.

If you specify an IP address in your command instead of the macro `@display`, you must append a display station and screen number to the address. The display station number for a Macintosh is always zero. You can use the Display pop-up menu as a quick reference for screen numbers. (Settings made with the Display menu take effect *only* when you use the `@display` macro in the Remote Command text field.)

## Output

This pop-up menu allows you to choose one of four ways to be notified of output from your command when it executes. Unless you choose the Discard option, MacX saves the output for potential display in the command's Output window. The command output consists of text strings that would be normally displayed on the user's console or `xterm` window if the command were executed from there.

- Save** If you want to save command output but not be notified, choose this option. When you want to see output (if there is any), choose the command name from the Command Output submenu in the Remote menu.
- Notify** This option causes a beep and displays a small, blinking MacX icon at the left end of the menu bar. To cancel the notification and see the command output, choose the command name (or names) marked with a diamond from the Command Output submenu in the Remote menu. A window displaying the output appears, as shown in Figure 6-4. Click the close box to close the window.
- Pop Up** Choosing Pop Up causes the Output window (one is shown in Figure 6-4) to automatically appear on the screen when command output arrives. If MacX is in the background, the Output window also appears in the background, so if you don't see it appear, it might be concealed behind a foreground window.
- Discard** Choose Discard if you don't want to see any command output. A typical usage pattern might be to use Pop Up when first defining a command and then switching to Discard for steady state use.



**Figure 6-4** An Output window

*Delete Output:* The Delete Output button indicates that a command has been completed. Clicking this button will delete the output window permanently. If the remote command is still executing, this button will change to “Setting...”, which allows changes to the amount of saved text.

## Command Output submenu

The Command Output submenu is located in the Remote menu. To display it, choose Command Output from the Remote menu and, while holding down the mouse button, move the cursor in the direction of the arrow. Notice that a symbol precedes some of the command names in the submenu. These symbols indicate whether an Output window contains new information or information you have already read. The absence of a symbol means the window contains no command output.

<b>Symbol</b>	<b>Means output window contains</b>
◇	Unread command output
3	Output you have read
blank	No command output

Because you can execute the same remote command more than once—for instance, you could execute `bedrock xterm` (see Figure 6-3) three times and have three `xterm` windows on your screen—these symbols help you keep track of which command output applies to which client window.

## Method

This pop-up menu, located in the Remote command dialog box, allows you to choose one of two available methods to access an X host. The default, `rexec`, uses the least amount of resources. Some networks, however, do not support the `rexec` command or restrict its use. If you know that your network does not support the `rexec` command, choose `rsh` from the Method menu. The `rsh` command preserves more of your environment. It also adds a level of security because you must have an account on the host to log in to it.

## Username

Type the username assigned to you on the host receiving your command.

## Execute at Startup

Click this checkbox if you want your command to execute automatically when you open the settings file. This option will take effect the next time you open the file. To temporarily override this option, hold down the Option key while opening the settings file and do not release the key until the MacX startup window has disappeared from your screen.

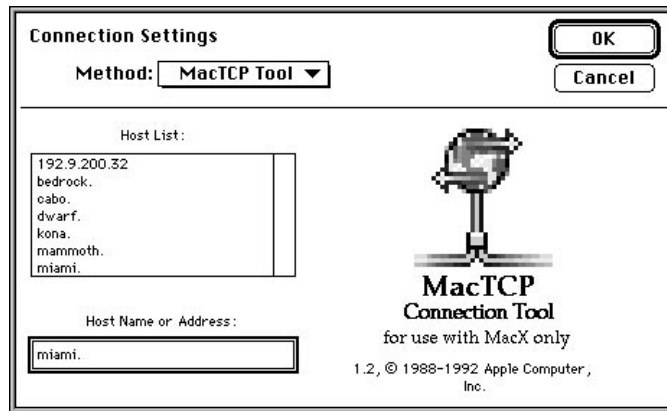
## Host

Click this button to display the Connection Settings dialog box illustrated in Figure 6-5. At the top-left side of the box, a pop-up menu labeled Method contains a list of connection tools that enable you to communicate with hosts that have clients stored on them. Choose a tool that can establish a connection with the host receiving your remote command. If you don't know which connection method to select, contact the system administrator who maintains the host you want to log in to.

MacX dims any connection tools in the Method pop-up menu that cannot establish duplex, reliable byte-stream connections. This does not imply that all the undimmed connection tools will work in every case. The host you select in the Host List field must support the protocol for the connection tool you choose.

*If you select MacTCP Tool:* Before issuing a remote command that specifies MacTCP as the connection method, contact your system administrator or consult your host documentation to verify whether an entry identifying your Macintosh needs to be recorded on the host you want to log in to. (For UNIX hosts, this entry is often recorded in the `/etc/hosts` file.) In some cases, without this entry, the host will refuse to establish a connection with your Macintosh, and will not be able to send you an error message.

In Figure 6-5, the connection method is MacTCP Tool. You'll notice when you select a different connection tool that the lower part of the configuration box changes. That's because each connection tool has a different method for selecting hosts and zones or domains. The instructions in this section explain the method used with the MacTCP Connection Tool. For instructions on using the connection settings box presented by other connection tools, refer to the user's guide for that tool.



**Figure 6-5** Connection Settings dialog box

The Connection Settings dialog box contains a scrolling list from which you can select a host. The host names that appear in this field come from the Hosts file in your System Folder. If the host you want to connect to appears in the list, click the host name to select it. (After you have selected a host, its name will appear highlighted.) Then press the Return key or click OK to return to the New Remote Command dialog box.

If the Host List field is empty or doesn't contain the host you want, *either* enter a host name to be resolved by a Domain Name Server *or* enter an IP address in decimal dot notation (for example, 192.9.200.32).

*Why use a local Hosts file?* This file is a convenient place to store the names of the hosts you frequently use. MacX can display these names in the Host List field so that you can select a name rather than enter an IP address. Your MacTCP Tool will provide a sample host file containing the proper syntax. You may also want to refer to Chapter 2, “Network Considerations,” for further information. For more information about Hosts files, see the *MacTCP Administrator's Guide*.

*Central network administration:* The preferred way to administer host names in the Macintosh environment is to use the Domain Name Resolver (DNR), thereby relying on central administration rather than Hosts files that need to be updated locally on each Macintosh.

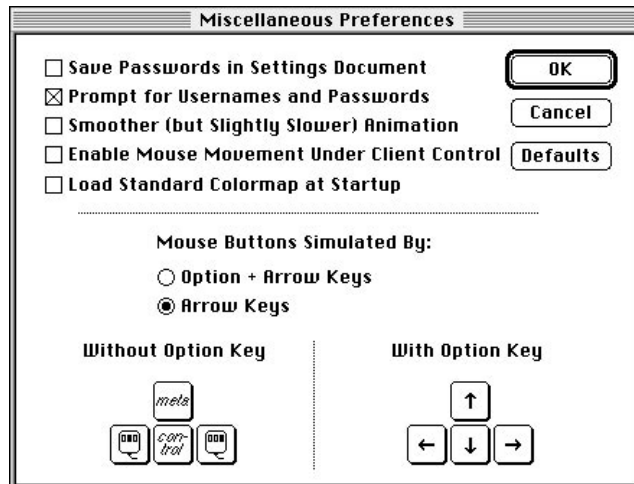
## Action buttons

Clicking any of these buttons performs the desired operation and closes the New Remote Command dialog box.

Execute	Executes and saves the command.
Set	Retains the command for the session without executing or saving it.
Cancel	Erases current changes not previously saved.

## Saving passwords

If you would rather not type passwords every time you issue a remote command, you can have MacX save them in the settings file. To save passwords, choose Miscellaneous Preferences from the Edit menu. When the Miscellaneous Preferences dialog box appears, click the Save Passwords checkbox and then click OK. The corresponding Save Password checkbox in every Remote Command dialog box will be highlighted so that you can click it. If any Remote Command dialog boxes are open, MacX will automatically select these Save Password checkboxes.



**Figure 6-6** Miscellaneous Preferences dialog box

*Note:* MacX encrypts all passwords in the settings file. Since settings files may contain saved passwords, please note that there may be security issues with sharing settings files.



Unless you do not need passwords for one or more of the hosts you log in to, you should also click the second checkbox, “Prompt for Usernames and Passwords.” This option ensures that MacX will prompt you for a password if you execute a remote command that has a blank password field. Selecting this option is especially important if you do not save passwords in your remote commands because it will circumvent login failures on hosts that require you to have a password.

If you have chosen Save Passwords in the Miscellaneous Preferences dialog box, the Save Password checkbox in the Remote Command dialog box will be activated. Click this box if you want to save your password for this command in the settings file. Enter the password assigned to you on the host that will receive your command. Each character typed appears as a dimmed, gray box for security purposes. When you execute the command, MacX will automatically send the password to the host.

If you don’t click the Save Password box, the Password field will always be empty and you will have to enter your password every time you execute the command. In the latter case, MacX will display a password dialog box so that you can enter your password as long as the “Prompt for Usernames and Passwords” option is checked in the Miscellaneous Preferences window. If this option is not checked, MacX sends an empty password to the host, causing an error if the host requires a password.

## Specifying screen numbers

In MacX, rooted and rootless window management styles coexist. When issuing a command to display a client, you can specify a screen style (rooted or rootless) and a screen type (color or monochrome) as part of the `-display` option. MacX provides two ways to specify these selections.

- Use the `@display` macro and choose a screen type from the Display pop-up menu in the Remote Command dialog box. This capability is only available in the Remote Command dialog box.
- Manually type a display name and add a display station number and screen number to the server name. (Display settings entered in the Remote Command field override the settings in the Display pop-up menu.) The server name is the network name of your Macintosh.

The complete format of the display option is

```
-display server:displaystn.screen
```

or

```
-display @display
```

where

`-display` is the remote command option

*server* represents the host name of your Macintosh

*displaystn* represents your display station number (always 0)

*screen* represents the screen number (in range 0 to 3).

A space separates `-display` from the server name. A colon separates the server name from the display station number, and a period separates the display station number from the screen number.

The display station number for a Macintosh is always zero. The screen number represents the screen style (rooted or rootless) and type (color or monochrome).

An example of the display option using an IP address is

```
-display 90.1.0.5:0.0
```

where 90.1.0.5 is the server's IP address (*server*). In the `:0.0` extension, the first 0 (zero) is the display station number (*displaystn*) and the second 0 is the screen number (*screen*).

Table 6-1 shows the default settings. These settings are in effect if you do not respecify Screen Zero in the Display Preferences dialog box (choose Display Preferences from the Edit menu).

**Table 6-1** Default screen numbers

Screen number	Description
0	Color screen, rootless style
1	Color screen, rooted style
2	Monochrome screen, rootless style
3	Monochrome screen, rooted style

If your Macintosh has more than one monitor of the same type attached to it, MacX displays the client on the largest of those screens. On the other hand, if no screen matches the type specified by the screen number—for example, if you specify “0,” but do not have a color screen—then MacX displays the client on the screen displaying the menu bar.

Some circumstances require using the `-display` option, specifying particular arguments with the `-display` option, or both in order to issue certain commands. In some cases you can’t use the `-display` macro. In other cases, you simply have to specify a different screen number. This section describes these special cases.

### Starting color clients from a monochrome `xterm`

You must use a display name and a color screen number to start a color client from an `xterm` window on a monochrome monitor. A typical command to start a rootless, color `xclock` is:

```
xclock -bg red -fg yellow -display karnak:0.2 &
```

This command starts `xclock` and sets the background color to red and the foreground color to yellow.

Suppose you have issued this command to a host called “pluto.” On pluto, the name for your Macintosh is “karnak.” Since pluto is a UNIX machine, the name karnak is listed next to the IP address for your Macintosh in the `/etc/hosts` file. However, if no name was assigned to your Macintosh in `/etc/hosts`, you will have to replace karnak in the above command with your machine’s IP address.

There are two ways to obtain the IP address for your Macintosh:

- Ask your system administrator.
- Look in the MacTCP Control Panel.

## Starting clients on another server

To start up a client on another server (UNIX or VMS system), you must use the `-display` option with the display name or network address of that server. Don't use the `@display` macro because it supplies the name of your server. If you don't know the other server's display name or network address, ask your system administrator.

## Clients that expect root windows

Some clients, such as `xfish`, change the appearance of the root window. If you try to run such a client in rootless style, MacX ignores root window operations and, often, nothing appears on your screen as a consequence. Should this situation happen to you, try starting up your client in rooted style. The screen numbers would typically be 1 or 3.

Interactive Desktop environments such as CDE or HP-VUE generally presume the use of their own window manager and supply a full screen pseudo root or desktop window. These are best accommodated by choosing Display Preferences from the Edit menu and clicking the Rooted button in the Screen Zero section of the dialog box.

## Saving and recalling remote commands

After you have modified a remote command, click the Set button. This will save the command for the rest of the session.

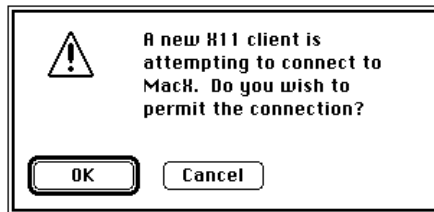
Use Save or Save As in the File menu to make the change to your settings file permanent.

When you want to recall the remote commands, open the file after starting MacX. You can choose Open from the File menu, or double-click the file icon in the MacX Application folder window.

## Access Control

If you are concerned about security breaches, you can enable Access Control in the Remote menu. A checkmark next to the menu item will indicate that Access Control is enabled. When enabled, MacX displays the alert box shown in Figure 6-7 in response to any attempt by a client to connect to your server.

Choose the Access Control command from the menu to toggle this feature on and off. Pressing  $\text{⌘-H}$  also turns Access Control on or off.



**Figure 6-7** Access Control alert box



# 7

## Using `xdm`

This chapter describes the last item in the Edit menu, XDMCP Preferences, and tells you how to start an `xdm` (X Display Manager) session using three different startup methods.

MacX supports the X Display Management Control Protocol. When `xdm` support is configured on host machines, this simple facility can be used to log in to and start an X session on a host machine.

The actual session started will vary depending on the host configuration. In certain cases it may be necessary to ensure that screen 0 is a rooted window so that a host window manager will run smoothly. Consult your system administrator to find out if the host machines on your network are configured to use `xdm`.

*Note:* Only one `xdm` session can be active at a time. You cannot have concurrent `xdm` sessions. In addition, do not have remote commands execute at startup when using `xdm`.

*Note:* Please note that `xdm` will not work with DECnet.

---

## Setting XDMCP preferences

Choose XDMCP Preferences from the Edit menu to display the dialog box illustrated in Figure 7-1. Two tasks are done with this dialog box: you can specify your preferences for starting an `xdm` session, and, optionally, you can initiate an `xdm` session. Once you have saved your XDMCP preferences, the next time you start MacX, an `xdm` session will automatically be initiated.

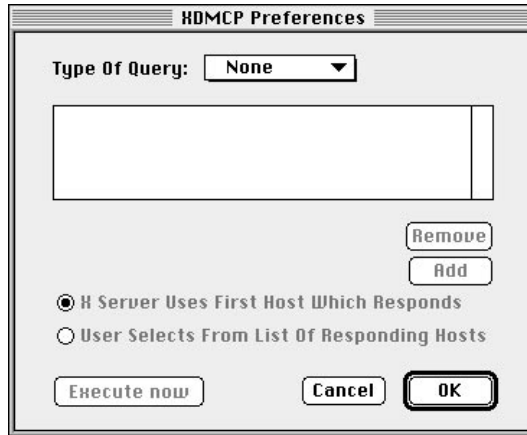


Figure 7-1 XDMCP Preferences dialog box

### XDMCP startup methods

MacX supports three XDMCP startup methods: Direct, Indirect, and Broadcast. The three methods of operation are described below.

- |          |   |
|----------|---|
| Direct   | In the Direct method, the X server sends a request to the X Display Manager program running on a specific host.   |
| Indirect | In the Indirect method, the X server sends a request to a single host with the expectation that the host will forward the request to a number of secondary display managers on different hosts. The initial host may also accept the request. You can specify multiple indirect recipients. Note that the Indirect mode may require special host configuration. |



**Broadcast** In the Broadcast method, the X Server sends a request to all hosts on the local network. Responses are displayed in a dialog box. Hosts that do not wish to service the request ignore the broadcast.

## Using the OK button

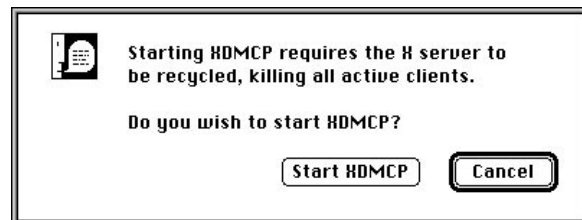
With all three of these methods, if you click the OK button, your query will be saved for the session. Then you can execute the query at another time during the same session.

After clicking OK, if you want to save the query for another session, you must choose Save or Save As from the File menu. The next time you start MacX, the query will be initiated automatically.

## Using the Execute Now button

If you want to try out the new `xdm` settings, click the Execute Now button. Only one `xdm` session can be active at a time.

If you have any active clients and you set up a query and click the Execute Now button, the alert box shown in Figure 7-2 will appear.



**Figure 7-2** XDMCP alert box

At this time, you can click the Start XDMCP button to continue, or click the Cancel button to stop. If you continue, MacX will kill all clients currently running and close all client windows (but not Macintosh windows).

After you have executed a query, choosing Save or Save As from the File menu will save the query for another session. When this is done, MacX will automatically reinstantiate XDMCP at the start of a session. If you do not want to automatically initiate XDMCP when you start MacX, set the Type of Query back to None.

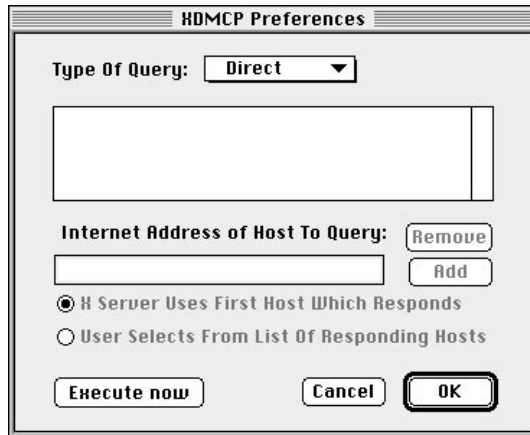
## Starting an xdm session

The rest of this chapter explains how to start an xdm session using each of the startup methods described earlier. Each one of the following scenarios assumes you are using the XDMCP Preferences dialog to initially set up xdm or change the xdm method. During normal MacX use, xdm simply presents you with a list of responding hosts, a login session, or an X-based chooser window at X server initialization.

### Initiating a Direct XDMCP session

- 1 **Choose Direct as the Type of Query in the XDMCP Preferences dialog box.**

A text field labeled “Internet Address of Host to Query” appears. See Figure 7-3.



**Figure 7-3** XDMCP dialog box with Direct settings

- 2 **Specify the host you want to connect to.**

In the “Internet Address of Host To Query” text field, type the IP Address or the name of the host to which you wish to connect.

- 3 **Click the Execute Now button.**

This will send your query, and the host will display a login window.

After you log in to the host, a host or user-specific session will start. In future server start-ups or recycles a direct host login will be initiated.

If you do not want to execute the command immediately, click the OK button, and your settings will be saved for the rest of the session.

## Initiating an Indirect XDMCP session

**1 Choose Indirect as the Type of Query in the XDMCP Preferences dialog box.**

When you choose Indirect as the Type of Query, a text field labeled “Internet Address of Host to Query” appears.

**2 Specify the host(s) you want to connect to.**

In the “Internet Address of Host To Query” text field, type the IP Address or the name of the host to which you wish to connect. This host will either respond or redirect the request.

Notice that the Add and Remove buttons have become active. You may use the text field and these buttons to make a list of hosts you wish to query. After adding one host, you can also re-use the text field to add more hosts.

To remove a host from the list, click the host’s IP Address or name and then click the Remove button.

**3 Select a host selection method by clicking its radio button.**

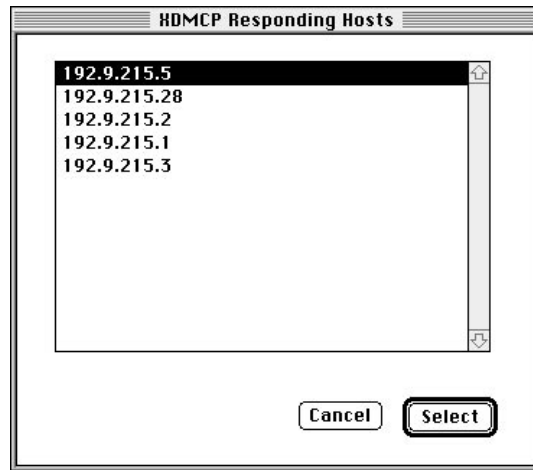
See step 4 for information about the two host selection methods.

If you do not want to start an `xdm` session immediately, click OK in the XDMCP Preferences dialog box; your settings will be saved for the rest of the session.

**4 Click the Execute Now button.**

If you selected “X Server Uses First Host Which Responds,” the host that responds first to your query opens a login window or an X-based chooser window. Go to step 6.

If you selected “User Selects From List Of Responding Hosts,” the XDMCP Responding Hosts dialog box appears, as shown in Figure 7-4. As hosts respond to your query, their names or IP addresses appear in the scrolling list. Go to step 5.



**Figure 7-4** XDMCP Responding Hosts dialog box with Indirect or Broadcast query results

- 5 Click a host (or IP address) in the scrolling list and then click the Select button.**  
A login window or a X-based chooser window for the selected host appears.
- 6 Log in to the host that responded or to the host that you selected.**  
This step will start your terminal emulator session on the host machine.

### Initiating a Broadcast XDMCP session

- 1 Choose Broadcast as the Type of Query in the XDMCP Preferences dialog box.**
- 2 Click a host selection method.**  
See step 3 for information about the two available host selection methods.  
If you do not want to start an `xdm` session immediately, click OK in the XDMCP Preferences dialog box; your settings will be saved for the rest of the session.
- 3 Click the Execute Now button.**  
If you selected “X Server Uses First Host Which Responds,” the host that responds first to your query opens a login window or an X-based chooser window. Go to step 5.

If you selected “User Selects From List Of Responding Hosts,” the XDMCP Responding Hosts dialog box appears, as shown in Figure 7-4. As hosts respond to your query, their names or IP addresses appear in the scrolling list. Go to step 4.

- 4 Click a host (or its IP address) in the scrolling list and then click the Select button.**

A login window or a X-based chooser window for the selected host appears.

*Note:* If you do not select a host from the list of responding hosts within 10 minutes, MacX selects the first host on the list for you.

- 5 Log in to the host that responded or to the host that you selected.**

This step will start your terminal emulator session on the host machine.

## Steady state information

During normal MacX use, you do not need to change your XDMCP Preferences when using `xdm`. MacX will present a scrolling list of responding hosts, a login session, or an X-based chooser window as appropriate.

## Host configuration

For sites with advanced host configuration setup, the administrator should be aware that MacX has an XDMCP Display Class of *Apple-MacX* and a Manufacturer Display ID of *Apple-MacX-[ethernet\_address]*.



# 8

## Handling Windows

One advantage of running X applications on the Macintosh desktop is that they can run in windows that look and act like Macintosh windows. So, if you're familiar with the Macintosh, you already know a lot about handling windows in MacX.

In addition to the familiar Macintosh features, MacX offers other handy features as well, including a selection of five different window styles and the ability to shrink windows into icons (called *iconifying*). MacX provides a built-in window manager for managing X clients in rootless screens. The first half of this chapter describes the Window menu and the MacX window manager. The remainder of the chapter focuses on rooted windows that support traditional X window managers.

---

## The Window menu

Figure 8-1 illustrates the Window menu. The items in the top half of the menu apply to the frontmost rootless X client window. With the exception of the Copy Screen to Clipboard menu item, all other menu items in this menu are dimmed until you have an active client window or dialog box on your screen. The last section of the menu shown in Figure 8-1 displays the names of active clients and windows. For instructions on starting a client, consult Chapter 5, “Getting Started” or Chapter 6, “Using Remote Commands.”



Figure 8-1 The Window menu

## Active clients and windows

For your convenience, MacX lists the titles of open windows in alphabetical order at the bottom of the Window menu. The windows listed are client windows, and MacX windows and dialog boxes, such as the Remote Command dialog box and the Color Namer. The titles appearing in the Window menu are the same ones displayed in the title bar of each open window. MacX extracts client window titles from certain X protocol requests sent by the clients, not from the Command Name field in the Remote Command window. When visible, the title of a root window will also appear in this list; the titles of *its* client windows won't appear in the list since they are not Macintosh windows.



Since several versions of the same client can run simultaneously, MacX differentiates among these iterations by appending numbers to their window titles. The first time you start up a client, MacX does not append a number to its title; however, as soon as a duplicate of that client appears, MacX adds a (1) to the original client window's title and a (2) to the duplicate window's title. In Figure 8-1, the title “xclock (2)” indicates that a second `xclock` is running. The bullet preceding “xclock (2)” means that this client's window is active, or frontmost.

## Making windows active

MacX provides several ways to make a window active in rootless style. You can click a window's title bar or you can choose its title from the Window menu. Once a window is selected, its title bar is highlighted and a bullet appears in front of the title in the Window menu. The client in an active window receives characters typed from the keyboard and controls the colors displayed on your screen. If you're not sure whether a window is active, check the Window menu to see if a bullet precedes the window's title.

Since clients executing in a rooted style may be under the control of a window manager, the method for making a window active or assigning input focus depends on the window manager. If no window manager is operating, you can make a window active and receptive to keyboard input by moving the mouse pointer into the window.

*Don't click in windows:* Whether in rooted or rootless style, avoid clicking in a client window to make it active. Taking this precaution prevents the client from receiving the mouse click and performing some action that you don't expect or don't want. Click the title bar instead.

## Positioning windows

Many clients accept the `-geometry` option, which determines the position of the top-level windows on the screen. The arguments to this option specify the width and height of the window in pixels followed by *x,y* coordinates that specify how far in pixels to position the window from the corners of the screen.

For example,

```
-geometry 400x150+10+40
```

requests a window 400 pixels wide and 150 pixels tall with the upper-left corner located 10 pixels from the left edge of the screen and 40 pixels from the top. The `xfontsel` window in Figure 8-2 illustrates (approximately) this geometry position. If the coordinates were `-10 -50`, the lower-right corner of the window would appear 10 pixels from the right side of the screen and 50 pixels from the bottom.

The MacX Window Manager will automatically position a window if its coordinates would display it offscreen, if the command to create it doesn't specify a geometry option, or if the `x,y` coordinates specified in the geometry option are `0,0`. MacX positions such windows in a cascading sequence starting near the screen's point of origin, which X11 specifies as the upper-left corner of the screen. In addition, when `x,y` coordinates aren't specified, MacX automatically positions a window on the largest screen best-suited to display it; for example, it displays a color window on the largest color screen available.

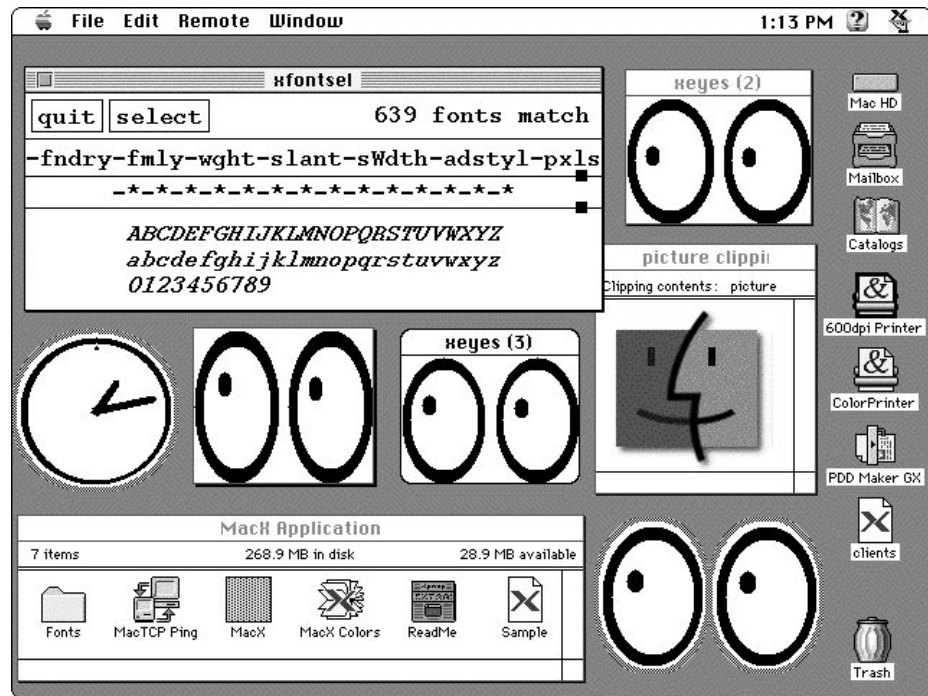


Figure 8-2 Rootless window geometry

When specifying geometry coordinates, make sure you consider how MacX determines the relationship between screens and the desktop. For example, suppose you have a 19-inch (monitor 1) and a 13-inch monochrome monitor (2) connected to your computer. In the Monitors control panel, you align the tops of both screens so that they're even. This creates a blank area that extends from the bottom of monitor 2 to the bottom of monitor 1.

With this configuration, if you were to specify geometry coordinates `-10-50`, intending to display a monochrome `xeyes` client at the bottom right corner of the smaller monitor, MacX would instead display it in the top-left corner of the larger monitor. It does so because your geometry coordinates would have placed the `xeyes` window off the screen in the blank area below monitor 2. Remember that the MacX Window Manager considers your desktop to be the smallest rectangle that can enclose all your screens. Even the blank areas within this rectangle are considered part of your desktop. Therefore, to display the `xeyes` client in the lower-right corner of monitor 2 as you wanted, you would have to specify coordinates similar to `-10-300` to account for the gap between the two monitors.

## Allowing clients to place title bars offscreen

The Display Preferences command in the Edit menu offers a feature that allows you to specify how MacX will handle placing window title bars in rootless mode.

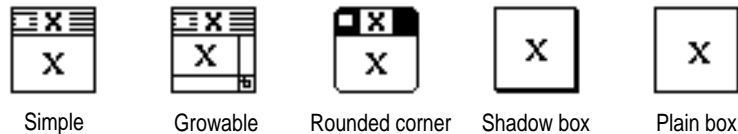
By default, MacX will locate X windows on the screen so that any decorations placed upon them by the MacX Window Manager will be visible. However, certain clients may request the placement of a window so that its top edge coincides with the bottom of the MacX menu bar. If so, title bars which are placed by the MacX Window Manager on these windows will be displayed underneath the menu bar, making them impossible to access. If the preference titled "Allow client to place titlebars offscreen" is not checked, MacX will adjust the vertical placement of these windows so that the title bars are visible. Similarly, if an undecorated window has decorations added to it with the Temporarily Adorn command, MacX will adjust the vertical placement of the window, if needed, so that the title bar that is added is completely visible.

## Styling and manipulating windows

While MacX enables you to treat client windows like regular Macintosh windows, it has no control over windows that open within a client window. According to X protocol convention, these lower-layer windows are controlled by the client itself, so MacX simply relays the information to your screen. On the other hand, the client and the host it runs on have no control over the type of window MacX creates for the client. They can make requests, called *hints*, but ultimately the MacX Window Manager, guided by your preferences, determines what is possible when mapping windows on the screen.

### Setting window styles

When clients open on your screen, they appear in the current default style. The five styles are shown in Figure 8-3.



**Figure 8-3** MacX window styles

To change the window style, follow these steps:

- 1 Bring the window you want to restyle to the front.**

You make a window active by choosing its name from the Window menu or by clicking the window's title bar.

- 2 Choose Set Window Style from the Window menu to display the five window styles.**

Figure 8-3 shows these styles. The one currently in effect will have a check mark next to it. To select a different style, choose it from the pop-up menu.

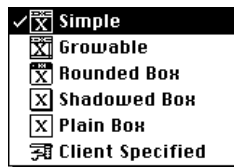
If you would like to change the default style for all new windows created from this point on, see the following section, "Setting the Default Window Style." Remember that a window must have a title bar to be moved and a size box to be resized. However, if you select a style without a title bar or a size box, you can still move or resize the window by choosing Temporarily Adorn from the Window menu. See the section "Moving and Sizing Windows" later in this chapter for more details.

When you resize a rootless X window, the size of the window in client-specified units (normally, pixels for graphics or characters for text-oriented clients such as terminal emulators) appears in the menu bar.

MacX also allows you to move and resize a root window displayed on your screen just as you would a client window. For further explanation, see “About Root Windows” near the end of this chapter.

## Setting the default window style

The Edit menu contains a Window Preferences command that sets a default window style for client windows. Figure 8-4 shows the pop-up menu from which you can choose a default window style. The default takes effect the next time you start up a client. These window styles (shown in Figure 8-3) apply only to client windows displayed in the rootless style when the MacX Window Manager is in control.



**Figure 8-4** Window style preferences

After choosing a new default window style, click the OK button. The new window style will go into effect for the rest of the session. If you would like to record your preference for future sessions, choose Save from the File menu.

*Displaying nonrectangular windows:* MacX provides support for the X Window System SHAPE extension. This extension allows client applications to display nonrectangular windows. Shaped rootless windows implicitly appear without decoration. For an example of a non-rectangular window, see the `oclock` client in Figure 8-2.

## Specifying a window style in a remote command

Top-level client windows displayed in a visible root window usually have a border with a client-specified width. In rootless style, this border is not displayed; however, you can use the border width option to specify one of the window styles shown in Figure 8-3, provided that the client supports this option and you have chosen Client Specified from the Window Preferences pop-up menu in the Remote Command dialog box. When entering a command to start up a client, specify a window style by including the border-width option in the command.

The procedure for specifying a border width varies depending on the client. The format of the border width option usually is

```
-bw n
```

where *n* represents a number from 1 to 5. MacX converts border widths into the window styles as illustrated below:

<i>Border width</i>	<i>Window style</i>
1	Simple
2	Growable
3	Rounded corner
4	Shadow box
5	Plain box

For example, the following command, typed in an `xterm` window, starts up the `xclock` client in a window with rounded corners and a solid title bar.

```
xclock -bw 3
```

In rooted style, where the root window is visible, the border width option functions as originally intended: it specifies the thickness of the window border. The border width can also be specified by a window manager.

## Moving and sizing windows

You have several options for moving and sizing windows.

### Using Temporarily Adorn

Before moving or sizing a client window, make sure it is active or frontmost. Then, depending on the window style selected, you can move and size the window in one of two ways:

- If the window has a title bar, move it with the mouse pointer as you would any Macintosh window. If the window has a size box, use the mouse to drag the window's dimensions to whatever size you prefer.
- If the window does not have a title bar or size box, use Temporarily Adorn to move or size it. Choose Temporarily Adorn from the Window menu or press ⌘-A. Your window will acquire a temporary title bar and size box, giving you one opportunity to move or resize it like any Macintosh window before it reverts to its former style. If you aren't satisfied with its new location or size, choose Temporarily Adorn again.

### Using the Option key

The Option key offers another way to move a window without a title bar. First, move your mouse pointer into the window. Next, hold down the Option key, press the button on your mouse, and drag the window anywhere you want. Pressing the Option key changes the mouse pointer to a crosshair-like shape.

## Converting windows to icons

An alternative to moving client windows when they get in the way is to *iconify* them, that is, convert them into icons on your screen. The client can determine what the icon looks like, but if it doesn't specify anything, MacX displays a miniature window. Iconified windows can be moved around with the mouse pointer, just like any icon on your desktop. You can return them to their original state by double-clicking them or by clicking them and choosing Uniconify from the Window menu.

The following steps iconify a window:

- 1 Click the title bar to make the window active.**
- 2 Choose Iconify from the Window menu or press ⌘-I.**

While the window is iconified, any commands, calculations, or other processes currently operating will continue to execute. When you uniconify the window to restore it to its previous size and appearance, the client redraws the contents of the window.

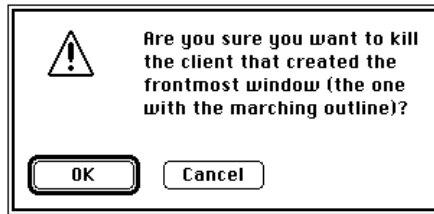
## Closing windows and killing clients

Close Window and Kill Client are two commands that appear in the same location in the Window menu depending on what type of window is active. When MacX first starts, and before any windows have been opened, the Close Window command appears dimmed in the Window menu. When an active MacX window appears on your screen, such as the Color Namer, the Close Window command becomes active in the Window menu. You can then choose it from the menu to close the window. This method is an alternative to clicking the window's close box or the Cancel button. Most X client applications have a mechanism for closing themselves; using a client-specified method is preferred.

Kill Client appears only when a rootless client window is active. It is designed to disconnect clients, like `xclock`, that provide no convenient way to issue commands to them directly. It is also useful to programmers who want to stop a runaway program. However, Kill Client is not the preferred way to close an `xterm` or other terminal emulator window because it causes an abrupt disconnection from the host.

Fortunately, MacX does not immediately execute a Kill Client request. An alert box appears first, inquiring whether you really want to kill the client (see Figure 8-5). In addition, the client window displays a moving, dashed outline to show you which client will be killed.





**Figure 8-5** Kill Client alert box

*Another way to kill clients:* Clicking the close box in the left corner of a client window's title bar is equivalent to choosing Kill Client.

## Commands for controlling window order

This section describes three shortcut commands that give you greater convenience when controlling windows without using the mouse. The commands are handy for switching between windows or for finding a buried window.

### Circulate Up (⌘-U)

The Circulate Up command causes the window farthest back in the collection of MacX windows to be brought to the front of the window stack order.

### Circulate Down (⌘-D)

The Circulate Down command causes the frontmost window in the collection of MacX windows to be sent to the back of the window stack.

### Maximize Height/Restore Height (⌘-M)

The Maximize Height command makes the frontmost window taller by extending its bottom edge to the bottom of the screen. The command is enabled only when the frontmost (active) window is a rootless X client window displayed at its original size. If the frontmost window has already been extended this way, the Restore Height command restores the window to its previous height.

## About root windows

MacX will create a visible root window if you specified a rooted display in the remote command. If a root window is present, you can show it at any time by choosing “Show B&W Root Window” or “Show Color Root Window” from the Window menu. Figure 8-6 shows what your desktop looks like with the root window visible, assuming that your Macintosh has just one screen attached. Usually the root window covers the entire screen when it first appears, although you can set a preference to change its size. You can also resize the root window by using the size box in the lower-right corner of the window. See “Root Window Preferences” later in this chapter.

You’ll notice that the window in Figure 8-6 has a size box in the lower-right corner. Though labeled *root*, this window is actually a Macintosh window that reveals all or part of an off-screen *bitmap*—a virtual root window stored in memory. This arrangement enables you to manipulate the root-viewing window without disturbing clients running in the underlying virtual root window.

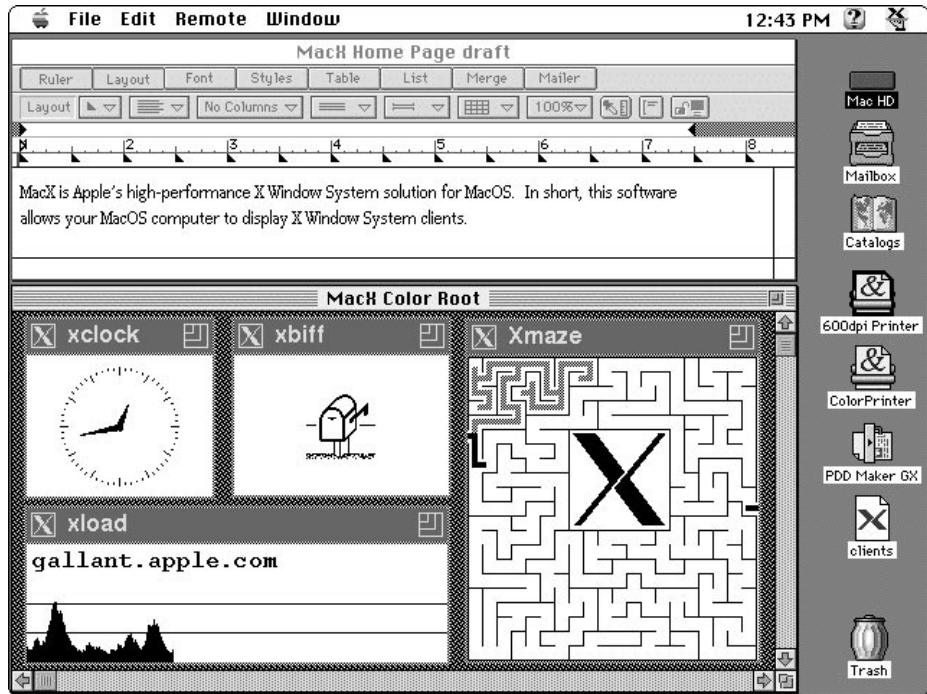


Figure 8-6 MacX on the desktop with the root window visible

The root-viewing window can be smaller but never larger than the dimensions of the virtual root window. When it is smaller, the scroll bars are activated so that you can scroll through the entire root window. MacX also supports autoscrolling in a root window. If you slowly bump the side of the root window when the mouse is depressed, the window contents will slowly scroll.

*Scrolling quickly with the hand pointer:* To scroll quickly in root windows, change the mouse pointer to a hand by holding down the Option and Command keys. Now press the mouse button and move the mouse to change your view of the root window.

In traditional X implementations, the root window never moves or changes size, so clients are not designed to accommodate such changes. Accordingly, MacX will not let you resize the virtual root window while any clients—whether rooted or rootless—are running. For more information on resizing the virtual root window, read “Root Window Preferences” later in this chapter.

## Starting rooted clients

Before starting rooted clients, remember that you may want to start a window manager so that you can move and resize your client windows when they appear on the screen. You can't use the MacX Window Manager in a root window.

Issuing a remote command is one way to start up a window manager. For example, if you're using the UNIX `csh` you could start `twm` in a black and white root window by typing:

```
setenv DISPLAY @display;/usr/bin/X11/twm -s &
```

Be sure to choose B&W Rooted or Color Rooted from the Display pop-up menu in your Remote Command dialog box before executing the command.

Another way to start up a window manager is to start a terminal emulator like `xterm` and then type the command to start up a window manager in the terminal emulator's window. For example, to start up `twm` from an `xterm` window, type:

```
/usr/bin/X11/twm -display displayname:0
```

at a system prompt. In a moment, the `twm` banner will appear at the top of the root window and you'll be ready to go.

Since the root window covers up all or part of your desktop, you might find it occasionally gets in the way of other applications. When this happens, you can always hide the root window, even with clients running in it, by choosing Hide B&W (or Color) Root Window from the Window menu.

There are many methods for starting clients. XDMCP can be used to start integrated environments such as CDE, HP-VUE, OpenWindows, and the AIX desktop. See Chapter 7, “Using `xdm`.”

## Show/Hide Color Root Window and Show/Hide B&W Root window

MacX does not allow you to iconify a visible root window, but it does give you a way to make it disappear even when it is displaying client windows. By choosing one of the Show/Hide commands from the Window menu, you can hide a color or black and white root window. Once hidden, the command in the menu changes from Hide to Show so that you can make the root window reappear. Figure 8-1, shown earlier in this chapter, illustrates these two commands.

## Root window preferences

The B&W and Color Root Preferences items, located near the bottom of the Edit menu, allow you to modify the default settings for a monochrome or color root window, respectively. Choosing either of these items displays a Rooted Screen Setup window. Figure 8-7 shows the monochrome version; the format for the color root window preference is the same. Both preferences let you change the size of the virtual root window. The dark rectangular area represents the current size of the respective root window; dragging the small square at the lower right lets you change the size of the root window. The Rooted Screen Setup window also displays an outline of the screens attached to your Macintosh. These outlines show you how big a root window you are creating. For example, in Figure 8-7, the setup window shows an outline for one large and one small screen. The virtual root window is slightly smaller than the large screen.

If you attempt to resize a root window when any clients—rooted or rootless—are running in it, MacX displays an alert box. This alert box gives you the option to defer your changes until later or to discard them altogether if you would rather not kill your clients in order to resize the root window immediately.

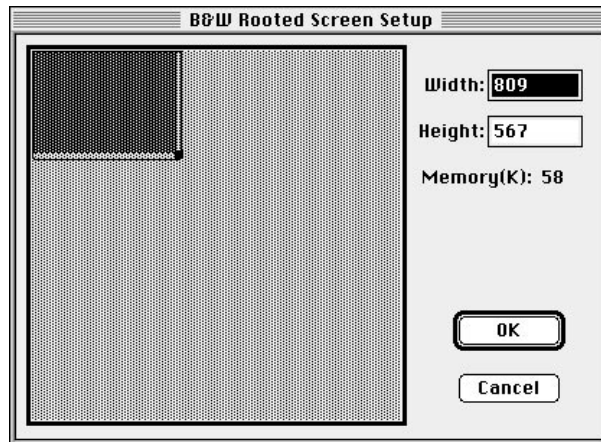


Figure 8-7 B&W Rooted Screen Setup window

## Optimizing client performance on multiple monitors

Some Macintosh systems have multiple monitors. MacX allows you to display client applications on each monitor. You can also display a client application on one monitor and drag its window onto another monitor. A client window can even “straddle” monitor boundaries, appearing on more than one monitor at the same time.

To optimize the speed with which MacX draws client windows in a multiple monitor setup, position the window on a screen of the same type (color or monochrome) and depth as the screen on which the window was originally displayed.

For example, you can have two monitors with different depths attached to your computer. One monitor is set to a depth of 1 bit per pixel, and the other monitor is set to a depth of 8 bits per pixel. You open MacX and create a remote command for the `maze` client application. You specify `maze` to appear on the 8-bit color monitor using either the color rooted screen or the color rootless screen. When you run the command, `maze` appears in a window on your 8-bit color monitor.

Since you set `maze` to appear on a color monitor at 8 bits per pixel, MacX draws `maze` fastest on the 8-bit color monitor. If `maze` had been set to display on a 1-bit-per-pixel monochrome monitor, the optimal speed would have been achieved on the 1-bit monitor.

## Running foreign window managers

MacX includes a built-in window manager for rootless screens typically designated screen number 0 and screen number 2. If you start a foreign window manager, such as `twm`, and specify that the window manager should manage either of these screens, you see the following messages in the Command Output window or in your terminal emulator window:

```
twm: another window manager is already running on screen 0?  
twm: another window manager is already running on screen 2?
```

You may also see these messages if the window manager you are attempting to start is set by default to manage all screens. (Some window managers, by default or option, attempt to manage all screens.) As long as the window manager is running in the location (screen) that you want, you may safely ignore these messages.

Interactive Desktop environments such as CDE or HP-VUE generally presume the use of their own window manager and supply a full screen pseudo root or desktop window. These are best accommodated by choosing Display Preferences from the Edit menu and making Screen Zero rooted.

# 9

## Managing Colors and Fonts

This chapter discusses the Color Namer, a special editor that lets you add, change, and remove colors from the color database.

This chapter also includes information about managing fonts in MacX. It covers font paths, font servers, font directories, and font utilities. It also tells you how to add font servers and font directories.



## The Color Namer

This section explains how to create, modify, and delete individual colors using the Color Namer.

The Color Namer eliminates the chore of specifying or naming colors in X. Instead of having to visualize the color you want and experiment with numerical red, green, and blue values until you hit upon the correct combination, you can open the Color Namer dialog, shown in Figure 9-1, and browse through a list of color samples until you find the one you want. If the color isn't in the list, you can create a new one or modify an existing color. In addition, you can remove colors, change color names, and copy color names to client commands.

When you make changes to the color database using the Color Namer, those changes are saved in the file "MacX Colors." The initial version of this file matches the standard X11R6 color names.

In X, color names are case insensitive, but space significant. Many standard X colors are entered into the database twice to incorporate the embedded space. For example, compare the following pair: "PeachPuff" and "Peach puff."

To display the Color Namer dialog box, choose Color Namer from the Edit menu.

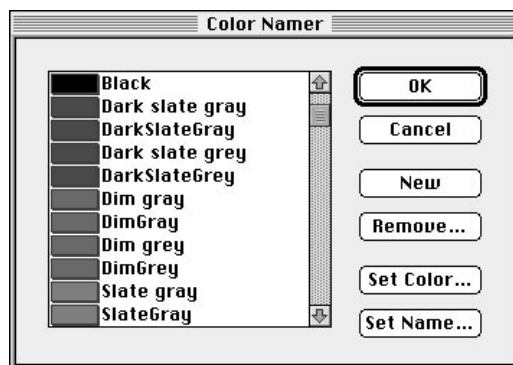
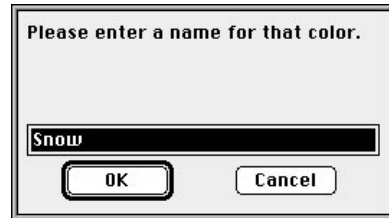


Figure 9-1 Color Namer dialog box



## Adding new colors

To add a new color, click the New button in the Color Namer dialog box. First, the dialog box shown in Figure 9-2 appears requesting that you enter a name for the new color. Type in a new name and click the OK button.



**Figure 9-2** Entering a new color name

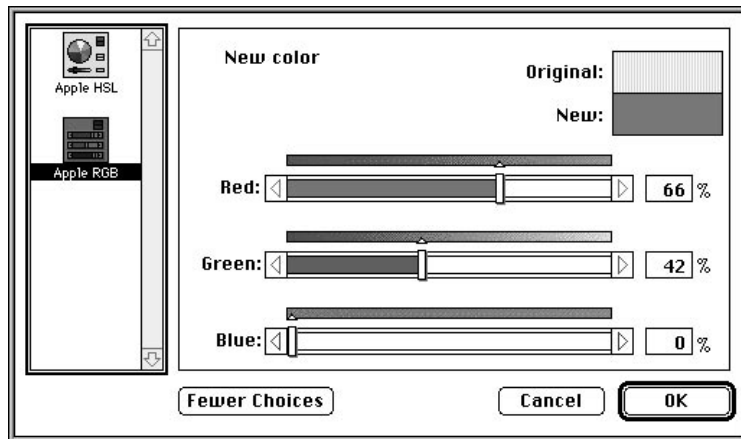
Next, the New Color dialog box appears with whichever color model was last used. Figure 9-3 illustrates the Apple RGB dialog box and Figure 9-4 shows the Apple HSL dialog box. See the following sections for descriptions of each.

If you have several color models on your system, you may see them in the scrolling field at the left side of the dialog box. If you don't see a scrolling field in the dialog box, try clicking the More Choices button. The scrolling field appears and the button changes to Fewer Choices.

### Apple RGB method

This method for selecting colors uses a slide bar to help you design a new color with combinations of red, blue, and green. The slide bars control color intensity. You can also type RGB numeric values for a particular color in the numeric fields to the right of the color bars. Make changes until the New box displays the color you want; then click OK. The color that you just created appears in the Color Namer dialog box.

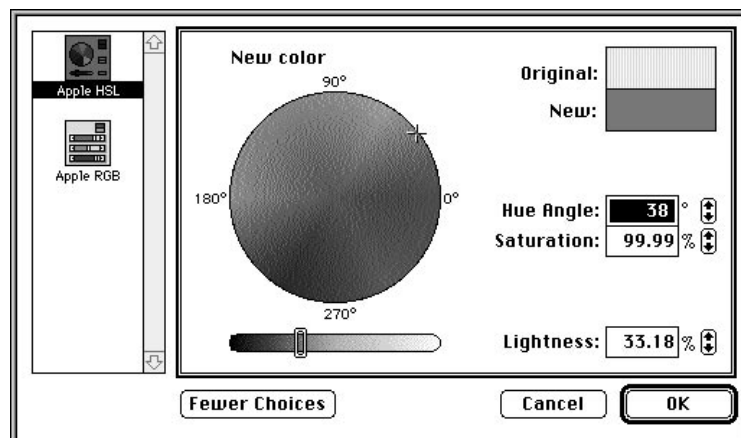
For more information on this color model, see the documentation that came with your Macintosh computer.



**Figure 9-3** New Color dialog box showing the RGB method for specifying a new color

### Apple HSL method

If you select the Apple HSL method, the Color Wheel dialog box pictured in Figure 9-4 appears. Clicking anywhere in the color wheel displays the selected color in the bottom half of the display box labeled New. Keep clicking in the color wheel until the New box displays the color you want. You can also type HSL numeric values for a particular color in the numerical fields to the right of the color wheel. Once you create your new color, click the OK button. The color that you just created appears in the Color Namer dialog box.



**Figure 9-4** New Color dialog box showing the HSL method for specifying a new color

## Removing colors

To remove a color, click its color name and then click the Remove button (see Figure 9-1). An alert box inquiring “Are you sure you want to remove the selected color(s)?” appears. Click the OK button to remove the color or click Cancel to retain it.

## Changing colors and color names

Changing a color is similar to adding a new color. Double-click the color sample you want to change or select the color sample and then click the Set Color button. The New Color dialog box appears. At the top right, the Original color area displays the existing color. As you choose a color, the top half of the box reflects the original color choice you have made, while the bottom half changes so that you can compare them. When you find the color you want, click the OK button. The Color Namer dialog box reappears showing the changed color. Alternately, you can type in the RGB or HSL values directly.

To change a color name, select the name by double-clicking the name or by using the Set Name button. The Color Namer displays a dialog box like the one shown in Figure 9-2. Enter another name in the text field, and click the OK button.

## Copying and pasting color names

Like other dialog boxes in MacX, you can use copy and paste commands to copy or insert text in the Color Namer.

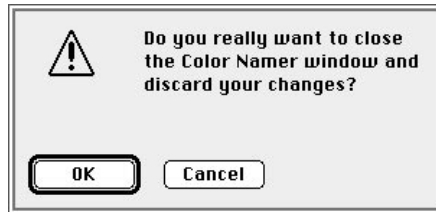
## Sorting color names

Any time you add, remove, or modify color names, the Color Namer sorts the new color names alphabetically and places them at the beginning of the scroll list.

## Saving or canceling changes

When you have finished using the Color Namer, click the OK button to save any changes and close the Color Namer window.

Clicking the Cancel button closes the window without saving any changes. If you have made a color change you do not like, clicking the Cancel button prevents it from taking effect (along with any other changes). Before canceling from the Color Namer dialog box, MacX displays an alert box that asks whether you really want to discard your changes. See Figure 9-5.



**Figure 9-5** Color Namer Cancel alert box

## Using fonts in MacX

This section describes how to use fonts with MacX. First it discusses font servers, including how to set the default font path and add font directories. Next it discusses font utilities and different types of fonts.

The following information is intended to assist you in accessing fonts available on your Macintosh in addition to the ones supplied with MacX. You may also access fonts available on other host computers connected via a network. When available on a network host, a font server provides the greatest flexibility and ease of font administration.

### Fonts supported

MacX supports BDF and PCF fonts locally and all fonts including Speedo or Type 1 via the X11 font server.

MacX does not support the use of Macintosh-native fonts by X clients.

### X11 font server

Prior to Release 5, fonts on the X Window System needed to be on a local disk or provided by transparent network file access (NFS). For the fonts to be local, they had to be copied and converted to a format recognized by the local system. Starting with Release 5, fonts can be requested from a *font server*.

The font server is a standard X11 R5 or R6 program that runs on a remote host on the network. It has the ability to provide fonts to MacX and other X11 display servers. The font server can understand several different font formats, making font administration easier and more reliable.

To make a font available to MacX, your Administrator must run the font server on the host where the font resides. If the current font server becomes overloaded with too many requests for fonts, the font server may pass the font requests onto other font servers, depending upon your system configuration.

The font server program supplied in Release 5 is called `fs` and is usually installed in `/usr/bin/X11/fs`. R5 servers typically use port 7000.

In Release 6, the font server program is called `xfss` and is usually found in `/usr/bin/X11/xfss`. R6 servers typically use port 7100.

To use the font server, you must add it to your font path.

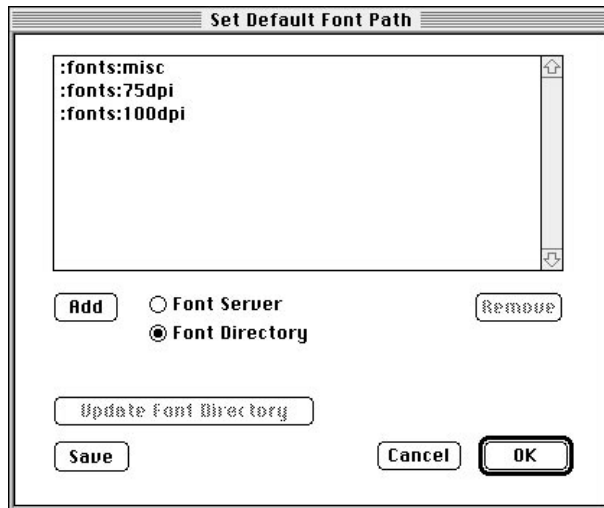
## Setting the default font path

The *font path* is an ordered list of directories and/or font servers. When a client requests a specific font, MacX searches in each of the directories in its font path for a file called `fonts.dir`. This file maps the name of the requested font to the filename of the font as it is stored in the file system. This file is required for the server to access any fonts within a directory. MacX also checks an alias file called `fonts.alias`.

When you choose Fonts from the Edit menu, the Set Default Font Path dialog box illustrated in Figure 9-6 appears. This dialog box lets you

- add a font directory to the font path
- add a font server to the font path
- remove a font directory or font server from the font path
- update a font directory

Figure 9-6 shows the default font paths as they appear relative to the folder in which you installed MacX. After you make changes to the font paths, they typically appear with their full or absolute pathnames in the dialog box. Information about the font paths is stored in the MacX Preferences file.



**Figure 9-6** Set Default Font Path dialog box

MacX fonts are normally stored in the Fonts folder located in the folder where you installed MacX. The fonts are divided into three separate folders: 75 dpi, 100 dpi, and Misc. The “dpi” suffix refers to the dots-per-inch or screen resolution of the display that the server is going to use. The “Misc” (short for miscellaneous) directory contains fixed-width and pointer fonts.

### Adding a font directory

You can add fonts that are stored in a folder accessible to your Macintosh. These fonts may be located on local and shared disks.

If you want to move X11 fonts from a UNIX host to your Macintosh, see “Working With Font Files,” later in this chapter.

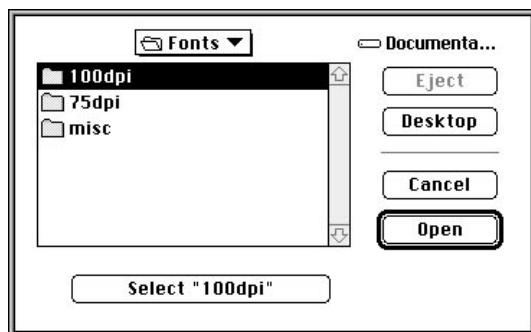
**1 Choose Fonts from the Edit menu in MacX.**

The dialog box shown in Figure 9-6 appears.

**2 Click the Font Directory button.**

**3 Click the Add button.**

The Font Directory dialog box appears, as shown in Figure 9-7.

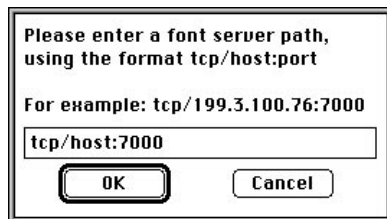


**Figure 9-7** The Font Directory dialog box

- 4 Select a font directory by clicking its name in the field.**  
You may have to use the pop-up menu to locate the font directory.
- 5 Click the Select button.**  
You return to the Set Default Font Path dialog box.
- 6 Click Save if you want to save the new font path in your MacX Preferences file.**
- 7 Click OK to change the default font path during the next server recycle.**  
Clicking the OK button does not affect the current session.

## Adding a font server

- 1 Choose Fonts from the Edit menu in MacX.**  
The Set Default Font Path dialog box shown in Figure 9-6 appears.
- 2 Click the Font Server button.**
- 3 Click the Add button.**  
The Font Server dialog box appears, as shown in Figure 9-8.



**Figure 9-8** "Adding a font server" dialog box

**4 Type a string using one of the formats shown below.**

Use one of the following formats:

```
tcp/hostname:port_id/catalog
```

```
tcp/hostname:port
```

The string must be made up of the following items:

- *tcp* indicates that the font server will be accessed over the network
- *hostname* can be either the internet name of the font server machine or its IP Address
- *port\_id* is the default port number  
In X11 Release 5, the default port number was set to 7000. For Release 6, the default port has changed to 7100 and has been registered with the Internet Assigned Numbers Authority. MacX can connect to X11R5- or X11R6-based font servers.
- *catalog* is the path to the directory containing the fonts you want to use. It is optional.

**5 After you've typed a string, click OK.**

You return to the Set Default Font Path dialog box.

**6 Click Save if you want to save the new font path in your MacX Preferences file.**

**7 Click OK to change the default font path during the next server recycle.**

Clicking the OK button does not affect the current session.

## Removing a font directory or a font server

**1 Choose Fonts from the Edit menu.**

**2 Click the name of a font directory or font server in the scrolling list.**

**3 Click Remove.**

The modified font path will take effect at the next system restart.



## After changing the default font path

Once you've made changes to the font path, clicking the OK button closes the dialog box and keeps your changes so that they can be used on the next recycle.

To save your changes, click the Save button. If you neglect to save your changes and later close MacX, you will be prompted as shown in Figure 9-9.



Figure 9-9 “Save font path changes” alert box

## Updating a font directory

The Update Font Directory button in the Set Default Font Path dialog box creates or updates the `fonts.dir` file. This file (in ASCII text) establishes the correspondence from font file names to fully qualified X11 logical font descriptions.

## Working with font files

MacX supports the traditional view of fonts in X11. It does not currently give users access to their native Macintosh TrueType or Bitmap fonts. An X11 font directory contains a number of font files and two special files, `fonts.dir` and `fonts.alias`. These files are described below.

- `.pcf` Portable Compiled Format (binary). Available since X11R5. Any host-derived `.pcf` file can be used in MacX. Be sure to copy a binary image to your Macintosh.
- `.bdf` Bitmap Distribution Format (ASCII). Available since X11R1. Any host-derived `.bdf` file can be used in MacX. Note that `.pcf` files are smaller and quicker to load than `.bdf` files. You can use the UNIX program `bdf2pcf` to transform a `.bdf` to the more efficient `.pcf` format (for advanced users, the best options are probably `-m -M -p4` or `-m -M -p2`).

- `fonts.dir` This ASCII file gives the correspondence from font file names to fully qualified X11 logical font description names. The Update Font Directory button in the Set Default Font Path dialog box can be used to synthesize this file from the font directory contents.
- `fonts.alias` This ASCII file provides additional aliases (shorter names) for fonts. This file must be present but it can be empty. The Update Font Directory button will create an empty file if the file does not exist. This file uses the `!` character as a comment delimiter. Adding a line containing exactly `FILE_NAMES_ALIASES` will allow access to all fonts by their filename prefix.

*Note:* For `.pcf.Z`, `.bdf.Z`, and `.spd` formats—MacX does not currently support these compressed or outline formats. You can instead access an X11 Font Server to gain access to these font types.

To add a font to an existing local font directory, you will first need to obtain a binary copy of the font in X11 `.pcf` (binary) or `.bdf` (ASCII) format (both are portable formats) and place it in an existing font directory. In the Set Default Font Path dialog box, click the name of the font directory in the scrolling list and then click the Update Font Directory button.

To copy a complete font directory from a UNIX host, copy all `.pcf` files in binary mode and all `.bdf`, `fonts.dir`, or `fonts.alias` files in ASCII mode. Then use the Set Default Font Path dialog box to add the new directory to the font path. Although you can always use the Update Font Directory button to generate a new `fonts.dir` file, it is up to you to ensure the correct carriage control in the `fonts.alias` file.

## `xfontsel`

The client `xfontsel`, typically found in `/usr/bin/X11`, is a utility that allows you to browse through the available installed fonts by displaying each character and the font name. The `xfontsel` window is shown in Figure 9-10.

To select a font, click the Select button located in the upper-left corner. The selection can be pasted into a file or command line without you having to type it. Consult the man page for `xfontsel` for more information; type `man xfontsel` in a terminal emulator window, such as `xterm`.



Figure 9-10 xfontsel window

## Scalable fonts

MacX supports scalable fonts. If you request a scalable font in a size that is not available, MacX scales the font from the closest matching font.

For a font to be scalable, its name must conform to the standard X Logical Font Description (XLFD) name convention. This format is fully defined in the document *MIT X Consortium Standard X Logical Font Description Conventions*.

In addition, the directory containing the target font must contain an XLFD with the digit zero (0) in the PIXEL\_SIZE, POINT\_SIZE, and AVERAGE\_WIDTH fields, as illustrated in the following example

```
-Adobe-Courier-Bold-R-Normal-0-0-75-75-M-0-ISO8859-1
```

where the zeros in the name string are used as place holders for the above-mentioned fields.

## Monospaced fonts

Some clients, including `xterm`, require the use of monospaced fonts. These fonts are composed of fixed-width characters that occupy the same amount of horizontal screen space, much like the output of a typewriter. Monospaced font families include Courier, Lucida, Typewriter, and Term. Various monospaced fonts exist in the Misc, 75 dpi, and 100 dpi directories and are often specified by their horizontal and vertical size (for example, 8 x 12).

The other supplied fonts contain proportionally spaced characters. These proportional fonts are used by X clients that vary the horizontal spacing between characters. X clients such as `xterm` that are not designed to use proportional fonts may produce displays that are difficult to read.

## Display issues

During MacX installation, a Fonts folder containing 75 dpi, 100 dpi, and Misc fonts used by the X clients was installed.

As a guide for choosing a font set that best suits your hardware configuration, review Table 1-1 in Chapter 1. If the X client looks for a font and it is not available, it may substitute a font that is harder to read.

If you have both 75 and 100 dpi fonts installed, it may be advantageous to reorder the two directories so that the 100 dpi fonts are accessed first.

# 10

## Copying and Pasting

This chapter explains how to cut and paste text and graphics between Macintosh and X applications. It also describes how to select images from the desktop and copy them to the Macintosh Clipboard, and how to print the contents of the Clipboard by using the Print Clipboard command.

You can copy and paste between Macintosh or X applications using their respective copy, cut, and paste conventions. MacX automatically converts between Macintosh and X text and graphics formats.

MacX facilitates the copying and pasting of text and graphics between Macintosh and X applications by creating an implicit linkage between the Macintosh Clipboard and the similar X facilities.

*Note:* The Macintosh Clipboard holds only one item at a time. If you copy one item to the Clipboard and then copy a second item, the second item replaces the first. Consider using the Scrapbook (a desk accessory found under the Apple menu) if you are working with more than one item.

*Note:* You can view the current contents of the Macintosh Clipboard by choosing Show Clipboard from the Edit menu in the Finder.

---

## Cutting and pasting text

With MacX, you can cut and paste text and graphics from an X client application into other Macintosh and X applications, and vice-versa.

### Copying text from an X application to a Macintosh application

X clients have their own commands for cutting, copying, and pasting, so you cannot use Macintosh commands (for example, ⌘-V) in a client window.

When a client cuts or copies text, MacX tracks and records the selection in the Macintosh Clipboard. Once something is in the Clipboard, you can paste it into a Macintosh file or document.

*Note:* The `xterm` client uses the left and middle mouse buttons to copy and paste, respectively. This is standard X convention.

- 1 Open a client application to copy from.**

For example, open an `xterm` window by creating a remote command or by entering a command in an existing terminal emulator window.

- 2 Select the text you want by using the client's commands.**

In an `xterm` window, for example, hold down the (left) mouse button and drag across the text to highlight it.

- 3 Open a Macintosh document or file to paste into.**

- 4 Position the pointer in the Macintosh document where you want to paste the selection.**

- 5 Choose Paste (⌘-V) from the Edit menu.**

The copied text appears in the Macintosh document. You can now edit this text using Macintosh capabilities.

## Copying text from a Macintosh application to an X application

To paste text or graphics copied from a Macintosh window into a client window, use the X client's command for pasting or inserting. MacX transfers the contents of the Macintosh Clipboard to an X cut/paste buffer (the equivalent of a clipboard in the X world) and then to the location selected in the client's window.

- 1 Open or activate a Macintosh document to copy from.**
- 2 Select the text you want to copy by highlighting it with the (left) mouse button.**
- 3 From the Edit menu, choose Copy (⌘-C) or Cut (⌘-X).**

This copies the text into the Macintosh Clipboard.
- 4 Open or activate an X client to paste into.**

For example, open an `xterm` window by creating a remote command or by entering a command in an existing terminal emulator window.
- 5 Select the location in the X client window to paste into.**

In an `xterm` window, for example, this location is automatically the pointer position.
- 6 Paste the text into the client window by clicking the middle mouse button (or left arrow key) or by using the client's commands.**

## Copying text between X applications

- 1 Open or activate the X client you want to copy from.**
- 2 Highlight the text you want to copy using the (left) mouse button.**
- 3 Open or activate the X client you want to paste the text into.**
- 4 Position the pointer at the location you want to paste into.**
- 5 Click the middle mouse button (or left arrow key) to paste the text.**

## Cutting and pasting graphics

Cutting and pasting graphics works the same as cutting and pasting text. MacX translates between the Macintosh PICT format and X pixmaps (color) and bitmaps (bitonal) as needed.

MacX also provides a handy feature for copying images on your screen to the Macintosh Clipboard, which facilitates graphics pasting operations. You can copy the contents of a client window, select a specific area on your screen to copy, or copy the entire desktop. You can then paste the image into other Macintosh and X applications if the particular application permits it. MacX also allows you to print the contents of the Clipboard.

### Copying an image from your screen to the Clipboard

- **Choose Copy Screen to Clipboard (⌘-B) from the Window menu in MacX.**

The pointer changes from an arrow to a crosshair pointer. You can perform any of the three following tasks to copy an image on your screen to the Clipboard.

*Note:* Remember that the Macintosh Clipboard holds only one item at a time.

- To copy an image of a client window, position the crosshair pointer in a client's window and press the mouse button.

This copies the contents of the client window to the Macintosh Clipboard. When you use this method, the image of the window does not include the Macintosh window borders.

- To copy a specific area on your screen, position the crosshair pointer on the desktop, press the mouse button, drag a box around the area you want to copy, and release the mouse button.

This copies an image of the selected area to the Macintosh Clipboard.

- To copy an image of the entire desktop, position the crosshair pointer in the menu bar or on the desktop and press the mouse button.

This copies an image of your entire desktop, including the menu bar, windows, and icons to the Macintosh Clipboard.



You can paste an image from the Macintosh Clipboard into another Macintosh application by using the Paste command (⌘-V). If the Macintosh application can't accept the graphic, the Paste command will be dimmed.

Depending on whether a particular X client supports pasting the primary or Clipboard selection, you can also paste an image into an X client. See the X client's documentation for more information.

## Using the Page Setup and Print Clipboard commands

The Page Setup and Print Clipboard commands in the File menu are used for printing the contents of the Clipboard. Print Clipboard is dimmed until you copy something to the Clipboard.

Used in conjunction with Copy Screen to Clipboard (⌘-B), these commands provide a convenient way to print the contents of X windows.

- **Printing from the Clipboard.**

Before printing, choose Page Setup from the File menu in MacX. The Page Setup dialog box allows you to specify the page size and orientation. In the Page Setup dialog box, click the Options button and a dialog box appears that allows you to make specific settings for the printer connected to your system.

Choose Print Clipboard from the File menu to print the contents of the Clipboard. MacX prints text or PICT-style graphics. When printing text, MacX includes spaces, carriage returns, and line feeds, but omits all other formatting.



## Appendix A X Window System Overview

The X Window System, or X for short, is a network-based graphics system designed to provide workstation users with an enhanced computing environment. X draws graphics, creates windows to display and run several applications simultaneously, and enables users to access X applications (usually called *clients*) over a network from different makes of computers without being affected by incompatible hardware or operating systems.

X is a window system, or windowing environment, because it displays applications in windows on your screen. Essentially, this process converts your screen into a desktop on which you can perform many activities rather than just one at a time. You can move, resize, and stack windows, as well as iconify them, that is, reduce them to icons—a handy way to set aside windows without closing the applications displaying them.

---

## Why use X?

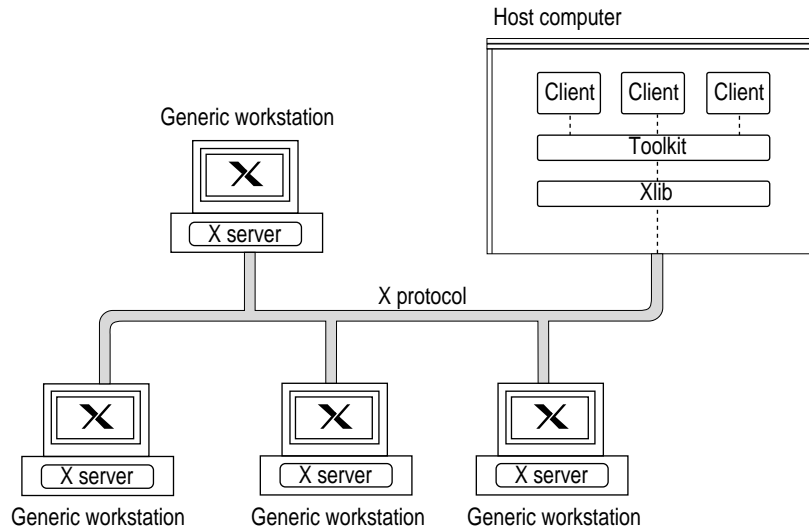
The primary strength of X is that it lets you access client programs running on a host (such as UNIX) remotely, over a network. Thus, you can run an application on one machine and display the results on your desktop. Hardware compatibility also facilitates balancing the workload among network hosts by enabling them to share files. If one host gets overloaded, you can shift to other hosts to run your applications.

The designers of X realized these enhanced capabilities through a design that assigns the major functions of X to individual components. X functions well in a network environment because these components are distributed between your Macintosh and the remote host computers on which the clients reside based on a concept called the *client/server model*. Knowing something about the different parts of X and how they work together will give you a clear picture of what happens when you run an X application.

## X Window System structure

X is composed of two separate but interrelated groups of software that communicate through a protocol. One group of programs are the clients (X applications) located on various host computers and the other is your desktop computer. These programs can work together on the same system if clients are installed on the machine that displays them, or they can be located on different hosts over a network. One desktop X server can simultaneously display X applications running on a variety of UNIX or VMS host machines. Figure A-1 illustrates the relationship of these different components.

A *display* is a workstation or desktop computer with a keyboard, a pointing device, such as a mouse, and one or more bit-mapped screens. X supports a mouse with up to five buttons.



**Figure A-1** Relationship between X clients and the X server

As depicted in the illustration, the X server is always located on a display, whereas the two application libraries—Xlib and the X toolkit—reside with the clients: either on different hosts or on your own computer. At first glance, this arrangement seems backwards to people who view workstations as the *clients* of a *server*, such as the file server that contains all the programs they use. The file server enables multiple workstations to share the same application simultaneously. In X, however, the workstation contains the server so that a person can run multiple clients simultaneously by displaying each one in a window on the screen. In effect, the clients are *sharing* the workstation.

The following paragraphs briefly describe the main functions of the basic components of X.

## X protocol

X Window System protocol is a low-level graphics description language used by clients and the X server in your desktop computer to exchange information. This protocol establishes rules for composing and transmitting packets of instructions used to draw graphic images and windows, transmit text, specify colors and fonts, notify when events (such as a pressed key or a mouse click) occur, and related matters.

## X server

The X server is a multilayer program that runs in your desktop computer and controls the flow of information to and from the keyboard, mouse, and screen (or screens). It acts as a switchboard relaying information from different clients to the appropriate windows on the screen and from your machine to the appropriate client. The language used in this information exchange is the X protocol. Beyond routing messages, the server performs other communications-related services, such as maintaining communications links with each client, interpreting network messages, and assembling and disassembling X protocol request packets. The server also draws graphic images and windows; installs fonts; tracks the pointer and maintains its color, size, and shape; maintains a map of color values; and requests services from the operating system.

## Xlib

Xlib is a library of C routines—program segments written in the C programming language—each of which performs a certain task when called by a client program. For example, these routines enable a client to communicate with a server, request that a window be created, draw graphics, respond to output from the keyboard or mouse, and so forth. Xlib calls are translated to X protocol requests before being transmitted to the server.

## Window manager

A window manager is a client which has special authority to control the layout of windows on the screen. This specialized client enables you to move, resize, and stack windows; create new windows; and shrink windows to icons.

## X toolkit

An X toolkit is a library of subroutines that employs several Xlib drawing routines and other functions to produce large graphic objects, such as menus and scroll bars. Programmers use these objects, called *widgets*, to create the images you see on your desktop.

## A brief look at how X works

Because the way you use X depends on the type of machine and operating system you have, giving step-by-step instructions for starting up and using X is beyond the scope of this guide. However, a general overview will give you an idea of what is common to all implementations of X. This information is helpful for readers unfamiliar with X.

In order to display clients on your screen, you must first start up the X server. The X server can operate in two different modes. In rooted mode, a background or root window is created. It is used to represent the X server “desktop.” It may cover the entire screen.

In rootless mode, application windows are opened in positions you or the client can specify. The X desktop shares the Macintosh desktop with X windows represented as Macintosh windows.

### Windows and their hierarchy

Windows in X are organized in a hierarchy. The root window comprises the first level. In traditional X systems, the root window is always visible and covers the entire screen. All other windows are subordinate to the root window. Occupying the second level in the hierarchy are the top-level client windows: the windows that appear when you start up a client. These are windows you can resize, move around, and manipulate in other ways, according to the dictates of the window manager.

Another important point about the window hierarchy is that higher-level windows impose restrictions on lower-level ones. Since a window is subordinate to the window that created it, think of the subordinate as the child and its creator as the parent. In X, every window has a parent except the root window. Accordingly, client windows are children of the root window, but are the parents of any lower-level windows their clients create. In rooted mode, a child always remains within the boundaries of its parent window. Even though a child window can be larger than its parent, you will see only the part bounded by the dimensions of the parent window. The rest is invisible, unless the client lets you move the child window around to reveal its hidden parts.





## Appendix B Network Troubleshooting

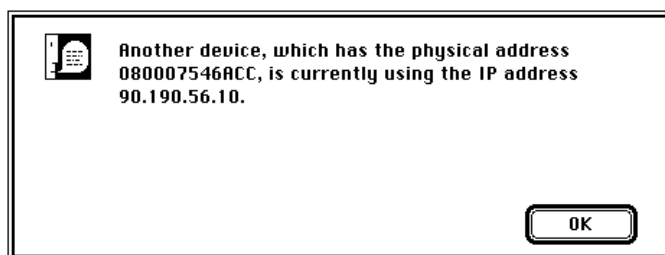
Because an internet is a large and complex aggregate of network hardware connected by gateways, tracking a single-point hardware or software failure can often be difficult. This appendix describes two troubleshooting features—a duplicate address notification dialog box and a fault-isolation tool, MacTCP Ping, which collects and computes packet-transmission statistics.

*Note:* MacTCP Ping is automatically installed in the MacX application folder when you choose the Easy Install option.



## Duplicate address notification

MacTCP includes a duplicate address notification feature. This feature alerts you when more than one system on the network is trying to use the same IP address. If there is a duplication problem, the software displays a dialog box informing you that your system is attempting to use the address of another system or that the other system is using your address. The dialog box shows the hardware address of the system that is advertising its use of the particular IP address. This address should be recorded for diagnostic purposes so that a network administrator can correct the problem.



**Figure B-1** Duplicate address notification

*Note:* This dialog box may also appear if MacTCP is configured so that the user's computer is not on the same network as the router.

## MacTCP Ping

MacTCP Ping is a network testing tool that uses the Internet Control Message Protocol (ICMP) echo request datagram to elicit an ICMP echo reply from a host or gateway. It is intended for use in network testing, measurement, and management, and should be used primarily for manual fault isolation.

When used for fault isolation, MacTCP Ping should first be run on the local host to verify that the local network interface is up and running. After the local network is verified, hosts and gateways successively farther away should be "pinged." MacTCP Ping computes round-trip times and packet-loss statistics. MacTCP Ping can also send IP options along with ICMP echo request packets. This release of MacTCP Ping supports the Record Route option.

When you open MacTCP Ping, the MacTCP Ping information dialog box is displayed. The following sections describe the MacTCP Ping user interface, consisting of its menus and the MacTCP Ping Information dialog box.

## MacTCP Ping menus

MacTCP Ping provides three menus—File, Edit, and Options—which are discussed in the following sections.

### File

The File menu contains the commands Save As and Quit. Save As allows the user to save the session information into a SimpleText or TeachText file. Quit causes MacTCP Ping to stop sending ICMP echo request datagrams to the host (if necessary) and quits MacTCP Ping.

### Edit

The Edit menu contains the command Delete Data, which clears the session information from the display window.

### Options

The Options menu contains two commands, Record Route and Show IP Address.

The Record Route command causes MacTCP to send the Record Route IP option along with the ICMP echo packet. The Record Route option provides a means to record the route of an internet datagram. When an internet module routes a datagram, it checks to see if the Record Route option is present. If it is, the module inserts its own internet address into the Record Route buffer of the datagram. When a destination host receives this echo request, it copies its Record Route buffer into the echo response and sends it back to the source host. When the source host receives an echo response, the Record Route buffer contains the round-trip path of the datagram. MacTCP Ping shows the round-trip path of only the last datagram transmitted.

The Show IP Address command displays the IP address of the local host Macintosh computer in the information window.

## MacTCP Ping Information dialog box

The following paragraphs describe features of the MacTCP Ping Information dialog box.

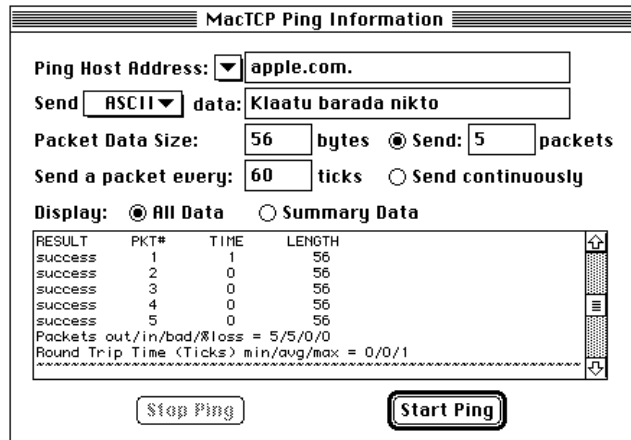


Figure B-2 MacTCP Ping Information dialog box

### Ping Host Address

The pop-up menu displays a list of host name addresses from the MacTCP Hosts file. The user can choose from this list or manually type the host name or IP address of the destination host to be pinged.

### Send ASCII/Hex Data

The user can send either ASCII or hexadecimal data along with an ICMP echo request datagram. The ASCII/Hex pop-up menu lets the user choose between these two commands. Hexadecimal data should be entered as a hex string (0-9, A-F, and a-f). The Hex Data command is useful for diagnosing data-dependent problems in a network.

### Packet Data Size

Packet Data Size specifies the number of data bytes to be sent. The default is 56, which becomes 64 ICMP data bytes when combined with the 8 bytes of ICMP header data. MacTCP Ping allows the user to send up to 5000 bytes in one ICMP echo request packet.

## Send a Packet Every # Ticks

MacTCP Ping waits a given number of ticks between sending each packet. (One tick is 1/60 second or approximately 17 milliseconds.) The default is 60 ticks (that is, 1 second). The minimum value allowed is 1 tick (17 milliseconds). This value should be used carefully, since it can flood the network with ICMP datagrams. Flood pingging is not recommended in general, and flood pingging the broadcast address should only be done under very controlled conditions.

MacTCP Ping can send either a fixed number of echo requests or it can send requests continuously until the user clicks the Stop Ping button.

## Display

The user can choose from two features to display the ICMP session information. The All Data option shows the status information of every ICMP echo request packet. The Summary Data option shows only the summary information about the ICMP session.

## Start Ping

When the Start Ping button is clicked, MacTCP Ping starts sending ICMP echo request datagrams to the host.

## Stop Ping

When the Stop Ping button is clicked, MacTCP Ping stops sending ICMP echo request datagrams to the host.

## Information/statistics area

ICMP packet statistics, along with the source and destination host addresses, are displayed in the bottom rectangular area. The Display-All Data option displays the packet number, round-trip time, and data length. The Display-Summary Data option displays only the average round-trip time and percentage packet-loss statistics. If the Record Route command has been selected, the route of the last packet is displayed in this area.



# Glossary

**active** The currently selected icon or window. Keyboard or mouse actions are directed to the active window or icon.

**adornment** The frame of a window, including, but not limited to, the title bar, size and zoom boxes, and borders. The window manager controls the adornment of windows in X.

**alert box** A box that appears on the screen to give a warning or to report an error message. The warning is accompanied by an alert sound.

**alias** A file that stands for and points to a file, folder, or disk. When you open an alias, you're actually opening the original item.

**application** A software program. X applications are often called *clients*.

**application window** A window that contains an application that is running.

**Backing Store** A feature in X that allows the server to save occluded window areas offscreen and return them, without client interaction, when the window is uncovered.

**balloons** The small text boxes that identify objects on the screen and explain their use.

**BDF file** Acronym for Bitmap Distribution Format. A source file that, when compiled, produces a font in a format usable by MacX. Since conventional X servers do not have this built-in capability, the BDF to SNF program is normally used to compile BDF font files. The format was

developed by Adobe Systems Incorporated and is accepted as a standard by the X Consortium.

**bitmap** A grid of pixels (picture elements) that can be set to white or black to create an image.

**border** The area of equal thickness surrounding a window on all sides.

**checkbox** A small square that appears in a dialog box, indicating that an option can be selected or cleared. When an option is selected, an X appears in its checkbox.

**client** A program designed to run within the X Window System. A client can request the X server to display graphics and text and to change or report on its (the X server's) state.

**client/server model** Depicts the relationship between different components of the X Window System, showing how they interoperate and exchange data.

**Clipboard** A holding place in the computer's memory for whatever you last cut or copied. Information in the Clipboard can be pasted into documents.

**close box** The small square box on the left side of the title bar of an active Macintosh-style window. Clicking it closes the window.

**colormap** A set of color cells that define color values. Each cell contains three values specifying intensities of red, green, and blue (RGB). MacX uses the colormap to translate pixel values into the corresponding RGB values displayed on the screen.

---

**colormap focus** The client window whose colormap is currently installed and is being used to map pixel values to actual displayed colors.

**connection tool** A small program that establishes a communications path between a Macintosh computer and another computer for the purpose of exchanging data according to a specific protocol, such as TCP/IP.

**cursor** See **pointer**.

**desktop** Your working environment on the computer (the menu bar and the background area on the screen).

**desktop manager** An X client that gives users the means to perform high-level manipulation of operating system functions.

**dialog box** A box that contains a message requesting more information from you, or a box that you use to select options. Dialog boxes that contain warnings are called alert boxes.

**direction keys** Keys marked with arrows used to move the cursor up, down, left, and right.

**display** (1) A set of one or more screens connected to a workstation that contains an X server or (2) a set of one or more screens or workstations (comprising a screen, keyboard, and pointing device) connected to a minicomputer that contains an X server. Compare *screen*.

**double-click** To click the mouse button twice in rapid succession.

**drag** To hold down the mouse button while moving the mouse.

**Ethernet** A high-speed LAN technology capable of transfer rates up to 10 million bits per second (mbps).

**event** A message that informs a client of input or the effect of a request.

**Finder** A multitasking operating system for Macintosh computers that enables several applications to be open at the same time. In addition, processes, like print spooling, can operate

in the background so that you can perform one task while the computer performs another.

**font** A collection of characters and displayable items. In X, fonts are treated as bitmap arrays with additional metric information that determines spacing and other properties.

**frame** The border that window managers typically put around windows.

**highlighted** Selected objects or text. Highlighted items appear in reverse video on monochrome displays and in color on most color displays.

**host** A physical computer and operating system on which an X client runs.

**hotspot** The reference point of a pointer that indicates its position on the display.

**icon** A graphic representation for various elements, such as application programs.

**iconify** To convert a client window to an icon, a small symbol on the screen. Iconifying is a convenient way of creating more space on your desktop or temporarily setting aside a client without having to close it.

**ISO** International Standards Organization, a group founded in 1975 to create worldwide standards for the computer industry and other industries.

**ISO Latin 1** A character set, based on ASCII, that the International Standards Organization has adopted. It is the standard character set supported by the X protocol, X servers, and clients. Characters with values less than 128 (decimal) are identical to ASCII characters; those greater than 128 are completely different from Macintosh extended ASCII characters.

**keyboard input focus** The client window designated to receive input from the keyboard.

**layout policy** A set of rules that specify the allowable sizes and positions of windows and icons.

**local area network (LAN)** A network that functions within the confines of one site or building.



**Macintosh extended ASCII** An extended version of the American Standard Code for Information Interchange that contains codes for extra characters used by the Macintosh.

**MacTCP** Apple Computer's TCP/IP product.

**mapping** The process by which a client makes a window eligible for display.

**maximize** To expand a window to its maximum size, which is determined by the application running in the window.

**minimize** To reduce a window to an icon without closing the application.

**Motif** A graphical user interface specification and toolkit for X offered by the Open Software Foundation.

**Motif Window Manager (MWM)** The window manager that adheres to the Motif look and feel. MWM was developed by the Open Software Foundation and is noted for its 3D appearance.

**network** Several computers connected together with the aid of special hardware and software rather than simple serial connections.

**network file server (NFS)** A network file communications protocol developed by Sun Microsystems.

**obscured** Partially viewable. A window is obscured if it is only partially visible because another window or object is in front of it.

**occluded** Not viewable. A window is occluded if it is completely covered by another window or object.

**Open Transport** The modern networking and communications architecture for the Mac OS. Its benefits include easier configuration of network-related control panels, higher performance, and improved control capabilities for network administrators. Open Transport supports AppleTalk networking, TCP/IP networking, serial communications, and other communications systems and protocols.

**operating system** A program that controls the operation of computer hardware and presents an interface through which the user can work with applications.

**overlapping windows** Windows that are placed on the screen so that each window covers part of another. Overlapping is the opposite of tiled.

**parent window** A new window created with reference to an existing window.

**paste** To transfer the contents of the Clipboard into an application.

**path name** A description of the location of a directory file. The path name's entries are separated by slashes. Backslashes are used in System 7 and forward slashes are used in UNIX.

**PICT** Contraction of picture. A data format for storing graphics.

**pixmap** A three-dimensional array of bits or, in other words, a stack of two or more bit maps. Pixmap contains the extra pixel values required to represent grayscale and color objects.

**pointer** An arrow or other symbol on the screen that moves as you move the mouse.

**point size** A unit of measure for a font. One point is equal to 1/72 of an inch.

**Power Macintosh** Macintosh computer powered by the PowerPC™ microprocessor designed by Apple Computer, Inc., Motorola, Inc., and IBM Corporation. The PowerPC processor uses Reduced Instruction Set Computing (RISC) technology to deliver very high performance at the lowest possible cost.

**RAM** An acronym for *random-access memory*, the memory chips that store information temporarily while you're working on it. RAM can contain both application programs and your own information. Information in RAM is discarded when you switch the power off.

**request** A command sent to the server from a client.

**resource** General term for windows, pixmaps, cursors, fonts, graphic contexts, and so on.

**rexec** A client startup method in which the server is initialized with all of the configuration files loaded. The `rexec` program executes a program on a remote machine that connects to the X server.

**root window** The parent window for all other windows in X. In rooted style, MacX maintains the image of the root window and all of its subwindows in an off-screen bitmap.

**rooted style** A style in MacX in which the root window is visible. Also known as single window mode.

**rootless style** The default style in MacX in which the root window is not displayed on the screen. Client windows appear on the desktop as Macintosh windows. Also known as multiple window mode.

**rsh** A client startup method in which `rsh` (remote shell) executes a program on a remote machine that connects to the X server.

**Save Under** A technique of saving the image on the screen under a window so that the image can be restored when the window is moved on the display or removed from the display.

**screen** The part of a monitor where information is displayed, similar to the screen on a television. In MacX a screen is defined by its video type (color or monochrome) and a window style (rooted or rootless). Compare *display*.

**scroll bars** The bars at the bottom and right edge of a window whose contents are not entirely visible.

**select** To highlight an item by holding down the mouse button and dragging across the text, or by double-clicking it.

**server** The program that serves as an interface between the display and the client programs. The MacX server allows a computer capable of running System 7 or later to be used as an X display.

**settings file** A Macintosh file that contains the remote commands, preference settings, connection tool settings, and page setup information you specified to customize your MacX environment.

**shell** A UNIX term for a program that interprets commands and arranges for their execution.

**size box** A box at the bottom-right corner of most active Macintosh windows that lets you resize the window.

**TCP/IP** Transmission Control Protocol/Internet Protocol, a communications protocol used in networks that follow the U.S. Department of Defense standards. Commonly used on Ethernet between UNIX workstations and X terminals. MacTCP is Apple Computer's TCP/IP product and is bundled with MacX.

**tiled windows** Windows that lie vertically or horizontally adjacent to each other on the screen, with no window covering any part of another. Tiled is the opposite of overlapping.

**toolkit** A collection of software subroutines and data that implements a set of user interface features (widgets), such as menus or command buttons, and allows clients to manipulate these features.

**UNIX** A multitasking operating system originally developed by AT&T.

**warping** A condition in which a client takes control of and moves the mouse pointer.

**widgets** Graphic objects, such as menus, buttons, and scroll bars, used as building blocks to create larger images such as windows and dialog boxes.

**window** An area with distinct boundaries, typically rectangular in shape, that displays information on the screen. You view clients and documents through a window.

**window manager** A client that allows you to move, resize, and change the appearance of windows on the screen.

**X server** The portion of the X Window System that controls the display, mouse, and keyboard—relaying mouse and keyboard input to clients and performing requests from clients to draw graphics on the screen.

**X Window System** The graphics protocol developed by MIT that enables applications to run in a server-based, object-oriented, windowed environment.

**XDMCP** X Display Manager Control Protocol. Allows a network administrator to manage X terminal and workstations from a single host.

**XIE** X Image Extension. The XIE protocol provides a very low level, yet powerful, set of primitives that enhance the image display capabilities of the X Window System. XIE makes it possible and practical to view and manipulate image data and scanned documents over a network. XIE increases performance by defining image compression-decompression methods which reduce transmission times over previous X standards. Also, many common image operations such as scale, rotate, flip, and edge enhancements are calculated by the XIE server. This allows for fast server-side updates and manipulation of images without increasing the network load.

**Xlib** A library of software subroutines used by clients to communicate with an X server. Xlib contains functions for connecting to a particular display server, creating windows, drawing graphics, and so forth.



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## **The Apple Publishing System**

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