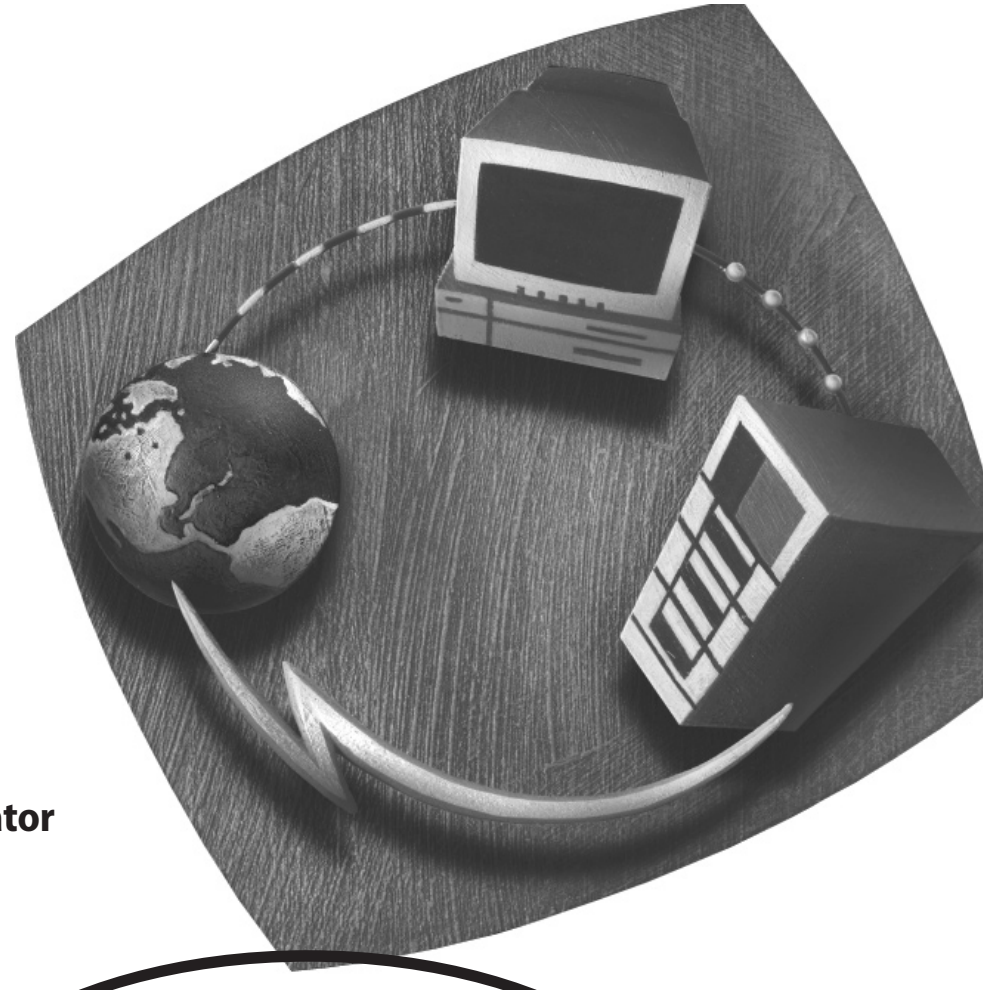
Version 7.0

for WINDOWS NT® 4.0
for WINDOWS® 98
for WINDOWS® 95



System Administrator Guide

WRQ Reflection® for HP with NS/VT

WRQ Reflection® for UNIX and Digital

WRQ Reflection® for ReGIS Graphics

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Reflection for HP with NS/VT
Reflection for UNIX and Digital
Reflection for ReGIS Graphics
System Administrator Guide
Version 7.0
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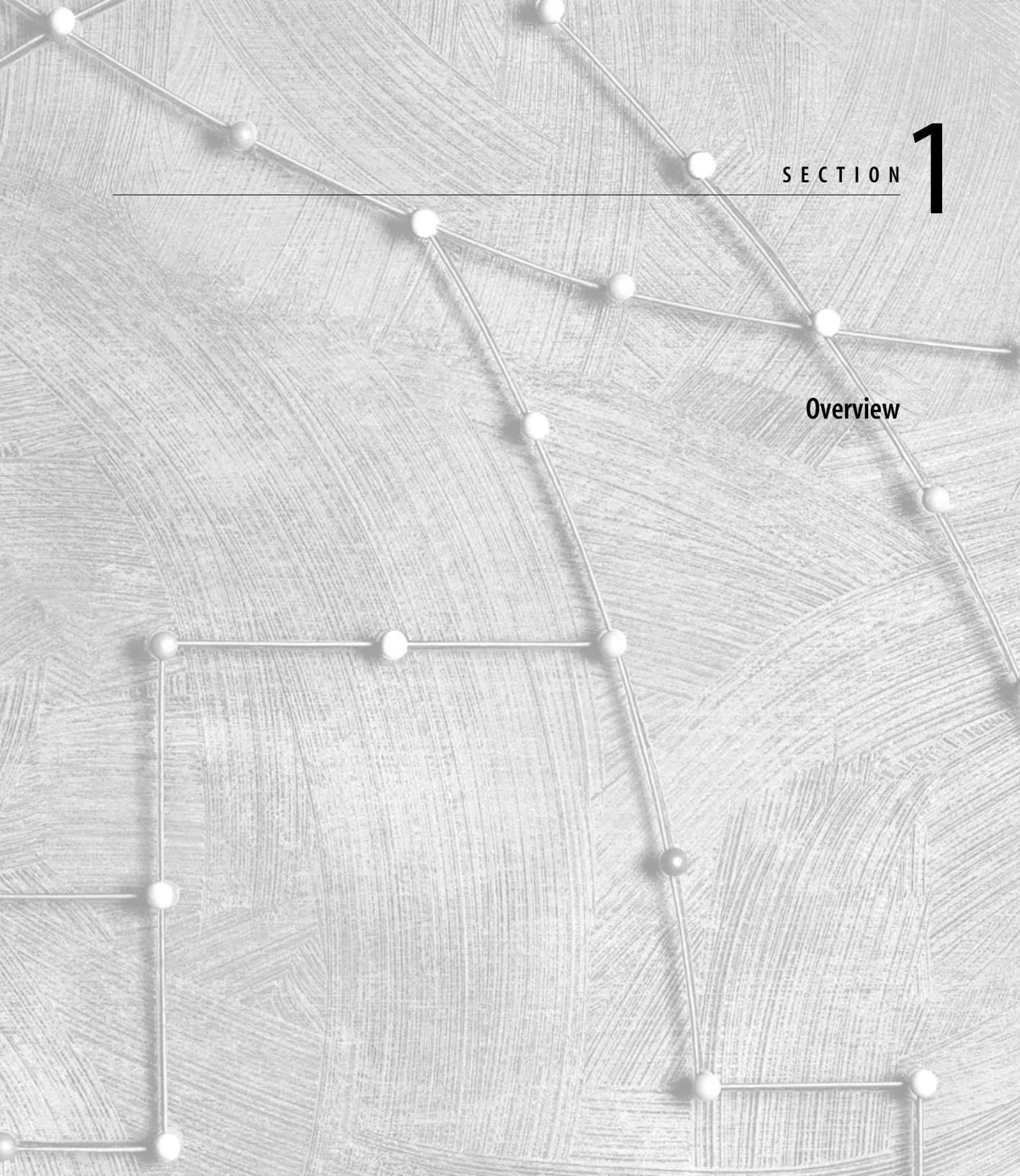


SECTION 1

Overview

Chapter 1

Introduction

WRQ makes PC software that connects personal computer users to enterprise computers and information networks. WRQ offers Reflection products for connections to IBM, UNIX, Digital, Unisys, and HP host systems. WRQ is also a leader in network security, communications, and utilities applications, products for the X Window System, and software management.

Reflection Product Overview

Reflection connectivity software products, described next, can establish and maintain communications to an HP, UNIX, Unisys, or Digital host from a PC running Microsoft Windows 95, Windows 98, or Windows NT version 4.0 or higher (Windows NT version 3.51 is supported using Reflection version 5.21, included on the Reflection product CD):

- Reflection for HP with NS/VT allows you to communicate with an HP 1000, 3000, 9000, or UNIX system. Your PC can emulate an HP 2392A, 700/92, 700/94, 700/96, or 700/98 terminal. Reflection for HP with NS/VT also provides VT52, VT102, and VT220 emulation.
- Reflection for UNIX and Digital allows you to communicate with a Digital, UNIX, or Unisys host. Your PC can emulate the Digital Equipment Corporation VT420, VT320, VT220, VT102, VT101, VT100, and VT52 text terminals. It can also emulate ANSI, ADDS, WYSE, DG, and Unisys T27 terminals.
- Reflection for ReGIS Graphics allows you to communicate with a Digital, UNIX, or Unisys host. Your PC can emulate the same terminals as Reflection for UNIX and Digital, and adds the ReGIS (Remote Graphics Instruction Set), Tektronix 4010/4014, and sixel graphics features of Digital's VT340, VT330, VT241, and VT240 graphics terminals. You can use either a bus or serial mouse in ReGIS as a locator device.

About This Manual

This manual is designed to aid system administrators whose job is to set up and maintain groups of Reflection users in diverse computing environments. You'll find topics that explain how to:

- Maintain multi-user license versions of Reflection
- Ensure security
- Interpret Reflection's error messages
- Use advanced features, such as the Profiler, in Reflection

Because this manual may be the only on-site reference for these important topics, you should keep it in a safe place for quick reference should a problem arise. It is also prudent to keep some areas of information undistributed as this information can be used to change the user's working environment—unintentionally or otherwise.

The Complete Reflection Documentation Set

The complete Reflection documentation set consists of:

- This *System Administrator Guide*
- The Reflection *User Guide*
- The Reflection *Terminal Reference Manuals*
- The Programming with Reflection: Visual Basic *User Guide*
- The Reflection Method and Properties *Reference Manual*

The above manuals are available as PDF (Portable Document Format) files on the Reflection product CD (explained in the Reflection *User Guide*). Adobe Acrobat, the application used to view and print PDF manuals, is also included on the Reflection product CD, and can be installed by running Setup and choosing the **Adobe Acrobat Reader** option.

Conventions

The following conventions are used in this manual:

- PC refers to an IBM-compatible personal computer.
- The term "login" is used generically for all host platforms (HP users may be accustomed to the term "logon").
- `This typeface` indicates text you should type, host responses, and samples of programming language.
- Reflection property names are shown using initial capital letters for logical words contained within the property name (such as `PrinterTimeout`). Case is not important, however, when entering these commands on the Reflection command line.
- When the manual gives an example of entering a Reflection command on the Reflection command line, the optional object prefix is omitted, for example:

  ```
  PrinterTimeout = 3600
  ```

  However, if you are using Reflection Basic, enter the command with the addition of Application, for example:

  ```
  Application.PrinterTimeout = 3600
  ```

- Keys are displayed like this: Shift. Keys that should be pressed simultaneously are shown joined by a plus sign, as in Alt+F4. Don't type the plus sign.
- This is how the Enter key on the main keyboard is shown: Enter ↵. On some keyboards, it is called the Return key.

- If you're using Reflection for HP with NS/VT, some HP block mode applications require that you press the Enter key on the numeric keypad; this key is shown as Enter.
- Parameters enclosed in angle brackets (< >) indicate that something must be added to complete the command, such as a password.
- The ASCII control character is represented by a caret (^). For example, Ctrl+M (carriage return) is shown as ^M.
- $^{E}S_{C}$ indicates an escape control code, $^{C}S_{I}$ indicates a control sequence introduction character, and $^{D}C_{S}$ indicates a device control string. The three-letter mnemonic representation is used in the documentation to make the sequences easier to recognize. Control codes are case sensitive and must be typed exactly as shown.

Chapter 2

Installing and Upgrading Reflection

The Reflection *User Guide* provides instructions on how to run the Reflection Setup program. However, the online help file Setup.hlp is your most complete resource for using Reflection Setup to install Reflection. This chapter provides information on upgrading to this new version of Reflection and gives an overview of installation features you can use to install Reflection in a multi-user environment.

Upgrading from Earlier Versions of Reflection

This section describes items you should be aware of if you are upgrading from an earlier version of Reflection to version 7.0.

Overwriting an Installed Copy of Reflection

When you are upgrading an installed copy of Reflection, it is strongly recommended that you let Setup install the new version of Reflection in the same folder as the existing, older version. Doing this ensures that registry values and other PC-specific configuration values are properly set.

Converting Earlier Version Settings Files

When you start Reflection for the first time after installation, the Reflection Conversion wizard asks if you would like to convert your pre-6.0 settings files to work with the 7.0 version of Reflection. When you do this, converted files are created and stored in the \User folder, and a \Restore folder is created for the purpose of storing the original settings files. This is described in detail in the Reflection *User Guide*.

Installing a Single-User vs. a Multi-User Version of Reflection

Which installation option you choose during Setup depends on whether you are installing a single-user or multi-user version of Reflection:

- **Reflection (using single user Setup)**: Installs a single-user version of Reflection. You can also use this option to install a multi-user version of Reflection, although the Deployment Manager is a better option in this case.
- **Reflection (using Deployment Manager)**: Deploys Reflection to multiple users with the Deployment Manager, a new utility for system administrators that also offers several maintenance and customization options.

If you use Reflection Setup to install a multi-user version of Reflection see "Other Multi-User Installation Options" on page 9 for ways to automate installation. The Deployment Manager, described below, performs these tasks automatically.

Deployment Manager

The Deployment Manager organizes and centralizes the various tasks an administrator must perform in the course of installing, maintaining, and updating Reflection software.

Installing Software

When you first run the Deployment Manager, an Installation Wizard helps you install Reflection software. Deployment Manager actually runs the Reflection Setup program for you during this phase, as many as three separate times.

Besides placing Reflection software on a server for users, the Deployment Manager installs Reflection on the administrator's local machine. This provides a secure site from which you can run utilities such as profilers. Administrators need not always run the Deployment Manager from the same "administrative installation." Since no information necessary for administration is stored on the local machine, administrators can carry the Reflection CD with them and create an administrative installation at any computer on the network.

When you run Deployment Manager from a new computer it detects that there is no administrative installation and then creates one. But it won't create a new server installation if you specify a server directory where one already exists. Modifications you have made to the server installation (profiles, web pages, shortcuts) are detected by Deployment Manager and can be accessed and modified from the new computer.

Web Page Generation

The Deployment Manager can create web pages that administrators can offer to their users as a way of running Reflection products. This option greatly simplifies the administrator's task in maintaining and customizing Reflection software. See the Deployment Manager's online help, Rdeploy.hlp, for more information.

Running Profilers

With the Deployment Manager, profilers (for example, the VT and HP Profiler) are all in one place. In the main Deployment Manager dialog box, choose Profilers to open the Profile Reflection dialog box. You'll see none, some, or all of the profilers listed, depending on what software you've installed on the server. See the Deployment Manager's online help, Rdeploy.hlp, for more information.

Other Features

The Deployment Manager lets you add files to your base installation on the server and create and include shortcuts.

Other Multi-User Installation Options

If you use Reflection Setup to install a multi-user version of Reflection, you may want to use the following options:

- **Automatic Installation**—Allows you to record your Setup options on a workstation in a file called Silent.inf, and use the Silent.inf configuration when running Setup on other workstations. See page 10 for more information.
- **Microsoft Systems Management Server (SMS) Support**—Provides a product-specific Package Definition File (PDF) for use with SMS, and includes the automatic installation option (Silent.inf) that conforms to unattended installation guidelines. See page 12 for more information.

Automating Installation of Reflection

Reflection's Setup program lets you automate the installation of Reflection products from a network or a CD (a multiple disk installation is not defined as an unattended installation). This is useful, for example, at sites where a system administrator must install Reflection products on multiple PCs. You can record and save the choices you make while running Setup, and then run Setup again using the same choices on another PC.

Note: Using the /F or /Q switch means you will not see the WRQ End User License Agreement (EULA) on screen prior to installation. By opening the CD case and installing the software, you are agreeing to its terms and conditions. Be sure to read and keep the printed version of the EULA which comes with the software. ◂

These switches control different ways to automate installation:

Switch	Description
/R or /R!	Use the /R switch during installation to "capture" all responses during Setup to a file called Silent.inf. Use /R! to create Silent.inf without installing the product. You can also specify a path where you want Silent.inf to be created; if you don't specify a path, Silent.inf will be created in a folder under the product's Setup folder.
/F	Use with all subsequent installations; the information from Silent.inf is used by Setup so you're never prompted.
/Q	Use with any installation to make Setup perform a default installation in a minimized state without showing the Welcome to Reflection Setup dialog box, or use before the /F switch to "point" Setup to the Silent.inf file.

To automate the installation of this Reflection product on multiple PCs:

1. In the Windows Run dialog box, start Setup from the CD or network with the /R! switch and specify a location for the Silent.inf file. The location should either be a place on the network that is accessible from each user's PC or, if you're installing Reflection from a CD, a disk.

   For example:

   ```
   <drive>:\Setup.exe /R! W:\Public\Reflection\Setup\Silent.inf
   ```

   or,

   ```
   <drive>:\Setup.exe /R! A:\Silent.inf
   ```

2. Follow the prompts to install Reflection. Setup creates a file called Silent.inf in the location you specified.

3. To install Reflection with the recorded Setup configuration, start Setup from the CD or a shared network using the /F switch, followed by the complete path information to Silent.inf. If you're starting Setup from a shared network drive:

   ```
   <drive>:\Setup.exe /F <path>\Silent.inf
   ```

   If you're starting Setup from the CD, use Setup.exe, which is in the \Disk1 folder of the product you are installing (do not use Install.exe, which is at the CD root):

   ```
   <drive>:\<Program files>\Disk1\Setup.exe /F <path>\Silent.inf
   ```

   Or, use the /Q switch to run Setup in a minimized state using Silent.inf. If you're starting Setup from a shared network drive:

   ```
   <drive>:\Setup.exe /Q /F <path>\Silent.inf
   ```

   If you're starting Setup from the product CD:

   ```
   <drive>:\<Program files>\Disk1\Setup.exe /Q /F <path>\Silent.inf
   ```

   For example, if you copied Silent.inf to a network location called \Public\Refauto on drive G and you're installing Reflection from a CD-ROM on drive D:

   ```
   D:\<Program files>\Disk1\Setup.exe /F G:\Public\Refauto\Silent.inf
   ```

   If your shared network drive supports long file names, enclose the path name in quotes. For example:

   ```
   D:\<Program files>\Disk1\Setup.exe /F "H:\Public Location\Ref Auto
   Install\Silent.inf"
   ```

4. You won't be prompted with any dialog boxes using the /F switch. Instead, the information from Silent.inf is used.

When Setup completes, Reflection is installed onto your PC.

Using Microsoft Systems Management Server with Reflection

The Reflection Setup program supports Microsoft Systems Management Server (SMS) by providing:

- An unattended installation option
- A product-specific Package Definition File for use on the Microsoft Systems Management Server Administrator program

Following are general instructions for installing this Reflection product using SMS; refer to the Microsoft Systems Management Server publication for more detailed information:

1. Create source folders for SMS on the network by copying the folders on the product CD.
2. Create and then add the Silent.inf file to the \Disk1 folder that you created in step 1.
3. Start the Systems Management Server Administrator program.
4. In the Package Preparation dialog box, click the Import button to browse to the PDF file provided with this Reflection product. The PDF file contains all of the information SMS needs to create the package to install this Reflection product, and is unique for each Reflection product.
5. Click the Workstations button to open the Setup Package for Workstations dialog box. Type the path to the source directory in the Source Directory box.
6. Schedule and run the job.

The procedure for installing a multi-user license version of Reflection is the same as that explained in the Reflection *User Guide* for a single-user version, except that you must use the network path for the Setup program when you click Run on the Start menu. For example, enter the following command in the Command Line box and then click OK to start Setup from the F drive on the network. Note the use of quotes if the path includes spaces (they are required In Windows 95 and Windows NT, but not Windows 98):

```
"F:\Reflection Disks\Disk1\Setup.exe"
```

Other Installation Topics

Reflection provides Windows NT 3.51 support and the ability to create 3.5-inch installation disks.

Windows NT 3.51 Support

Your Reflection product CD includes version 5.21 of Reflection for Windows NT 3.51 environments. To install this version, put the Reflection product CD in the CD-ROM drive and click Run on the Program Manager File menu. In the Command Line text box, type your CD-ROM drive letter (for example, `D:`) followed by `\Nt351\Disk1\Setup`.

Follow the prompts to install Reflection. Because this is an earlier version of Reflection, the information in the *User Guide* does not entirely apply—see the Reflection online help for more information.

Creating 3.5-Inch Disks from the Product CD

Version 7.0 of Reflection is available on CD-ROM only. If you need to install Reflection to a PC that does not have a CD-ROM drive, use the **3.5" Disk Utility** option, available when you run Setup from the original product CD (or from installed disk images on a shared network drive), or contact WRQ to request 3.5-inch installation disks.

Chapter 3

Setting Up Your Connectivity Environment

Reflection provides you with a variety of methods to connect users to hosts when they start Reflection. Each option is suited for a different type of host environment.

Following are some guidelines for how to take advantage of these options, ranging from the simplest to the most complex.

Using Reflection's Connection Wizard

The Connection Wizard takes the guesswork out of establishing a session with a host computer. The wizard guides users through the process by asking a series of questions. Your users don't need to be computer experts to answer these questions—just a little knowledge of your PC and host computer will do.

To establish a host connection using the Reflection Connection Wizard:

1. On the File menu, click New Session.
2. Select the **Connection Wizard** option, then click OK.
3. Use this wizard by answering the questions on each of the wizard's panels, clicking Next to advance to the next panel. To go back to an earlier panel to change an answer, click Back. To exit the wizard before finishing, click Cancel. For help with any of the Connection Wizard's panels, click the Help button.

Note: You can also start the wizard by clicking the Connection Wizard shortcut in the Wizards folder (which is contained in the Reflection folder). ◄

Connecting to Any Host Using the Best Network Option

The method presented here requires the least amount of configuration and support.

If you have any of the following protocols, you can let your users to connect using Reflection's **Best Network** option without any further configuration on your part:

- Telnet
- LAT
- VT-MGR

The **Best Network** option automatically finds the appropriate protocol for the product and host you are using. Once users start Reflection they simply press Enter ↵ —Reflection prompts for the name of the host before connecting using the best transport.

Using this method depends on the number of users you must support and how secure your environment is. Connecting using the **Best Network** option requires that *each user* knows the name of the particular host.

Connecting to a Host Using the Default Settings File

If your users need to connect to only *one* host, you can create one default settings file (Settings.r<*n*>w) for all users (by default, Reflection will always search for and automatically load a settings file using this name). By placing this file on a shared network drive and making it read-only, you protect it from inadvertent changes or corruption, and ensure that all users will standardize on this file. Doing so also allows you to control the configurations for multiple users from one location. See "Maintaining Common Settings Files on the Network" on page 43.

Note: You can also specify a site default settings file using Reflection Profiler; see page 18 for more information. ◂

Connecting to Multiple Hosts Using Unique Settings Files

If your users need to connect to more than one host (such as an HP 3000 *and* a UNIX host), you should create a unique settings file for each host connection. Further, you can configure a shortcut to automatically start Reflection, load a settings file, and connect to a specified host. Although this requires more configuration (on both the shared network drive and each user's workstation), it is a practical connection method for multi-host environments. The advantages to using this method are:

- You use the operating system shortcuts to manage access to hosts.
- Each destination can have completely different settings.

Following is an example of creating a settings file to connect to a UNIX host using Reflection for UNIX and Digital:

1. Start Reflection and change the necessary parameters for connecting to a UNIX host, such as:
   - Select a UNIX preset configuration (on the Protocol tab in the File Transfer Setup dialog box).
   - Open a UNIX-specific toolbar settings file.
   - Change the **VT backspace sends** option to **Backspace** (on the Keyboard tab in the Terminal Setup dialog box).
2. Click Save As on the File menu to open the Save Settings dialog box.
3. Enter a unique name for the file in the **File name** box, such as Unixhost.r2w.
4. Click the Shortcut button to open the Shortcut dialog box.
5. Select the **Create a shortcut when saving settings files** check box, then specify where the shortcut will be located.
6. Click OK.
7. In the Save Settings dialog box, click Save.

Creating a Site Default Settings File to Control Connections

If you administer Reflection in a multi-user environment and you want a standardized set of Reflection connectivity functions for your group of users, use Reflection's site default settings file feature. Doing this lets a user group use exactly the same Reflection settings while you administer Reflection from a single settings file for easy maintenance, and ensures that each user is restricted to the same host, commands, and features. See page 85 for details on site default settings files.

Attaching a Connect Macro to a Settings File

You can attach a *connect macro* to a settings file in Reflection. When you start Reflection and load the settings, the connect macro automates the process of logging in to a host and starting a host application. The advantages to using connect macros are:

- You can include the user's login name.
- You can completely automate the login by including a user's password.
- Connect macros don't have to stop at connecting; you can write a macro that connects and launches a particular host application.
- Connect macros can be tailored to individual users' needs (for instance, connect one user to a financial application and another to a database).

To link a connect macro to a host connection, use one of these two methods:

- When you record a login macro, select **Make this the connect macro** in the Stop Recording dialog box.
- In Reflection, click Connection Setup on the Connection menu, and click the Connect Macro button. This opens the Connect Macro dialog box. Enter the macro name in the **Macro name** box (or use Browse to select a macro).

For more information on using macros in connections, see the Vbrwin.hlp online help file.

SECTION 2

Managing Reflection for Multiple Users

Chapter 4

Information About Connections

As a system administrator, you probably need to maintain Reflection in a large variety of environments. The topics in this chapter:

- Explain the difference between file services and network protocols
- Describe how to set up network connections and establish a connection
- Describe Reflection's Windows Sockets support
- Discuss network communications services

File Services vs. Network Protocols

To establish a network host connection using Reflection it helps to understand the difference between file services and network protocols:

- A *file service* is what you use to access a network drive. You run a file service protocol (such as Ipx.com), and then log into the network and access the server. At this point, you would start Reflection. This is only one half of the process in establishing host communications.
- A *network protocol* is what you use to communicate with the host. The software to load a network protocol (such as TCP/IP) is unrelated to the software you load and use for accessing your file service.

Network Connection Setup

Before you can use Reflection to connect to a host over a network, the appropriate networking software must be installed on your PC. Following is a list of 32-bit networking software products you can use with Reflection to make a LAT, Telnet, or NS/VT connection to a host. For a list that includes 16-bit networking software products, search for *Supported networks* in the online help.

LAT

For Windows 95 and Windows 98, one of the following:

- WRQ's LAT protocol for Windows 95, which is provided in:
  - Reflection LAT Connection for Windows 95 and Windows NT (version 6.2)
  - Reflection Network Series 3000 Connection for Windows 95 (version 6.1)
  - Reflection Network Series TCP/NFS Connection for Windows 95 (version 6.1)
- PATHWORKS 32 for Windows 95 (version 6.0 or higher), SuperLAT for Windows 95, or TES32 (version 3.0 or higher)

Note: To connect with LAT under Windows 95 or Windows 98, you will need to take some additional steps. See page 24 for more information. ◂

For Windows NT 4.0, one of the following:

- WRQ's LAT protocol for Windows NT 4.0, which is provided in:
  - Reflection LAT Connection for Windows 95 and Windows NT (version 6.2)
  - Reflection Network Series LAT Connection for Windows NT 4.0 (version 6.01)
- PATHWORKS 32 for Windows NT (version 7.0 or higher) or SuperLAT for Windows NT

TELNET	One of the following: ▸ Microsoft's TCP/IP software for Windows 95, Windows 98, or Windows NT ▸ Other Windows Sockets-compatible TCP/IP software ▸ WRQ's TCP/IP software for Windows 95, formerly available in: – Reflection Network Series 3000 Connection for Windows 95 (version 6.1) – Reflection Network Series TCP/NFS Connection for Windows 95 (version 6.1) Both of these products include TCP/IP software for Windows 95, but not for Windows 98 or Windows NT
VT-MGR	Reflection for HP with NS/VT or Reflection Suite for HP and one of the following: ▸ Microsoft's TCP/IP software for Windows 95, Windows 98, or Windows NT ▸ Other Windows Sockets-compatible TCP/IP software ▸ WRQ's TCP/IP software for Windows 95, formerly available in: – Reflection Network Series 3000 Connection for Windows 95 (version 6.1) – Reflection Network Series TCP/NFS Connection for Windows 95 (version 6.1) Both of these products include TCP/IP software for Windows 95, but not for Windows 98 or Windows NT

Establishing a Host Network Connection

To create and save a host connection:

1. Make sure you are not already connected to a host (click Disconnect on the Connection menu, or click New Session on the File menu).
2. Click Connection Setup on the Connection menu to open the Connection Setup dialog box.
3. Select **Network** in the **Connect using** box, and select how you'll be connecting from the list of network connections.

4. Enter the information needed by the protocol you selected, such as a host name.
5. Click the Connect button to establish a host connection.
6. Click Save As on the File menu to open the Save Settings dialog box.
7. Reflection proposes a settings file name for your saved connection based on the host name and connection type you specified in the Connection Setup dialog box.

   If you do not want to accept the proposed name, type another name in the **File name** box.
8. From the **Save as type** list, select **Connection (*.rco)** to save your connection as a connection settings file.

   A connection saved as a connection settings file does not contain other Reflection attributes, such as file transfer, terminal, keyboard, toolbar, or color settings.
9. To establish this connection again at a later time, click Open on the File menu, and select your connection from the list of connection settings files.

Connecting over LAT

To run Reflection using the Local Area Transport (LAT) protocol, you must install your Ethernet hardware and have one of the networking software products described on page 22.

In addition, if you are running Windows 95 or Windows 98, you must enable the LAT protocol:

1. On the Setup menu, click View Settings.
2. In the **Reflection settings** list, select **Allow Legacy Communications**.

Tip: To quickly select this setting, type `legacy` in the Search text box. ◂

3. Select **As Needed** in the **Setting details** text box.
4. Click OK.

Note: The above procedure also applies if you want to establish a connection with the BAPI, HP-NSVT, HP-Telnet, IBM-ACS, INT-14, U.B., CTERM, NASI, EICON, or NLAT network connection types. ◂

After starting Reflection, select **LAT** in the Connection Setup dialog box.

Connecting over Telnet

Windows Sockets Telnet support is included with Reflection using a Windows Sockets-compatible TCP/IP stack. This lets you:

- Use your PC as a virtual terminal over your TCP/IP connection.
- Manage sessions in a way that is seamlessly integrated with Reflection. Reflection gives you the flexibility to manage one or more terminal sessions to one or more hosts on the network.
- Establish an FTP (TCP/IP File Transfer Protocol) session.

After starting Reflection, select **Telnet** in the Connection Setup dialog box.

Connecting over NS/VT

Reflection for HP with NS/VT for Windows 95, Windows 98, and Windows NT is a product from WRQ that lets you connect to a host over Network Services/Virtual Terminal (NS/VT) using a Windows Sockets-compatible TCP/IP stack. Network Services is a proprietary protocol from Hewlett-Packard; NS/VT uses the TCP/IP protocol stack.

After starting Reflection, select **VT-MGR** in the Connection Setup dialog box.

Creating a Connect Macro

Using Reflection's Macro Recorder, it's easy to create a login macro that will run each time you start Reflection:

1. If you're already connected, click Disconnect on the Connection menu.
2. Click Start Recording on the Macro menu.

   A small recording toolbar will appear in the lower right-hand corner of the terminal window.
3. Establish a host connection (typically you just need to press Enter ↵).
4. When prompted by the host, enter your login name and password as you usually do.
5. Click Stop Recording on the Macro menu, or click the left button on the Recording toolbar.

   The Stop Recording dialog box appears.
6. Under **Macro name**, enter a name for the macro, such as Login.

7. Select the **Make this the connect macro** check box.

   Tip: Selecting the **Create a button** check box will create a toolbar button that performs the same function. ◂

8. Click OK.

9. Click Save on the File menu to save your settings file.

Making Multiple Connections

Hint: See the online help to make multiple connections in one copy of Reflection (search for *Multiple sessions, running in one window*). ◂

Reflection lets you establish multiple host connections that function independently. The New Session command lets you create a new host session in a new Reflection window while maintaining your other active connections in their own windows.

To make multiple host connections:

1. Establish your first host connection.

2. Click New Session on the File menu:

   - This command opens the New Session dialog box. The options shown depend on which Reflection products are installed. Select the Reflection product you want to use to start the new session, then click OK.

3. In the new terminal window, establish another host connection.

Note: Some Unisys hosts require a unique Station ID for each instance of Reflection. ◂

New Session starts Reflection in its default state and does not use any settings files. You may need to change some settings to connect to a host (for example, Reflection for HP with NS/VT is configured for an HP host by default and requires different settings to connect to a UNIX host), or click Open on the File menu to load an existing settings file.

Your active sessions are shown at the bottom of the Window menu (the current session is dimmed). You can toggle between active connections by:

- Clicking the session name on the Window menu
- Pressing the Windows Alt+Tab keystroke

Imposing Session Limits

You can specify the maximum number of sessions for Telnet, LAT, and NS/VT using the View Settings dialog box.

To set a session limit for one of these connection types:

1. Click View Settings on the Setup menu to open the View Settings dialog box.
2. Select an option for your connection type from the list of **Reflection settings**:
   - **Session Limits LAT**
   - **Session Limits NS/VT**
   - **Session Limits Telnet**
3. In the **Setting details** box, specify the maximum number of sessions (the range is 0-255).
4. Click OK.

Specifying a Hosts File

The TCP/IP Hosts file is a simple list that maps recognizable names to Internet addresses, similar to a domain name system. This file controls what names appear when the user opens the Host/Service Name dialog box. If you have LAT installed, the list also includes names broadcast from LAT service multi-casts.

You can use a TCP/IP Hosts file if there is no Domain Name Server on your network (or even if there is). It is also convenient to place frequently used name-to-address mappings in this file. A TCP/IP Hosts file can reside on your PC, or on a PC server.

To specify a hosts file in Reflection:

1. Click View Settings on the Setup menu to open the View Settings dialog box.
2. Select **Hosts File** from the list of **Reflection settings**.

3. In the **Setting details** box, enter the full path of the TCP/IP hosts file (you can enter up to 128 characters).

   For example:

   ```
   C:\Program Files\Reflection\User\Hosts
   ```

   Reflection uses the names (not the aliases) from the file you specify here. If you don't know the path to your Hosts file, click the Browse button to locate it from the Hosts File Browse dialog box.

4. Click OK.

5. Click Save on the File menu to save the settings file.

Windows Sockets Support

The Windows Sockets specification describes a set of common APIs (application programming interfaces), and was developed to increase the interoperability of TCP/IP applications and protocol stacks. This specification defines a standard interface between a Windows application and a TCP/IP protocol implementation. Other products that match this specification should also work together.

Use the proper Windows Sockets DLL file (Wsock32.dll) provided by your vendor. Reflection for Windows is a Windows Sockets-compatible application. A file named Rntelnx.dll allows access to the TCP/IP software for host communications if you have the TCP/IP software provided with one of the following products:

- The Microsoft Windows 95, Windows 98, or Windows NT TCP/IP stack
- Another Windows Sockets-compatible stack
- WRQ's Reflection Network Series version 6.1 for Windows 95

See page 35 for Windows Sockets troubleshooting information.

Connecting to the Host over a TCP/IP Stack

To connect to a host computer over one of the TCP/IP networking software products described above:

1. Start Reflection.
2. Click Connection Setup on the Connection menu to open the Connection Setup dialog box.
3. Select **Network** from the **Connect using** box.
4. Select **TELNET** as the network connection.
5. Click Connect.

Network Communications Services

Networks typically provide the following services: print services and communications services. Reflection focuses on the communications services aspect of network use. There are three types of communications services: virtual terminal services, asynchronous (RS-232) servers, and X.25 servers.

Virtual Terminal Services

Virtual terminals provide a local area network (LAN) connection to the host. There are three virtual terminal connections available to a host:

- NS/VT (HP 3000 only)
- Telnet
- LAT

The host must support the virtual terminal protocol.

Asynchronous (RS-232) Servers

An asynchronous communications service usually consists of a LAN connection between your PC and the communications server, and an RS-232 connection between the communications server and the host.

X.25 Servers

X.25 servers provide an X.25 connection to the host.

To connect to an HP 3000, you should have an Intelligent Network Processor (INP). An INP is either a communications input/output board used with HP data communications products, or a Packet Assembly and Disassembly (PAD), a functional unit that allows Data-Terminal Equipment (DTEs) not equipped for packet switching to access a packet-switched network. The PAD does not work as well as an INP board.

Configuring Network Servers

Use the following information to configure your network's asynchronous communications server (terminal server). Page 21 describes the difference between file services and network protocols.

Data communication between a PC and a host over a network requires the following:

- A hardware interface between the PC and the network
- A hardware interface between the host and the network
- Software that lets Reflection communicate with the PC hardware interface

It is best to configure an asynchronous communications server to do flow control with the host. Reflection can maintain flow control with the network and the host, but it is often a good idea to have the server do flow control, as well.

Some servers allow transmit pacing and receive pacing to be configured independently:

- Flow control from an asynchronous server to the host is *transmit pacing*—the host sends an XOFF to the server when the host is not ready to receive data.
- Flow control from the host to an asynchronous server is *receive pacing*—the server sends an XOFF to the host when the server is not ready to receive data.

For a VMS or UNIX host, the server should be configured to do XON/XOFF pacing in both directions (receive and transmit).

Classic HP 3000

Some asynchronous servers (for example, Ungermann-Bass) support Enq/Ack:

- Configure the server to do Enq/Ack flow control.
- You can also configure the server to do XON/XOFF receive pacing (the server sends an XOFF to the HP 3000 when the server's buffer is full), but this is usually not necessary. The HP only sends 80 characters at a time, then sends an ENQ, and waits for an ACK.
- Keep the **Enq/Ack** check box selected in the Advanced HP Options dialog box (the default). Either the network server or the PC must have Enq/Ack pacing for communication with an HP 3000—it's not a problem if they both do. Termtype 10 is assumed.

If the asynchronous server does not do Enq/Ack:

- Confirm that the **Enq/Ack** check box is selected in the Advanced HP Options dialog box (the default). This slows communications since each ENQ from the host has to be sent across the network to Reflection.
- Transmit pacing on the server should be set to none. The server should not do XON/XOFF transmit pacing (the host sends an XOFF to the server when the host buffer is full): the XON character is DC1, and this is also the HP 3000 read trigger (host prompt). If the asynchronous server interprets the DC1 as an XON, it is handled as a flow control character and the server does not pass it on to Reflection.
- If the server does not allow independent configuration of transmit and receive pacing, set its pacing to none.

MPE/iX HP 3000

MPE/iX hosts do not use Enq/Ack pacing. If the server supports independent configuration of transmit and receive pacing:

- Configure the server to do XON/XOFF receive pacing.
- Configure the server not to do transmit pacing.

If the server does not allow independent configuration of transmit and receive pacing, the read trigger (host prompt) must be reconfigured in both Reflection and on the host. The read trigger is a ^C1 by default; changing it to ^C4 is recommended. Use the following procedure:

- To reconfigure the host prompt in Reflection, select ^4 from the **Host prompt** list in the Advanced HP Options dialog box.
- To reconfigure the read trigger on the host, run the TRIGGER program on the HP 3000. This program is available via the WRQ bulletin board (see page 221 for the telephone number).

X.25 Software with HP 3000s

When signing on to the host over an X.25 network, use; TERM=24. Additional configuration items depend on the type of HP 3000 and whether you have HP INP or PADSUP.

X.25 Software with HP INP

If you are connecting to a Classic HP 3000 using TYMNET/Telnet and have an HP INP with X.25 software, configure Reflection as follows:

More Settings—Serial Port dialog box	Value	
Receive pacing list	Xon/Xoff	(default)
Transmit pacing list	Xon/Xoff	

Advanced HP Options dialog box	Value	
Inhibit handshake check box	Selected	
Inhibit DC2 check box	Selected	
Use host prompt check box	Cleared	
Keyboard tab, Terminal Setup dialog box		
Typeahead check box	Cleared	(default)

If you are not using a host prompt, the settings for **Inhibit handshake** and **Inhibit DC2** are disregarded, but it is safest to change these values anyway. If you find you are experiencing data errors during file transfer, try increasing the **Line transmit delay** (in the Connection Setup—More Settings dialog box). If this does not solve the problem, change the value in the **Transfer link** list, on the WRQ tab in the File Transfer Setup dialog box, to **7-Bit**. The selection of **7-Bit** may slow down transfers considerably, but files transfer successfully.

X.25 Software without HP INP or PADSUP

If you don't have an HP INP or PADSUP running X.25 software, you must also disable echo at the local PAD and use the local echo feature of Reflection. To disable echo at the PAD, consult the documentation for your particular network. In Reflection, select the **Local echo** check box on the Keyboard tab in the Terminal Setup dialog box.

Check to see if $^{D}c_{1}$ (^Q) characters pass from the host computer to the PC. (This is determined by host PAD configuration and the terminal type setting of the host port.) If $^{D}c_{1}$ characters are being passed to the host, you should be able to produce them in Reflection.

From the modes keys (selected from the **Function key set** list on the Function Keys tab in the Terminal Setup dialog box), press F7 to turn on display functions, and type carriage returns at the host prompt. If a $^{D}C_{1}$ exists, the following sequence appears:

$^{L}F:^{D}C_{1}C_{R}$

$^{L}F:^{D}C_{1}C_{R}$

$^{L}F:^{D}C_{1}$

If you see this sequence, no special configuration changes (other than local echo) must be made; use the defaults.

If $^{D}C_{1}$ characters do not appear, configure Reflection as noted above for X.25 software on your network.

X.25 with MPE/iX and PADSUP/DTC

Newer DTCs for MPE/iX machines include a PADSUP module that includes read trigger character support for remote X.25/PAD connections. This allows the $^{D}C_{1}$ character to be sent to the terminal over X.25. Typeahead is also supported in this environment.

When using this module, fewer Reflection settings need to be changed from their defaults in the Connection Setup—More Settings dialog box:

- Select **Xon/Xoff** from the **Transmit pacing** list.
- If you're experiencing datacomm errors during file transfer, increase the **Line transmit delay**.

Technical Tips

Try the following tips to improve or troubleshoot your network connections.

Windows Sockets Error Messages

Following are error messages you may receive when connecting over Windows Sockets compliant TCP/IP software; a solution to each is provided.

Cannot Find Wsock32.dll

When you select the VT-MGR, Telnet, or Best Network connection type, Reflection does the following in an attempt to establish a connection:

1. Reflection loads Rnnsvtx.dll or Rntelnx.dll, depending on the Best Network loading order in the Connection Setup dialog box or whether the modules are found.
2. As Rnnsvtx.dll loads, the Wsock32.dll file provided with Windows 95, Windows 98, or Windows NT also loads. Rnnsvtx.dll searches for Wsock32.dll in the following folders:
   - The Reflection folder
   - The Windows folder
   - The Windows \System folder

If Reflection cannot locate any of the files in the above locations, then the "Cannot find Wsock32.dll—Cannot load connection-specific library" error message displays.

Required Communication Software Not Installed

This message appears if Wsock32.dll or the appropriate Dynamic Link Library (DLL) could not be located. In addition to the guidelines in "Cannot Find Wsock32.dll" above, make sure the DLL you need is located in your Reflection folder.

Unable to Connect to Host

If you receive this message when you're trying to connect to your host:

1. Verify that the name and IP address of the host you are trying to connect to is in the Hosts file. In the View Settings dialog box, select **Hosts File** from the **Reflection settings** list, and check to see where Reflection is looking for the Hosts file.
2. Try connecting using the IP address of the host rather than the host name.
3. If you cannot connect using the IP address, check your vendor's documentation on troubleshooting your network software.

Cannot Load Connection Specific Library for Your Connection

This message may indicate that one or more of the following files are not in your path and cannot be found by Reflection.

- Wsock32.dll (must be in the Windows System folder)
- Msvcrt.dll (must be in the Windows System folder)
- Rntelnx.dll (must be in the Reflection folder)
- Rnnsvtx.dll (must be in the Reflection folder)
- Rnlatx.dll (must be in the Reflection folder)

This message may otherwise indicate that Reflection could not find a 32-bit TCP/IP software on your PC, that it is not installed properly, or that you have extra copies of Wsock32.dll that should be deleted or renamed.

Click Network in Windows Control Panel to verify or change your TCP/IP software configuration.

Could Not Resolve Host Name

This message appears when Reflection cannot find the host name you indicated. See the guidelines described under "Unable to Connect to Host" above.

Chapter 5

Reflection As an ActiveX Control

New for version 7.0 of Reflection is the ability to use Reflection as an ActiveX control. Reflection can now be used inside a web page like any other Active X control, or within an application that supports ActiveX controls, such as a Visual Basic application. This enables an application to launch Reflection, to send commands to Reflection, and to respond to events that occur in the Reflection session.

This chapter provides a complete overview of using Reflection as an ActiveX control. This chapter details the tags, methods, and properties used to embed Reflection and invoke its features, and shows an example of HTML source code created to control Reflection in a web page.

What Is the Reflection ActiveX Control?

Reflection 7.0 includes a new file, R<*n*>axctrl.ocx, (<*n*> is 1, 2, or 4, depending on what product you installed, see the table on page 47). This .ocx file is the Reflection ActiveX control. It's purpose is to pass information between a web browser or a Visual Basic application and Reflection. This control calls and passes commands to Reflection from your application, and can also return messages to the application indicating an event has occurred in the Reflection session. This control also lets you access almost all Reflection methods and properties.

Defining and Referencing Reflection As an ActiveX Control

To include Reflection in a web page requires HTML source code similar to the source used to include any other object in a web page. This HTML source code references the object and specifies parameters that should be used when the object is loaded.

As an example:

```
<OBJECT ID="R2winCtrl" width="550" height="370" CLASSID="CLSID:
15B168B2-AD3C-11d1-A8D8-00A0C9200E61">
<PARAM NAME="StartUpSettingsFile" VALUE="hostname.r2w">
<PARAM NAME="StartupMacro" VALUE="login">
<PARAM NAME="ControlID" VALUE="r2session">
</OBJECT>
```

```
<PARAM NAME="InWebBrowser" VALUE="True">
<PARAM NAME="SilentInstall" VALUE="True">
</OBJECT>
```

The `Object` tag is used to specify the ID of the ActiveX control, its placement in the web page, and the Class ID of the control. The `Object ID (R2winCtrl)` is used to reference the object elsewhere in the HTML source code. This `Class ID` is registered during installation of Reflection, or when the control is downloaded by a user from a web page (see "Downloading a Reflection ActiveX Control" on page 41 for more information).

Three different `Class IDs` are used, one for each of the three Reflection products:

- Reflection for HP with NS/VT:
  `15B168AD-AD3C-11d1-A8D8-00A0C9200E61`
- Reflection for UNIX and Digital:
  `15B168B2-AD3C-11d1-A8D8-00A0C9200E61`
- Reflection for ReGIS Graphics:
  `15B168B7-AD3C-11d1-A8D8-00A0C9200E61`

The parameters following the `Object` tag are unique to the Reflection ActiveX control. They can be used to specify desired actions when Reflection is started in a web page. Use of these parameters is optional, and each parameter has a different function:

Parameter Name	Description
StartUpSettingsFile	Specifies what settings file to load at startup: if no settings file is specified, or the file that is specified doesn't exist, Reflection starts with default values
StartupMacro	Specifies the macro in the settings file that should be run when Reflection starts
ControlID	Specifies a unique session ID for Reflection: if you have more than one Reflection session running on a web page, specifying this parameter ensures that the position of each session is remembered when users return to this page in their browsers
InWebBrowser	Specifies whether the control is being used within a browser. The value determines if Reflection will display exiting dialogs or no. Values are True or False.

Parameter Name	Description
Silent Install	Specifies whether to launch a silent installation of Reflection or to launch Setup as the system administrator requests. This can be interactive or silent as well, as the system administrator has specified.) Values are True or False.

Defining and Referencing Reflection As an ActiveX Control in an Application

Using Visual Basic, the Reflection ActiveX control is available as soon as Reflection is installed. To access the control, add the Reflection ActiveX control to your VB toolbox. Dragging the Reflection icon from the VB toolbox to your form drops the control right into the application. The properties of the control, such as the height and width, and the parameters, such as `StartUpSettingsFile`, is defined in the Properties window of the Visual Basic environment.

Controlling Reflection Within a Web Page or Application

The HTML example on page 37 shows an excerpt from a web page that contains Reflection. There are actually two ways to communicate to Reflection once the control has started the session: the distinction between the two forms of communication is important to note. The Reflection ActiveX control has its own interface, containing methods that let a user control Reflection through the ActiveX control. In contrast, a method exists for a user to bypass the Reflection ActiveX control and communicate directly with Reflection. The two methods are explained below.

The Reflection ActiveX contains the following methods:

- **RunMacro:** Runs a specific Reflection macro (contained in a settings file), for example: `R2winCtrl.RunMacro "DoTransfer", "Myfile.doc"`

  The `DoTransfer` parameter is the name of the macro to be executed. The `Myfile.doc` parameter is the macro data passed into the macro. In the example above, `Myfile.doc` is the file to be transferred.

- **Command:** Runs a specific Visual Basic command in Reflection, for example: `R2winCtrl.Command ".WRQSendFile,""Myfile.doc"","", rcBinary, rcDelete"`

  In the above example, the `.Command` file is used to pass the Reflection method `WRQSendFile` to the Reflection session. In this case, `Myfile.doc` is transferred to the host as a binary file.

- **SetFocus:** Sets focus to the Reflection session, for example:
  `R2winCtrl.SetFocus`

  This method brings focus to Reflection's terminal window from the web page or application.

- **GetActiveSession:** Returns the instance of the Reflection session object directly to the calling application so that this application can communicate directly to the Reflection session. The way to use this method differs when using it from within a browser and using it in an application.

  The following example is correct syntax when run inside a browser:
  ```
  R2winCtrl.GetActiveSession.WRQSendFile "Myfile.doc","",rcBinary,
  rcDelete
  ```

  The following example is correct syntax for a Visual Basic application:
  ```
  Dim Reflection2 As Reflection2.Application
  Set Reflection2 = R2winCtrl.GetActiveSession
  Reflection2.WRQSendFile "Myfile.doc","",rcBinary,rcDelete
  ```

  This code sets `Reflection2` as the Reflection session object.

Receiving Information from Reflection Through Events

Perhaps as important as passing commands to Reflection, is the ability to respond to events that occur in a Reflection session. An application or web page can receive information from Reflection by using the event provided in the ActiveX control.

There are two separate actions required to use this event, one in the Reflection session itself, and one in the application or web page:

- **In the Reflection session:** Define an internal Reflection event, or mapping, which executes the Visual Basic command, `.RaiseControlEvent.`

  To define the internal Reflection event, use any of the mapping dialog boxes (Keyboard Mapping, Mouse Mapping, Event Setup, etc.), and map an action in Reflection to the Visual Basic command `.RaiseControlEvent`. This command can specify two optional parameters, an integer and a string. These two values are passed back to your application or web page.

- **In the application or web page:** Handle the event in your application or web page using the event handler, `OnReflectionEvent` (*integer*, *string*). The (*integer*, *string*) is optional.

As an example:

Map the Reflection Event, **When a connection is made** to `.RaiseControlEvent 0, "connected"`. Now, in the web page, insert code to perform some action based on `.RaiseControlEvent`, such as:

```
<VBScript>
Sub R2winctrl_OnReflectionEvent(eventnumber, eventdata)
If  (eventnumber = 0) then
   MsgBox "Connection Established", ,"Reflection"
Else
   if(eventnumber =1) then
      MsgBox "Disconnected", ,"Reflection"
   End if
End if
End Sub
</VBScript>
```

In this example, when the Reflection session has established a connection, the `.RaiseControlEvent` is sent to your web page. Your web page then displays a message box with the text "Connection Established."

Downloading the Reflection ActiveX Control

One useful feature of an ActiveX Control is its web-based availability. The Reflection ActiveX Control is downloadable from the Web, but it is important to note the distinction that this control is *not* Reflection itself, but a control that *calls* Reflection. As a result, downloading the control by itself would not enable a user to run Reflection if Reflection were not installed. However, this control is capable of installing Reflection to any PC that has a web browser.

When creating a web page that will contain Reflection, a system administrator can use optional parameters to specify what should happen if the user who loads this web page does not have Reflection installed, or does not have the latest version of Reflection. This functionality is also available when including the Reflection ActiveX control in a Visual Basic application.

All of the parameters shown in the example below are available via the Customized Property sheet for the Reflection ActiveX control, in the Visual Basic environment:

```
<OBJECT ID="R2winCtrl"
CLASSID="CLSID:15B168B2-AD3C-11d1-A8D8-00A0C9200E61"
codebase="r2axctrl.ocx" >
<PARAM NAME="InstallerPath"VALUE="
\\server\share\Reflection7.0\Setup\R2win32\setup.exe>
<PARAM NAME="InstallType" VALUE=1>
<PARAM NAME="ReflectionVersion" VALUE="7.0.0">
</OBJECT>
```

This HTML source code specifies several parameters. The `Object ID (R2winCtrl)` is used to reference the object elsewhere in your HTML code. The `CLASSID` parameter contains the `CLSID` value stored in the registry, which tells the operating system what ActiveX control to load. If this `CLSID` is not found in the registry, then the `codebase` tag tells the browser where and what ActiveX control to download. In the example above, the `codebase` tag points to the `r2axctrl.ocx` file, which is in the same directory as the web page.

Tip: You should fully qualify the path to the control. ◂

The control is now automatically downloaded, installed, and registered. Next, the control starts, checking to see if Reflection is installed. If so, the control uses the value specified by the `ReflectionVersion` parameter to see if an upgrade of the Reflection product is required. If the parameter value is higher than the installed version, the product is upgraded. To force an upgrade in all cases, specify a value of -1.-1.-1.

The HTML parameter `InstallType` can be specified with three different values:

- 0 – Do not install Reflection
- 1 – Local Configuration only
- 2 – Full Installation only

Currently only two of these values are used, but for forward compatability, each has been defined. For Version 7.0 values 1 and 2 will always perform the same type of installation. The Reflection Setup components that are installed depend on what the system administrator installed to the server (see the Setup online help for more information).

The `InstallerPath` parameter specifies the path to the Reflection Setup program. Once Reflection is installed the ActiveX control will launch Reflection in the web page.

Chapter 6

Settings and Other Reflection Files

This chapter explains how to maintain common settings files that are shared by network users and ensure the files remain secure (that is, protected from overwriting or accidental erasure). It also describes how to create shortcuts that let users start Reflection and automatically load settings files.

Maintaining Common Settings Files on the Network

To provide users with a secure Reflection configuration, you should maintain common settings files on the network. Doing so allows you to control the configurations for multiple users in one location.

Depending on the site being administered, you can decide to maintain one settings file for the entire user group, or maintain multiple settings files that are based on the host connection type. Either way, you have a choice between using standard Windows tools to restrict access to one or more settings files, or, if only one settings file will be used, configuring the user group for this file using options on the Reflection Profiler's Files tab. For more information on using the Profiler to specify a site default settings file, see "Controlling Access to Reflection Features" on page 81.

Configuring a Workstation for Reflection

After installing Reflection on a shared network drive, you must run the Setup program (whether web- or server-based) for each user from their workstation (see the Reflection *User Guide*). It is recommended that the Reflection User folder be created on the workstation's local drive. However, you can specify that user files, such as macro, script, and settings files, default to a shared User folder for all users. Doing this lets you maintain one or more settings files for your user group from the same folder on the shared network drive. For additional security, you can then designate the common files as read-only.

Configuring a Workstation to Share Network-Based Settings Files

The following steps summarize how to point a newly configured workstation to settings files on the shared network drive. If you will be specifying a single site default settings file on the network, use the Reflection Profiler, as described on page 85.

To configure a workstation for shared settings files on the network:

1. Start Reflection.
2. Save whatever settings your users require to a settings file. Make sure the settings file is saved to a shared network drive (preferably to a location where users have read-only privileges).
3. Start Windows from a user's workstation.
4. From the Start button, click Run.
5. Type the following command, where <*n*> is the Reflection product (described in the table on page 47) in the **Open** box, then click OK.

   ```
   <network drive>\<Reflection folder>\Setup\R<n>win32\Setup.exe
   ```

   If a folder name contains spaces, then you must enclose the above command in quotation marks.
6. Follow the prompts to configure the workstation.
7. When the Setup program displays the User Folder dialog box, enter the network path where the common settings files are located.
8. Complete the Setup program on the user's workstation.
9. If users have write privileges in the network directory where settings files are located, designate the settings file as read-only. See "Protecting Files from Accidental File Erasure" on page 51.

Creating Shortcuts to Load Common Settings Files

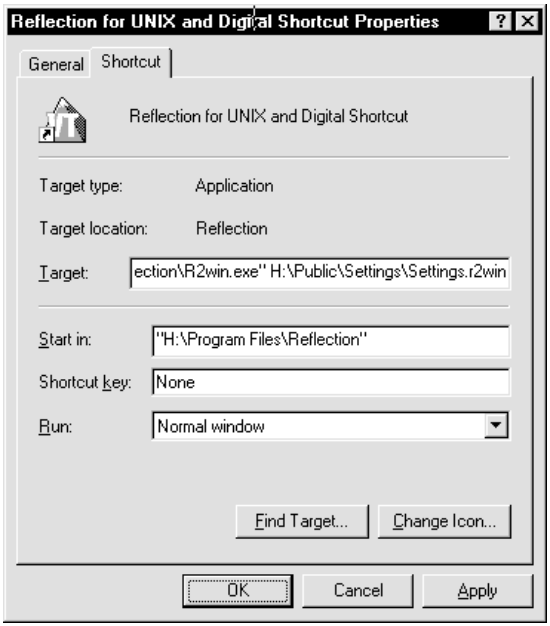
Once you have created a common settings file, you can create shortcuts that start Reflection and load the settings files. The following procedure must be performed on the workstation of each user who will be running Reflection with a common settings file.

To create a Reflection shortcut that loads a settings file:

1. In Windows Explorer, click the Reflection program, such as R2win.exe, that you want to create a shortcut to.
2. On the File menu, click Create Shortcut.
3. Use the right mouse button to click the new Reflection shortcut, then click Properties.
4. In the Shortcut Properties dialog box, click the Shortcut tab.

   The **Target** box shows the path of the Reflection program. If the path includes spaces, it must be enclosed in quotes.
5. Add the path for the settings file in the **Target** box after the Reflection program path, separated by a space. Again, if the path includes spaces, it must be enclosed in quotes.

For example, the properties for a Reflection for UNIX and Digital settings file could look like this:



Reflection for UNIX and Digital Shortcut Properties

6. Click OK.
7. Drag the shortcut onto the desktop or onto the Start button.

Now when the user clicks the Reflection shortcut, Reflection starts and loads the common settings file.

File Extensions Used by Reflection Products

Complete settings files are product-specific, meaning they belong only to the Reflection product that created them. For example, if you open a complete settings file in Reflection for UNIX and Digital that was created in Reflection for HP with NS/VT, this will start a session of Reflection for HP with NS/VT using those settings (provided you have both products installed).

Note: Windows Explorer does *not* display file extensions by default. ◄

You identify a complete settings file and the product it belongs to by its file name extension:

Reflection Product Name	File Extension
Reflection for HP with NS/VT	.r1w
Reflection for UNIX and Digital	.r2w
Reflection for ReGIS Graphics	.r4w
Reflection FTP Client	.rfw
Reflection for IBM	.rsf
Reflection X	.rxc

Unlike a complete settings file, a partial settings file does not belong to a specific Reflection for Windows product. You can use a partial settings file created in one product to change the settings for another Reflection product. For example, a color settings file created in Reflection for ReGIS Graphics can be used by Reflection for HP with NS/VT.

You can identify a partial settings file by its file name extension:

Type of Partial Settings	File Extension
Keyboard map	.rkm
Mouse map	.rkm
Toolbar	.rtb
Colors	.rcr
Menus	.rmu
Hotspots	.rhs
Connection	.rco

Note: If you're accustomed to starting Reflection by clicking on a settings file name in Windows Explorer, note that Windows Explorer does *not* display file extensions by default. ◄

Linking Settings Files

Note: This is equivalent to using Connection Directory entries in earlier versions of Reflection. ◂

Reflection gives you expanded control over partial settings files with an advanced feature that lets you link partial settings files to complete settings files. This is useful if you want to:

- Share a partial settings file, such as a toolbar, among users of a variety of complete settings files. This way when you update the toolbar, the changes are automatically distributed to the linked complete settings files.
- Distribute some special settings, such as a customized colors or mouse mappings, to a group of users.
- Keep partial settings files on a shared network drive so that users can link to them from their complete settings files stored on their local drives. Again, changes made to the partial settings file are automatically updated and distributed via the link.

Caution: ● If you distribute linked settings files over a shared networked environment, changing file locations or names, or deleting files, will disrupt those links. ◂

As an example, if your users connect to a variety of UNIX hosts, they could use one complete settings file that contains the information about their UNIX terminal emulation, file transfer, and keyboard mapping settings. Then, to connect to the various UNIX hosts, they could simply open connection partial settings files representing each of those host connections.

Showing the Link to file Check Box

Since linking is an option typically reserved for advanced users, the **Link to file** check box is hidden for convenience. To show this option, in the View Settings dialog box, select the setting **Show Link to File Check Box** and change the value in the **Setting details** box to **Yes**. Now, when you use the Open Settings dialog box to load a partial settings file, you'll see the **Link to file** check box.

To link a partial settings file to a complete settings file:

1. On the File menu, click Open.
2. In the Open Settings dialog box, click a complete settings file, then click Open. All of Reflection's settings are now governed by that complete settings file.
3. Now, click Open on the File menu again.

4. In the Open Settings dialog box, use the **Files of type** list to select the type of partial settings file you want to use, then click the name of the partial settings file.
5. Select the **Link to file** check box.
6. Click Open.

The partial settings file you selected is now linked to the complete settings file currently loaded. This link is only temporary; save your complete settings file to make the link permanent.

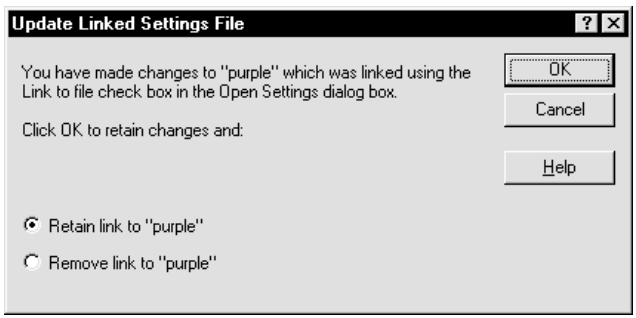
Breaking a Link Between Settings Files

If you want to unlink a partial settings file from a complete settings file, you can open the partial settings file and clear the **Link to file** check box: this will break the link between the files. Or, you can make a change to the partial settings file.

When you make a change to a partial settings file, Reflection asks if this change also means you want to remove the linked relation between the files. The following example shows how a change can unlink a color partial settings file from a complete settings file:

1. Load the complete settings file: the linked color partial settings file automatically opens.
2. On the Setup menu, click Display, then click the Colors tab.
3. Make a change to the color settings, then click OK.

   Reflection displays a dialog box similar to this:



4. Click **Remove link to <file name>**, then click OK.

Storing Reflection Settings Files Locally

You may want to store Reflection settings files on a user's local drive (a "local" drive might be a network user folder) to prevent one user from accidentally using or over-writing a settings file that belongs to another. Then when the user clicks the Reflection shortcut on the desktop, Reflection loads the local settings file.

You can do this from Windows or from Reflection:

Follow these steps from Windows Explorer:

1. Click the Reflection shortcut.
2. Use the right mouse button to click the Reflection program or shortcut, then click Properties.
3. In the Shortcut Properties dialog box, click the Shortcut tab. The **Target** box shows the path for the Reflection program.
4. Add the local path for the settings file in the **Target** box after the Reflection path, separated by a space.

Follow these steps from Reflection:

1. On the File menu, click Save As to open the Save Settings dialog box.
2. Explicitly select the local drive.
3. Click the Shortcut button.
4. Select the **Create a shortcut when saving settings file** check box, and choose a shortcut option in the **Place the shortcut** box.
5. Click OK (twice).

Protecting Files from Accidental File Erasure

It is recommended that you either set the read-only attribute on all Reflection's program files, or assign users read-only privileges for the server drive where Reflection is installed. This prevents accidental erasure or overwriting of program files.

To specify files as read-only in Windows:

1. Start Windows Explorer and highlight the files you want to set the read-only attribute on.
2. Use the right mouse button to click the files, then click Properties.
3. On the General tab, select the **Read-only** check box.
4. Click OK.

Settings Conversion Wizard Advanced Options

The Reflection Settings Conversion Wizard allows you to convert your pre-6.0 settings files to the new format. Using the wizard is explained in the Reflection *User Guide*; selecting the default option (**Let the wizard decide**) is recommended for most users.

You need to use the advanced wizard conversion options if any of the following apply:

- You store settings files in a location other than the Reflection folder, the User folder, or if your settings files have a non-default file extension.

  By default, the wizard only converts those settings files found in the original Reflection folder or theUser folder. (The default path for 16-bit versions of Reflection is C:\RWIN.) In addition, it only converts settings files with the .r<*n*>w file extension. (For an explanation of the <*n*> value, see page 47.)

- You have saved connections not linked to settings files, and you want them converted to complete settings files (by default, the wizard will convert these into connection settings files).

- You want to convert unmodified settings installed by earlier versions of Reflection.

  By default, the wizard does not convert unmodified settings.* This includes both settings files (such as Vms.r2w and Unix.r2w) and supplied connection settings icons (such as *HP 3000 Host*) from earlier versions.

- You want to convert existing color schemes into color partial settings files.

- The wizard did not provide the results that you expected in a converted setting.

To start the wizard again and specify advanced wizard options:

1. Restore the converted settings as explained on page 55.
2. When the restoration completes, click Restart.
3. For the Conversion Method, select the **Let me make the decisions** option. Then click Next.
4. In the next dialog box, tell the wizard what types of files you want to convert.

   If you don't want to convert a particular group of settings, clear the associated check box—doing so causes some of the wizard dialog boxes later in this procedure not to appear.
5. If you told the wizard to convert old settings files in the previous step and it finds old settings files, you'll see an Old Settings File Locations dialog box. If you have settings files in locations other than that detected by the Wizard, click Add, then click Browse to find the location.

   To remove a detected settings file location, click the path name, then click Remove.

   Click Next to continue the conversion process.

* This is controlled by a file called Convert.inf. If this file is missing from the Reflection folder, then all settings (unmodified or otherwise) are converted.

6. If the wizard does not detect any old settings files, you'll see the Could Not Find Any Settings Files dialog box.

   The wizard detects old settings file locations by looking for earlier versions of Reflection, or reading the path information from a file called Wrq.ini in the Windows folder. If earlier versions of Reflection are not detected, or the Wrq.ini file is missing, the wizard cannot detect earlier settings.

   Note: Reflection versions prior to 5.0 did not use Wrq.ini, so if you install version 7.0 into a new directory, the wizard may not find pre-5.0 settings. ◄

7. Now the wizard needs to know which settings files it should convert in the locations specified in step 5. All settings files shown will be converted. If you do not want to convert a specific file, select it and click the Do Not Convert button. If you change your mind, you must click Back to go back to the Location dialog box, and then click Next to have the wizard find all the settings files again.

   Click Next to continue the conversion process.

8. If you told the wizard to convert old saved connections or templates (by selecting the corresponding check box in step 7), you'll see the Select Saved Connections and Templates for Conversion dialog box.

   If you do not want to convert a specific saved connection, select it and click the Do Not Convert button. If you change your mind, you must click Back and then click Next to have the wizard find all the saved connections again.

   Click Next to continue the conversion process.

9. If the wizard detects that you have saved connections that are not linked to settings files, you'll see the Connection Found with No Link to Settings File dialog box.

   Version 7.0 of Reflection requires that your saved connections be converted to either a complete or partial settings file. By default, the wizard creates a connection partial settings file. If you want to create a complete settings file, or perform no conversion at all, make the appropriate selection here.

   If you have multiple, unlinked, saved connections, and want them all converted using the same selection you make here, clear the **Ask me this question for every unlinked saved connection** check box. Click Next to continue the conversion process.

10. If you chose the option **Create a full settings file** in the previous step you'll see the Create a Complete Settings File from a Saved Connection dialog box.

    Since you are about to create a complete settings file for this connection, the wizard needs to know where to get the non-connection information. You have two choices:

    - You can specify a specific settings file (click the Browse button if necessary).
    - You can use Reflection's default factory values for all items that are not connection-related.

    After making your selection, click Next to continue the conversion process.

11. The wizard suggests that it copy the converted settings files to the 7.0 User folder.

    New settings files replace old settings files with the same names. However, backup copies of the old files are automatically created and can later be restored (see page 55).

    If your earlier settings files were in a folder other than the 7.0 User folder, you can have the wizard place the converted files in their original location. You would want to do this, for example, if you already had desktop shortcuts configured to this location. Backup copies of the original files will be copied to the Restore folder.

    Click Next after selecting where your converted settings will be saved.

12. In the next dialog box, click Finish to start the conversion.
13. When the conversion completes successfully, click OK to exit the wizard and return to Reflection.
14. To access converted settings:
    - To open converted settings files, use the Open command on the File menu as you normally would.
    - To access connection information that used to be in the Connection Directory, Phone Directory, or a connection template, use the Open command on the File menu and change **Files of type** to **Connection** (***.rco**).
    - To access color information, change **Files of type** to **Colors**.

Restoring Converted Settings

Before the wizard converts earlier settings files, it copies only the files it is replacing into a folder beneath the User folder called Restore (if you don't have a User folder, the Restore folder is created beneath the Reflection folder). Each file placed in this Restore folder is renamed with the prefix "Old_."

For example, the contents of \Program Files\Reflection\User\Restore might look like this:

```
Old_Favorite Settings.r2w
Old_Compuserve Account.r2w
Old_Unix Connection.r2w
```

To restore converted settings, you must first restore the Script menu:

1. On the Setup menu, click Menu to open the Menu Setup dialog box.
2. Click Macro under **Defined menu** to select this item.
3. In the **Available options** box, open **Additional items**, open **Items from Version 6.x**, then select **Script**.
4. Click Add After. This adds the Script menu to the right of the Macro menu.
5. Click OK to close the dialog box.

If you want to save this change, on the File menu, click Save.

Now, to restore the converted settings, start the wizard again:

1. On the Script menu, click Run Script.
2. Locate the script file Convert.rbs in the Reflection folder, then click Run; the Settings Conversion Wizard starts.
3. Click Next on the wizard opening screen to see the Restore Old Settings dialog box.

   This dialog box will always appear when the wizard detects the log file Conv<*n*>log.txt described below.

   To restore the earlier settings, click Finish.
4. After the earlier settings are restored, you'll see the Restoration Complete message box.

   Click Exit to return to Reflection—if you want to try the conversion again, you'll need to run the wizard at another time.

   If you want to rerun the wizard and try the conversion again (using the advanced conversion options), click Restart.

Conversion Log

The wizard records all of its conversion information to a log file (for example, Conv2log.txt). The log file is located with the original (old) settings in the \User\Restore folder, and contains information such as the time and date of the conversion, and all files that were copied, created, or deleted during the conversion.

If the wizard fails in any way, it also records the problem information to the log for troubleshooting purposes. If you have trouble with converted settings, open the log in a text editor and see if the problem is documented there.

Chapter 7

Customizing the Menu Bar

Reflection allows you to customize its menu bar; you can add your own menus and menu commands or edit existing Reflection menus. Use the Menu Setup dialog box for:

- Adding your own custom menus to the menu bar, including support for keyboard access key assignment, menu command separators, and status line help text.
- Adding commands to a menu.
- Changing the properties of menus and menu commands, for example, the menu or command name, status line help text, or action associated with a menu command.
- Rearranging menus on the menu bar, or rearranging the commands that appear on the menus.
- Deleting selected menus from the menu bar or menu commands from a menu.

After configuring the menu bar, you can save your changes to a partial settings file that contains only the menu bar configuration. Other users can load this partial settings file and use the same customized menu bar when working in Reflection.

To show or hide the Reflection menu bar:

1. Click the Reflection icon in the upper-left corner of the title bar on the Reflection window.
2. Click Show Menu Bar to display the menu bar, or click Hide Menu Bar to toggle the menu bar out of view.

Opening the Menu Setup Dialog Box

To change the Reflection menus:

- Click Menu on the Setup menu to open the Menu Setup dialog box.

To clarify the terminology for menu setup:

- A *user-defined item* is a command on a Reflection menu that you define.
- A *user-defined popup* is a drop-down menu that contains one or more commands.

The **Defined menu** area on the left side of the Menu Setup dialog box represents your current menu bar configuration. You can customize either the Reflection terminal window menu bar or the items appearing on the pop-up context menu that opens when you right-click on the terminal window—make your selection from the **Defined menu** list.

On the right side of the dialog box, the **Available options** are a list of default menu items available as predefined items for customizing the menu. These items allow you to:

- Create your own menu
- Reposition menus
- Add a separator to divide commands on a menu
- Change the keyboard shortcut associated with a menu or a menu command
- Change the status line text that appears when a menu or menu command is highlighted
- Remove menus

Adding a New Menu to the Menu Bar

You can add your own menu to Reflection's menu bar. There are two ways you can configure a menu to behave:

- Configure a menu with multiple commands so that when you click it, it drops down. Then, to this menu, you can add commands to provide access to any combination of Reflection commands or terminal keys, as an example.
- Configure the menu with only one command so that when you click it, it automatically performs an action. For example, create a menu called "View Help." Click once on the menu to start help.

Adding a New Menu Containing Two or More Commands to the Menu Bar

If there is more than one command that you want to associate with a menu, you should create a drop-down menu. A drop-down menu contains menu commands arranged in a column. For an example of a typical drop-down menu, click any command on your default Reflection menu bar in the terminal window.

To create a user-defined menu that will contain one or more commands:

1. In the **Defined menu** list in the Menu Setup dialog box, decide where you want to position the menu on the current menu bar and highlight a menu name. For example, if you want the new menu to appear before or after the File menu, select **File** in the **Defined menu** list.
2. In the **Available options** list, select **User defined popup**.
3. Click Add After or Add Before, depending on the relation of the new menu to the menu selected. Using the same example as in step 1, click Add Before if you want the new menu to appear before the File menu. This means your custom menu will appear to the left of the File menu on the actual menu bar.

4. In the Menu Popup Properties dialog box, enter a name for the menu up to 30 characters long in the **Name** box.
5. Enter the status line help text, up to 150 characters, in the **Description** box. (If you leave this item blank, Reflection uses the descriptive name for the status line text.)
6. Click OK.

Now that you've added the new drop-down menu, you need to populate it with commands. To add commands to a menu:

1. In the **Defined menu** list, highlight the new menu you just added.
2. In the **Available options** list, select **User defined item**.
3. Click Add After. This opens the Menu Item Properties dialog box.
4. Enter a name for the menu command, up to 30 characters, in the **Name** box.
5. Enter the status line help text, up to 150 characters, in the **Description** box. (If you leave this item blank, Reflection uses the descriptive name for the status line text.)
6. Associate the menu command with an action by selecting one of the following:
   - **Send text** to transmit text to the host. Use the **Insert a special character** list or the **Insert special characters using the keyboard** check box to enter the characters you want to transmit.
   - **Macro** to run a Visual Basic macro or Reflection Basic script. The dialog box will change according to what you select from the **Type** list. Provide either a **Macro name** (Visual Basic) or **Script file** name (Reflection Basic).
   - **Commands** to perform a terminal command (such as transmitting a host keystroke) or menu command (such as toggling the state of the CapsLock key), or to execute a Visual Basic command. If you chose **Terminal Command** or **Menu Command**, use the **Categories** and **Commands** boxes to complete your selection.

7. Click OK to close the Menu Item Properties dialog box. You'll see the new command in the **Defined menu** area under the new menu.

8. You can continue to add new commands to this menu by repeating steps 3 through 7. The only variation is where you want to place the new commands on the menu; highlight the appropriate location and use Add After or Add Before.

9. As an option, you can add separators to divide menu commands visually by function and define keyboard access keys.

10. Click OK to update the menu bar with your changes.

Adding a New Menu Containing One Command to the Menu Bar

If you want the menu command to open when you click it (this is analogous to creating a toolbar button; the menu does not drop down like typical Windows menus), then follow this procedure:

1. In the **Defined menu** list, decide where you want to position the menu command on the current menu bar and highlight a menu name. For example, if you want the new menu command to appear before or after the File menu, select **File** in the **Defined menu** list.

Caution: ● Do *not* double-click a menu name to highlight it, since this causes the menu to expand and display its commands. If you do so, the remaining steps in this procedure will add the new command to the highlighted menu that you expanded (instead of adding the command directly to the menu bar). ◂

2. In the **Available options** list, select **User defined** item.

3. Click Add After or Add Before, depending on the relation of the new menu to the menu selected. Using the same example as in step 1, click Add Before if you want the new menu to appear before the File menu. This means your custom menu command will appear to the left of the File menu on the actual menu bar.

4. In the Menu Item Properties dialog box, enter a name for the menu command, up to 30 characters, in the **Name** box. If you want to add a keyboard shortcut key (accelerator), type an ampersand (&) before the character that will activate the command.

5. Enter the status line help text, up to 150 characters, in the **Description** box. (If you leave this item blank, Reflection uses the descriptive name for the status line text.) To prevent display of status line help, press the spacebar once.

6. Associate the menu command with an action by selecting one of the following:

   - **Send text** to transmit text to the host. Use the **Insert a special character** list or the **Insert special characters using the keyboard** check box to enter the characters you want to transmit.

   - **Macro** to run a Visual Basic macro or Reflection Basic script. The dialog box will change according to what you select from the **Type** list. Provide either a **Macro name** (Visual Basic) or **Script file** name (Reflection Basic).

   - **Commands** to perform a terminal command (such as transmitting a host keystroke) or menu command (such as toggling the state of the CapsLock key), or to execute a Visual Basic command. If you chose **Terminal Command** or **Menu Command**, use the **Categories** and **Commands** boxes to complete your selection.

7. Click OK. You'll see the new command in the **Defined menu** area.

8. Click OK to update the menu bar with your changes.

Adding a New Item to the Terminal Window Shortcut Menu

When you right-click on the terminal window, this displays the shortcut menu. To add an item to this shortcut menu:

1. In the Menu Setup dialog box, select **Terminal window context menu** from the **Defined menu** list. The left side of the dialog box changes to show the commands available on the current menu.

2. Decide where you want the item to appear and highlight a shortcut menu name.

3. In the **Available options** list, select **User defined item**.

   Note: If you want to create a cascading menu on the context menu that contains its own subset of commands, select **User defined popup** instead. The steps are the same for creating new menus and then adding commands to them. ◂

4. Click Add After. This opens the Menu Item Properties dialog box.

5. Enter a name for the menu command, up to 30 characters, in the **Name** box. If you want to add a keyboard shortcut key (accelerator), type an ampersand (&) before the character that will activate the command.

6. Enter the status line help text, up to 150 characters, in the **Description** box. (If you leave this item blank, Reflection uses the descriptive name for the status line text.) To prevent display of status line help, press the spacebar once.

7. Associate the menu command with an action by selecting one of the following:

   - **Send text** to transmit text to the host. Use the **Insert a special character** list or the **Insert special characters using the keyboard** check box to enter the characters you want to transmit.

   - **Macro** to run a Visual Basic macro or Reflection Basic script. The dialog box will change according to what you select from the **Type** list. Provide either a **Macro name** (Visual Basic) or **Script file** name (Reflection Basic).

   - **Commands** to perform a terminal command (such as transmitting a host keystroke) or menu command (such as toggling the state of the CapsLock key), or to execute a Visual Basic command. If you chose **Terminal Command** or **Menu Command**, use the **Categories** and **Commands** boxes to complete your selection.

8. Click OK. You'll see the new item in the **Defined menu** area.

9. Click OK to update the shortcut menu with your changes.

Changing Menu Popup or Item Properties

You can access the properties of each defined menu and change its unique characteristics, including the menu title and description (status line help text).

To edit menu popup or command properties:

1. In the **Defined menu** list of the Menu Setup dialog box, navigate to the location of the menu you want to edit, then select it.
2. Click the Properties button.
3. Change the menu name and description.
4. Click OK to save your changes and close the Menu Popup or Menu Item Properties dialog box.
5. Click OK to update the menu bar with your changes.

Adding Separators to a Menu

Whenever a menu contains a set of related menu commands, you can divide those sets with a line called a separator that spans the width of the menu. Separators are not allowed as the first or the last item in a menu, and you cannot have two separators in a row.

To add a separator to a menu:

1. In the **Defined menu** area of the Menu Setup dialog box, double-click on the name of the menu containing the command you wish to add a separator to. Then, click once on the command name to select it.
2. In the **Available options** area, select **Separator**.
3. Click Add After or Add Before, depending on where you want to insert the separator.
4. Click OK to update the menu bar with your changes.

Although separators appear in the **Defined menu** area like menu commands, there are no properties associated with a separator.

Defining a Keyboard Access Key for a Menu or Menu Item

When creating a custom menu, you should also assign a keyboard access key to the menu title or menu command title. All default menus and menu commands provide a keyboard access key; some also provide shortcut keys (also referred to as accelerator keys).

To access the menu or menu command with the keyboard access key, press Alt + key on the keyboard, where key is the underlined character.

You can change the keyboard access key for a defined menu or menu command by editing its properties, or assign one when you add either the **User defined popup** or the **User defined item** option to a menu.

To define a keyboard access key:

1. Open the Menu Item Properties or Menu Popup Properties dialog box.
2. Define a title for the menu or menu command if you haven't done so.
3. In the **Name** box, type an ampersand (&) before the character in the title you've designated as the keyboard access key.
4. Click OK to save your changes and close the Menu Item Properties or Menu Popup Properties dialog box.
5. Click OK to update the menu bar with your changes.

Rearranging the Menu Bar

One of the ways you can configure your Reflection menu bar is to rearrange menus on the menu bar or menu commands that appear on menus:

1. Move items in the Menu Setup dialog box to achieve your custom design:
   - To move an entire menu (including its associated menu commands), select it in the **Defined menu** list, then click the Up or Down button.
   - To move a menu command, expand the associated menu tree by clicking the plus sign, select the menu command, then click the Up or Down button.
2. Every time you click the Up or Down button, the menu or menu command will move up or down by one in the tree.

Deleting a Menu or Menu Command Item

One of the benefits of running and maintaining a multi-user version of Reflection on a server is the ability to control and manage the configuration of Reflection for multiple users with the Profiler. Profiled versions of Reflection may disable certain features by making menus or menu commands inactive.

If you frequently profile Reflection, you may also want to remove inaccessible menus from the menu bar or delete disabled menu commands from menus. Even if you don't use a profiled version of Reflection, you can remove menus and menu commands as needed for a more streamlined menu bar, leaving only those commands that you frequently use.

To delete a menu or menu command:

1. In the **Defined menu** list of the Menu Setup dialog box, select the menu or menu command that you want to remove. To expand a menu tree to display the associated menu commands, click the adjacent plus sign. When a tree is expanded, the plus sign changes to a minus sign. To collapse the tree, click the minus sign.

Caution: ● If you delete a user-defined menu, you cannot restore it. You can only restore the default menus and menu commands. Also, keep in mind that if you change the properties of a default menu or menu command it automatically becomes a user-defined popup or command, respectively. ◂

2. Click Remove to delete the command from the **Defined menu** list.
3. Click OK to update the menu bar with your changes.

You can restore a single default menu or menu command if it is not a user-defined popup or command by selecting it from the **Available options** list on the right side of the dialog box and clicking the Add After or Add Before buttons. To restore the menu bar to the factory-installed configuration, click Defaults.

Restoring Version 6.x or 5.x Menu Items

If you want to restore menus and menu commands that have been removed from version 7.0 of Reflection, you can use the **Additional items** options in the **Available options** list. When you expand the **Additional items** option, you will find:

- **Items from version 6.x**: Includes the Script menu and its commands, replaced by the Macro menu in version 7.0 of Reflection.
- **Items from version 5.x**: Includes the Connection menu, including the Connection Directory and the Phone Directory commands, as well as the DDE menu and its associated commands.

Use the example shown next to restore a Reflection earlier version menu to the menu bar.

Example: Restoring the Script Menu

This example restores the Script menu to a position directly to the right of the Macro menu:

1. On the Setup menu, click Menu to open the Menu Setup dialog box.
2. Click **Macro** under **Defined menu** to select this item.
3. In the **Available options** box, open **Additional items**, open **Items from version 6.x**, then select **Script**.
4. Click Add After. This adds the Script menu to the right of the Macro menu.
5. Click OK to close the dialog box.
6. On the File menu, click Save to save this change.

Guidelines for Adding and Editing Menus and Menu Items

- Design your menu carefully. By default, Reflection provides a menu bar that meets Windows standards for ease of use and compatibility with other Windows applications. When designing a custom menu for other users, keep these concepts in mind when creating a custom menu, changing default menus, and rearranging commands on the menu bar. Use Reflection and other Windows applications as examples.
- Manage the number of menus you add to the menu bar. The maximum number of menus you can add to the menu bar is 32. To a menu, you can add up to 32 menu commands. The Reflection menu bar supports a combination of up to 256 menus and menu commands.
- Test your menu before distributing it as a menu map-only settings file to other users. Ensure you can execute the commands on the menu.
- Add separators to drop-down menus where appropriate. Separators visually group similar menu commands for users.
- Define a keyboard shortcut key for menus and associated command so you can use the keyboard as well as the mouse to access a drop-down menu or execute a command, terminal key, or script associated with a menu command.

Chapter 8

Configuring a Generic Printer for All Users

The printer you select in Reflection's Print Setup dialog box is saved with other values when you save your settings file. Changing printers in the Print Setup dialog box has no effect on the default printer used by other Windows applications.

You can, however, force Reflection to always use the default printer specified under Windows:

1. Click View Settings on the Setup menu.
2. Highlight **Default Printer** from the **Reflection settings** list.

   Your default printer displays in the **Setting details** box.
3. Delete (clear) the printer listed in the **Setting details** box.
4. Click OK to exit the View Settings dialog box.
5. Click Save on the File menu to save this change to your settings file.

The Reflection **Default Printer** setting is useful, for example, if you're creating one generic settings file to distribute to many users, each of whom probably has a unique default printer assigned to his or her Windows environment.

The following caution has to be taken into account when you use this setting. The setting will be changed from a null string to a specific printer when the following events occur:

1. The user clicks Print Setup on the File menu.

   The Print Setup dialog box opens, with the Windows default printer highlighted.
2. The user clicks OK.

   Now, the value of the **Default Printer** setting will be the name of the printer that was highlighted when the user clicked OK in the Print Setup dialog box.

If you want to ensure that the settings file you give your users has a null string for the printer, configure the **Default Printer** setting *before* you distribute the settings file. Alternatively, you can map a Reflection event or record a macro that uses the `DefaultPrinter` property.

Chapter 9

Creating Custom Help

A customized Windows help file can be added to Reflection's Help menu to supplement the standard help that is included with the product. For system administrators or help desk personnel, customized help is a convenient way to present site-specific information and guidance to users: the login procedure for different systems, host names, who to call for help, and so on. All you need to do is write and compile a Windows help file.

Creating Online Help

The compiler you need to create a Microsoft Windows help file is part of the Windows Software Developers Kit (SDK), Microsoft Visual Basic, and a number of other commercially available products.

Once you've written your help document, you need to test the file before you incorporate it into Reflection. To do this:

1. Click Run on the Start menu.
2. In the **Open** box, locate the name of your custom help file, then click OK.

See how the help you created looks. Do the jumps to other topics work? Is the formatting correct? Does the Index tab contain a complete list of items you want your users to be able to find?

Creating a Command on Reflection's Help Menu

Once you are satisfied with the help file, you need to incorporate it into Reflection's Help menu:

1. Click View Settings on the Setup menu to open the View Settings dialog box.
2. Select **Custom Help File** from the **Reflection settings** list.
3. In the **Setting details** box, enter the full path of the Windows help file you created. Do not include quotes around the path name.
4. Select **Custom Help Menu Name** from the **Reflection settings** list.
5. In the **Setting details** box, enter the menu command for the help file as you want it to appear on the Help menu.
6. Click OK to close the View Settings dialog box.
7. Restart Reflection for the changes to take effect in the Windows registry.

The Context String for Your Contents Page

When you click the Custom Help command, the topic that appears in the Help window depends on what you have defined for the Contents option in the [OPTIONS] section of your help file's project (.hpj) file. For example:

```
[OPTIONS]
CONTENTS=_MAIN_HELP_INDEX_HELPDESK
```

Note: When you click Contents on the Help menu, you may not see the Contents tab of the Help Topics dialog box, because Windows always displays the last tab you used. ◂

Adding Custom Help Using Menu Map

You can use the menu mapping feature in Reflection to add your own menu command that calls a unique help file. However, if you do add your own menu for custom help and then for some reason another user adds a menu for it, too, from the View Settings dialog box, the user's custom help file takes precedence. This is because the View Settings method records the information to the Windows registry, where the Menu Map method stores the information in a Reflection settings file. Registry settings take precedence over a Reflection settings file.

Note: If you already have a custom help file defined in the registry and you create a new menu item mapped to the built-in function HelpCustom, you cannot change the menu item's name in the Menu Setup dialog box (it is dimmed in the Menu Item Properties dialog box). You can, however, change the name in the View Settings dialog box or by editing the registry. ◄

SECTION 3

Security Issues

Chapter 10

Security Options with Reflection

This chapter provides an overview of security features that are either available with Reflection or that become available when Reflection is used with Reflection Signature, a security product from WRQ.

For more information about Reflection Signature, contact WRQ (see page iii).

Reflection Security Features

The security features described below are available with Reflection, no other WRQ product is required.

Authentication with SOCKS hosts

You can configure Reflection to make a Telnet connection through a SOCKS proxy server or a passthrough server (firewall). SOCKS authentication options are in the Security Properties dialog box. To open this dialog box:

1. Click Connection Setup on the Connection menu.
2. Select **Network** as the **Connect using** option.
3. Select **TELNET** as the protocol.
4. Click the Security button. The Security Properties dialog box opens.

For information about how to configure your connection, click Help in the Security Properties dialog box.

Security-Related Reflection Settings

The Reflection settings **Save Passwords**, **FTP Password**, and **Web Security** provide various types of security and are available from the View Settings dialog box. To open this dialog box, click View Settings on the Setup menu.

Save Passwords is described on page 93. **FTP Password** and **Web Security** are described in the View Settings dialog box help: in the View Settings dialog box, highlight the setting's name in the **Reflection settings** list, then click the Setting Help button.

VT and HP Profiler

The VT and HP Profiler, described starting on page 81, is installed as a **Custom installation** option during Setup. While the Profiler is not a security utility, it does allow system administrators to limit the availability of certain commands and features, including some that are security-related:

- **Unsecured Connections** protection: When Reflection is profiled with **Unsecured Connections** disabled, users cannot connect to hosts with protocols that are not secure.
- **Password** protection: The options on the Profiler's Password tab protect access to the Reflection Profiler, Reflection, or both. See page 87 for more information.

Secure Macro Recording Features

Reflection prevents passwords from being recorded and saved to macros—unless the **Save Passwords** setting (described on page 93) is enabled. Reflection macro recording can interact with Admit One (a component of Reflection Signature) without interrupting the user, resulting in silent updates to the Admit One database.

Reflection Signature Security Features

The security features described below are available when Reflection is used with Reflection Signature.

Encryption and Authentication with Kerberos Hosts

Reflection is a kerberized client application which can be configured to use Kerberos authentication for access to services that require it. You can choose the principal name and realm you want to use for authentication, and indicate whether you want to require mutual authentication or encrypt the data stream.

Kerberos authentication options are in the Security Properties dialog box. To open this dialog box:

1. Click Connection Setup on the Connection menu.
2. Select **Network** as the **Connect using** option.
3. Select **TELNET** as the protocol.
4. Click the Security button. The Security Properties dialog box opens.

For information about how to configure your connection, click Help in the Security Properties dialog box.

Single Sign-On Enabled

Reflection is designed to work with Admit One, a component of Reflection Signature that allows users to enter a single "key" to access a database of encrypted passwords. Once accessed, Admit One authenticates the user for a variety of hosts.

The setting **Admit One**, available in the View Settings dialog box, allows system administrators to enable or disable the installed Admit One utility.

Secure FTP Sessions

When you use Reflection with Reflection Signature, you can make secure, encrypted connections to FTP servers with the FTP Client or with **WRQ's FTP**.

The FTP Client is available in your Reflection folder. **WRQ's FTP** is available in Reflection for Windows: click File Transfer in the Setup menu, then click the FTP tab. **WRQ's FTP** is one of the **Transfer with** options.

Chapter 11

Controlling Access to Reflection Features

Use the Reflection Profiler to limit the availability of particular features and commands in Reflection. Typically, the Profiler is used on multi-user license versions of Reflection or to specify default settings appropriate for your site.

Before Profiling a Multi-User License Version of Reflection

If you're profiling a multi-user license version of Reflection installed on a shared network drive, the following requirements must be met before you can run the Profiler:

- Confirm that you have network rights to modify, update, and write to the Reflection shared network drive.
- Confirm that the Reflection executable file is not assigned the "read-only" attribute (you cannot profile read-only files).
- Confirm that no one is running the multi-user license version of Reflection before starting the Profiler.

Starting the Profiler

To start the Reflection Profiler:

1. After completing a **Custom installation** of Reflection with the **Profiler** check box selected, you start the Profiler by clicking its icon in the Reflection Utilities folder.
2. In the Profile Reflection dialog box, if necessary, change to the folder where you installed Reflection. Select the Reflection executable name you want to run the Profiler on, then click OK. The Reflection Profiler dialog box opens.

Using the Commands Tab to Limit Access to Commands

To limit access to Reflection commands, follow these steps:

1. Start the Profiler, select the Reflection executable name you want to run the Profiler on, then click OK.

2. In the Reflection Profiler dialog box, click the Commands tab. This is where you enable and disable Reflection menu commands and host-specific commands (to disable or enable product features, such as the Reflection Macros feature, click the Features tab).

3. To display a different set of commands, choose a different name from the **Categories** group. Doing so changes the list of command names shown to the right. The first seven categories are the names of Reflection's menus. The remaining categories are for individual host and terminal commands.

   Choose **All** to see the cumulative list of names from all categories.

4. The **Commands** list shows all of the command names in the selected category. If a command is enabled, you'll see a green dot next to it. If it's disabled, you'll see a red X. Select or clear one or more command names from the **Commands** list. To see what a command does, single-click on its name and read the text in the **Command description** box.

   To select more than one command name, click the name, hold down Ctrl, and then click additional names. To select a block of commands, click one name, hold down Shift, and then click another name: both command names, plus all commands in between them, are selected. To select all commands in a category, double-click the name shown in the **Categories** list.

5. Select or clear the **Enabled** check box to control the availability of the selected commands. The state of this check box changes depending on which command is selected. When this check box is cleared, it means that the highlighted command is disabled. You can also double-click a command name to toggle its availability.

6. When you have multiple commands selected and they are of varying states (for example, one is disabled and the all the others are enabled), the center of the **Enabled** check box turns gray. You must first select the check box to enable all commands; if your intention is to disable all the highlighted commands, select the check box again to clear the X.

   When you're through enabling and disabling commands, click OK.

Disabling the Enter Key for Reflection's Reconnect Feature

When a user disconnects from the host, Enter ↵ is the default keystroke mapped to display the Connect to Host/Service dialog box. As a system administrator, you may want to disable this feature to prevent users from accidentally reconnecting to the last established connection using this dialog box. To do this:

1. Click the Commands tab in the Reflection Profiler.
2. Click **Connection** in the **Categories** list.
3. Scroll down to highlight **ConnectionConnect** in the **Commands** list.
4. Clear the **Enabled** check box.

Using the Settings Tab to Limit Access to Reflection Settings

To limit access to options (that is, settings) found on Reflection dialog boxes, follow these steps:

1. Start the Profiler, select the Reflection executable name you want to run the Profiler on, then click OK.
2. In the Reflection Profiler dialog box, click the Settings tab. This is where you enable and disable Reflection settings shown as options on Reflection dialog boxes.
3. The **Reflection settings** list shows all of the settings names. If a setting is enabled, you'll see a green dot next to it. If it's disabled, you'll see a red X. To see what a setting does, single-click its name and read the text in the **Setting details** box.
4. Select or clear the **Modification enabled** check box to control the availability of the selected setting. The state of this check box changes depending on which setting is selected. When this check box is cleared, it means that the highlighted setting is disabled. You can also double-click a setting name to toggle its availability.

   When you have multiple settings selected and they are of varying states (for example, one is disabled and the all the others are enabled), the center of the **Modification enabled** check box turns gray. You must first select the check box to enable all settings; if your intention is to disable all the highlighted settings, select the check box again to clear the X.

   When you're through enabling and disabling settings, click OK.

Note that the changes can be overridden under certain circumstances, for example:

- By settings that, when modified, will now change the state of the disabled setting
- By changing the disabled setting via an escape sequence
- By the same setting in a settings file

Using the Features Tab to Disable Reflection Features

The Profiler can be used to disable common features in Reflection, such as using Reflection macros, or file transfers either to or from a host. In the example below, the ability to launch more than one copy of Reflection is disabled using the **More Than One Instance** option in the **Reflection features** list:

1. Start the Profiler, select the Reflection executable name you want to run the Profiler on, then click OK.
2. In the Reflection Profiler dialog box, click the Features tab.
3. Select the **More Than One Instance** option. The **Reflection features** list shows all of the features you can disable (use the **Feature description** box to understand what the feature name means). If a feature is enabled, you'll see a green dot next to it. If it's disabled, you'll see a red X.
4. Clear the **Feature enabled** check box to disable the feature. You can also double-click the feature name to toggle its availability.
5. Click OK to exit the Reflection Profiler dialog box.

Now, start the Reflection product you just profiled and, on the File menu, click New Session. Notice that the product you profiled is not available.

General Profiler Settings

The General tab lets you capture the information you set in the Profiler to a text file. The top of this dialog box provides information on the product you are profiling; it also shows the Profiler's version number and copyright information. To do this, select the Create Report button on the General tab in the Reflection Profiler dialog box and give the file a name.

For example, if you are running the Profiler on Reflection for UNIX and Digital, the base outline of the report looks like this:

```
Product Name: Reflection for UNIX and Digital
Product Version: 7.00.101
Product Path: C:\Program Files\Reflection\R2win.exe
Disabled Commands:
<listed here>

Disabled Settings:
<listed here>

Disabled Features:
<listed here>
```

Importing Information and Creating Site Defaults

The Files tab in the Reflection Profiler lets you specify a settings file as the site default settings file for one or more users. This is useful in a multi-user environment whenever a system administrator wants to present an identical interface to the user group, complete with selected hosts connections, color schemes, and toolbars. In addition, all Default buttons will reset to the site default settings file settings instead of factory defaults.

You can also apply the profiled configuration of a copy of Reflection to another copy of Reflection using the Import button.

Creating a Site Defaults Setting File

If you administer Reflection in a multi-user environment and you want a standardized set of Reflection settings for your group of users, use Reflection's site default settings file feature. As an example, a system administrator could author and maintain a profiled copy of Reflection as a settings file in a single location for easy maintenance. Now, whenever the shared network drive copy of Reflection is started, the site default settings file is loaded automatically, and each user sees the same configuration.

Caution: ● Once you specify a site default settings file, all Defaults buttons will reset Reflection to the settings in the settings file, not to factory defaults. ◂

Note: A site default settings file cannot retain either the host connection or window and position size settings. However, you can link these settings using a partial settings file. See "Linking Settings File*s*" on page 48 for more information. ◂

To specify a site default settings file:

1. Start the Reflection Profiler and click the Files tab.
2. Click Browse to open the Settings File dialog box. Use this dialog box to specify the settings file (use the Clear button to remove the path to the currently specified settings file if there is one).
3. Click OK to exit the Settings File dialog box. The path to the settings file now appears on the **Settings file name** box on the Files tab.
4. Click OK to exit the Reflection Profiler.

The settings file you specified in the Files tab will now be the site default settings file for the shared network drive copy of Reflection.

Importing Information Already Profiled in Another Copy of Reflection

If you've already profiled one version of a Reflection product, and you are installing a newer version, you can save time by importing the profiled information from one Reflection product to another. This is often the case when Setup does not detect a profiled copy of Reflection, and therefore does not display the Save Profiled Settings dialog box (or if you choose not to import these settings during Setup). Setup will also not detect these copies if they reside on another PC or a shared network drive and you are installing to your local PC.

Note: You can import settings from Reflection for Windows version 5.0 and higher executables only. (That is, you cannot import versions prior to 5.0, or other Reflection for Windows products, such as Reflection for IBM.) ◂

Click the Import button on the Files tab to open the Import Profile dialog box and select a copy of Reflection that you've already configured using the Profiler. The settings you defined in that copy of Reflection are applied to the copy of Reflection you are currently profiling.

For example, you might be upgrading Reflection for UNIX and Digital, and you want to restrict the same commands, or you are importing Reflection for UNIX and Digital settings to the Reflection for ReGIS Graphics product.

1. Start the Profiler, and in the Profile Reflection dialog box, select R2win.exe (Reflection for UNIX and Digital) and click OK.
2. Make any necessary adjustments on the Commands, Settings, and Features tabs, then click OK.
3. Start the Profiler, and in the Profile Reflection dialog box, select R2win.exe (Reflection for UNIX and Digital) and click OK.
4. Click the Import button on the Files tab.
5. In the Import Profile dialog box, browse to the product that you already profiled, for example the R2win.exe file based on a server, or the R4win.exe file based locally or on a server.
6. Click OK. A message box informs you that all profile information was successfully imported into the target Reflection product.

Protecting Profiled Settings with a Password

Select the Password tab in the Reflection Profiler dialog box to assign a password to protect the information you're currently changing in a Reflection executable file. There are two areas you can protect with a password:

- The Profiler itself, using the options described below in the **Profiler** group box
- The Reflection product, using the options described below in the **Users** group box

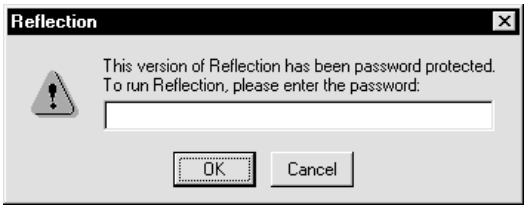
Select the **Enable password protection** check box to assign a password needed for future modifications to the currently loaded Reflection executable. After doing so, the following two boxes become available:

Password
Type your password, up to 32 characters, in the **Password** box. To preserve security while you type, each character displays as an asterisk.

Confirm Password
After entering a name in the **Password** box, type the same name in the **Confirm password** box. If you click OK without doing so, Reflection prompts you that you must first enter the same name here to enable the password.

Warning: ● If you forget your password and in the future want to make changes, you must re-install Reflection from the original program disks and run the Profiler again: there is no way to circumvent the entry of a required password. ◂

After you click OK, the file is password protected. When you use the Profiler for that copy of Reflection to make modifications later, you will be prompted for your password as shown here:



Verifying a Profiled Copy of Reflection

To confirm that a copy of Reflection has been modified by the Profiler:

1. Start the copy of Reflection you ran the Profiler on.
2. On the Help menu, click About Reflection.
3. Select **System** in the **Information** list.
4. The top line of information will read: "Permanent Customizations: Reflection was customized by your system administrator."

Chapter 12

Restricting Access to Online Help

You can remove, or restrict access to, the Reflection online help system. For example, you may want users to have access to only a customized help file (explained on page 71).

You have three options for setting restrictions:

- You can delete or rename the help files that are installed during a **Typical** or **Custom installation** of Reflection
- You can disable access to the commands on Reflection's Help menu using the Profiler (the Profiler is explained starting on page 81)
- You can use menu mapping to remove commands from the Help menu

These procedures are explained next.

Removing or Renaming Online Help Files

If you want to completely restrict user access to a specific help file, just delete it (the file can always be restored by rerunning the Setup program from the distribution disks), or rename it. The following online help files are included with Reflection:

Help File Name	Description
R<*n*>win.hlp	Emulator help file for Reflection for Windows (<*n*> is 1, 2, or 4, depending on what product you installed, see the table on page 47)
R<*n*>winsys.hlp	System administrator help file for Reflection for Windows
Cnectwiz.hlp	Connection Wizard help file
Convert.hlp	Settings Conversion Wizard help file
Condirv5.hlp	Help file used by the pre-6.0 Connection Directory and Phone Directory
Oldmodem.hlp	Help file used by the pre-6.0 modem dialer

Help File Name	Description
Rbrwin.hlp	Reflection Basic help file used by the Reflection Basic Editor
Rcl.hlp	Reflection command language help (used by the Reflection command window)
Rdeploy.hlp	Reflection Deployment Manager help file
Readme.hlp	Reflection Readme help file
Rnlog.hlp	Help file used by Reflection Event Viewer
Rnsocks.hlp	Help file for Reflection SOCKS client support
Profil32.hlp	Help file used by the Reflection Profiler
Rftpcom.hlp, Rftpext.hlp Rftpllib.hlp Rftpc.hlp	Help files used by Reflection FTP Client
Rwinprog.hlp	Reflection Basic methods and properties
Setup.hlp	Setup help file (used by the Reflection Setup program)
Tstoolbr.hlp	Help file used by the troubleshooting toolbar
Vbrwin.hlp	Help file that provides introductory Visual Basic topics and tutorials
Viewset.hlp	Help file used by the View Settings dialog box

Disabling Access to Online Help

An alternative to deleting or renaming help files is to use the Profiler (explained on page 81) to disable Reflection commands that open the Help window. For example:

1. Start the Reflection Profiler.
2. In the Profile Reflection dialog box, select the Reflection executable name that will have its Help commands disabled, then click OK.
3. In the Reflection Profiler dialog box, click the Commands tab.
4. Double-click **Help** in the **Categories** group. This causes all the names in the **Commands** list to be selected.
5. Clear the **Enabled** check box.
6. Click OK.

Now, neither the Help menu nor the commands you would find under it appear. Instead, they are removed from the Reflection menu bar completely. You will see the Help menu in the Menu Setup dialog box, however, but it is unavailable for modification.

Removing Menu Commands Using Menu Setup

To remove commands from the Help menu:

1. Click Menu on the Setup menu.
2. In the **Defined menu** area on the left side of the dialog box, double click **&Help** to see the Help commands.
3. Highlight the name of the command you want to remove.
4. Click Remove.
5. Click OK.

You can save this change to a complete settings file, or use the Save As command on the File menu to save a menu partial settings file (*.rmu).

Chapter 13

Password Protection

Before you create a connect macro or a host connection that requires a user to enter a password, you must decide, for security reasons, whether you want the password recorded. Recording a password makes it easier for a user to log in to a host, but could also provide access to unauthorized users.

The **Save Passwords** setting in the View Settings dialog box controls whether Reflection saves a password or prompts a user for the password. By default, recording a connect macro or saving a host connection to a settings file *does not* record the password associated with the host connection.

Note: Saved passwords in settings files and other files are encrypted. ◂

Requiring Login Passwords

To require a password for a host connection:

1. On the Setup menu, click View Settings to open the View Settings dialog box.
2. From the **Reflection settings** list, select **Save Passwords**.

Tip: You can also type the first few characters of this setting in the **Search** text box to automatically highlight it. ◂

3. Select **No** in the **Setting details** box to force Reflection to prompt for a password.
4. Click OK.

From this point forward, passwords will *not* be saved with a host connection or connect macro. This affects the LAT and NLAT connections, and any passwords that are saved in a connect macro (connect macros can be saved with settings files).

Now when a user establishes a host connection that requires a password, Reflection displays a dialog box prompting for a password.

Reversing the Value of the Save Passwords Setting

If the **Save Passwords** value is changed at any point, all connect macros and settings files that were saved with the *original* value will act as they had before, and will *not* change to reflect the new value of the setting.

Saving the new value to a settings file containing the old value only requires that you resave the settings file (click Save on the File menu to do this). However, to save the new value in a Reflection macro, you must re-record the macro with the new value: there is no other way to incorporate the new value into an existing macro.

Caution: ● Manually editing a macro to include your password means that the password is not encrypted. ◂

SECTION 4

File Transfers

Chapter 14

Introduction to File Transfers

With Reflection, you can transfer any type of file—not only text files—to and from a host computer. If you're running multiple host sessions, you can transfer files in one session and continue to work in other sessions. You can even transfer files simultaneously in different sessions.

Use Reflection to transfer files between your PC and an HP 3000, VMS, ULTRIX, Unisys, or UNIX system, or any host or electronic service that supports the Zmodem, Xmodem, Kermit, SuperKermit, or FTP protocols.

About File Transfer Protocols

The file transfer protocol is the set of rules that two computers follow when transferring files between them. Files can be transferred only when both computers use the same protocol, and therefore follow the same rules. Protocols can also specify error-checking and correction rules to ensure that the information being transferred is sent and received accurately.

Reflection comes with the **WRQ/Reflection** protocol, which supports transfers to the hosts listed above.

Host Transfer Program Version Numbers

Before you can transfer files between your PC and a host system, a host version of the file transfer program should be available to work with Reflection.

The host software should be at the following version levels:

Host Program Name	Version Number
PCLINK2	2.69 (HP compatibility mode, Pclink2.pub)
PCLINK2	3.52 (HP native mode, Nmpcl2.pub)
VAXLINK2	2.61 (Vaxlink2.exe and Alphalk2.exe)
UNXLINK2	3.03 (Unxlink2.c and Unxxfer2.c)

Before you upload a copy of the host program, you should check if a copy already exists. You can also check an existing host program's version number. The remainder of this chapter explains how to do this.

Checking for PCLINK2

To see if PCLINK2 is already on the host (and if it is, to see its version number), go to the account on the HP where you or someone else may have uploaded the program. If you think PCLINK2 was uploaded to the default account, type one of the following commands at the host prompt.

```
RUN PCLINK2.PUB.SYS;INFO="VERSION"    (Native mode for MPE/iX systems)
RUN PCLINK2.PUB.SYS,VERSION           (Classic HP 3000)
```

If the host program is detected, its version number is displayed. For example, the native mode message is:

```
Native Mode PCLINK2 (Privileged) Version:  3.52.00
```

The version number required by the compatibility mode is 2.69.

If you receive the message "Failed to load program PCLINK2.PUB.SYS" or "File is not a valid program file," then you must upload the host program following the steps on page 102.

Checking for VAXLINK2

VAXLINK2 may already be defined as a logical name or foreign command. If so, you don't need to upload another copy. If VAXLINK2 is defined as a foreign command, you can also determine its version number, explained below.

If you do not find VAXLINK2 as a logical name or foreign command, you need to upload a copy of the host program yourself.

Checking for VAXLINK2 As a Logical Name

To check whether VAXLINK2 is defined as a logical name:

- At the DCL prompt, type `SHOW LOGICAL VAXLINK2`.

If VAXLINK2 has been defined as a logical name, a line that looks similar to the following appears:

```
"VAXLINK2" = "SYS$SYSTEM:VAXLINK2.EXE" (LNM$PROCESS_TABLE)
```

If VMS reports that there is no translation for the logical name, either VAXLINK2 has not been defined as a logical name or it has been defined using a different name.

If VAXLINK2 has not been defined as a logical name—or even if it has—it's possible that it has been defined as a foreign command so that you can specify additional VAXLINK2 parameters and check the version number. Checking for VAXLINK2 as a foreign command is explained next.

Checking for VAXLINK2 As a Foreign Command

To check whether VAXLINK2 has been defined as a foreign command (described on page 137):

- At the DCL prompt, type `VAXLINK2 V`.

If VAXLINK2 is defined, its version number is displayed. To use the **WRQ/Reflection** protocol, the version number of VAXLINK2 required is 2.61. If an error message is reported when you issue the above command, either VAXLINK2 is not installed, it's not defined as a foreign command, or it has been given a different name.

Checking for UNXLINK2

If UNXLINK2 is not in your current UNIX directory, here's how to determine if a copy is available in your search path and to see its version number:

- At the UNIX host prompt, type `unxlink2 -v`.

  (The command must be typed in all lowercase letters.)

If UNXLINK2 is available in your search path, the version number is displayed. To use the **WRQ/Reflection** protocol, you must have version 3.03 of UNXLINK2. If an error message is reported when you issue the above command, either UNXLINK2 is not installed, it's not in a directory in your search path for commands, or it has been given a different name on the host.

Chapter 15

Uploading the File Transfer Host Program

Before Reflection users can transfer files between their PCs and a host, a host version of the file transfer program must be available to work with Reflection. Typically this file is uploaded by the system administrator. Reflection includes host programs used by the **WRQ/Reflection** protocol for transferring files to MPE (HP 3000), VMS, and UNIX systems.

Locating the Upload Scripts

There are three Reflection Basic scripts included with Reflection which upload host programs to HP, VMS, and UNIX hosts:

Uploadhp.rbs
Uploadvx.rbs
Uploadux.rbs

These scripts are not copied by Setup when you perform a **Typical installation**; they are only installed during a **Custom installation** when you have the **Host transfer files** check box selected. To continue with the procedures that follow and upload the host file transfer programs, first check to see if the upload scripts are available—Setup copies them to the Reflection Host subfolder. If they are not in this location:

1. Start the Setup program from the product CD.
2. Select **Custom installation** as the installation method.
3. In the Custom Installation dialog box, clear all check boxes except **Host transfer files**.
4. Click the Install button, and follow the prompts to complete Setup and install the necessary host program files.

Restoring the Script Menu from Reflection Version 6.0

Before you can upload a host program, you need to restore the Script menu from Reflection version 6.0:

1. Click Menu on the Setup menu to open the Menu Setup dialog box.
2. Click **Macro** under **Defined menu** to select this item.
3. In the **Available options** box, open **Additional items**, open **Items from version 6.x**, and then select **Script**.
4. Click Add After. This adds the Script menu to the right of the Macro menu.
5. Click OK to close the dialog box.
6. Click Save on the File menu to save this change.

Basic Steps for Uploading the Host Program

To upload a host program (you must first restore the Script menu using the procedure above):

1. Start Reflection and establish a host connection.
2. Click Run Script on the Script menu to open the Run Script dialog box.
3. Change to the Reflection Host folder.
4. Select the upload script name that matches your environment:

Script name	Host type	Host program name (to be copied)
Uploadhp.rbs	HP 3000	PCLINK2
Uploadvx.rbs	VMS	VAXLINK2
Uploadux.rbs	UNIX	UNXLINK2

5. Click the Run button. After a moment, you'll see the Upload Script dialog box. It is recommended that you first choose the Default Upload button; this successfully uploads the host program in almost all situations.

6. When you see the Completed Successfully dialog box, this indicates that the host program has been uploaded. Now your users can transfer files using the **WRQ/Reflection** protocol.

If you had a problem or received an error when using the Default Upload button to upload the host program, use the Custom Upload button:

- For more information on uploading PCLINK2, see below.
- For more information on uploading VAXLINK2, see page 107.
- For more information on uploading UNXLINK2, see page 109.

Specifics on Uploading the HP Host Program

This section provides detailed instructions for uploading the HP 3000 host program. PCLINK2 is the host program that lets you transfer files to and from an HP 3000 system; it must be copied to the host before you can transfer files using the **WRQ/Reflection** protocol. All users of Reflection can share the same host copy of PCLINK2; as a system administrator, you can place a copy in a common group and account on the host.

Important: WRQ does not supply a host program for the HP 1000. You must obtain a Kermit or Xmodem file transfer program for the HP 1000 and use those transfer methods in Reflection. ◂

Two versions of PCLINK2 are distributed with Reflection:

- PCLINK2 for classic HP 3000 machines. (This program can also run on an MPE/iX system in compatibility mode.)
- PCLINK2 for MPE/iX systems. This version of PCLINK2 runs in native mode on an MPE/iX machine, and provides the best performance in this environment. POSIX support is only available in the native mode version of PCLINK2.

During the upload of the HP host file transfer program, the upload program detects what type of system you have, and automatically uploads the appropriate version of PCLINK2. Since the native mode version of PCLINK2 is almost 10 times larger than the classic mode version, it takes longer to upload. If you have a slow data line, you may prefer to upload the smaller classic version of PCLINK2 and run it in compatibility mode on an MPE/iX system. To do this, use the Custom Upload option and select the Compatibility Mode (MPE/V or Classic) option explained on page 106.

PCLINK2 needs to be uploaded only once for each HP 3000, but should be updated with a newer version when one is available.

To upload PCLINK2, you need the following files in the Reflection\Host folder:

- Uploadhp.rbs is a script file automating the upload procedure.
- Pclink2.pub is the host program for classic HP 3000s and compatibility mode. Nmpcl2.pub is the native mode version of PCLINK2 for MPE/iX HP 3000s.
- WRQUPLOA is an auxiliary file required for the upload.
- VERIFYPH is a program that checks the target group for PH (Processing Handling) capabilities. This type of processing capability is required to perform wildcard transfers and to display host directory information. If the target group does not have this capability, a warning message is issued with options allowing you to cancel the upload or continue with the operation.
- VERIFYPM is a program that checks the target group for PM (Privileged Mode) capabilities. This type of capability is required to perform faster host directory displays in the File Transfer dialog box. If the target group does not have this capability, then the older method of obtaining host directory information will be used.

To upload PCLINK2 to an HP 3000 host:

1. Start Reflection for HP with NS/VT and establish a connection to the HP 3000. You can upload PCLINK2 using a direct serial, modem, or network connection.
2. Log on as Manager.sys, or to the account where PCLINK2 will reside. You must sign on with a term type equal to 10 (the normal value). You can force this by adding `TERM=10` to your logon string, as follows:

   ```
   HELLO <logon>;TERM=10
   ```

3. Click Run Script on the Script menu to open the Run Script dialog box (see page 102 for information about restoring the Script menu).
4. From the Reflection\Host folder, select the file Uploadhp.rbs and click the Run button to open the Reflection HP 3000 Upload Script dialog box.
5. Click Default Upload.
6. When you see the Completed Successfully dialog box, this indicates that the host program has been uploaded. Now your users can transfer files using the **WRQ/Reflection** protocol.

If you encounter any problems, perform a custom upload (explained next).

HP Custom Upload Options

If you need to specify custom options, click Custom Upload in the Reflection HP 3000 Upload Script dialog box. The custom options are explained next.

Upload Method

These options determine what method, or methods, will be used to upload the host program:

- Leave the **Try WRQ/Reflection Protocol** check box selected so the PCLINK2 host program will be uploaded using the **WRQ/Reflection** proprietary protocol. Using this protocol results in the fastest upload procedure.

  If the **WRQ/Reflection** protocol is not found by the upload script, then the next two options are tried (as long as you leave the **Try Old-WRQ Protocol** and **Try Method Using Host FCOPY Utility** check boxes selected).

- Leave the **Try Old-WRQ Protocol** check box selected so the PCLINK2 host program will be uploaded using the Old-WRQ proprietary protocol. (This was the protocol used by Reflection in versions prior to version 4.0, which has since been replaced with the **WRQ/Reflection** protocol.)

  If the Old-WRQ protocol is not found by the upload script, then the remaining option is tried (as long as you leave the **Try Method Using Host FCOPY Utility** check box selected).

- Leave the **Try Method Using Host FCOPY Utility** check box selected so the PCLINK2 host program will be uploaded using the HP 3000's FCOPY utility.

  Reflection uses the FCOPY utility to upload PCLINK2 by issuing the command RUN FCOPY.PUB.SYS. If for some reason the HP 3000 was not able to run FCOPY, the message "Could not invoke FCOPY utility" displays. Make sure that another program is not running by pressing Ctrl+Break, and then typing `ABORT` at the colon prompt and pressing Enter.

  If you see the message "Received unexpected data from FCOPY," normally this is a result of having a term type other than 10. Log on to the host with `;TERM=10` at the end of your logon string (see page 104), and try the upload again. This error may also be related to noise on the line, or possibly an intermediary device such as a data switch.

  When FCOPY is used, no error checking is performed. If you have problems, the Serial Connection Statistics dialog box described on page 204 can indicate the possible sources of the problem.

PCLINK2 Mode

This option determines what program to upload based on the operating system:

- Leave the **Script Determines Best Mode** option set so the script automatically detects which MPE operating system you have, and uploads the appropriate software for your environment. If you have an MPE/XL or MPE/iX host, then the script uploads the native mode version of PCLINK2. For MPE/V or Classic hosts, the compatibility mode of PCLINK2 is uploaded.
- If you want to transfer files using the faster native mode on your MPE/iX system, select the **Native Mode (MPE/XL and MPE/iX)** option. This results in the best system performance. If you do not need to run your MPE/iX system in compatibility mode, this is the recommended option.
- The **Compatibility Mode (MPE/V or Classic)** option is intended for use on the older HP 3000 classic machines. Select this option if you have this type of host.

  If you select this option and your host is an MPE/XL, or if you start a file transfer from Reflection and notice slow performance on your MPE/iX system, you can do one of two things:

  – Your host may be running the compatibility mode of the PCLINK2 software (because you selected this option); to take advantage of optimum system performance, you need to upload the Reflection file transfer host software that runs in native mode by forcing that selection here.

  – If you must run PCLINK2 in compatibility mode, you can change the system priority by reassigning PCLINK2's *queue* priority level to either D or E. To do this, modify the **Startup command** on the WRQ tab in the File Transfer Setup dialog box. For example:

```
RUN PCLINK2.PUB.SYS;PRI=DS
```

PCLINK2 Capabilities

Leave this option set to **Script Determines Capabilities** so that the script automatically detects what capabilities the host software will have. The script detects either Privileged Mode or Process Handling.

Choose the **PCLINK2 Will Have the Following Capabilities** option if you want to force PCLINK2's capabilities: you can select PM or PH capabilities.

Host Program Will Be Called

If you want to call the host program something other than the default proposed name of PCLINK2.PUB.SYS, type the name here.

Caution: ● Don't confuse the name that you enter here (which is the name you want the program called once it is uploaded to the host) with the host **Startup command** that you specify on the WRQ tab in Reflection's File Transfer Setup dialog box. In other words, do *not* enter the **Startup command** here. ◂

Creating a Troubleshooting Log

Select this check box if you're running the upload script again because the first time you ran it, the upload was unsuccessful. If you request assistance, WRQ technical support will ask for a copy of the log created by selecting this check box. The log will be located in the Reflection\Host folder.

Canceling an Upload

If you want to cancel the upload, press Esc or click Cancel. You may also need to abort the program on the host:

1. Enter a break (by pressing Ctrl+Break).
2. Press Esc and then enter a colon (:) to turn the HP 3000 echo facility back on.
3. Type `ABORT` at the host prompt, and press Enter ↵ to abort the PCLINK2 program.

Specifics on Uploading the VMS Host Program

This section provides detailed instructions for uploading the VMS host program. Vaxlink2.exe is the host program that lets you transfer files to and from VMS systems; it must be copied to the host before you can transfer files using the **WRQ/Reflection** protocol.

To upload VAXLINK2, you need the following files in the Reflection\Host folder:

- Uploadvx.rbs is a script file that automates the upload procedure.
- Vaxlink2.exe is the VAX/VMS host file transfer program.
- Alphalk2.exe is the AXP/VMS host file transfer program.
- Wrquploa.mar is a receive-only Kermit program that assists in the upload.

Host programs are provided for both VAX and AXP machines running VMS. Clicking the Default Upload button after running the upload script causes the upload procedure to automatically determine which program to upload to your host. If the AXP version is uploaded, it is renamed Vaxlink2.exe after the upload completes.

VAXLINK2 may already be defined as a logical name or foreign command (see page 135). If so, you don't need to upload another copy.

To upload VAXLINK2 to a VMS host:

1. Start Reflection and establish a connection to a VMS host. You can upload VAXLINK2 using a direct serial, modem, or network connection.

   Note: Connecting to one VMS host and performing a `SET HOST` DCL command to another VMS host may cause the upload script to fail. Be sure that you are connected to the host to which you want to upload VAXLINK2. ◄

2. Log in to the host as you usually do.
3. Click Run Script on the Script menu to open the Run Script dialog box (see page 102 for information about restoring the Script menu).
4. From the Reflection\Host folder, select the file Uploadvx.rbs and click Run to open the Reflection VMS Upload Script dialog box.
5. Click Default Upload.
6. When you see the Completed Successfully dialog box, this indicates that the host program has been uploaded. Now your users can transfer files using the **WRQ/Reflection** protocol.

If you encounter any problems, perform a custom upload (explained next).

VMS Custom Upload Options

If you need to specify custom options, click Custom Upload in the Upload Script dialog box. The custom options are explained next.

Upload Method

The check boxes in the Upload Method box allow you to specify up to three protocols the script should use when attempting to upload the host transfer program. By default, the script first tries to upload using the **WRQ/Reflection** protocol. If that is unsuccessful, the script tries the **Old-WRQ protocol**, then the **Kermit** public domain transfer protocol.

Upload VAXLINK2 to Which VMS System

By default, the upload script determines what VMS system you are uploading to: either a VAX system or an AXP system. If you want to force a specific system type, select that option here.

Host Program Will Be Called

If you want to call the host program something other than the default proposed name of Vaxlink2.exe, type the name here.

Caution: ● Don't confuse the name that you enter here (which is the name you want the program called once it is uploaded to the host) with the host **Startup command** that you specify on the WRQ tab in Reflection's File Transfer Setup dialog box. In other words, do *not* enter the **Startup command** here. ◄

Creating a Troubleshooting Log

Select this check box if you're running the upload script again because the first time you ran it, the upload was unsuccessful. If you request assistance, WRQ technical support will ask for a copy of the log created by selecting this check box. The log will be located in the Reflection\Host folder.

Specifics on Uploading the UNIX Host Program

This section provides detailed instructions for uploading the UNIX host program. UNXLINK2 is the host program that lets you transfer files to and from a UNIX host, including Digital's ULTRIX. It must be uploaded to the UNIX host before you can transfer files using the **WRQ/Reflection** transfer protocol.

To upload UNXLINK2, you need the following four files in the Reflection\Host folder:

- Uploadux.rbs is a script file that automates the upload procedure.

- Unxlink2.c is part of the version 3.03 UNIX file transfer program.
- Unxxfer2.c is part of the version 3.03 UNIX file transfer program.
- Wrqkerm.c is the receive-only Kermit program that assists in the upload of UNXLINK2.

To upload UNXLINK2 to a UNIX host:

1. Start Reflection and establish a connection to a UNIX host. You can upload UNXLINK2 using a direct serial, modem, or network connection.
2. Log in to the host as you usually do.
3. Click Run Script on the Script menu to open the Run Script dialog box (see page 102 for information about restoring the Script menu).
4. From the Reflection\Host folder, select the file Uploadux.rbs and click Run to open the Reflection UNIX Upload Script dialog box.
5. Click Default Upload.
6. When you see the Completed Successfully dialog box, this indicates that the host program has been uploaded. Now your users can transfer files using the **WRQ/Reflection** protocol.

UNIX Custom Upload Options

If you need to specify custom options, click Custom Upload in the Reflection Upload Script dialog box. The custom options are explained next.

Upload Method

The check boxes in the Upload Method box allow you to specify up to three protocols the script should use when attempting to upload the host transfer program. By default, the script first tries to upload using the **WRQ/Reflection** protocol. If that is unsuccessful, the script tries the **Old-WRQ protocol**, then the **Kermit** public domain transfer protocol.

Compile UNXLINK2 Using

You can customize the compiling of the UNIX host program by using "switches." If you're uploading to an AT&T UNIX System 5 system, leave the first check box selected. Also, by default, Berkeley Software Distribution (BSD) switches are used.

Other detected systems are shown in the box below after you select the **Other System Switches** check box. For example, if you select Berkeley v4.2 UNIX from this box, this appends the following switch to the unxlink2 compiler:

```
-BSD42
```

You can append any additional switches to those that you see here.

To compile unxlink2 on an AIX host:

1. Select the **Other System Switches** check box.
2. Select **AIX (IBM RS6000)** from the **Other System Switches** list.
3. Clear these two check boxes:
   - **AT&T and UNIX System V**
   - **Berkeley Software Distribution (BSD) Switches**

Host Program Will Be Called

If you want to call the host program something other than the default proposed name of `./unxlink2`, type in the name here.

Caution: ● Don't confuse the name that you enter here (which is the name you want the program called once it is uploaded to the host) with the host **Startup command** that you specify on the WRQ tab in Reflection's File Transfer Setup dialog box. In other words, do *not* enter the **Startup command** here. ◄

Create a Troubleshooting Log

Select this check box if you're running the upload script again because the first time you ran it, the upload was unsuccessful. If you request assistance, WRQ technical support will ask for a copy of the log created by selecting this check box. The log will be located in the Reflection\Host folder.

Chapter 16

Advanced HP File Transfer Topics

Following are some advanced file transfer topics about using Reflection for HP with NS/VT to transfer files to an HP 3000 host.

General Transfer Rules

The following rules apply when transferring files to an HP 3000.

Sending New Files

Reflection checks the name you specify for the transferred file against existing file names. If the host file exists prior to the transfer, what happens depends on the value in the **If file exists** list.

However, if the host file does not exist yet, it is created with an estimated file limit. A generous estimate for the file size is initially given, but when the transfer is complete, unused disk space is released. You can override the calculation by using MPE file equations.

If a PC file contains many blank lines or short lines, the file created on the HP 3000 may not be large enough, which will cause the transfer to abort. If this occurs, purge the created file on the host at the MPE prompt. Then use a file equation at the MPE prompt to define a larger file.

File Creation Based on Transfer Type

If the **Transfer type** is **ASCII**, the host will default to an ASCII MPE file with fixed-length records. The record size specified in the **Record size** box (on the WRQ tab in the File Transfer Setup dialog box) is used as the actual record size.

If the **Transfer type** is **Binary**, the host file is created as a binary MPE file with variable-length records. The specified record size is used as a maximum.

If the **Transfer type** is **Auto-Detect**, Reflection automatically determines the file type and selects the transfer type for you.

All creation defaults may be overridden by MPE file equations, but this has no effect on the transfer type.

Using Lockwords

A lockword is a password you can attach to a file on the HP. Once a lockword is assigned to a file, you cannot read or write from that file without supplying the lockword.

When an HP file has a lockword, you must add it to the host file name before performing a transfer to the PC:

```
<file name>/<lockword>
```

If the PC file is sent back to the host using the original file name and the **If file exists** list is set to **Delete**, the lockword must be specified in the host file name.

You can create a lockword file when transferring a PC file to the host by adding the lockword to the host file name as described above.

Using the POSIX Shell

Beginning with version 5.0 of the MPE/iX operating system, MPE is "POSIX compliant." Some of the POSIX features included are:

- Support for long file names and lowercase file names; case is preserved when you transfer the files from Reflection.
- Fully hierarchical file names.
- Native POSIX files have a new record format, "stream," which is just a stream of bytes. POSIX support is only in the native mode version of PCLINK2 (Reflection's file transfer host program).
- A POSIX shell, replacing the MPE colon prompt with a UNIX-type interface.

Reflection for HP with NS/VT is a POSIX-compliant application. When the **MPE file names** list (in the HP Advanced File Transfer Options dialog box) is set to **POSIX**, the host side of the File Transfer dialog box will show files created with lowercase file names in lowercase. The host directory shows multiple levels of the directory hierarchy. All the functionality included for the MPE host directory is supported with the POSIX file naming format (for example, drag-and-drop file transfers).

Both POSIX and UNIX sort file names by placing lowercase after uppercase. For example, three files named TEST1, test2, and TEST3 are sorted in the host directory listing as follows:

```
TEST1
TEST3
test2
```

HP 3000 Host Directory Support

The following section discusses the host directory support specific to the HP 3000 and its operating system, MPE. Since the MPE file system is not hierarchical by nature, Reflection needs to make certain assumptions when displaying HP host directory information.

MPE Groups and Accounts

The MPE file system is broken into groups and accounts. The highest level in the file system displays a full set of the accounts available on the system. Although one account (SYS) is typically designated for MPE system files, it has no particular precedence in the MPE file system.

Each account consists of one or more groups. The PUB group is generally taken to be one where common files are kept (although this is not a mandatory requirement).

Files are stored in a specific group. Therefore, to reference a file you must include:

- The file's name
- The name of the file's group
- The name of the account containing the file's group

A fully qualified file name is concatenated with periods that separate these three elements, as in:

```
PCLINK2.PUB.SYS
```

`PCLINK2` is the file name, `PUB` is the group, and `SYS` is the account.

Changing the Directory Display

The File Transfer dialog box supports a "change directory" command typed in the **Host file names** box to provide you with a view to other groups and accounts.

Note: You are not changing your logon group or account by using these commands—what you are changing is the current group and account being viewed. As a system administrator, you can restrict the display view as explained on page 120. ◄

Valid Options

The options described below are valid at any time (assuming you have the permissions):

filespec.group.account
: Make group.account the current directory, and set the current pattern to filespec.

.group.account
: Make group.account the current directory, and reset the pattern so that all files are displayed.

..account
: Make account the current directory, such that groups for that account are displayed as children of the account.

..
: Make the root the current directory, such that the list of all accounts is displayed below the root.

Valid Options When the Current Directory Is the Root

account
: Change to the specified account and display its groups underneath the account.

group.account
: Change to the specified group in the specified account and display the files in that group.

Valid Options When the Current Directory Is an Account

group
: Change to the specified group and display the files in the group.

.account
: Change to the specified account, and display its groups underneath the account.

Valid Options When the Current Directory Is a Group

filespec.group
: Change to the specified group in the current account and set the current pattern to filespec.

.group
: Change to the specified group in the current account.

The HELLO Command and the Logon Group

When you log onto the MPE system with the HELLO command, a certain group and account becomes your default directory: this is commonly referred to as your "logon group.account."

Your logon group.account is related to the logon name. For example, the logon sequence `HELLO MGR.TRACK` logs you onto the `TRACK` account with a user name of `MGR`. The logon account can be directly determined from the HELLO command, but the logon group is determined by whatever the default is for the user (in this example, `MGR`). The group name is often not included when logging on.

On MPE/iX machines, you can change your current group to another group in your account with the CHGROUP command, but you cannot change to a different account without logging on again. On Classic machines, you cannot change either the group or account. Since there is no nesting in the directory structure other than the group-within-account aspect, and it is not common to switch directories often, groups tend to have many files in them (users tend to store everything in their logon group.account).

Adding Parameters to the PCLINK2 Startup Command

Some of the default values that govern the **WRQ/Reflection** protocol file transfers to an HP 3000 can be altered by appending parameters to the **Startup command** or by changing the value in the **Transfer link** list. Both these items are set on the WRQ tab in the File Transfer Setup dialog box.

When appending parameters, use the following format:

```
RUN PCLINK2.<group>.<account>;PARM=<n>
```

The value of *n* is a 16-bit number, of which the three right-most bits indicate the type of file transfer (the 13 left-most bits indicate the PCLINK2 timeout).

Optional parameters for the startup sequence include:

- **QEDIT**
  Files with label information similar to QEDIT's are received as if they were QEDIT files. On a Classic HP 3000, add `,NQ` to the **Startup command** if you do not want to retain this label information when receiving files. On an MPE/iX machine, use `INFO=NQ`. To maintain QEDIT information when a file is sent to the host, add `;Q` to the host file name. See page 129 for more information.

- **Timeout**
  Use `PARM=<value>` at the end of the **Startup command** to change the default timeout value for PCLINK2 (30 seconds). Bits 0–12 (these bits are counted left to right) are used to indicate the timeout interval in seconds. Bits 13–15 are reserved. For the 13th bit, this is equivalent to multiplying the desired timeout by 8. For example, to set a timeout of 60 seconds use `PARM=480` (480 is equal to 8 * 60). If the parm value of these bits is zero, the default timeout is used.

- **PARM=1**
  Enq/Ack flow control is automatically turned off with **8-Bit** file transfer (the default for **Transfer link**). If you experience flow control problems during file transfer with Classic HP 3000s, you can add `PARM=1` to the **Startup command**. This preserves Enq/Ack flow control, and is faster than slowing down to 7-bit.

- **PARM=2**
  To create a file transfer log file that records file transfer activity, add `PARM=2` to the **Startup command**. See page 152 for more information.

- **PARM=5**
  If you receive the error message:

  ```
  File transfer failed, error in protocol, transfer aborted
  ```

  Try setting PARM=5. (5 is the mux parameter; this works in most situations.)

- **Combining PARM values**
  If more than one of the PARM values apply, add the values. For example, to select a 60-second timeout and create a file transfer log file, use PARM=482.

Configuring Host Directory Displays

The version of PCLINK2 (version 3.51, HP native mode) shipped with this copy of Reflection provides a means for system administrators to exercise greater control over the display of host directories and files presented to a user in the File Transfer dialog box. This control is distinct from MPE security and can be configured to be more or less restrictive than MPE security would allow for a specific user or group of users.

The configurable display control does not, however, go beyond the bounds of MPE security to limit what can be transferred—it limits only what can be displayed. That is, if a user knows the fully qualified path name for a file and has read access allowed by MPE, the file can be downloaded even if the display control will not allow viewing of the directory that contains that file. The **Host file names** box in the File Transfer dialog box can always be used to enter specific file names and wildcards for file transfer.

Configurable Display Levels

When you click the Show Host Files button in the File Transfer dialog box, this shows the user a list of all files in their current group and account. You can use the VT and HP Profiler to completely remove the Show Host Files button from the File Transfer dialog box.

You can limit display privileges on a user-by-user basis. When a user attempts to access a restricted area, the following warning appears:

No Display Privileges—Warning Message

Setting Display Levels

There are several display levels available for both the MPE and POSIX namespaces. MPE and POSIX levels are set independently of one another. The table below describes the different display levels; a definition of the following terms will be useful in understanding the table.

Display Privileges:

- *None*—Indicates that the user cannot obtain a graphical display of any host directory data.
- *Current Group Only*—Indicates that the user cannot change groups within an account.
- *Current Account Only*—Indicates that the user cannot change accounts but can view all groups within the current account.
- *Full Display*—Indicates that the user can display all accounts and groups available on a host machine.

MPE User Capabilities:

- *Normal*—User has no AM (Account Manager) or SM (System Manager) capabilities.
- *AM*—User has AM capability but not SM.
- *SM*—User has SM capabilities.

Display Level	Namespace	User Capabilities	Edit Box Privileges	Graphical Privileges
0	MPE	Normal, AM, SM	None	None
0	POSIX	-	None	None
1	MPE	Normal, AM, SM	Group Only	Group Only
1	POSIX	-	Group Only	Group Only
2	MPE	Normal	Group Only	Group Only
2	MPE	AM	Account Only	Account Only
2	MPE	SM	Full	Full
2	POSIX	-	Account Only	Account Only
3	MPE	Normal	Group Only	Full
3	MPE	AM	Account Only	Full
3	MPE	SM	Full	Full
3	POSIX	-	Full	Full
4	MPE	Normal, AM, SM	Account Only	Account Only
5	MPE	Normal, AM, SM	Full	Full

The MPE levels can affect the display of files differently based on how the directory display request was made:

- If the user requests a display of a new directory by clicking on the account folder in the File Transfer display box, what appears depends on the user's assigned display privileges—either a list of all groups for that account appears or, if the user has Current Account Only privileges, the display doesn't change at all.
- If the user changes to that same directory using the appropriate commands in the Host File Names box, then the display of requested data may appear, depending on the restriction level.

For the POSIX namespace, a user's box privileges and graphical privileges are always the same.

Operating System Requirements

If the host is running MPE/iX 5.0 or higher, all display levels for both MPE and POSIX namespaces are available when using the PM version of the PCLINK2 program. With this configuration, PCLINK2 also takes advantage of HP's Architected Interface Facility (AIF), which provides marked performance improvement when displaying the host directories. When using the non-PM version of PCLINK2, display levels 0–3 are available for both MPE and POSIX.

If the host is running a version of MPE/iX earlier than 5.0, PCLINK2 cannot use the AIF to display the host directories. In addition, POSIX is not supported.

Configuring User Displays

These two functions of PCLINK2 allow you to configure a user's display level:

- CONFDISP configures user display level limits.
- SHOWDISP prints the current display level settings to the screen.

Using the CONFDISP Function

There are two ways to specify a display level for a user or group of users:

- Use the MPE command line to execute the command.
- Use a data file containing the necessary information (user and account names and the desired display levels). Then, specify this data file as input to the command executed on the MPE command line.

  There are several advantages to this second option. One is you can use just one data file to apply changes to multiple systems. Further, the data file can be used again when new versions of PCLINK2 are made available.

To execute the CONFDISP function:

1. At the MPE colon prompt, enter this command:

   ```
   :RUN PCLINK2.PUB.SYS;INFO="CONFDISP"
   ```

   Your screen looks like this:

   ```
   Native Mode PCLINK2 Version 3.52
   Enter display configuration information  (Type ABORT to cancel.)
   (Press RETURN when done) >
   ```

2. At the prompt, enter the display level information using this syntax:

   ```
   <user name>.<account name> <MPE level> <POSIX level>
   ```

   You can replace both the `<user name>` and the `<account name>` with a single wildcard character (@). The wildcard character cannot be used with other characters; that is, pattern matching is not supported. For example, user or account names such as `FOO@` and `ABC@` are not supported.

   Here are some examples of valid CONFDISP command entries:

   ```
   MGR.FOO 0 1
   MGR.@ 1 3
   @.PLAY 5 0
   @.@ 2 2
   ```

3. To accept the entry and add another, press Enter ↵.
4. When you're through making entries, press Enter ↵ twice.

Using a Data File with CONFDISP

To use a data file as input to the RUN command, add `<file name` (where < is the redirection character that sends the information to the specified `file name`) to the end of the RUN command shown in step 1 above. For example:

```
:RUN PCLINK2.PUB.SYS;INFO="CONFDISP" <mycfg
```

There is a 4K limit on the data contained in data file configuration strings. The minimum number of bytes required for a single record is eight. This equals a maximum of 500 entries. If the user and account names are longer than a single digit, as is often the case, the number of entries allowed is decreased.

The output of CONFDISP is a new PCLINK2 program, named PCLINK2A, with the specified levels configured. In actual use, you should rename this back to PCLINK2.

Using the SHOWDISP Function

Use the SHOWDISP function to see the configurations specified by CONFDISP for a particular system. To execute this function at the MPE colon prompt, enter this command:

```
:RUN PCLINK2A;INFO="SHOWDISP"
```

This function is being run against the new executable created above by CONFDISP (PCLINK2A); *not* the original PCLINK2.

Using the earlier example for CONFDISP settings, your screen changes to look like this:

```
Native Mode PCLINK2 Version 3.52

DISPLAY LEVEL CONFIGURATIONS

USER.ACCT                MPE / POSIX
MGR.FOO                - 0 / 1
MGR.@                  - 1 / 3
@.PLAY                 - 5 / 0
@.@                    - 2 / 2
```

```
POSIX supported:  YES,  PM: Yes,  Fast Directory:  YES

For MGR.FOO:  MPE Level  = 0,  POSIX Level = 1

End of Program
```

To determine a user's display level, the user and account names are compared with each configuration string in PCLINK2A following this algorithm:

- If the configuration value is an exact match (such as `MGR.FOO`), PCLINK2 uses the associated display levels.
- If there is a configuration string that includes a wildcard in either the user or account name, PCLINK2 uses the display levels associated with this string.
- If there are multiple strings matching this criteria, (such as `MGR.@` and `@.FOO`) the first of these will be selected.
- If there are no single wildcard matches and the record `@.@` exists, the display values associated with this string will be used.
- If none of the above is present, PCLINK2 defaults the display levels for this user to 3 for both MPE and POSIX namespaces.

Advanced HP File Transfer Options

To configure advanced HP transfer options in Reflection:

1. On the Setup menu, click File Transfer, then click the WRQ tab.
2. Make sure the **System type** is set to **HP 3000**.
3. Click the Advanced button to open the HP Advanced File Transfer Options dialog box.

A description of each option follows; for more detailed information, see the online help.

MPE File Names

Select which naming format to use from the **MPE file names** list. This file name structure is used for host file names during file transfers, and it also determines how the file names display in the File Transfer dialog box after you click the Show Host Files button. When this list is left set to **MPE**, files beginning with a period or a forward slash (. or /) are interpreted as **POSIX** files.

Reflection supports four name spaces for file names:

- The traditional **MPE** file names. For example, the names must be all uppercase, each name a maximum of eight characters, in the format directory structure FILENAME.GROUP.ACCOUNT.
- The MPE version 5.0 **POSIX** file names. For example, the names can be mixed case and of any length, using a fully hierarchical directory structure.

  The MPE file names are a subset of the POSIX names. All MPE file names are visible from within POSIX (for example, PCLINK2.PUB.SYS appears as /SYS/PUB/PCLINK2), but only POSIX files whose names are also valid as MPE file names are visible from MPE.
- When you select **Auto** from the **MPE file names** list, the host will determine if it is running under the MPE Command Interpreter (CI) or the POSIX shell. If it is the MPE CI, the name space is set to **MPE**; if it is the shell, the name space is set to **POSIX**.

  Note: Even though the host determines the name space, the setting in the dialog box is not changed; it remains as **Auto**. ◂
- Selecting **MPE-Only** from the **MPE file names** list allows only valid MPE names to be accepted.

  This option is for those users who used the ".groupname" construct for the host file name. This allowed them to transfer files into a different account. For example, specifying `.PUB`, transferred files into the `PUB` group. With the introduction of POSIX, this behavior changed. PCLINK2 interprets the `.PUB` as a POSIX name and therefore attempts to transfer the files as a single file named `.PUB`. If the name space is set to **MPE-Only**, the old behavior is performed.

  There is an alternative to setting the name space to **MPE-Only**. If the name space is left set to **MPE**, then the host name may be specified as `@.groupname`, as in `@.PUB`. This will result in the same behavior as described above for the **MPE-Only** name space.

Send as Stream

Native POSIX files under version 5.0 of the MPE operating system support a new record format known as "stream," which is just a stream of bytes. Files created under the POSIX shell or by POSIX programs have this format by default. Files created from the MPE command interpreter or by MPE programs can optionally be stream files.

Interoperability between stream files and other record formats is automatic. This means an MPE program can read from a stream file and it will appear to be a traditional variable-length record file, and a POSIX program will see all files as stream files. MPE does the translation automatically.

If you want all files that you send to the host to have the stream format, select the **Send as stream** check box (when you receive files from the host, the WRQ/Reflection protocol automatically detects the record format of the host file and the correct translation is performed). When this check box is left cleared, PCLINK2 defaults to a fixed record format for ASCII files and a variable record format for binary files.

QEDIT Format on Send

Select this check box to create a host file with the QEDIT format. See page 129 for more information.

Send to Spooled Device

To send a spool file to a device on an MPE/iX machine, select this check box. This ensures correct handling and minimizes extra form feeds being issued on the printer.

Remove File Extension on Send

Select this check box to automatically strip the file extension from the file or files you are sending to an HP 3000.

File Transfers from HP Desk

To perform file transfers from HP Desk, you must have MPE access. If you always work within HP Desk, place a colon before the **Startup command** (on the WRQ tab in the File Transfer Setup dialog box). For example, :RUN PCLINK2. Then, save the change to the default settings file.

If you perform file transfers from within and outside HP Desk, it is best to set and then reset the **Startup command**.

To simplify implementation, you can configure the two user-defined commands (UDCs) described below. Both can be called by the HP Desk UDC already set up on your system. The first UDC might be called SETLINK and contain the following lines:

```
OPTION LIST
COMMENT ^EC&oFSETHOST-STARTUP
":" & VALUE(HOST-STARTUP)^CR
```

The LIST option directs the UDC to echo any subsequent lines to the terminal. (MPE normally does not echo.) The comment line changes the current host startup command so that a colon precedes it. Note that ^CR represents a carriage return. The ^EC&oF sequence is a Reflection escape sequence that invokes Reflection's command interpreter, as explained in the HP *Terminal Reference* manual.

To reset the startup command upon exiting HP Desk, a second UDC containing the following lines could be used:

```
OPTIONLIST
COMMENT ^EC&oFSETHOST-STARTUPMID
(VALUE(HOST-STARTUP),2,-1)^CR
```

This UDC (call it RESETLINK) would return the startup command to its default setting.

The center four lines of this version of the HP Desk UDC follow:

```
SETLINK
CONTINUE
RUNHPMAIL.HPMAIL.SYS;LIB=g;PARM=:tray;INFO="!user"
RESETLINK
```

The CONTINUE ensures that if an error occurs while trying to run HP Desk, the rest of the UDC is executed. This ensures that the startup sequence will be reset by the RESETLINK UDC, regardless of whether HP Desk runs.

QEDIT

QEDIT is an HP 3000 text editor from Robelle Consulting, Ltd., that you can run from Reflection. When you start the program, it automatically adjusts the following Reflection settings:

- Completion codes are enabled (see the Reflection *Terminal Reference for HP Hosts* for more information on completion codes).
- To avoid minor problems with typeahead in block mode, typeahead is disabled while in VISUAL mode.

  Reflection's variable V9 is used to save and reset typeahead. (That is, if typeahead was on before entering VISUAL mode, it will be on again when you exit this mode.) Because QEDIT uses the variable V9, it cannot be used in any of your Reflection command scripts that might be run while also running QEDIT.

Transferring QEDIT Files from Reflection

Files with label information similar to QEDIT's are received as if they were QEDIT files. PCLINK2 sends host files in the QEDIT format to the PC as ASCII files. To override this on a Classic HP 3000, append `,NQ` to the **Startup command** (on the WRQ tab in the File Transfer Setup dialog box) if you do not want to retain this label information when receiving files. On an MPE/iX machine, use `INFO=NQ`. When sending QEDIT files back to the host, append `;Q` to the host file name (if the file already exists on the host in QEDIT format, this switch is not necessary).

QEDIT files are received on the PC without sequence numbers, since they are seldom used by PC tools. When a PC file is uploaded into QEDIT, new sequence numbers are assigned to the lines. If you are receiving a QEDIT file that contains PC data (such as a Reflection command script or an Assembler program), use SET LANGUAGE JOB in QEDIT for PC files. A JOB file has 80-byte records and is saved without sequence numbers. When you download a QEDIT JOB file, Reflection does *not* add a label to it; JOB is the default.

Note: QEDIT has a :REFLECT command that allows you to execute any Reflection command. You can include Reflection commands in UDCs, as in:

```
:REFLECT receive report.dta from reptdata delete
:REFLECT chdir \winword
:REFLECT shell winword
```

Using a QEDIT UDC, you could do a :REPORT into a file, then download the file to a PC and update a PC database that monitors use of HP 3000 system resources. ◄

Retaining QEDIT Language Attributes

QEDIT files can have the following language attributes:

Code	Attribute	Record Size
1	SPL	72-byte records
2	FORTRAN	72-byte records
3	COBOL without comments	66-byte records
4	RPG	80-byte records
5	JOB	80-byte records, KEEP UNN
6	Text	SET LENGTH sets the record size up to 256 bytes
7	Pascal	72-byte records
8	COBOLX with comments	74-byte records

For example, the following starts a QEDIT session for a new COBOL file:

```
:RUN QEDIT.PUB.SYS
SET LANGUAGE COBOL
NEW COBFILE
```

If you transfer a QEDIT file to your PC, Reflection writes a label to the PC file that describes the QEDIT file attributes, as in:

```
RECSIZE=80; LANGUAGE=3
```

The LANGUAGE specifier tells QEDIT the record format and which compiler to use with the source file. For Transact or Powerhouse, you can use SPL or JOB, and then invoke the interpreter via a user-defined command (UDC).

Stopping File Transfers

If you want to stop a transfer to an HP host, press Esc or click Cancel in the File Transfer in Progress window and wait for Reflection to stop the transfer. If PCLINK2 is still running on the host (colons marching across the screen are one indication of this situation), use the following steps to reestablish communications with an HP 3000:

1. Press Ctrl+Break.
2. The next step differs according to whether you are on a Classic or MPE/iX system:
   - If you're on a Classic HP 3000, press Esc then type a colon (:) to turn the HP 3000 echo facility back on. (If your host system is MPE V (T-MIT), you must log off and back on.)
   - If you're on an MPE/iX system, type `SET ECHO=ON`.
3. Type `ABORT` at the host prompt and press Enter ↵ to abort PCLINK2.

Setting Up Remote Transfers

You can force PCLINK2 to use a communications port other than the one assigned to your session. For instance, a host program running as part of a batch job could perform file transfers to and from PCs running Reflection.

PCLINK2 opens the file HPPCPORT when it opens the communications port, enabling PCLINK2 to do file transfers to any other PC not opened by any process. For PCLINK2 to communicate with a PC designated via HPPCPORT, Reflection must be running and the baud rate must be configured to match that of the port's default baud rate.

PCLINK2 expects Reflection to tell it what files go in which direction. If the host is to control a file transfer, it must force Reflection to initiate the file transfer.

The following steps in a host program tell Reflection to send the PC file PCFILE.PC to the HP 3000:

1. FOPEN the PC's port with the following:

   foptions = %600 (Undefined length records)
   aoptions = %404 (Read/Write and NOBUF access)

2. FWRITE ^{E}S$_{C}$&oCSEND pcfile.pc TO hpfile ASCII ^{C}R.

3. FREAD the Startup Command, RUN PCLINK2.PUB.SYS.

4. Create and activate PCLINK2.

5. FREAD the completion code that Reflection sends indicating the success or failure of the host-initiated command.

HP Host File Name Switches

The WRQ/Reflection protocol for HP hosts supports ASCII, binary, and label file transfer types, and also lets you specify various qualifiers, or *switches,* to modify the way the file is saved on the HP 3000, and how it is handled when the transfer is complete.

To use the file transfer switches, append the switch you want to the host file's name when transferring it. For example, to send the file LUNA to a device on the HP 3000 as a spool file, you would enter `LUNA;O` in the **Host file names** box in the File Transfer dialog box. The switches described here are different from the parameters you can append to PCLINK2 to change the timeout value, create a log file, and so on; see page 118 for details about the PCLINK2 parameters.

A list of available switches follows. For information on switches specific to QEDIT, see page 129.

;F – Fixed-Length File Transfers

Reflection lets you specify fixed-length file transfers when using the binary file transfer type. The fixed-length type lets you send graphics data files, which may require a fixed-length binary format, to the HP 3000. Reflection defaults to variable-length files in binary transfers, but gives the option of either fixed or variable formats. Fixed-length files are padded with nulls when returned to the PC.

;L – Include Label Information

Adding the ;Label modifier (or simply ;L) to a host file name ensures that HP 3000-specific file information is retained in the data transmitted to the PC. If your goal is to transfer a file between two HP 3000 systems via Reflection, use the labels transfer type or the ;Label modifier.

Both the ;Label modifier and the labels type force the inclusion of user labels on HP 3000 files. Files such as message catalogs and executable programs can be transferred without losing any information. Label information is encoded in an ASCII format in the PC file.

;O – Spool to MPE/iX Machine

You can send a file to a device on the HP 3000 as a spool file. Add ;O to the host file name to ensure correct handling and minimize extra form feeds being issued on the printer.

;P – Purge Existing HP 3000 File

When a file being transferred already exists on the host, file characteristics of the existing file are kept, even if you choose to overwrite the host file. You must purge the existing file if you want the file characteristics to be determined by the file being transferred. To do this, add a ;P (or ;Purge) to the host file name, for example `MYFILE;P`.

Chapter 17

Advanced OpenVMS File Transfer Topics

Following are some advanced file transfer topics about using Reflection to transfer files to a OpenVMS-related host system.

Transferring Files to Any OpenVMS Host Directory

The default settings for the **WRQ/Reflection** protocol allow you to transfer files between your PC and the host directory in which Vaxlink2.exe is stored.

There are two ways to transfer files between your PC and *any* host directory:

- Define VAXLINK2 as a logical name on the host. This lets you transfer files between your PC and any host directory, without changing any transfer settings in Reflection. Defining VAXLINK2 as a logical name is described below.
- Define VAXLINK2 as a foreign command on the host. This also lets you transfer files between your PC and any host directory, but you must change the **Startup command** on the WRQ tab in the File Transfer Setup dialog box to remove the word "RUN." By defining VAXLINK2 as a foreign command, you can check its version number, and specify additional parameters for running the program.

  Defining VAXLINK2 as a foreign command is described on page 137.

Defining VAXLINK2 As a Logical Name

By defining VAXLINK2 as a logical name on the host, you create a logical equivalent for the full directory path and name of the Vaxlink2.exe program. Whenever the host sees the logical name VAXLINK2, it replaces it with the full equivalent name. This allows you to store just one copy of Vaxlink2.exe on the host, and run it from whichever directory you're currently logged into.

Further, by defining VAXLINK2 as a logical name, you do not need to make any changes to the file transfer settings before transferring files; the default settings will let you transfer files between your PC and any host directory.

If you define VAXLINK2 as a system-wide logical name, all users can share the same Vaxlink2.exe program.

There are a couple of limitations when VAXLINK2 is defined as a logical name:

- You cannot check the version number of VAXLINK2.
- You cannot specify additional parameters for VAXLINK2 to modify file transfers.

If you want to check the version number of VAXLINK2 or specify additional parameters, you should also (or instead) define VAXLINK2 as a foreign command, as described in the next section.

To define VAXLINK2 as a logical name, type the following at the DCL prompt:

```
DEFINE VAXLINK2 [device]:[directory]VAXLINK2.EXE
```

Note: To avoid potential symbol resolution problems on the host, be sure to use the full name Vaxlink2.exe when defining the logical name. ◄

The `[device]` and `[directory]` specify the location where you uploaded Vaxlink2.exe. If you don't know the device and directory names, type `SHOW DEFAULT` at the DCL prompt to display them.

The above command defines the logical name VAXLINK2 in the current process logical table, and for the current session only. To define the logical name each time you log in, add the above line to your Login.com file on the host, preceding the line with a dollar sign, as in:

```
$ DEFINE VAXLINK2 [device]:[directory]VAXLINK2.EXE
```

Defining VAXLINK2 As a Foreign Command

By defining VAXLINK2 as a foreign command on the host, VAXLINK2 can accept a number of parameters—to show the version number, change the number of times a failed transfer should be retried, create a log file on the host, and so on. When VAXLINK2 is defined as a foreign command, you must change the **Startup command** (on the WRQ tab in the File Transfer Setup dialog box) setting to use the defined command; this is described below. The parameters you can use with VAXLINK2 are listed on page 138.

To define VAXLINK2 as a foreign command:

- Type the following at the DCL prompt:

```
VAXLINK2 :== $[device]:[directory]VAXLINK2.EXE
```

- Or if VAXLINK2 is defined as a logical name (described earlier):

```
VAXLINK2 :== $VAXLINK2
```

The `[device]` and `[directory]` specify the location where you uploaded Vaxlink2.exe. If you don't know the device and directory names, type `SHOW DEFAULT` at the DCL prompt to display them.

The above command defines the symbol VAXLINK2 as a foreign command, but for the current session only. To define the symbol each time you log in, add the above line to your Login.com file on the VAX, preceding the line with a dollar sign, as in:

```
$ VAXLINK2 :== $[device]:[directory]VAXLINK2.EXE
```

You can add the above line to the Sys$manager:Sylogin.com system-wide login file, so that all users automatically have VAXLINK2 defined when they log in.

Changing the Startup Command

To use VAXLINK2 when it's defined as a foreign command:

1. On the Setup menu, click File Transfer, then click the WRQ tab.
2. With the **System type** list set to **OpenVMS**, remove the word "`RUN`" from the **Startup command**. The box should then read VAXLINK2. Click OK.

Adding Other Parameters to the Startup Command

When VAXLINK2 is defined as a foreign command (see page 137), it can accept additional parameters to modify the transfer protocol.

Once VAXLINK2 is defined, remove the word "RUN" from the **Startup command** setting (on the WRQ tab in the File Transfer Setup dialog box) so that it reads just VAXLINK2. VAXLINK2 then has the following syntax and can take the following parameters:

```
VAXLINK2 [D<n>] [E<n>] [H] [L] [N<n>] [R<n>] [S] [T<sec>] [V] [X<n>]
```

D<n>	Defines how, and if, Reflection should attempt to perform fast file transfers. DØ disables fast file transfer, D1 instructs Reflection to try a nonroutable fast file transfer, and D2 indicates a request for a routable TCP-style fast file transfer. The default, D3, causes Reflection to try *all* forms of fast file transfer; in general, you should never have to change the default.
E<n>	Sets a packet size for fast file transfers. The valid range is 1–4 and the default is 4.
H	Displays a summary of VAXLINK2 parameters.
L	Creates a log of the file transfer. The log file is called Wrqlog and is saved in the current VAX directory. This is explained on page 153.
N<n>	When there is no response from the PC, the file transfer attempt is repeated 5 times (by default) before canceling. This parameter sets the retry limit to <*n*> consecutive times (<*n*> must be an integer).
R<n>	VAXLINK2 tries to queue up several reads at a time in order to speed up the terminal I/O. This parameter sets the number of reads that can be queued up. The valid range is 1–5, and the default for most connections is 5. If you're connected over either LAT or CTERM, the default value is 1.
S	Displays a summary of valid host file name switches. See page 140 for a complete description of the switches.
T<sec>	Sets the timeout—the number of seconds during which there is no response from the PC. The default timeout is 30 seconds. This parameter should always be set to a value at least 5 greater than the **Receive timeout** parameter on the General tab in the File Transfer Setup dialog box; if the two timeouts match and an error occurs, the host and PC will time out simultaneously, making recovery more difficult.

V	Displays the version number of VAXLINK2. This should be version 2.61.
X<n>	During file transfers, blocks may need to be retransmitted. This parameter sets the number of retransmits to be performed before giving up the file transfer; the default value is 10.

To use the above parameters, with the exception of H, S, or V, append the parameter to the word VAXLINK2 in the **Startup command**; for example, a **Startup command** of `VAXLINK2 L T15` creates a log file and sets a timeout value of 15 seconds.

To use the *H, S,* or *V* parameters to obtain VAXLINK2 information, append the parameter to the word VAXLINK2 at the DCL prompt. For example, to display VAXLINK2 help, your DCL command line would look like this:

```
$ VAXLINK2 H
```

OpenVMS Host File Name Switches

The **WRQ/Reflection** protocol lets you specify various qualifiers, or *switches,* to modify the way a file is saved on OpenVMS hosts, and how it is handled when the transfer is complete. When there is a Reflection setting equivalent for the switch as provided below, in most cases you should specify these parameters in the File Transfer Setup dialog box.

To use the file transfer switches, append the switch you want to the host file's name when transferring it. For example, to submit the file Luna.dat to the print spooler after sending it to the VAX, you would enter `Luna.dat/S` in the **Host file names** box in the File Transfer dialog box. The switches described here are different from the parameters you can append to VAXLINK2 to change the timeout value, the number of retries, and so on; this is explained on page 138.

Warning: ● Do *not* type a space before appending a switch to a file name; doing so results in an error. (Reflection considers this as two separate file names.) For example, `<File name>/A` is valid; `<File name> /A` will cause the transfer to fail. ◄

The following switches are available:

/A – ASCII Transfer: Set Maximum Record Length

When transferring ASCII files with fast file transfer, you can specify that the maximum record length be set in the file header of the resulting host file.

/B – Block Mode

For binary transfers from the host only. This switch forces VAXLINK2 to read the host file in block mode rather than record mode.

For certain files in nonstandard formats, this gives you every byte that is actually contained in the file, including record separators, without regard to record lengths or carriage control. In other words, if you do a binary receive of a file that does not have fixed record lengths, record separators will be discarded unless you use /B.

You *must* use this switch when the file is put onto the OpenVMS system using PATHWORK's COPY command.

/C – Submit Files to Batch Queue

File transfer to the host only. Submits the file or files to the batch queue (SYS$BATCH) upon completion of the transfer. Files are deleted on the host after they have been submitted; use /K (described below) to keep the file. The Reflection equivalent is the **Submit to batch queue** check box (in the OpenVMS Advanced File Transfer Options dialog box).

/D – DECDx Format Files

Binary file transfer only. Transfers files in DECDx format between the VAX and PC. The Reflection equivalent is the **Preserve record counts** check box (in the OpenVMS Advanced File Transfer Options dialog box).

/F – Fixed Length Records

The /F switch was used with VAXLINK to specify fixed length binary files. This is the file format that VAXLINK2 creates by default. (This switch is offered only for backward compatibility with the older protocol.)

/I – Image Transfer Method

The /I switch was used with VAXLINK to specify a file transfer image method; the image method should be specified in the File Transfer dialog box. (This switch is offered only for backward compatibility with the older protocol.)

/K – Keep Submitted Files

This switch is valid only in conjunction with the /C or /S switch, both of which submit files to a queue on the host. Once the files are in the queue, they are normally deleted. To keep a copy of the file on the host, use the /K (keep) switch. The Reflection equivalent is the **Keep file after submitting** check box (in the OpenVMS Advanced File Transfer Options dialog box).

/L – Add Linefeed

Binary file transfers from the host only. This switch appends a linefeed character to each record when receiving a file that has carriage control. The linefeed character is added even if the carriage control is not stream-lf.

/P – Translating Carriage Control Characters

ASCII or binary file transfers from the host only. This switch translates FORTRAN or PRINT carriage control characters in OpenVMS files.

If you don't use this switch on files that contain printer carriage control characters, set the Reflection property `TranslateCharacters` to False to prevent these control characters from being translated unpredictably. When carriage control characters are *not* translated, they become part of the file's records. To discard these characters, use the /T switch (see below).

/S – Spool Files to Printer

ASCII file transfers to the host only. Submits the file or files to the print queue (SYS$PRINT) upon completion of the transfer. Note that files are deleted on the host after they have been submitted; see /K above to keep the file after it is submitted. The Reflection equivalent is the **Submit to print queue** check box (in the OpenVMS Advanced File Transfer Options dialog box).

/T – Discard Carriage Control Characters

ASCII or binary file transfers from the host only. This switch discards FORTRAN or PRINT carriage control characters in OpenVMS files. To translate these characters, use /P (see above). The Reflection equivalent is the **Translate carriage control** check box (in the OpenVMS Advanced File Transfer Options dialog box).

/V – Variable Host Record Size

Binary file transfers to the host only. Creates the host file with variable-length records (the default is fixed). The Reflection equivalent is to select **Variable** from the **Record format** list (in the OpenVMS File Attributes dialog box).

/W – Block Mode Binary

Binary file transfers from the host only. This switch supports the block mode binary transfer required for files created by applications such as the DOS and OpenVMS versions of Lotus 1-2-3 and WordPerfect.

Chapter 18

Advanced UNIX File Transfer Topics

Following are some advanced file transfer topics about using Reflection to transfer files to a UNIX host.

Making UNXLINK2 Available System-Wide

After UNXLINK2 is uploaded to the host, it can be made available to all Reflection users by placing it in a system-wide directory, then configuring each user's login so that the user "inherits" an operating environment that includes the directory path to UNXLINK2.

For more information about UNIX user profiles, operating environments, and directory paths, see the documentation for your UNIX host.

Adding Parameters to the UNXLINK2 Startup Command

For UNIX systems, UNXLINK2 can accept the following parameters to modify the **Startup command** (set on the WRQ tab in the File Transfer Setup dialog box):

```
unxlink2 [-C] [-H] [-L] [-N<n>] [-T<sec>] [-V] [-X<n>]
```

`-C`	By default, wildcard transfers to UNIX hosts result in host file names that are lowercase. This parameter creates host file names that are uppercase. In file transfers without wildcards, the local file name is reproduced on the host with upper and lowercase as entered; the case is preserved and not changed during the transfer.
`-H`	Displays a summary of UNXLINK2 parameters.
`-L`	Creates a log of the file transfer. The log file is called Wrqlog and is stored in the current UNIX directory. This is explained on page 154.
`-N<n>`	When there is no response from the PC, by default the file transfer attempt is repeated 5 times before canceling. This parameter sets the retry limit to <*n*> consecutive times (<*n*> must be an integer).

`-T<sec>`	Sets the *timeout,* the number of seconds during which there is no response from the PC. The default timeout is 30 seconds. This value should always be set to a value at least 5 seconds greater than the **Receive timeout** parameter on the General tab in the File Transfer Setup dialog box. If the two timeouts are the same and an error occurs, the host and PC will time out.
`-V`	Displays the version number of UNXLINK2. The version number required is 3.03 or higher.
`-X<n>`	During file transfers, blocks may need to be retransmitted. This parameter sets the number of retransmits to be performed before giving up the file transfer; the default value is 10.

To use the above parameters (with the exception of `-H` and `-V`), append the parameter to the word `unxlink2` in the **Startup command**; for example, this **Startup command** `unxlink2 -L -T15` creates a log file and sets a timeout value of 15 seconds.

To use the `-H` or `-V` parameters to obtain UNXLINK2 information, append the parameter to the word `unxlink2` at the UNIX host prompt. For example, to display UNXLINK2 help, your UNIX command line would look like this:

```
ux: unxlink2 -H
```

Configuring UNIX File Attributes

To specify UNIX file transfer attributes in Reflection:

1. Click File Transfer on the Setup menu to open the File Transfer Setup dialog box.
2. If necessary, click the WRQ tab to bring it to the front.
3. Make sure the **System type** is set to **UNIX**.
4. Click the Attributes button to open the UNIX File Attributes dialog box.

A description of each option follows; for more detailed information, click the Help button and click on the item you need help with.

Owner

In this box, enter the owner for the file. The name specified must correspond to a valid login name or user ID in the specified group.

Group

In this box, enter the group of the file's owner. The value specified must correspond to a valid group name or group ID.

Mode Group Box

Select the **Set mode** check box to specify read, write, and execute permission for the **Owner**, **Group**, **Others**, and **All**. If this check box is not selected, permissions are determined by the default creation mode on the host.

The modes are as following:

- Select the **Set user ID on execution** check box when transferring an executable file to specify that the owner's permissions should determine access when the program is run (instead of using the permissions of the person running the program).
- Select the **Set group ID on execution** check box to specify that the permissions of the login group of the person running the file determine access as the file is running. See *chmod (1)* in your UNIX documentation for more information.
- If an executable file is prepared for sharing, selecting the **Save text image after execution (sticky bit)** check box will prevent the system from abandoning the swap space image of the program-text portion of the file when its last user terminates. When the next user of a file executes it, the text does not need to be read from the file system (it is swapped in), saving time.

Chapter 19

Solving File Transfer Problems

This chapter provides solutions to some problems you may encounter when transferring files between Reflection and the host.

Using Predefined Settings

Most file transfer problems can be solved by choosing one of the **Preset configurations** on the Protocol tab in the File Transfer Setup dialog box. Each predefined value also has a trouble-shooting counterpart; try that setting if your first choice does not work.

General File Transfer Troubleshooting Solutions

Following are some general troubleshooting solutions for transferring files.

Changing the Startup Command

If you're having trouble transferring files, make sure you have the correct **Startup command** on the WRQ tab in the File Transfer Setup dialog box:

- For HP 3000 transfers, make sure the location of PCLINK2 matches the group and account specified in your **Startup command**; see "Location of PCLINK2" below.
- For OpenVMS transfers, if you defined VAXLINK2 as a foreign command using the procedure on page 137 and you cannot transfer files, make sure the word `RUN` is not part of the **Startup command**. The sequence should simply read VAXLINK2.
- For UNIX transfers, first make sure the **Startup command** reads unxlink2 (this must be in lowercase letters). Then, type `unxlink2 -h` at the UNIX host prompt. If you receive the error message "Command not found" and the file unxlink2 is located in the current UNIX directory, change your **Startup command** to `./unxlink2`.

Location of PCLINK2

Is PCLINK2 where you think it is? Normally, PCLINK2 is installed in the PUB group of the SYS account. To find out if PCLINK2 is installed, and where, enter the following command at the colon prompt:

```
LISTF PCLINK2.@.@,2
```

It may take several minutes, but your HP 3000 ultimately displays all files and programs named PCLINK2, along with the name of the group and account in which they are installed.

The listing will look something like this:

```
:LISTF PCLINK2.@.@,2
ACCOUNT=  SYS       GROUP=  PUB
FILENAME  CODE ----LOGICAL RECORD-------- ----SPACE -----
               SIZE  TYP   EOF  LIMIT R/B SECTORS  #X  MX
PCLINK2    PROG 128W  FB    82    82    1     83     1  1
```

This indicates that PCLINK2 is installed in the PUB group of the SYS account. Now check the **Startup command** on the WRQ tab in the File Transfer Setup dialog box. The sequence should match the PCLINK2 group and account. For example:

```
RUN PCLINK2.PUB.SYS;PARM=1
```

No Host Response for Transfer

If you get the message "Host doesn't respond" when initiating a transfer, this means that the host file transfer program could not be executed. Review the following situations that cause this message to appear:

- You did not have a host prompt when starting the transfer. First, try manually typing the startup sequence from your host prompt. If this works, check the syntax for the **Startup command** on the WRQ tab in the File Transfer Setup dialog box to make sure it matches what you just typed.
- The host program was not uploaded; see page 101.
- Another program is running on the host, so the startup sequence could not be executed. Wait until the other program completes, then try again.

- You are starting a file transfer or uploading a file, and Reflection for HP with NS/VT cannot get the normal `:DC1` prompt from the host. In either case, the transfer is never initiated. There are a number of possible causes:
  - There may be no connection with the host or you may not be logged on to the host.
  - The serial port on the HP 3000 may not be configured as an HP block mode terminal. Log on to the system again, specifying `;TERM=10` at the end of the logon string.
  - Your **Startup command** is incorrect. Check to see if PCLINK2 is where your **Startup command** says it is; see page 148.

File Transfer Timeout

When transferring a file, if Reflection and the host do not respond to each other within a certain amount of time, the file transfer will time out with the message "Transfer link failed—too many retries."

The following circumstances are possible:

- You are transferring a file and Reflection times out repeatedly while waiting for a response from the host. If the host is really sending data, but slowly, you might try increasing the **Receive timeout** value on the General tab in the File Transfer Setup dialog box (discussed in more detail, below).
- You may have an intermediary device (multiplexer) that is trying to perform flow control or to filter out certain characters. Select the appropriate Troubleshooting preset configuration on the Protocol tab in the File Transfer Setup dialog box and try again.

Receive Timeouts

The value of **Receive timeout** (on the General tab in the File Transfer Setup dialog box) determines the maximum amount of time that Reflection should wait for a packet of data or an acknowledgment from the host when receiving a file; by default, this is set to 15 seconds. If there is no response within the timeout period, data is assumed to be lost and Reflection requests that the data be sent again. Consecutive timeouts can cause the file transfer to fail.

If you know that your host computer responds quickly to data requests, but your host connection is prone to transmission errors, try decreasing the value of **Receive timeout**. If noise on the data line requires a data packet to be retransmitted, decreasing this value causes Reflection to wait less time before timing out from the error, which in turn speeds up transfers.

VAX Process Quotas

You may not be able to run the OpenVMS file transfer host program if the process quotas on your OpenVMS are not set high enough. For example, you may receive the message "File access failed" or "Exceeded quotas."OpenVMS won't tell you which quotas you exceeded (for security reasons), but following are the recommended minimums:

ASTLM 24

BIOLM 18

DIOLM 18

BYTLM 16000

To display process quotas, type the following DCL command at the host prompt:

```
SHOW PROCESS/QUOTAS
```

For example, to set the byte limit quota (which is the Buffered I/O limit) to 16000, modify the user authorization file (UAF) with the AUTHORIZE utility.

Note: Changing process quotas requires certain access privileges. ◄

Once you are in the AUTHORIZE utility, the syntax is as follows:

```
MODIFY username/BYTLM=nnnn
```

To set the byte limit for HIMRT to 16000, for example, use:

```
MODIFY HIMRT/BYTLM=16000
```

The UAF file is updated when you exit AUTHORIZE and the new quota values take effect the next time you log in.

PC File Information

If you do not know the type of the PC file you want to transfer to the host (and therefore do not know whether you should specify **ASCII** or **Binary**), use the Fileinfo utility copied by the Setup program to either the Reflection \HP\Support or \VT\Support folder.

The Fileinfo utility tells you:

- Whether the file contains any characters outside of the ASCII set (characters with a decimal value higher than 127) and is therefore binary.

  Note: If you run this utility on a binary file that has *no* high-bit characters, Fileinfo will (incorrectly) report that the file is ASCII. If you are unsure of results, you should use a more sophisticated tool to determine file type. ◄

- If an ASCII file contains a ^Z as an end-of-file indicator.

This utility should only be used for examining files that were created on the PC. Fileinfo is not intended for use on label files that were received from the host; using it on a label file may yield inaccurate results.

Using Fileinfo

The syntax for the Fileinfo utility, entered from the DOS prompt, is:

```
Fileinfo <file name>
```

The `<file name>` can contain wildcards. Different categories of information are shown, depending on whether the file is ASCII or binary. The categories are:

`RECSIZE`	Specifies the maximum number of bytes per record (the length of the longest line). This is the size of the largest record.
`ASC/BIN`	Indicates whether a file is in ASCII or binary format. Record statistics (#RECORDS) are not shown for binary files.
`TYPE`	Displays `V` if records are of variable length; `F` displays if fixed length.
`#RECORDS`	Shows the total number of records in an ASCII file.
`EOF(^Z)`	Shows the record in a file where the ^Z end-of-file marker was found. If no ^Z is found, `NONE` displays in this column.
`BYTES`	Shows the number of bytes in the file.
`ARCV'D`	Indicates whether the file has been backed up by a backup utility (the file's archive bit is not set).
`TABS`	Indicates whether the file contains tab (decimal 9) characters.

File Transfer Log Files

If you're experiencing file transfer problems while using the **WRQ/Reflection** protocol, WRQ's technical support staff may request that you "capture" a trace file that logs file transfer activity. How to create a log file when you use the **WRQ/Reflection** protocol, either on your PC or on the host, is explained below (for public domain protocols, you must use event tracing described on page 199).

While the contents of these trace files—a cryptic record of data communications activity that occurs during the transfer—will not make much sense to you, the files are of great assistance to a WRQ technical support person experienced in reading file transfer trace files.

HP File Transfer Log

To capture file transfer activity to an HP host log file when using the **WRQ/Reflection** protocol, go through the following steps:

1. On the Setup menu, click File Transfer, then click the WRQ tab.
2. Append `;PARM=2` to the **Startup command**.
3. Click OK.
4. Perform the transfer you are having trouble with.

A log file (Wrqlog) containing terminal-based data communications is created in the current host directory. This is a variable-length binary file. Because logging requires additional host resources, use this facility only for debugging purposes. A brief explanatory record is written to the log file after each frame record. The record includes the following information:

First byte: <	Frame sent by the host
First byte: >	Frame sent by the PC
CTRL (control) frame	Protocol overhead
CTRL DATA frame	Configuration and other control information
USER DATA frame	Application data

The frames are not converted back from their printable ASCII form. If the application is sending binary data, some of it may be transformed to printable ASCII.

Upon request, you can transfer this file to your PC and send it to the WRQ technical support staff. Before receiving the file, press Alt+L to open the command line and enter the following command:

```
TranslateCharacters = False
```

OpenVMS File Transfer Log

To capture file transfer activity to an OpenVMS host log file when using the **WRQ/Reflection** protocol, go through the following steps:

1. Define VAXLINK2 as a foreign command (page 137).
2. On the Setup menu, click File Transfer, then click the WRQ tab.
3. Append `L` to the **Startup command**:

   ```
   VAXLINK2 L
   ```

4. Click OK.
5. Perform the transfer you are having trouble with.

A log file containing terminal-based data communications is created in the current host directory. The log file name is Wrqlog. Upon request, you can transfer this file to your PC and send it to the WRQ technical support staff (a period is required after the file name, as in `Wrqlog.`).

Before receiving the file, press Alt+L to open the command line and enter the following command:

```
TranslateCharacters = False
```

UNIX File Transfer Log

To capture file transfer activity to a UNIX host log file when using the **WRQ/Reflection** protocol, go through the following steps:

1. On the Setup menu, click File Transfer, then click the WRQ tab.
2. Add the `-L` parameter to the **Startup command**:

   ```
   unxlink2 -L
   ```

   (The case of the letter L does not matter, unlike the lowercase requirement of the **Startup command**.)
3. Click OK.
4. Perform the transfer you are having trouble with.

File transfer activity is logged to a host file called Wrqlog.

PC File Transfer Trace File

To capture file transfer activity to a local file when using the **WRQ/Reflection** protocol, press Alt+L to open the command line and enter the following command before initiating the transfer:

```
StartTrace "Wrqlog."
```

The `StartTrace` method lets you capture all data communication between the host and PC to a local file named Wrqlog.pc, which is created in the Reflection\User folder.

You can include the option `rcTraceTimed` parameter to create a file that also includes the time at which data was sent or received from the host:

```
StartTrace "Wrqlog." ,rcTraceTimed
```

When you're through with tracing, press Alt+L to open the command line and enter this command:

```
StopTrace
```

Fast File Transfer Traces

If you use PCLINK2 over a VT-MGR or Telnet connection, or VAXLINK2 over a Telnet or LAT connection, Reflection's "fast file transfer" may be in effect; if it is, the PC log file Wrqlog.pc will contain only the initial data communication used to determine that a "fast" transfer can occur. At that point in the transfer, data communication switches from terminal communication to network communication. Any data sent or received via network communication is not included in the log file.

When using PCLINK2, the HP host log file will record all terminal-based communication. In contrast, when using VAXLINK2, the OpenVMS host log file records only the initial data communication, as described above.

If the resulting log file does not help in solving your file transfer problem, and you suspect that fast file transfer is not the cause of the problem, you can disable this feature:

1. On the Setup menu, click File Transfer, then click the WRQ tab.
2. Select **Never** from the **Fast file transfer** list.
3. Click OK.
4. Click Save on the File menu to save your settings file.

Now, when you perform a transfer and create a log file, this will record *all* terminal-based communication, as explained earlier.

Transferring Files Running PCLINK2 in Compatibility Mode

If you start a file transfer from Reflection and notice slow performance on your MPE/iX system, you can do one of two things:

- Your host may be running the compatibility mode of the PCLINK2 software; to take advantage of optimum system performance, you need to upload the Reflection file transfer host software that runs in native mode. This is explained below and is the recommended solution.
- If you must run PCLINK2 in compatibility mode, you can change the queue priority for PCLINK2; this is explained below.

Uploading Native Mode PCLINK2

The compatibility mode version of PCLINK2 is intended for use on the older HP 3000 Classic machines. If you want to transfer files using the faster native mode on your MPE/iX system, use the supplied script file Uploadhp.rbs to upload the Reflection file transfer host program (see page 102 for information about restoring the Script menu). The upload procedure automatically detects which MPE operating system you have, and uploads the appropriate software for your environment.

Uploading the native mode version of PCLINK2 results in the best system performance. Therefore, if you do *not* need to run your MPE/iX system in compatibility mode, this is the recommended solution. See the instructions starting on page 101.

Changing the System Priority for PCLINK2

If you're running PCLINK2 and notice a decrease in performance when transferring files from Reflection, you can change the system priority by reassigning PCLINK2's "queue" priority level to either D or E. To do this, modify the **Startup command** on the WRQ tab in the File Transfer Setup dialog box.

For example, to reassign PCLINK2 to the HP 3000's D queue, enter the following startup sequence:

```
RUN PCLINK2.PUB.SYS;PRI=DS
```

File Transfers over High-Speed Modems

If you're experiencing trouble transferring files over a high-speed modem, first try disabling Reflection's data compression. To do this, press Alt+L to open the command line and type the following command:

```
WRQCompression = rcNone
```

If this setting does not resolve your problem, then try turning off the modem's data compression. This can be done using a modem initialization string that you enter in the More Settings dialog box (see the online help for details).

Zmodem Transfer Problems

If you are unable to transfer files using the Zmodem protocol, typically this can be corrected by changing the **Transfer type** to **Binary**.

If you're transferring files using the Zmodem protocol and receive the message "Unable to communicate with remote system," first check to see if the Zmodem program on the host is a public domain version. To do this, type the command that starts a Zmodem download at the host prompt; this is typically `sz`. The resulting output produces a syntax listing: if you see "For Use with Omen Technology Products," then the version of Zmodem you're attempting to use will not work with Reflection's public domain implementation of Zmodem.

Kermit Transfer Problems

If you are unable to transfer files using the Kermit protocol, typically this can be corrected by changing the **Transfer type** to **Binary**.

Both the host and the PC determine which parity Kermit uses during file transfers. If both are able to operate in 8-bit mode, Reflection transfers in 8-bit mode. If Reflection's **Parity** setting is other than 8-bit, 7-bit mode is used. Problems occur if both systems can operate in 8-bit mode, but an intermediary, connecting system can only operate in 7-bit mode. You must set the parity to 7/0's in this case to force Kermit to operate in 7-bit mode.

SECTION 5

Using LAT Networking Software

Chapter 20

The LAT Protocol

This chapter only applies if you are using a Reflection suite.

Your Reflection suite provides NDIS3 support for the LAT protocol on PCs running Windows 95, Windows 98, or Windows NT 4.0. You can use the LAT protocol over multiple network card interfaces.

The LAT protocol is installed during Setup; see your Reflection suite *User Guide* for a detailed installation procedure. The Setup program automatically binds the LAT protocol to your computer's Ethernet hardware address via an NDIS2- and NDIS3-compliant driver, or via an ODI driver. NDIS3 is the recommended driver.

You can only use the LAT protocol over an Ethernet interface. You cannot use LAT over a Token-Ring or serial interface.

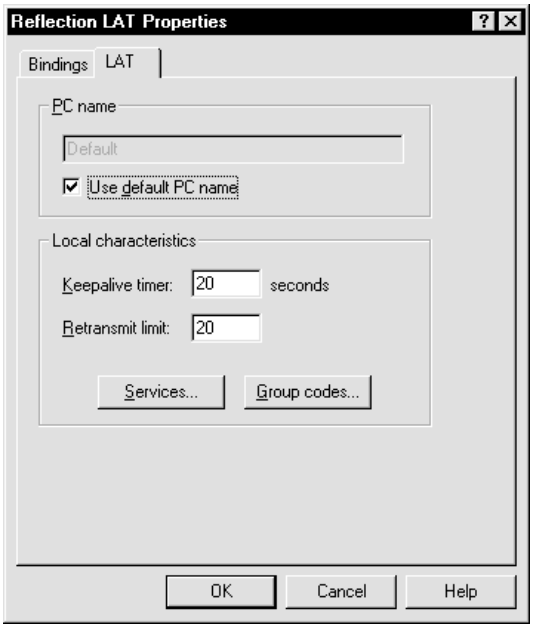
LAT Configuration

The Setup program does not configure any parameters specific to LAT. The initial value for **PC name** is based on your Ethernet hardware address. The other initial values for LAT parameters are based on LAT protocol defaults.

When you make changes to your network configuration, the changes do not become effective until you click OK to close the Network Control Panel and restart the Reflection network software. In some cases you must exit and then restart Windows to have network configuration changes take effect. You will be prompted to do this if it is necessary.

To configure LAT:

1. Open the Windows Control Panel and double-click the Network icon. If you're using Windows NT, click the Protocols tab.
2. In the list of installed components, click Reflection LAT.
3. Click Properties.



There are two LAT configuration options that are only available on PCs running Windows NT. In Windows 95 or Windows 98, the **Circuit timer** and **Fast transfer mode** options are not available and do not appear in the Reflection LAT Properties dialog box.

PC Name

Your Ethernet address (in the format *WRQ_<Ethernet address>*) can identify your PC as a node on the network. To generate the **PC name** this way, select the **Use default PC name** check box.

To identify your PC with a name other users on the network can readily recognize, type in a string of up to 16 characters.

Local Characteristics

You can configure local settings that apply to LAT.

Keepalive Timer

The LAT protocol sends keepalive packets to notify the network that your system is still available; this setting lets you set the number of seconds between packets. You can enter a value from 10 to 600 seconds. The default is 20 seconds. For a busy network, choose a value between 60 and 180 seconds.

Retransmit Limit

The PC may have a problem sending messages to, or receiving messages from, the host server on a busy network. This parameter sets the number of times the PC will retransmit a message before it drops the connection. You can enter values from 4 to 255. The default is 20. If you lose established LAT connections, try increasing the **Retransmit limit**.

Circuit Timer

The **Circuit timer** determines the time interval between transmits when **Fast transfer mode** is disabled. A higher **Circuit timer** setting slows down the connection by increasing the time between packet transmissions. A lower setting speeds up the connection by reducing the time between packets. You can enter a value from 10 to 1000 milliseconds. The default is 10 milliseconds.

The **Circuit timer** setting is only available for PCs running Windows NT.

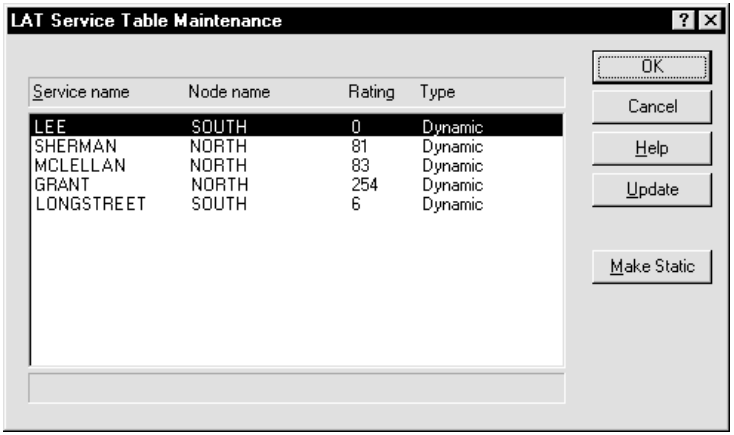
Fast Transfer Mode

Fast transfer mode allows your PC to transmit data over your LAT connection as fast as possible. (When **Fast transfer mode** is enabled, the Reflection software ignores the **Circuit timer** setting.) **Fast transfer mode** is enabled by default. You should disable this setting only when you want to reduce traffic on the network or reduce the network load on your PC.

The **Fast transfer mod**e setting is only available for PCs running Windows NT.

Services

Click Services on the LAT tab to see the service table.



The LAT protocol uses a directory of services available on the network, which includes the names and addresses of service providers. Service providers periodically send multicast messages advertising their services on the network. The information in the service directory (such as rating) is updated on the basis of these messages. Existing dynamic entries are removed from the directory if advertisements of that service are not received for a period of time. You can define static entries that remain in the service table even when they are not updated by new service advertisements.

See the description of service **Type** on page 165 for information about making a service static or dynamic.

The LAT Service Table Maintenance dialog box displays the LAT services that are currently available on your network. The Reflection networking software continually updates these LAT services. When you shut down your network software or exit Windows, the service table entries are saved in a file called Rservice.ini in your Windows directory. When you restart the Reflection LAT protocol, these entries are available in the service table.

Service Name

The **Service name** is the resource that a host server provides on a LAT network.

Node Name

The **Node name** is the location from which the service is advertised.

Rating

A service **Rating** indicates how much traffic a service on a particular node is getting. A low rating indicates that the service is busy. If a service is available from multiple nodes, the node with the highest rating (least amount of traffic) is used.

Type

A service is either dynamic or static. By default, all services are dynamic.

To ensure that a service on a particular node is available when you try to make a connection, change its entry from dynamic to static. To do this, select the entry, then click Make Static. A static entry stays in the service table regardless of any multicasts.

You may also need to build a static table in cases where the system administrator has disabled multicasting and you must preload service entries.

To change an entry from static to dynamic, select the static entry and click Make Dynamic.

Note: If you do not want to display any dynamic entries in the service table, click Group Codes on the LAT tab and disable all groups. No multicasts will update the service table. ◄

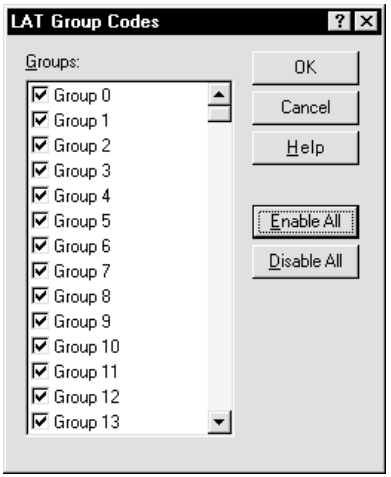
A service table can be as large as 64K, or approximately 300–500 entries, depending on the amount of information associated with each entry. You may see a description of the service (sent as part of the multicast) at the bottom of the dialog box when you select a particular service. The amount of information in these entries affects how many total entries your service table can accommodate.

Update

The service table displays the services available when you opened or last updated the table. Click Update to have the display reflect multicast information received since you opened or updated the table.

Group Codes

The LAT protocol can divide a local area network into subnetworks called groups. A system administrator can use groups to reduce the number of services that the users see. Click Group Codes on the LAT tab to open the LAT Group Codes dialog box.



By default, all group codes are enabled. If you only use services in specific groups, clear the check box for any group announcements you do not want to see. You can enable or disable groups numbered from 0 to 255. Click Enable All to reset all groups to the default. To enable only a few groups, first click Disable All, then select the groups. The group codes settings are stored in Rservice.ini in the Windows directory.

When you change your group codes, the dynamic entries in your service table are cleared; new entries will be added to reflect subsequent multicast messages.

Chapter 21

LAT Statistics

This chapter only applies if you are using a Reflection suite.

The LAT Statistics utility displays statistics for the LAT protocol. Most users don't need to view a statistics display, but system administrators can use this information when tuning, troubleshooting, or monitoring network transactions. This utility applies only to PCs running Windows 95 or Windows 98; it is not available for PCs running Windows NT.

Network counters are updated continuously while the counter window is open.

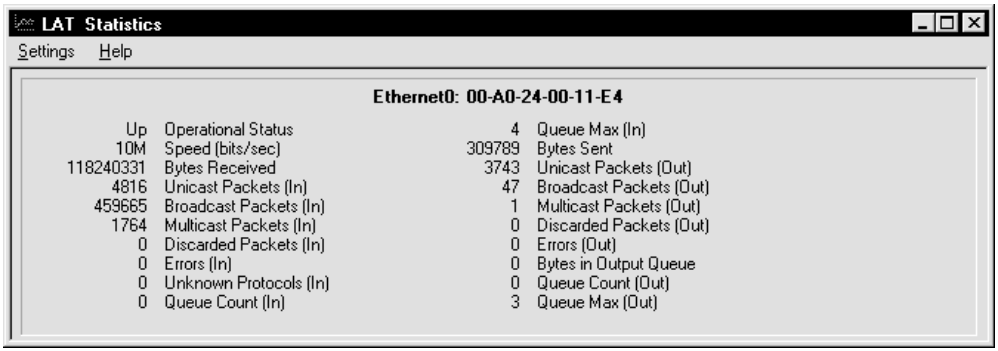
Viewing LAT Statistics

By default, the LAT Statistics utility is located in the Reflection\Utilities folder available from the Start menu. (On the Start menu, point to Programs, Reflection and then Utilities. Click LAT Statistics.)

On the LAT Statistics Settings menu, click Interface Counters or LAT Counters to specify the statistics you want to see. This will display the counts for a prescribed set of statistics for the interface or the LAT protocol—almost all counter values are numeric. You can display both interface and LAT protocol counter types at the same time.

Interface Statistics

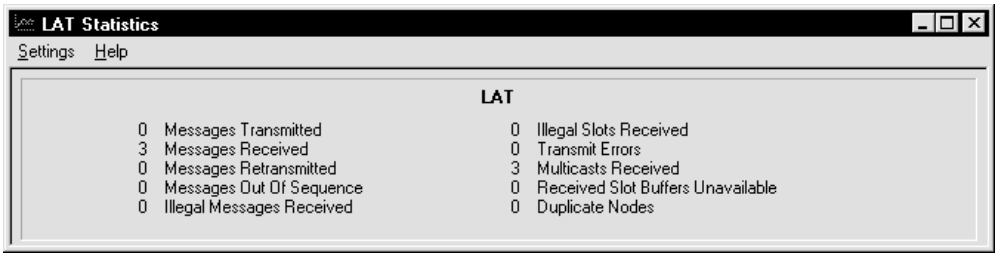
The title of the interface statistics group indicates that it is an Ethernet interface and includes your hardware address.



For a detailed description of the interface counters, see the online help.

LAT Protocol Statistics

LAT statistics shows counters associated with LAT sessions. Multicast counters are displayed even if you don't have a LAT session open.



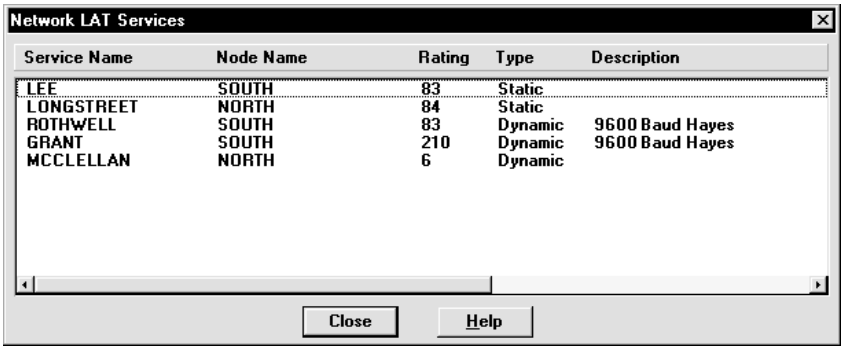
For a detailed description of the LAT protocol counters, see the online help.

LAT Services

The LAT Services table shows information about each service currently known to LAT. The services table consists of information read from the static service table and information received from service announcements on the network. The information for each LAT service is shown as a row in the table.

To see the Ntework LAT Services table, open the LAT Statistics utility. On the Settings menu, click LAT Services.

The table provides the following information about each LAT service:



Service Name

The name of the resource on a LAT network that is provided by a host server.

Node Name

The node from which the service is advertised. A service can be advertised on multiple nodes, but the node with the highest rating is used.

Rating

A service rating is determined by how busy a service is. As traffic increases, the service rating decreases. LAT attempts to connect to the node offering the highest rating.

Type

A service is either Dynamic or Static.

Description

A text string describing this LAT service. This is defined by your LAT administrator.

A service table can be as large as 64K, or approximately 300–500 entries, depending on the amount of information associated with each entry.

Chapter 22

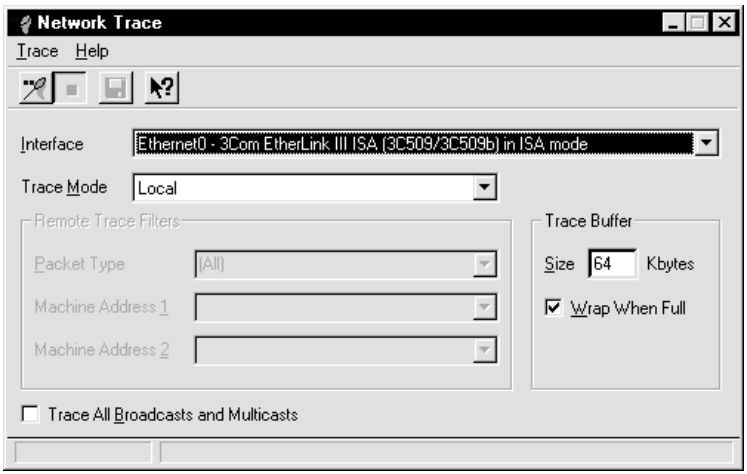
Network Trace

This chapter only applies if you are using the LAT networking protocol that you received as part of a Reflection suite. If you need to perform an event trace with Reflection for Windows, see page 199.

The Network Trace utility allows you to capture packets on your own machine or from a remote machine. The trace file is saved in a binary format that WRQ technical support can use for troubleshooting. This LAT Connection utility applies only to PCs with Windows 95 or Windows 98; you can not use it to capture a trace on a PC running Windows NT.

Setting Up Network Trace

To open the Network Trace window illustrated below, click the Start button, point to Programs, point to your Reflection network software folder, point to Utilities, and then click Network Trace.



Network Trace includes options for configuring a local or a remote network trace.

Interface

From the **Interface** list, select the network interface whose traffic you want to capture. The **Interface** list shows the Ethernet interfaces configured on your PC.

Trace Mode

You can choose from four different trace modes:

- **Local**
  This mode captures all packets sent or received on your PC.
- **Remote Address**
  This mode captures packets sent or received by another system or gateway on your local subnet. This mode therefore allows you to capture the specified system's or gateway's "view" of the network. You can specify the packet types you want to trace.
- **Between Remote Addresses**
  This mode captures packets sent between two remote systems. You can perform traces that involve systems and gateways on your local subnet (including your own PC). However, you cannot perform a trace between two systems that are on a remote subnet, since the traffic between two systems on a remote subnet does not cross the router to your PC. You can specify the packet types you want to trace.
- **All Addresses**
  This mode captures all packets sent and received on your local subnet. This mode therefore allows you to see all traffic on your local subnet. You can specify the packet types you want to trace.

Remote Trace Filters

Remote trace filter options are available if you choose any trace mode except local trace.

Packet Type

If you do not select (All), only the packet type that you specify is captured. You can use the Symbols command described on page 176 to assign commonly used packet types. Once a packet type is assigned to a symbol, you can you can select it from the **Packet type** list.

Machine Address 1

If you have chosen Remote Address or Between Remote Addresses as your **Trace mode**, type in the hardware address of the network card to be monitored. Alternatively, you can select a symbol from the list if you have used the Symbols command described on page 176 to assign symbols to commonly used addresses.

If the system that you want to monitor is running the LAT networking protocol, you can display that system's machine address by doing either of the following:

- Right-click the LAT icon in the notification area at the end of the taskbar, then click About. Select **Hardware addresses** from the **Information** list.
- Open the LAT Statistics utility and click Interface Counters on the Settings menu. The machine address is displayed as the header of the interface display.

Machine Address 2

This option is available if you have chosen **Between remote addresses** as your **Trace mode**. Type in a machine address to capture any packets assigned to this destination. Alternatively, you can select a symbol from the list if you have used the Symbols command described on page 176 to assign symbols to commonly used addresses.

You can confirm the destination's machine address if you have a network connection to this destination.

Trace Buffer

The packets that are captured are kept in a circular trace buffer.

Size

This is the size (in kilobytes) of the trace buffer for the capture. You can enter a size from 16K to 1024K. The default is 64K.

Wrap When Full

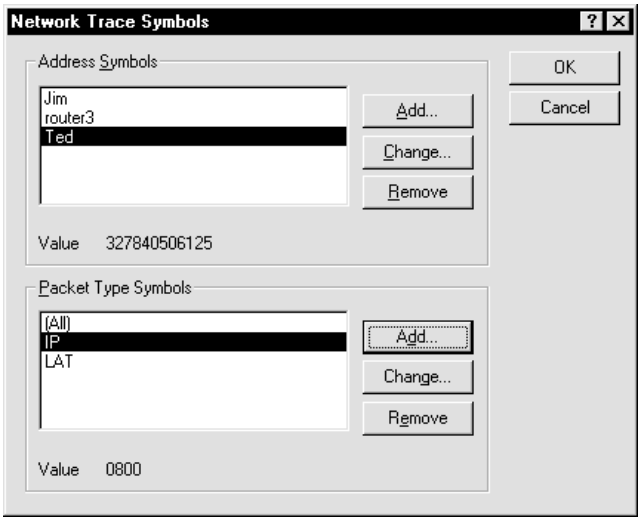
If you select the **Wrap when full** check box, the oldest entries in the trace buffer are overwritten with new entries when the buffer is full. If the **Wrap when full** check box is cleared, the capture stops when the buffer is full.

Trace All Broadcasts and Multicasts

Select this check box if you want the trace to include all applicable broadcast and multicast packets. Broadcast packets are directed to all machines on the network, and multicast packets are directed to a set of machines on the network. To exclude all broadcasts and multicasts from the trace, clear the **Trace all broadcasts and multicasts** check box. Be sure you have selected the correct option for your trace before clicking the Start button.

Setting Symbols

If you trace the same packet types or addresses often, you can assign symbols to make them available. Click Symbols on the Trace menu to see the dialog box illustrated below.



Address Symbols

Any address symbols you have already defined are displayed. These symbols will be available as options for source address or destination address when you run a remote trace. Click Add to define a new address symbol.

Symbol

You can use any string that helps you recognize the address.

Value

Type in the machine address you want to include in the selections for Destination or Source Address for a network trace. The address must follow the standard machine address format (00-00-00-00-00-00).

Packet Type Symbols

Any packet type you have already defined is displayed here. Click Add to define another packet type.

Symbol

You can use any string that helps you recognize the packet type.

Value

Some common Ethernet packet types are:

0800	DoD IP (TCP/IP standard)
0806	ARP (for IP)
6001	DEC MOP Dump/Load Assistance
6002	DEC MOP Remote Console
6004	DEC LAT
8005	HP Probe
8035	RARP (for IP)
809B	Kinetics Ethertalk (Appletalk over Ethernet)
80D5	IBM SNA Services over Ethernet
80F3	Kinetics, Appletalk ARP (AARP)
8137	Novell NetWare IPX (ECONFIG E Option)
8138	Novell

You cannot request Ethernet frames such as 802.2 HP or 802.2 SNAP by type.

Using Trace

After specifying the type of trace and any additional parameters, click Start on the Trace menu to begin the trace. The message "Tracing" appears at the bottom of the dialog box.

After you have captured the sequence you want to trace, click Stop on the Trace menu. The number of packets in the trace is reported at the bottom of the dialog box. To save this trace to a file, click Save As on the Trace menu. The default is a file with a .pkt extension in your Reflection\User\Cache folder. If you select a file name that already exists, you are given an opportunity to overwrite the file or to cancel the operation.

The packets you have captured remain in memory until you exit the Trace utility or until you start another trace. If you choose to exit the Trace utility without saving the trace to a file, you are prompted to confirm that you do not want to save the trace. The captured packets are discarded after you exit the Trace utility.

Interpreting the contents of the file requires the assistance of WRQ technical support or your authorized distributor.

SECTION 6

Troubleshooting

Chapter 23

Troubleshooting Tools

The different troubleshooting tools described in this chapter may help you identify a problem that is preventing Reflection from working. In general, these tools narrow the range of software and hardware problems.

Using the Troubleshooting Toolbar

The troubleshooting toolbar was developed by WRQ technical support to help you resolve problems with Reflection. This toolbar helps you:

- Collect information about a problem with the help of the Information Gathering Assistant and send it to technical support for analysis by technicians.
- Receive helpful troubleshooting information from WRQ using the Technical Note Assistant.
- Download files from the WRQ technical support bulletin board system (BBS).
- Get updated troubleshooting tools from the WRQ technical support BBS.
- Perform an event trace to determine the cause of a problem. An event trace "captures" all communications activity (except modem commands), keystrokes, commands, and menu and dialog box selections to an event file.
- Open Reflection online troubleshooting help.

The troubleshooting toolbar files are automatically installed during Setup to your Reflection User folder. However, the toolbar is not displayed by default.

To view the troubleshooting toolbar, click Troubleshooting Toolbar on the Help menu.

Reflection Tools

Unless you cleared the **Utility and Support Files** check box when performing a **Custom installation** during Setup, the utilities described next are in these folders:

- Reflection for HP with NS/VT: Reflection\HP\Support
- Reflection for UNIX and Digital and Reflection for ReGIS Graphics: Reflection\VT\Support

Using Fileinfo to Identify File Types

Use Reflection's Fileinfo utility to determine a file type when transferring files from your PC. This utility tells you:

- If the file is Binary. (If the file used characters outside the ASCII set, or characters with a decimal value higher than 127, it is Binary.)
- If an ASCII file contains a ^Z as an end-of-file indicator.

Determining File Versions Using the About Box

When calling technical support at WRQ, you may be asked to give the version of a file, or module, in Reflection. To determine a file version in Reflection:

1. Click About Reflection on the Help menu to open the About Reflection dialog box. This lets you view details on Reflection modules (and a variety of other topics you can select from the Information box).
2. Select **Modules** (or **Network Modules**) from the **Information** box.
3. Select the module and note the version number from the list that appears.
4. Click OK to close the dialog box. Or, click Copy to send the information to the Windows Clipboard, then paste the information into a document to save it to a file or print it.

Using the Paper Clip Test to Check Connections

Using a paper clip, you can determine if communications problems are occurring in your PC or elsewhere, such as in cabling or the host port configuration. Search for *Paperclip test* in the online help for information on how to do this.

Windows 95, Windows 98, and Windows NT 4.0 Tools

Windows 95, Windows 98, and Windows NT 4.0 provide several diagnostic tools you can use to locate conflicts and troubleshoot problems. These tools are located in the Control Panel folder. To open Control Panel:

- From the Start menu, point to Settings and click Control Panel. The Control Panel folder opens.

Using System to View Computer Status

The System utility, opened by double-clicking the System icon or folder, profiles your computer's hardware and performance. In most cases, Windows 95, Windows 98, and Windows NT 4.0 are configured for optimal performance, and adjustments to settings such as Virtual Memory are not recommended. However, you can use the tabbed dialog boxes to change port and network settings.

For example, open the System folder and click the Device Manager tab. Some of the devices you can configure from this panel include:

- **Network adapters**—Open this folder to configure interrupts and I/O range for your installed network card.
- **Ports (COM & LPT)**—Open this folder to determine port status, and configure drivers, settings, and resources available to your ports.
- **System devices**—Open this folder to display a list of your installed hardware. Each device folder can be opened to see properties, such as drivers and current performance configuration. Anything marked with an exclamation mark (!) indicates a problem.

Using Network to View Network Settings

You can display your current network settings by double-clicking Network in the Control Panel folder. Use the Network dialog box to identify your computer to other computers on the network, configure network protocols, and control who has access to your computer.

Chapter 24

General Troubleshooting

This chapter offers troubleshooting tips on a variety of areas. The topics are presented in alphabetical order.

Display Problems

If you're experiencing display problems in Reflection, refer to the topics below.

Cannot See Line Drawing Characters

If you are having trouble displaying line drawing characters, try changing the **Host character set** (on the Emulation tab in the Terminal Setup dialog box) to either **PC English (437)** or **PC Multilingual (850)**.

Colors Not Displaying Properly

If the correct color display is not selected, certain colors and shapes may appear to be white. For accurate ReGIS and sixel graphics emulation, a 256-color display is recommended. To set your display to 256 colors:

1. Right-click on your Windows desktop.
2. Click Properties.
3. In the Display Properties dialog box, click the Settings tab.
4. In the **Color palette** list, select **256 Colors**.
5. Click OK to exit.

Terminal Window Flashing When Inactive Window

If you are working in another application (even another instance of Reflection), and you notice that an inactive Reflection terminal window is flashing, this means your host connection was dropped or you set a printer timeout, and that time has expired and the printer has closed.

To stop the flashing, make Reflection the active window. You'll see the message "Your <connection type> connection has been terminated." The cause of this problem may be that:

- Your connection to the host has timed-out.
- Your network has gone down.
- The cable connecting your PC to the network has been physically disconnected.
- An error has occurred with your serial connection.

After determining why your host connection was dropped, press Enter ↵ to resume the connection.

To stop Reflection's terminal window from flashing at a host disconnect:

1. On the Setup menu click View Settings.
2. From the **Reflection settings** list, highlight **Flash Window on Disconnect**.

   Tip: To quickly select this setting, type `Flash` in the **Search** box. ◂
3. In the **Setting details** box, click **No**.
4. Click OK to exit the View Settings dialog box.
5. Click Save on the File menu to save this change.

Fonts

If you're having trouble with display fonts in Reflection, refer to the solutions that follow.

- You can copy any combination of text and line drawing characters from Reflection, and paste this to any application that supports RTF (Rich Text Format). If the line drawing characters are misaligned or jagged after pasting:

  1. On the Setup menu, click Display, then click the Fonts tab.
  2. Select **r_ansi** from the **Font** list.
  3. Click OK.

  Now, recopy and paste the text; the pasted line drawing characters using the default font will be properly aligned.

- If you need the international fonts used when you select a character set from the **Host character set** box (on the Emulation tab in the Terminal Setup dialog box), you must first install them. This is explained in the Reflection *User Guide.*

- You can change the Reflection display font to support international fonts you have installed. To perform a file transfer that includes these fonts, however, you must be running that language's version of Windows (for example, Chinese Windows) for the fonts to transfer correctly.

Reflection Fonts not Found Error Message

If you receive the error message "Reflection fonts not found" when starting Reflection, it is possible that you either have too many fonts installed or you need to reinstall Reflection fonts.

To solve the problem, do the following in the order described:

- **Reduce the number of installed fonts:**

  1. Open Windows Control Panel, and double-click the Fonts icon.
  2. Press Ctrl, and select each font to remove.
  3. On the File menu, click Delete.
  4. Exit Control Panel and restart Windows.

- **Reinstall the Reflection fonts:**

  1. Run Reflection Setup with all applications closed, reinstalling to the same Reflection folder.
  2. Choose the **Custom installation** option, and click **Clear All**.
  3. Select the **Application Files** check box, and proceed with Setup.
  4. When Setup is finished, click the Restart Windows button.

Problems with Soft Fonts

If you're experiencing display problems when an OpenVMS host application downloads its "soft fonts," execute the following command at the host prompt:

- `SET TERM/NOSOFTCHARACTERS`

Keyboards and Keyboard Mapping

If you're having trouble with your keyboard or with keyboard mapping, refer to the solutions that follow.

- Do you have a keyboard attached to your PC that is *not* a US Enhanced 101-key keyboard? If so, choose the proper keyboard from the **PC** list (click the Keyboards button in the Keyboard Map Setup dialog box).
- If you're using Reflection for UNIX and Digital or Reflection for ReGIS Graphics and you don't see the characters you expect when you type from the right half of the keyboard, turn off NumLock.

Multiple Connections

When the default settings file (for example, Settings.r2w) is found, it is loaded the first time you start Reflection. Each time thereafter, when you click New Session on the File menu, the Reflection product you select *does not* load the default settings file, and instead starts in a new Untitled terminal window.

To load the default settings (or, for that matter, any other settings file):

1. Click Open on the File menu.
2. In the Open Settings dialog box, highlight the name of the settings file you want to load.
3. Select the **New window** check box.
4. Click the Open button.

Printing

If you're having trouble printing (either output is not printing at all or the printout is garbled), follow these steps in the order presented to troubleshoot printing from Reflection. After completing a step, try printing and see if your printing problem is fixed.

- Prevent Windows from handling fonts, font size, font style, and characters by selecting the **Bypass Windows print driver** check box in the Print Setup dialog box; this solves many printing problems. For example, do this if you're receiving the message "Error writing to printer."
- If this doesn't solve your problem, clear the **Bypass Windows print driver** check box and continue with the next step.
- Open the File menu; is the Close Printer command available (that is, not dimmed)? If so, click it now to close the printer.
- Press Alt+Y to open the Reflection command window, type some text, and click Print on the File menu. If this works, then the problem is with a Reflection setting in either the Print Setup or Page Layout dialog box.
- Select the **Bypass Windows print driver** check box in the Print Setup dialog box. Then try printing characters in the character set exactly as they come from the host by selecting the **Disable printer translation** check box.
- If this doesn't solve your problem, clear the **Disable printer translation** check box and continue with the next step.
- Try directing printed output to a disk file (explained in the Reflection *User Guide*). If this works, then the problem is either with a Windows print parameter or your physical printer; continue with the steps below.

If your printing problem is still not solved, check how Windows is configured to print:

- Open a file in Windows WordPad and click Print on the File menu; does the output print? If so, click the Print Setup button and see what printer you have assigned, then verify this is the same printer selected in Reflection's Print Setup dialog box.
- Do you have the correct default printer specified under Windows? Open the Print Setup dialog box and see what printer is selected.
- Try printing to a generic or text-only printer, by assigning a Generic/Text Only printer under Windows (this option will not work with serially connected printers, such as COM1 and COM2). In Reflection's Print Setup dialog box, select this printer type and see if you can print.

If you're still having trouble, check the physical aspects of your printer:

- Is the printer online? (The word "online," or a light, should appear on your printer.)
- Try pressing the Self Test button (or an equivalent button combination) found on the front panel of most printers. If this does not produce a test page, there is something wrong with your printer hardware.
- Can other users print to the same printer? If so, check how they are configured for this printer under Windows.
- If you're printing over a network, check the network print queue. Is your job "stuck" behind someone else's that is holding up the print queue?
- If you're connected serially (click Connection Setup on the Connection menu, and see if you're connected over COM1—COM4), make sure the baud rate specified under Windows matches that of your printer.

If you still cannot print, perform an event trace as explained on page 199.

Registry

When Setup installs Reflection, it writes information to the Windows registry, a central database of PC resources. Because the registry consolidates Reflection information into a single database, it is easy to access and reconfigure, even across a network.

Before the registry on each networked PC can be remotely administered, the proper security and remote access requirements must be configured. Once this is done, a system administrator can use the Win32-based registry APIs through Remote Procedure Call (RPC) to access and reconfigure a PC's registry. This is useful whenever network management mechanisms, such as Simple Network Management Protocol (SNMP), are used by a company to provide uniform changes across a wide base of users.

For a detailed explanation, see your Windows documentation.

Chapter 25

Resetting Reflection

This chapter describes the different methods you can use to reset Reflection's default values, and different commands you can choose when Reflection appears to be "stuck."

Restoring Reflection's Default Settings

Reflection offers many methods for restoring default settings:

- If you need to restore Reflection's factory default settings, click Defaults on the Setup menu. If you have an active connection, the Defaults command is dimmed—instead click New Session on the File menu. This starts another copy of Reflection with a new, untitled terminal window and the default factory settings.

  Note: If you have your users running a site defaults settings file, then the default settings in Reflection may not match those listed in the online help. The only way to get back to factory defaults is to remove the site default file using the Profiler. ◂

- Most Reflection dialog boxes have a Defaults button; click it to restore the default dialog box values.

  When you click the Defaults button in a tab dialog box, Reflection asks if you want to reset the default values on the active panel, or to reset the defaults. Clicking the Defaults button in the Toolbar Setup dialog box restores the default toolbar at the top of the terminal window, in addition to resetting the values in the dialog box.

Reset Commands in Reflection for HP with NS/VT

This information applies only to Reflection for HP with NS/VT.

If users call you, as a system administrator, because Reflection for HP with NS/VT appears to be "stuck," see if instructing them to select one of the Reset commands on the Connection menu won't solve the problem.

Recall User Keys

Recalls the set of user keys from the current settings file. User keys are configured on the Function Keys tab in the Terminal Setup dialog box.

A user might accidentally overwrite preconfigured user keys when, as an example, a host application is active with application-specific user key labels showing and the user clicks Save on the File menu.

Clear Typeahead

The Clear Typeahead command clears buffered keystrokes. Typeahead allows you to type ahead of the HP 3000. To enable typeahead:

1. On the Setup menu, click Terminal, then click the Keyboard tab.
2. Select the **Typeahead** check box.
3. Click OK.

When typeahead is enabled, Reflection buffers each line of keystrokes until it sees a $^{D}C_{1}$, indicating the HP 3000 is ready to receive. If you type ahead of the HP 3000 and then decide not to transmit the buffered keystrokes, clear the typeahead buffer by selecting this command. After clearing the buffer, you can continue to type ahead of the host.

There are other situations where it is necessary to clear Reflection's typeahead buffer. You may need to do this because:

- You have logged off the host system but continue to type.
- The HP 3000 does not respond with a host prompt after you log on and press Enter ↵.
- The MPE SPEED command is used to changed the baud rate.
- Reflection never received a $^{D}C_{1}$ character from the host because it either got lost or garbled in transmission.

Soft Reset

A soft reset does the following:

- Beeps.
- Unlocks the keyboard (if it was locked).
- Turns off display functions (if they were on).
- Initializes the serial communications ports to the last activated values, and clears the receive buffer.
- Resets typeahead and clears the keyboard buffer.
- Transmits an XON if the **Receive** option is set to **Xon/Xoff** in the **Pacing** group box.
- Terminates an executing Reflection macro, or a Reflection Basic or Reflection command language script.

Hard Reset

A hard reset does everything that a soft reset does, plus the following:

- Terminates an executing Reflection macro, or a Reflection Basic or Reflection command language script.
- Homes the cursor and clears display memory.
- Resets the margins to their default values, and clears all tab stops.
- Sets all configuration parameters that were set (typically by the host) with escape sequences* to their last activated values.
- Sets the function key labels to the value specified in the **Function key set** list (on the Function Keys tab in the Terminal Setup dialog box). By default, this displays the user keys.
- Sets the user keys to their last saved values.
- Turns off F5, SMOOTH SCROLL, and F6, MEMORY LOCK, from the modes keys.

* When an item is configured with an escape sequence, it is considered to be *volatile* and can be changed with a hard reset. Setting a value in a dialog box is considered to be *non-volatile*; it cannot be changed with a hard reset.

- Turns off the following modes:
  - Format mode (which is enabled with the sequence $^{E}S_{c}W$)
  - Insert character mode
  - Caps lock mode
- Turns off any active logging mode.
- Clears the printer buffer and sends a reset command to the printer.

Hard reset does *not* change the following modes keys:

F2, MODIFY ALL

F3, BLOCK MODE

F4, REMOTE MODE

F8, AUTO LF

Reset Commands in Reflection for UNIX and Digital and Reflection for ReGIS Graphics

This section applies only to Reflection for UNIX and Digital and Reflection for ReGIS Graphics.

If users call you, as a system administrator, because Reflection appears to be "stuck," see if instructing them to select one of the Reset commands on the Connection menu won't solve the problem.

Clear Communications

When you click Clear Communications on the Connection-Reset cascading menu, the following happens:

- Printing operations, escape sequences, control functions, and device control strings are canceled. See the *Terminal Reference* manual for more information on these topics.
- If enabled, logging is turned off.

- Receive, transmit, and keyboard buffers are cleared, and the keyboard is unlocked.
- XOFF (^C3) signals from the host are reset.
- For all connections except VT-MGR, an XON (^C1) signal is sent to the host.

This command can often remedy communications problems when the host connection appears to be "stuck." Clear Communications does not disconnect you from the host computer.

Terminal

When you click Terminal on the Connection-Reset cascading menu, the following items are reset to their factory default values—this is also known as a *soft reset:*

Terminal Feature	Value after Reset
Active display	Main display
Autowrap pending	Cancel pending autowrap
Character sets	Default sets
Cursor keys	Normal
Insert/replace	Replace
Keyboard action	Unlocked
Numeric keypad	Numeric characters
Origin	Absolute
Saved cursor state	Home position
Select graphic rendition	Normal rendition
Selective erase	Normal attribute
Text cursor enable	Cursor enabled
Top/bottom margins	Top/bottom of display
UPSS	Last saved value
Use NRC characters	No

In addition, the Terminal command:

- Initializes the communications port for serial connections to the last activated values, and clears the receive buffer.
- Terminates an executing Reflection macro, or a Reflection Basic or Reflection command language script.

Note: This command does *not* cancel a `Wait` method; you must use the Recall Last Setup command (explained next). ◄

Recall Last Setup

Click Recall Last Setup on the Connection-Reset cascading menu to restore Reflection's terminal settings, for the active connection only, to their last saved values—this is also known as a *hard reset*. Settings specific to Reflection, such as file transfer parameters, preferences, and printer options, are not reset. A hard reset is like reloading the terminal settings from your most recent settings file before any changes were saved. This is how to "undo" any actions a user has done.

In addition to recalling the last saved settings, this command also does the following:

- Clears the display and places the cursor in the upper-left corner.
- Sets the select graphic rendition (SGR) function to normal.
- Sets the selective erase attribute (DECSCA) to erasable.
- Clears the user-defined keys.
- Selects the default character sets: ASCII in the graphic left (GL) table and user-preferred supplemental set in the graphic right (GR) table.
- Terminates an executing Reflection macro, or a Reflection Basic or Reflection command language script.
- Cancels a pending Reflection Basic `Wait` method.
- Disconnects from the active connection.

See the Reflection *Terminal Reference* manual for information on the DEC mnemonics (such as SGR) referenced here.

Chapter 26

Performing an Event Trace

One way to determine the cause of a problem is through an *event trace*. The troubleshooting toolbar has an event trace function that lets you start, stop, and process an event trace. The troubleshooting toolbar also provides connection statistics (for serial-based connections only).

An event trace "captures" all communications activity, keystrokes, commands, and menu and dialog box selections to an event file on disk. Using the troubleshooting toolbar, you can then send the event file to Reflection technical support, along with a report, for help in solving the problem.

Note: If you are using a Reflection suite and suspect that your problem is related to your LAT networking software, use the Network Trace utility described on page 173. ◂

To perform an event trace:

1. Click Troubleshooting Toolbar on the Help menu.
2. Click the Start Trace button on the troubleshooting toolbar (at the bottom of the terminal window) to open the Save Trace Events dialog box.
3. Change to the Reflection User folder and enter an event trace report file name or accept the proposed name.
4. Click Save. If a file by that name already exists, Reflection asks if you want to overwrite the file.

   When event tracing is on, a bug icon appears in the Reflection status bar.
5. Do whatever actions are required to demonstrate the problem.
6. As soon as the problem has been demonstrated, click Stop Trace on the troubleshooting toolbar.

Creating an Event Trace Report

Once you have captured the events leading up to a problem, you can print a report of the event trace to either a printer or a disk file. This is *not* the version of the trace file you need to send to a WRQ technician for analysis as explained above; the event trace report is in ASCII format (as opposed to binary) so you can study it and perhaps resolve the problem yourself.

To print an event trace report:

Caution: ● Event traces are not backward-compatible. If you have an event trace captured by an earlier version of Reflection, you must use that earlier version to process the trace. ◂

1. Click the Process Trace button on the troubleshooting toolbar.
2. Select **Printer** as the **Destination** option.
3. Click OK.
4. In the Open Events dialog box, select the event trace file and click Open to print the report.

Chapter 27

Solving Communications Problems

This chapter provides solutions to some common host communications problems. You can also create a disk file that records the events leading to the problem. This is known as an *event trace* and is explained on page 199.

No Response from Host

If nothing is echoed on the screen when you type characters while connected to the host, consult the following list:

- Is the physical connection correct? If possible, verify this by connecting a terminal to the host with the same cable you use to connect the PC (using a gender changer is usually necessary due to the male serial port on the PC). If the terminal works, you can assume that the physical connection is correct. If not, see the cable diagrams located in the Reflection *User Guide.* Ensure that the cable and gender changer (if used) both have straight-through pin connections (for example, 2–2 and 3–3).

- Try connecting to the host using HyperTerminal, the emulator included with Microsoft Windows. If you cannot get a host response using HyperTerminal, then the problem is related to the PC or host configuration, or your physical cabling.

  If you can get a host response using HyperTerminal, the problem is probably that an invalid configuration setting is preventing Reflection from communicating with the host. Start by configuring Reflection with the factory defaults (click New Session on the File menu), and then make sure you select the correct connection type.

- Is Reflection in remote mode, and able to communicate with the host? Make sure the **Online** check box (on the Emulation tab in the Terminal Setup dialog box) is selected; otherwise, Reflection does not transmit anything to the host.

- Check your host connection in the Connection Setup dialog box. You may be using the wrong COM port as a connection type. If this is the case, click Disconnect on the Connection menu, then click Connection Setup and try again.
- Check the communication parameters in the Connection Setup dialog box. For example, make sure you've selected the correct **Baud rate**.

If none of the above solutions solved your problem and you still do not see any characters on your screen, try the *paperclip test,* described in the online help. (Search for *Paperclip test* in the online help index.) If the characters appear on the screen during the paper clip test and do not appear without it, then the PC can successfully send and receive characters. The problem lies outside of the PC—the cable may be the wrong kind or the host port may be bad.

Checking Serial Ports

If you have more than one serial port in your PC, find out if the boards are set up according to the documentation supplied with them. You may have to open your PC and look at how they are set up. There are usually two jumper wires on these boards that can be adjusted to make a serial port function as COM1–COM4. (PS/2 serial boards are not configurable.) Problems occur if boards have conflicting configurations. Check the following:

- The IRQ line. Check the setting on the boards for the jumper that sets the interrupt request line. See the information below for the default IRQ line each COM port uses and how to configure the IRQ for a different line.
- The I/O port. Check the setting on the boards for the jumper that sets the I/O port address.

Refer to the documentation supplied with the boards to determine how to configure them correctly.

Note: Simple communications programs that use *polling* may work even if the IRQ line is incorrectly configured. However, Reflection is *interrupt driven* and does not work unless the IRQ and I/O ports are correctly configured. ◄

Changing the IRQ

Changing the setting for your IRQ line only applies to AT-class machines. The IRQ and I/O base address are not configurable for PS/2 serial ports.

Reflection uses the IRQ values specified in the System.ini file. If you are using the default values, these correspond to the following IRQ settings:

Port	IRQ	I/O Base Address
COM1	04	03F8h
COM2	03	02F8h
COM3	04	03E8h
COM4	03	02E8h

If either the IRQ or the I/O base address differs from the default, you can easily change the IRQ in Windows by modifying the values under Windows (see the Windows documentation for instructions on how to do this).

Transmit Pacing Problems

If Reflection transmits data as fast as it can, the host computer may not be able to keep pace. If this happens, use one of the following methods to control the speed of transmission:

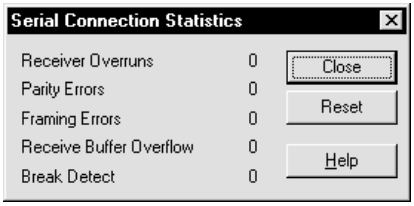
- If the host uses XON/XOFF pacing to control transmission speed, make sure **Transmit pacing** is set to Xon/Xoff in the More Settings–Serial Port dialog box.
- Enter a value in the **Char transmit delay** box in the More Settings–Serial Port dialog box. This causes Reflection to wait the specified time between the characters it transmits. A delay of 1–3 milliseconds should be sufficient for most systems.
- If the host computer does not use a prompt character, you may have to specify a time delay after each line transmission in the More Settings–Serial Port dialog box.

Serial Connection Statistics

If you're connecting serially, Reflection records any data communications statistics that may occur (if your connection is over any other type of network, connection statistics are not available).

To view these statistics:

1. Click Troubleshooting Toolbar on the Help menu to open the troubleshooting toolbar.
2. Click the Serial Connection Statistics button on the troubleshooting toolbar to open the following dialog box:



If any of the fields have non-zero values, refer to the explanations below. When you're through, click Close to continue using Reflection. To clear any errors, click Reset (when you exit Reflection, the values are automatically reset to 0).

Analyzing Datacomm Errors

Any fields in the Serial Connection Statistics dialog box that are non-zero indicate some problem in data reception. Whenever the data communications hardware detects an error, Reflection increments a counter.

Receiver Overruns

Each time the host computer transmits a character, the data communications hardware notifies the processor, saying, in effect, "I just received a character." Reflection must read that character before another character is received; if it doesn't, a receiver overrun error occurs.

Receiver overruns occur for the following reason: the serial port typically has a 16450 UART,* which only has a one-character buffer. Reflection needs to be notified by the CPU before the next character arrives. With a one-character buffer, this results in a lot of receiver overruns.

To prevent receiver overruns:

- You can purchase an updated UART chip.
- You can change the stacks statement in your Config.sys file to the following:

```
STACKS=0,0
```

- If you have a PC speaker driver installed under Windows and experience receiver overruns, set the **Terminal Sound** setting (available in the View Settings dialog box) to **Simple**.

  If this solves your problem, save your settings file.

Parity Errors

Parity errors are much more likely to occur with a modem connection than with a direct connection. To correct parity errors, make sure your PC matches the parity of the host or intermediary system.

Framing Errors

Framing errors often indicate that the baud rate is incorrect; change the rate in the Connection Setup dialog box. A bad cable or one that is too long can also cause framing errors; try replacing the cable to fix this problem. A framing error (a square symbol on the screen) may also indicate that the UART received a character with the wrong number of stop bits. If you're consistently getting these errors, you may have specified the wrong number of stop bits when you configured the remote port. Most systems use one start bit and one stop bit, but two stop bits are often used when transmitting at 110 baud.

Receive Buffer Overflow

Reflection has a buffer; characters received from the host computer are held there until they can be processed. If Reflection cannot keep up with the incoming data, the buffer fills up and this field is incremented by one. If this happens, set **Receive pacing** (click the More Settings button on the Connection Setup dialog box) to **Xon/Xoff**.

* UART stands for *Universal Asynchronous Receiver/Transmitter*. This device receives and transmits data asynchronously and checks incoming data for errors. It is capable of halting transmission when certain events occur, such as the receipt of a character or line error. A common UART is the INS 8250.

Break Detect

Whenever the UART detects a break (a 200 millisecond signal), this field is incremented by one. Your communications line is probably noisy and the signal is being interrupted; try connecting to the host (or re-dialing the modem).

Modem Communications Problems

One of the more common problems when using a modem is that you're able to dial out successfully (for example, to a host or bulletin board), but pressing Enter ↵ does not result in a host or login prompt. Reflection receives its default baud rate from Windows. To confirm this:

1. Click the Start menu, point to Settings, then click Control Panel.
2. In the Control Panel, double-click the Modems icon.
3. On the General tab, click Properties.
4. Note the value listed in the **Maximum speed** box. Click OK to exit.
5. In Reflection, click Connection Setup on the Connection menu to open the Connection Setup dialog box.
6. Click More Settings. Confirm that the value you noted in step 4 is the value in the **Baud rate** list. If it isn't, select **Default** as the **Baud rate**.
7. Click OK to exit.

If you can now connect, click Save on the File menu to save your settings file.

Monitoring the Modem's 232 Line

If you want Reflection to indicate the state of one of the modem's RS-232 lines so that you can troubleshoot the connection:

1. On the Setup menu, click Display, then click the Options tab.

2. Select a value from the **Connection indicator** list: **CTS**, **DSR**, or **DCD**.

   This specifies which connection status line you want to have monitored. If the selected line (pin) is in a true state, an indicator is shown in Reflection's status bar.

3. Click OK.

Some modems can be configured to force these lines to a true state, in which case the indicator has little meaning. Hayes Smartmodem factory settings cause it to always set the data carrier detect (**DCD**) signal to a true state.

Using the Modem's Indicator Lights

If you are using an external modem to connect to the host, there are probably some indicator lights on the modem that can help diagnose problems you may be having:

- Is there an indicator marked `SD` (send data) or `TD` (transmit data)? This light should flash whenever you press a key.
- Is there an indicator marked `RD` (receive data)? If it flashes after you key a character, it means that an echo is coming back from the modem.

  If the `SD` light flashes but the `RD` light does not, then the problem probably lies with the modem. It could also mean that the host computer is not echoing, either because it is not accepting input, or because it is operating in half-duplex mode. Select the **Local echo** check box (on the Keyboard panel in the Terminal Setup dialog box) if your host operates in half-duplex mode.

If you need help entering modem commands, see below.

Modem Command Summary

The command summary on the following pages can be used with a standard modem. Your modem manual will have more detail about these commands: they are listed here for your convenience and should not be confused with Reflection commands. Not all modems support these commands; see your modem manual to find out which ones are valid for you.

The rules for entering modem commands are as follows:

- If a command accepts a parameter and you do not enter one, the modem assumes a zero (Ø) value.

- The length of the command cannot exceed 40 characters (spaces are not counted) for most modems: the initial "AT" and the ending ^R are not counted. You can use optional hyphens and parentheses when you enter a telephone number, however, they are counted as characters.
- The maximum number of digits you can dial in a single command is 38.
- Pressing Enter ↵ executes each of the commands in the following table, with the exception of +++.
- Each command line must start with AT. Commands may be concatenated together, for example:

  ATE1 Turns echo on

  AT&W Stores status registers

  ATE1&W Turns echo on and stores status registers

Command	Parameter	Description
+++	<none>	Escape from online to the OK prompt; pause one second before typing and do not follow with a carriage return
A/	<none>	Repeat previous command
AT	<none>	Attention
ATA	<none>	Manually answer incoming call (force answer mode)
ATB<n>	<n>=Ø <n>=1	CCITT V.22 (international) Initiate calls using Bell 103/212a at 1200 baud
AT&C<n>	<n>=Ø <n>=1	DCD always high DCD follows carrier detect
ATD<number>	<none>	Dial <number> using tone dial; <number> can include special characters (/ , ; !), explained on page 211
ATDP<number>	<none>	Dial <number> using pulse dial; <number> can include special characters, explained on page 211
ATDS	<none>	Dial previously stored number

Command	Parameter	Description
ATDT<number>	<none>	Dial <number> using tone dial; <number> can include special characters, explained on page 211
AT&D2	<none>	Enable disconnect
ATE<n>	<n>=Ø <n>=1	No echo in command mode Echo enabled
AT&F	<none>	Reset modem to factory defaults
AT&G<n>	<n>=Ø <n>=1 <n>=2	Guard tone off Guard tone, 550 hertz on Guard tone, 1800 hertz on
ATH<n>	<n>=Ø <n>=1	Hang up, immediate (go on-hook) Pick up (go off-hook)
ATI<n>	<n>=Ø <n>=1 <n>=4	Request product code Request checksum Display registers
ATL<n>	<n>=1 <n>=2 <n>=3	Speaker volume low Speaker volume medium Speaker volume high
AT&L1	<none>	Leased line operation
AT&K<n>	<n>=Ø <n>=1 or 3 <n>=2 or 4 <n>=5	Disable local flow control Enable RTS/CTS local flow control (hardware handshaking) Enable XON/XOFF local flow control Enable transparent XON/XOFF local flow control
ATM<n>	<n>=Ø <n>=1 <n>=2 <n>=3	Speaker always off Speaker on until carrier is detected Speaker always on Speaker on during carrier detect
ATO<n>	<n>=Ø <n>=1	Return online Return online and retrain (2400 baud)
AT&P<n>	<n>=Ø <n>=1	Set dialing mode to pulse (rotary), U.S. timing Set dialing mode to pulse (rotary), U.K. timing

Command	Parameter	Description
ATQ<n>	<n>=Ø <n>=1	Send result codes Do not send result codes
ATS<n>?	<none>	Status check of register <n>
ATS<r>=<n>	<n>=Ø-16	Set register <r> to <n>; see the table on page 211
AT&S<n>	<n>=Ø <n>=1 <n>=2	DSR always on DSR per V.22bis (RS-232 specification); assert DSR signal before handshake only Assert DSR after negotiation, but before CONNECT nnnn result code is sent to the Data Terminal Equipment (DTE)
AT&T<n>	<n>=Ø <n>=1-8	Exit test mode Enter test mode
ATV<n>	<n>=Ø <n>=1	Result codes as digits Result codes in words
ATW	<none>	Wait for dial tone
AT&W	<none>	Store status registers
ATX<n>	<n>=Ø <n>=1 <n>=2 <n>=3 <n>=4	Give results indicating connection, no carrier, and ring detection Give result codes indicating connection speed Give result codes indicating connection speed and dial tone detection Give result codes indicating connection speed and busy signal detection Give result codes indicating connection speed, dial tone, and busy signal detection
ATY<n>	<n>=Ø <n>=1	Ignore breaks; long space disconnect disabled Enable breaks; long space disconnect enabled
ATZ	<none>	Reset (“zap”) modem to power-on values
AT&Z<number>	<none>	Store telephone number; <number> can include special characters, explained next

The commands used as the <number> parameter with ATD and AT&Z are shown in the following table:

ATD and AT&Z Special Character Commands

Command	Description
/	125-millisecond pause in dialing
,	2-second pause in dialing
;	Return to command mode
!	Flash (on-hook, off-hook) for one-half second

The command ATS<r>=<n> sets register <r> to <n>. Use ATS<r>? to display the contents of register <r>. The table below lists the possible values of <r>:

<r>	Description
0	Auto answer, number of rings
1	Count number of rings
2	Escape code character (<n> is a decimal ASCII value)
3	Carriage return character (<n> is a decimal ASCII value)
4	Linefeed character (<n> is a decimal ASCII value)
5	Backspace character (<n> is a decimal ASCII value)
6	Wait time before dialing
7	Wait time for carrier detect
8	Duration of pause while dialing
9	Carrier response time (<n> is the amount of time)
10	Wait time before disconnect
12	Escape guard time (<n> is the amount of time)
14	Option register status

<r>	Description
16	Self-test register
18	Self-test timer value
21	Option register
22	Option register
23	Option register
25	DTR delay value
27	Option register

Examples of Modem Commands

`ATD<number1>W<number2>`
: Dial `<number1>`, wait for a secondary dial tone, and then dial `<number2>`.

`ATS0=1`
: Enable the modem to answer on the first ring.

`ATS0=0`
: Disable modem answer.

`ATDT1,P(800)555-1212`
: Tone dial 1, pause, then pulse dial the remainder of the number.

Chapter 28

WRQ Event Viewer

WRQ network protocols and many WRQ applications log events to the WRQ Event Viewer. By default, events are logged to an event log file, Rnevent.rel, in your Windows directory. The WRQ Event Viewer gives system administrators a troubleshooting tool for viewing these events and configuring event log settings.

The event log stores events from a variety of Reflection software modules. Your list of choices depends on the WRQ products you installed—each product has one or more components.

You can configure the size of the event log and the types of events you want to log. Fatal errors are always logged. The Rnevent.dll module records events and Rnlog.exe allows you to view them.

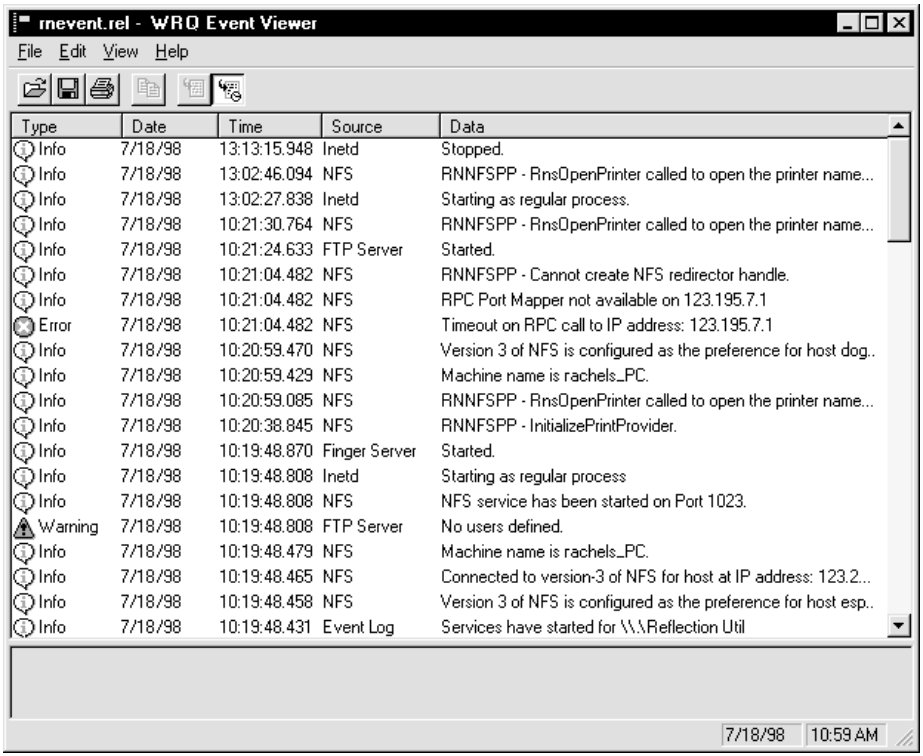
Fatal Errors and the Event Log

The event log can be configured to record events for a variety of severity levels and for a subset of Reflection software modules. Fatal errors, however, are always logged: these errors may indicate that a Reflection module has failed to load.

If one of these events occurs, you'll see a dialog box that indicates that the Reflection software module failed to load and allows you to look at the events in the event log associated with this error.

Using the WRQ Network Event Viewer

When you open the WRQ Event Viewer it displays the currently configured log file:



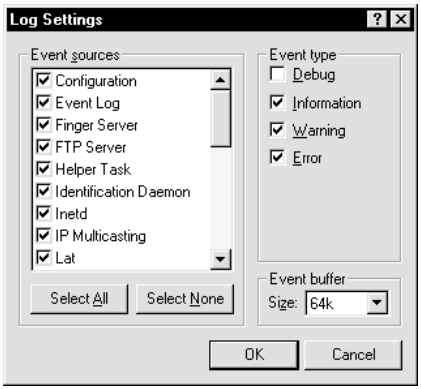
Some event log messages are longer than will fit in the message area in the upper part of the log. To see the rest of the message, select the message and the full text will appear in the lower window.

Type	The five message types are Debug, Information, Warning, Error, and Fatal. By default, the WRQ Event Viewer logs Information, Warning, Error, and Fatal messages. See page 216 for information about configuring which events are logged.
Date	This is the date of the event.

Time	This is the time of the event. By default, the most recent event is listed first, but you can configure the WRQ Event Viewer to list events with the oldest event first.
Source	This is the module that produced the event.
Data	This is the transaction message.

Configuring Log Settings

Click Log Settings on the File menu to choose the events you want to capture. The event sources you see in the list depend on the Reflection product you have installed and the options you chose during Setup.



After capturing the events, you can choose what portion of them you want to view by clicking Filter on the View menu.

Event Sources

Click Select All to have events for all installed modules logged. Otherwise, select the check box for each module that should have events recorded in the log file. The **Event sources** available will depend upon the WRQ products you have installed.

Event Type

You can select any combination of the following event types:

Debug
Information
Warning
Error

By default all event types except Debug are logged. Fatal messages are always logged. Don't enable Debug unless you are troubleshooting—logging debug messages has a significant impact on your machine's performance.

Event Buffer Size

Use this setting to specify the size limit of the event log buffer. Once the limit is reached, newly logged events overwrite the oldest events. Events are periodically saved to disk. If you have sufficient memory and want to minimize disk activity, set this size higher. If you have limited Windows memory, lower this size.

WRQ Event Viewer Options

When you start the WRQ Event Viewer, it automatically opens the event log file for your PC, Rnevent.rel, which is located in your Windows root directory. The WRQ Event Viewer updates this binary file when Reflection software events occur.

In addition to selecting the event sources and types you want to log, you can configure the following WRQ Event Viewer options:

- You can use the WRQ Event Viewer to view event log files other than the default Rnevent.rel. On the File menu, click Open to locate and open the event log file you want to see. You can use this option to examine event logs from other PCs. In order for the WRQ Event Viewer to open a log file, it must be in the original binary format.
- You can create an ASCII version of the current event log information. The default extension is .txt. You will not be able to view the ASCII file in the WRQ Event Viewer, but can read it in any text editor (such as Notepad).

- By default, the event log displays the most recent events first. To display the oldest events first, click Sort by Oldest on the View menu.
- The upper portion of the WRQ Event Viewer provides a one-line view of each event; the lower portion provides a larger display area for the selected event. To change the size of these panes, click Split on the View menu, then click the location for the new window division. You can also position the cursor on the divider and drag it to a new position.
- By default, the WRQ Event Viewer updates the log file display as it records new events. You can disable this option by clicking Auto Refresh on the View menu. If you disable Auto Refresh, you will only see new events when you click Refresh to refresh the display manually.

Filtering Event Log Messages

You can independently configure which events to log, and which events in an existing log you want the WRQ Event Viewer to display.

The filter options, accessible on the View menu, let you select which events in the log file you want to display in the WRQ Event Viewer. This is *not* the location where you determine which events are actually logged—use Log Settings on the File menu to determine which events are written to the log. You can configure WRQ Event Viewer filters to show all types of events from all of the event sources that you chose to log, or you can display a subset of these. The selection procedure is similar to that in the Log Settings dialog box.

Except for fatal events, all the event levels you can select for logging are available for filtering. By default, the WRQ Event Viewer displays information, warning, error, and fatal events. For example, if you only want to see error and warning messages, clear all the other options. The other events are still written to the log; to see a different set of events, change your filter options.

SECTION 7

Getting Help

Chapter 29

Contacting Reflection Technical Support

WRQ strives to provide the best possible technical support for all of its products. To receive technical support, you must be a registered user of WRQ products. Complete the registration card and send it to our USA or European address.

Technical Support Options

When you have a problem that you cannot resolve with our online help and manuals, WRQ offers several options for technical support:

- Request Technical Notes through a 24-hour automated fax request line: call 206.216.2680. Select from a wide range of available topics.
- In the USA, use your modem to dial into WRQ's bulletin board system (BBS) by calling 206.217.0145.
- You can also connect to the WRQ BBS over the Internet: Telnet to `bbs.wrq.com`. The anonymous FTP server address is `ftp.wrq.com`.
- Leave a message for WRQ technical support via the Internet at `support@wrq.com`.
- You can view WRQ's World Wide Web Technical Support site at http://support.wrq.com. The site contains technical notes, tutorials, access to other WRQ online services, and links to other technical resources available on the Internet.
- One way for WRQ technical support to determine the cause of a problem is through an *event trace*. The troubleshooting toolbar lets you start, stop, and process an event trace. This records all communications activity, keystrokes, commands, and menu and dialog box selections to an event file on disk. For an explanation of how to perform an event trace, see Chapter 26 starting on page 199.
- If you have questions or comments on the documentation (either the printed manuals or the online help), send them via the Internet to `docs@wrq.com`.

Technical Support by Telephone

If you prefer to speak with a WRQ support technician, call the technical support team. When you call:

- Be seated at your computer. If you cannot be at your computer, have the appropriate system files available to you, such as your Autoexec.bat file or any initialization (.ini) files.
- Have your product version number ready. Click About Reflection on the Help menu to display the version number.
- If appropriate, know your Internet address.
- Be able to answer questions about your hardware and software. What kind of processor does your PC have? What version of Windows are you using?
- Be familiar with how you are connected to the host. Are you using a direct serial connection or a modem? What baud rate and parity are you using? Are you connecting over a network? What kind of network are you on?
- Know what kind of host computer you are using, which operating system your host is running, and the name of the host application in which the problem occurs.

For Telephone Support in the USA

In the USA, telephone support hours are from 5AM to 5PM Pacific time, Monday through Friday. Call WRQ technical support at 206.217.7000.

If you prefer to send a fax describing the problem, the technical support fax number is 206.217.9492. In your fax, provide the information requested above.

For Telephone Support Outside the USA

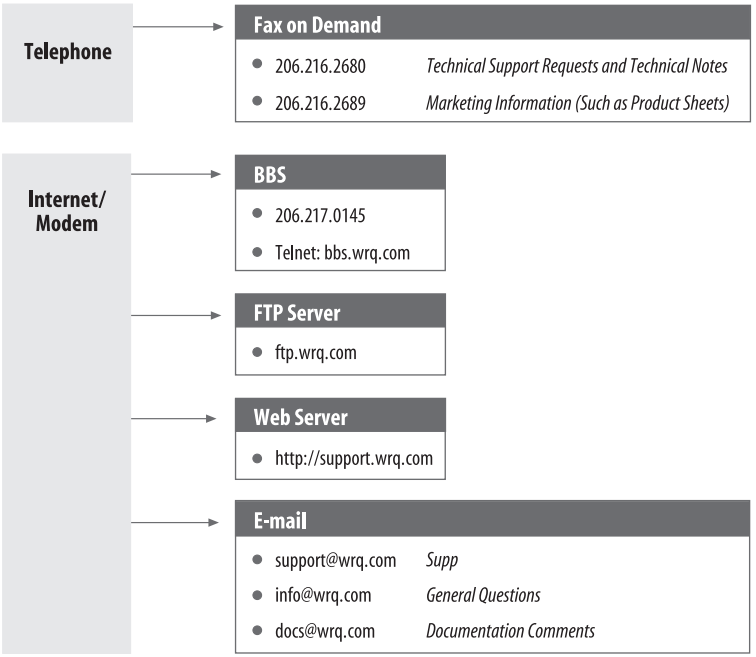
For support outside the USA, contact an authorized Reflection distributor. If you need the name of a distributor, call WRQ for information:

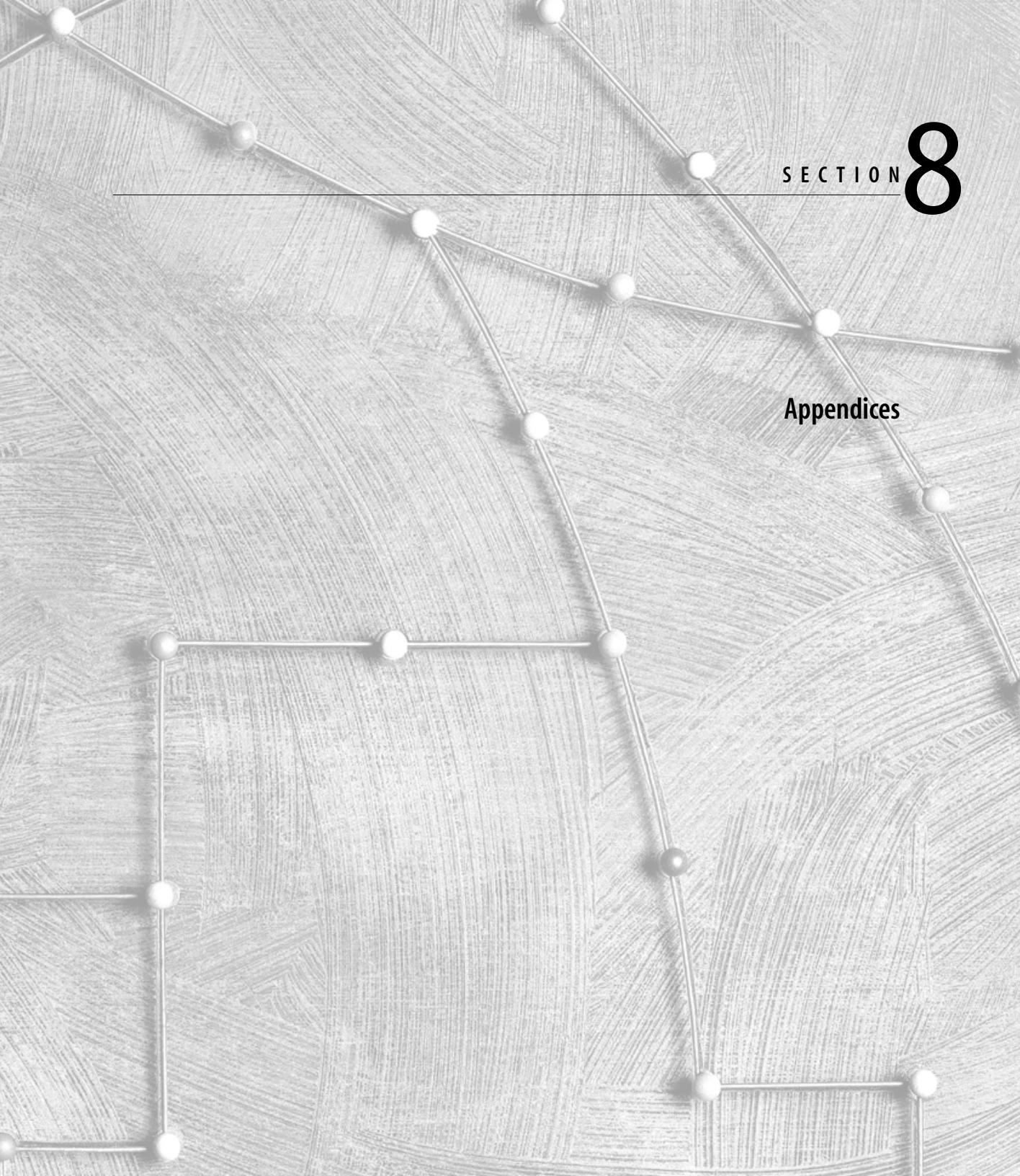
- In Europe, call +31.70.375.11.00 for the name of the distributor nearest you. The corresponding fax number is +31.70.356.12.44.
- In Asia, call +65.336.3122 for the name of the distributor nearest you. The corresponding fax number is +65.336.5233.
- In other countries, call WRQ at +1.206.217.7100 (USA) and ask for the International Department. Or fax +1.206.217.0293.

Electronic Technical Support Options

WRQ is here to answer your questions online, by fax, or by telephone:

Avenues of Online Access to WRQ





SECTION 8

Appendices

Appendix A

Escape Sequences and Control Functions

An escape sequence (Reflection for HP with NS/VT) or control function (Reflection for UNIX and Digital and Reflection for ReGIS Graphics) is a command sent to a terminal to perform an operation. Typically, escape sequences and control functions are sent to Reflection from a host program, but they can also be entered from the keyboard. For example, these functions can make Reflection do such things as move the cursor, add a line of text, assign display enhancements, and change character sets.

All escape sequences begin with the ASCII escape character (decimal 27) and control functions begin with the $^{C}S_{1}$ 7-bit equivalent $^{E}S_{C}$+[.

When coding escape sequences and control functions, take care to distinguish between uppercase and lowercase characters; in general, sequences are case sensitive. Further, if an escape sequence consists of more than one character and ends with a letter, the final letter must be capitalized. Reflection does not process the escape sequence until it receives an uppercase letter. The control codes are represented by $^{E}S_{C}$, ^{C}R, ^{L}F, etc.

Entering Escape Sequences and Control Functions

To enter these escape sequences and control functions from the terminal window:

To enter this sequence:	**Esc**	**Csi**	**Dcs**
In the terminal window press:	Esc	Esc+[	Esc+P

To indicate the $^{E}S_{C}$ character on the Reflection Basic command line, use the following syntax:

```
Application.Transmit Chr$(rcESC) & "<escape sequence>"
```

For example, the escape sequence ESC&w6f132X sets the display in Reflection for HP with NS/VT to 132 columns. To enter this sequence:

1. In the terminal window, press Esc and type `&w6f132X`.
2. Press Alt+L to open the command line, then execute one of the commands shown below.

   ```
   Application.Transmit Chr$(rcESC) & "&w6f132X"
   Application.Display Chr$(rcESC) & "&w6f132X"
   ```

   The first sequence transmits the command to the host; the second causes the sequence to change your display.

   The corresponding control function in Reflection for UNIX and Digital or Reflection for ReGIS Graphics is CSI?3h, so your command would look like this:

   ```
   Application.Transmit Chr$(rcESC) & "[?3h"
   ```

   ESC+[is the 7-bit equivalent of CSI.

Reflection for HP with NS/VT escape sequences when emulating an HP terminal are explained next. For those control sequences supported when using Reflection for HP with NS/VT to emulate a VT-series terminal, see page 239. See page 246 for the control functions supported by Reflection for UNIX and Digital and Reflection for ReGIS Graphics.

For a complete reference of all escape sequences and control functions supported by Reflection, see the *Reflection Terminal Reference manuals*, available as .PDF files on the Reflection product CD.

A Word About Notation

The following notation is used in the remainder of this appendix:

- Escape sequences and control functions are case sensitive, and must be typed exactly as shown.
- Where appropriate, a slash is used through a zero (Ø) to distinguish it from the uppercase letter O.
- Note the difference between a lowercase L (l) and the number 1 (1).

- Parameters you supply for a sequence are enclosed in angle brackets.

  For example, when using the ESC[<n>C control function, replace <*n*> with the number of spaces you want the cursor to move.

- Most control functions (shown starting on page 246) have a mnemonic identifier. You do not enter the mnemonic; it's simply a convenient "word" to help you remember the name of the control function. For example, DECCOLM is the DEC mnemonic for setting the number of display columns.

Reflection for HP with NS/VT Escape Sequences

Escape Sequence	Description
ESC[	Start unprotected field
ESC]	End unprotected field
ESC{	Start transmit-only field
ESC^	Primary status request
ESC~	Secondary status request
ESC`	Sense cursor, relative
ESC@	Delay one second
ESC)@	Select base characters
ESC.	Enable NS/VT typeahead for MPE/iX machines
ESC,	Disable NS/VT typeahead for MPE/iX machines
ESC)B	Select line drawing characters
ESC1	Set tab stop
ESC2	Clear tab stop
ESC3	Clear all tabs
ESC4	Set left margin
ESC5	Set right margin

Escape Sequence	Description
ESC9	Reset margins
ESC&a<col>c<row>R	Cursor movement sequences (absolute)
ESC&a<col>c<row>Y	Cursor movement sequences (relative)
ESC&bR	Reset data communications
ESC&d<x>	Select display enhancement
ESC&ds<x>	Display enhancement with security
ESC&f...	Define user key
ESC&f-1E	Transmit HP Enter
ESC&f<x>E	Trigger function key
ESC&fØB	Store setup
ESC&f1B	Restore setup
ESC&f211P...	Configure Tab key
ESC&fR	Configure Tab key
ESC&f1m149P<!149>	Configure n key as Enter ↵
ESC&f1m149P<!154>	Configure Enter ↵ key as keypad Enter
ESC&k2S	Enable compressed (132-column) printing
ESC&k0S	Enable regular printing
ESC&j@	Enable user keys, no labels
ESC&jA	Display modes keys
ESC&jB	Display and enable user keys
ESC&jC	Remove message, replace labels
ESC&j<n>D	Select function key features
ESC&j<x>L...	Remove function key labels and display message

Escape Sequence	Description
ESC&jR	Enable function key labels
ESC&jS	Disable function key labels
ESC&kØA	Auto linefeed off
ESC&k1A	Auto linefeed on
ESC&kØB	Block mode off
ESC&k1B	Block mode on
ESC&kØC	Caps lock off
ESC&k1C	Caps lock on
ESC&kØD	Margin bell off
ESC&k1D	Margin bell on
ESC&kØI	Set previous parity
ESC&k1I	No parity
ESC&kØK	Auto keyboard lock off
ESC&k1K	Auto keyboard lock on
ESC&kØL	Local echo off
ESC&k1L	Local echo on
ESC&kØM	Modify all mode off
ESC&k1M	Modify all mode on
ESC&kØN	SPOW latch off
ESC&k1N	SPOW latch on
ESC&kØP	Caps mode (TeleType) off
ESC&k1P	Caps mode (TeleType) on
ESC&kØR	Remote mode off

Escape Sequence	Description
ESC&k1R	Remote mode on
ESC&kØZ	Modified data tags off
ESC&k1Z	Modified data tags on
ESC&kØ\	HP terminal mode
ESC&k1\	VT terminal mode
ESC&kØ[	Smooth scroll off
ESC&k1[	Smooth scroll on
ESC&kØ]	Select key off
ESC&k1]	Select key on
ESC&oB<cmd>CR	Reflection command with completion code
ESC&oC<cmd>CR	Reflection command
ESC&oF<cmd>CR	Reflection command without completion code
ESC&oX	Clear typeahead
ESC&p[<a>d]<b>D	Select destination device
ESC&p[<a>d][<b>d]<Y>	Copy data to destination device
ESC&p<x>^	Device status request
ESC&p<x>p<y>u<z>C	Perform action on device
ESC&p<x>p2ØC	Enable record mode
ESC&p[<a>d][<b>d]<x>W<data string>	Transfer bytes of string to destination device
ESC&p[<a>d][<b>d]W<data string>	Transfer string to destination device
ESC&p9^	Forms buffer status request

Escape Sequence	Description
ESC&p <>n9^	Read forms cache directory
ESC&p<<name>>n9^	Forms buffer status request (by name)
ESC&p9u<f#>p<<con>>L	Store form, length unknown
ESC&p9u<<name>>n<f#>p<<con>>L	Store form using name, length unknown
ESC&p9u<f#>p<len>L<con>	Store form
ESC&p9u<name>n<f#>p<len>L<con>	Store form, using name
ESC&p9u<form#>pF	Display form
ESC&p9u<form#>pL	Purge form
ESC&p<form#>p9^	Forms buffer status request (number)
ESC&p16C	Enable compressed (132-column) printing
ESC&p14C	Enable regular printing
ESC&qØL	Configuration unlocked
ESC&q1L	Configuration locked
ESC&q8teØ{ØD	Turn bell off
ESC&q8teØ{1D	Turn bell on
ESC&q8te1{<x>A	Return definition 1st character
ESC&q8te1{<x>B	Return definition 2nd character
ESC&q8te1{ØR	Return equals enter off
ESC&q8te1{1R	Return equals enter on
ESC&q8te1{ØT	Transmit tab as spaces off
ESC&q8te1{1T	Transmit tab as spaces on

Escape Sequence	Description
ESC&q<m>te0{0A	Transmit functions off
ESC&q<m>te0{1A	Transmit functions on
ESC&q<m>te0{0B	SPOW off
ESC&q<m>te0{1B	SPOW on
ESC&q<m>te0{0C	Inhibit EOL wrap off
ESC&q<m>te0{1C	Inhibit EOL wrap on
ESC&q<m>te0{0D	Line mode
ESC&q<m>te0{1D	Page mode
ESC&q<m>te0{0G	Inhibit handshake off
ESC&q<m>te0{1G	Inhibit handshake on
ESC&q<m>te0{0H	Inhibit DC2 off
ESC&q<m>te0{1H	Inhibit DC2 on
ESC&q<m>te0{0N	Esc xfer to printer off
ESC&q<m>te0{1N	Esc xfer to printer on
ESC&q<m>te1{0A	Auto linefeed off
ESC&q<m>te1{1A	Auto linefeed on
ESC&q<m>te1{0B	Block mode off
ESC&q<m>te1{1B	Block mode on
ESC&q<m>te1{0C	CapsLock off
ESC&q<m>te1{1C	CapsLock on
ESC&q<m>te1{0L	Local echo off
ESC&q<m>te1{1L	Local echo on
ESC&q<m>te1{0M	Modify all mode off

Escape Sequence	Description
ESC&q<m>te1{1M	Modify all mode on
ESC&q<m>te1{ØR	Remote mode off
ESC&q<m>te1{1R	Remote mode on
ESC&q<m>te2{<x>F	Field separator character
ESC&q<m>te2{<x>L	Set forms buffer size
ESC&q<m>te2{<x>R	Set block terminator character
ESC&q<m>te2{ØZ	Transmit all
ESC&q<m>te2{1Z	Transmit modified
ESC&sØA	Transmit functions off
ESC&s1A	Transmit functions on
ESC&sØB	SPOW off
ESC&s1B	SPOW on
ESC&sØC	End-of-line wrap off
ESC&s1C	End-of-line wrap on
ESC&sØD	Line mode on
ESC&s1D	Page mode on
ESC&sØG	Inhibit handshake off
ESC&s1G	Inhibit handshake on
ESC&sØH	Inhibit DC2 off
ESC&s1H	Inhibit DC2 on
ESC&sØZ	Parity checking off
ESC&s1Z	Parity checking on
ESC&w6f8ØX	Set 80-column mode

Escape Sequence	Description
^E^S^C&w6f132X	Set 132-column mode
^E^S^C&w12F	Turn on display
^E^S^C&w13F	Turn off display
^E^S^C&xØC	Clear send cursor position mode
^E^S^C&x1C	Set send cursor position mode
^E^S^C*dØE	Normal video
^E^S^C*d1E	Inverse video
^E^S^C*dQ	Enable cursor
^E^S^C*dØQ	Underline cursor
^E^S^C*d1Q	Block cursor
^E^S^C*dR	Invisible cursor
^E^S^C*s-<n>^	Terminal capabilities
^E^S^C*s^	Request terminal ID
^E^S^C*s1^	Request terminal ID
^E^S^C*s12345^	Request serial number
^E^S^C*s12347^	Request serial number
^E^S^C*s12348^	Request Unique Product Identifier (UPI)
^E^S^C*y^	Report DCS capability
^E^S^CØ	Copy display memory to destination
^E^S^CA	Cursor up one line
^E^S^Ca	Sense cursor, absolute
^E^S^CB	Cursor down one line
^E^S^Cb	Unlock keyboard

Escape Sequence	Description
ESCC	Cursor right one character
ESCc	Lock keyboard
ESCD	Cursor left one character
ESCd	Transmit block
ESCE	Hard reset
ESCF	Cursor home down
ESCf	Disconnect
ESCG	Cursor to left margin
ESCg	Soft reset
ESCH	Cursor home up
ESCh	Cursor home up
ESCI	Horizontal tab
ESCi	Backtab
ESCJ	Clear display
ESCj	Display user key screen
ESCK	Clear line
ESCk	Remove user key screen
ESCL	Insert line
ESCl	Memory lock on
ESCM	Delete line
ESCm	Memory lock off
ESCN	Insert with wraparound
ESCO	Delete with wraparound

Escape Sequence	Description
ESCP	Delete character
ESCp	F1 default
ESCQ	Insert character mode on
ESCq	F2 default
ESCR	Insert character mode off
ESCr	F3 default
ESCS	Scroll up
ESCs	F4 default
ESCT	Scroll down
ESCt	F5 default
ESCU	Page down
ESCu	F6 default
ESCV	Page up
ESCv	F7 default
ESCW	Format mode on
ESCw	F8 default
ESCX	Format mode off
ESCY	Display functions on
ESCZ	Display functions off
ESCz	Terminal self-test

Reflection for HP with NS/VT VT Control Sequences

These control sequences are recognized when you are using Reflection for HP with NS/VT to emulate a VT-series terminal.

Sequence	Description
^S_I>c	Secondary DA request
^S_I>Øs	Home up
^S_I>1;11;Øc	Reflection secondary DA response
^S_I>1s	Home down
^S_I?ØJ	Erase unprotected characters, cursor through end of screen
^S_I?ØK	Erase unprotected characters through end of line
^S_I?1Øn	Printer status response: printer ready
^S_I?13n	Printer status response: no printer
^S_I?15n	Printer status request
^S_I?18h	Form feed after PrtScrn on
^S_I?18l	Form feed after PrtScrn off
^S_I?19h	Printer extent, screen
^S_I?19l	Printer extent, scrolling region
^S_I?1h	Cursor keys set to application
^S_I?1i	Print cursor line
^S_I?1J	Erase unprotected characters, top of screen through cursor
^S_I?1K	Erase unprotected characters, start of line through cursor
^S_I?1l	Cursor keys set to normal
^S_I?25h	Cursor visible
^S_I?25l	Cursor invisible

Sequence	Description
CSI?2J	Erase unprotected characters, entire screen
CSI?2K	Erase unprotected characters, complete line
CSI?2l	VT52 emulation
CSI?3h	Set 132-column mode
CSI?3l	Set 80-column mode
CSI?42h	Use 7-bit national replacement
CSI?42l	Use 7- and 8-bit characters
CSI?4i	Log to printer off
CSI?5h	Display enhancements inverse video
CSI?5i	Pass through to printer
CSI?5l	Display enhancements normal
CSI?6h	Origin mode, first row
CSI?6l	Origin mode, upper left corner
CSI?7h	End-of-line wrap on
CSI?7l	End-of-line wrap off
CSI?8h	Autorepeat on
CSI?8l	Autorepeat off
CSI<n>@	Insert <*n*> characters
CSI<n>A	Cursor up
CSI<n>B	Cursor down
CSI<n>C	Cursor forward
CSI<n>d	Vertical position absolute

Sequence	Description
^CSI<n>D	Cursor backward
^CSI<n>e	Vertical position relative
^CSI<n>F	Previous line
^CSI<r>;<c>f	Horizontal/vertical position
^CSI<n>G or ^CSI<n>`	Horizontal position absolute
^CSI<r>;<c>H	Cursor position
^CSI<n>L	Insert <*n*> lines
^CSI<n>M	Delete <*n*> lines
^CSI<n>P	Delete <*n*> characters
^CSI<t>;<b>r	Top/bottom margin
^CSI<row>;<col>R	Cursor position response
^CSI<n>S	Scroll up <*n*> lines
^CSI<n>T	Scroll down <*n*> lines
^CSI<n>U	Page forward <*n*> pages
^CSI<n>V	Page backward <*n*> pages
^CSI<n>X	Erase character(s)
^CSI<n>Z	Cursor backtab
^CSIØ;1234c	Serial number request
^CSIØ;1235c	UPI request
^CSIØJ	Erase from cursor to end of screen
^CSIØ"q	Select erasable characters through end of screen
^CSIØK	Erase from cursor through end of line

Sequence	Description
CSI1"q	Select protected characters
CSI12h	Local echo off
CSI12l	Local echo on
CSI1J	Erase from top of screen to cursor
CSI1K	Erase from start of line through cursor
CSI2"q	Select erasable characters
CSI20h	Auto linefeed on
CSI20l	Auto linefeed off
CSI2h	Keyboard locked
CSI2J	Erase complete screen
CSI2K	Erase entire line
CSI2l	Keyboard unlocked
CSI3g	Tab clear (all)
CSI3h	Display controls on
CSI3l	Display controls off
CSI4h	Insert mode
CSI4i	Passthrough mode off
CSI4l	Replace mode
CSI5i	Passthrough mode on
CSI61"p	VT102 emulation
CSI62;0"p	VT220 emulation, 8-bit
CSI62;1"p	VT220 emulation, 7-bit

Sequence	Description
^C_S_I62;2"p	VT220 emulation, 8-bit
^C_S_Ig	Tab clear (at cursor)
^D^C_S_1234;Ø{<cmd>^S_T	Invoke Reflection command
^D^C_S_1234;1{<cmd>^S_T	Reflection command with completion code
^D^C_S_1234;2{<cmd>^S_T	Reflection command without completion code
^E^S_C(<char>	Selects GØ
^E^S_C)<char>	Selects G1
^E^S_C*<char>	Selects G2
^E^S_C+<char>	Selects G3
^E^S_C<	ANSI mode
^E^S_C=	Keypad mode application (VT52)
^E^S_C>	Keypad mode normal (VT52)
^E^S_C]	Print screen (VT52)
^E^S_C^	Log to printer on (VT52)
^E^S_C_	Log to printer off (VT52)
^E^S_C}	Map G2 into GR
^E^S_C~	Map G1 into GR
^E^S_C$@	JIS C 6226-1978
^E^S_C$B	JIS X 0208-1983
^E^S_C&@Esc$B	JIS X 0208-1990
^E^S_C$(D	JIS X 0212-1990
^E^S_C(J	JIS Roman (same as Esc(H)

Sequence	Description
ESC(H	JIS Roman (same as Esc(J)
ESC(B	ASCII
ESC(I	Half width Katakana
ESC#3	Double-width, double-height line (top half)
ESC#4	Double-width, double-height line (bottom half)
ESC#5	Single-width, single-height line
ESC#6	Double-width, single-height line
ESC&bR	Connection reset
ESC7	Save cursor state
ESC8	Restore cursor state
ESCA	Cursor up (VT52)
ESCB	Cursor down (VT52)
ESCc	Hard reset
ESCC	Cursor right (VT52)
ESCD	Cursor left (VT52)
ESCD	Index
ESCE or CSI<n>E	Next line
ESCF	Character set graphics (VT52)
ESCG	Character set ASCII (VT52)
ESCH	Home cursor (VT52)
ESCH	Tab set at current column
ESCI	Reverse linefeed (VT52)

Sequence	Description
ESCJ	Erase to end of screen (VT52)
ESCK	Erase to end of line (VT52)
ESCM	Reverse index
ESCn	Lock shift G2
ESCN	Single shift G2
ESCo	Lock shift G3
ESCO	Single shift G3
ESCV	Print cursor line (VT52)
ESCW	Controller mode start (VT52)
ESCX	Controller mode stop (VT52)
ESCY<r><c>	Move cursor (VT52)
ESCZ	Identification request (VT52)
ESC/Z	Identification response (VT52)
ESC&k<n>\	Terminal class
SI	Lock shift GØ
SO	Lock shift G1

Reflection for UNIX and Digital and Reflection Graphics Control Functions

This section also includes control functions for emulating the Data General 215 terminal (see page 259), a Unisys A Series T27 terminal (see page 272), and the WYSE 50 or 60 terminals (see page 261).

Control Function	Mnemonic	Description
CSI!p	DECSTR	Reset terminal (soft reset)
CSI&u	DECRQUPSS	Request UPSS
CSI>Øc	DA	Request secondary device attributes
CSI>24;11;Øc	DA	Response to secondary device attributes
CSI>c	DA	Request secondary device attributes
CSI?<n>$p	DECRQM	Request DEC private mode settings
CSI?<n>;…<n>l	RM	Reset DEC private mode
CSI?<n>;…<n>h	SM	Set DEC private mode
CSI?<n1>;<n2>$y	DECRPM	Report DEC private mode setting
CSI?<n>*{	—	Macro space report; <*n*> is the number of bytes divided by 16
CSI<n>*z	DECINVM	Invoke macro
CSI?Øi	MC	Send graphics to printer
CSI?ØJ	DECSED	Erase unprotected characters from cursor to end of screen
CSI?ØK	DECSEL	Erase unprotected characters from cursor to end of line
CSI?10n	DSR	Report printer ready
CSI?13n	DSR	Report no printer
CSI?15n	DSR	Request printer status
CSI?18h	DECPFF	Send form feed after printing

Control Function	Mnemonic	Description
CSI?18l	DECPFF	No form feed after printing
CSI?19h	DECPEX	Print full screen
CSI?19l	DECPEX	Print scrolling region
CSI?1h	DECCKM	Cursor keys application
CSI?1i	MC	Print line
CSI?1J	DECSED	Erase unprotected characters from top of screen to cursor
CSI?1K	DECSEL	Erase unprotected characters from beginning of line to cursor
CSI?1l	DECCKM	Cursor keys normal
CSI?20n	DSR	Report UDKs unlocked
CSI?21n	DSR	Report UDKs locked
CSI?2i	MC	Send graphics to host
CSI?25h	DECTCEM	Cursor visible
CSI?25l	DECTCEM	Cursor invisible
CSI?25n	DSR	Request UDK status (VT200)
CSI?26n	DSR	Request keyboard dialect
CSI?27;<n>n	DSR	Report keyboard dialect (<n> = 1 for North American keyboards)
CSI?2J	DECSED	Erase unprotected characters from screen
CSI?2K	DECSEL	Erase unprotected characters from line
CSI?2l	DECANM	VT52 emulation
CSI?3h	DECCOLM	Columns 132
CSI?3l	DECCOLM	Columns 80

Control Function	Mnemonic	Description
CSI?42h	DECNRCM	Use national replacement: 7-bit
CSI?42l	DECNRCM	Use national replacement: 7-bit and 8-bit
CSI?43h	DECGEPM	Expanded print mode
CSI?43l	DECGEPM	Compressed print mode
CSI?44h	DECGPCM	Print color mode
CSI?44l	DECGPCM	Print monochrome mode
CSI?45h	DECGPCS	Print color syntax set to RGB
CSI?45l	DECGPCS	Print color syntax set to HLS
CSI?46h	DECGPBM	Print background
CSI?46l	DECGPBM	Do not print background
CSI?47h	DECGRPM	Print rotated mode
CSI?47l	DECGRPM	Print compressed mode
CSI?4h	DECSCLM	Smooth scroll
CSI?4l	DECSCLM	Jump scroll
CSI?4i	MC	Auto print off
CSI?50n	DSR	Report a locator device detected
CSI?53n	DSR	Report no locator device detected
CSI?55n	DSR	Request status of locator device
CSI?56n	DSR	Request type of locator device
CSI?57;0n	DSR	Report no locator device connected
CSI?57;1n	DSR	Report locator device is a mouse
CSI?5h	DECSCNM	Inverse video
CSI?5l	DECSCNM	Normal video

Control Function	Mnemonic	Description
CSI?5i	MC	Auto print on
CSI?60h	DECHCCM	Couple the cursor to the display (horizontally)
CSI?60l	DECHCCM	Uncouple the cursor from the display (horizontally)
CSI?61h	DECVCCM	Couple the cursor to the display (vertically)
CSI?61l	DECVCCM	Uncouple the cursor from the display (vertically)
CSI?62n	DECMSR	Device status request for a macro space report (VT400 mode only)
CSI?64h	DECPCCM	Couple the cursor to the display (page cursor coupling)
CSI?64l	DECPCCM	Uncouple the cursor from the display (page cursor coupling)
CSI?66h	DECNKM	Numeric keypad mode application
CSI?66l	DECNKM	Numeric keypad mode numeric
CSI?67h	DECBKM	Backarrow key set to BS
CSI?67l	DECBKM	Backarrow key set to DT
CSI?6h	DECOM	Origin mode set
CSI?6l	DECOM	Origin mode reset
CSI?7h	DECAWM	Autowrap on
CSI?7l	DECAWM	Autowrap off
CSI?80h	DECSDM	Disable sixel scrolling
CSI?80l	DECSDM	Enable sixel scrolling
CSI?8h	DECARM	Keyboard auto repeat on

Control Function	Mnemonic	Description
C`S`I?8l	DECARM	Keyboard auto repeat off
C`S`I?i	MC	Send graphics to printer
C`S`I<n>$p	DECRQM	Request ANSI mode settings
C`S`I<n1>;<n2>$y	DECRPM	Report ANSI mode settings
C`S`I<n>@	ICH	Insert <n> characters
C`S`I<n>A	CUU	Cursor up
C`S`I<n>B	CUD	Cursor down
C`S`I<n>C	CUF	Cursor forward
C`S`I<n>D	CUB	Cursor backward
C`S`I<r>;<c>f	HVP	Move cursor to horizontal and vertical position
C`S`I<n>;…<n>h	SM	Set ANSI mode
C`S`I<r>;<c>H	CUP	Cursor position
C`S`I<n>;…<n>l	RM	Reset ANSI mode
C`S`I<n>L	IL	Insert <n> lines
C`S`I<n>D	CUB	Cursor backward
C`S`I<n>;...<n>m	SGR	Select graphic rendition
C`S`I<n>M	DL	Delete <n> lines from cursor
C`S`I<n>P	DCH	Delete <n> characters from cursor
C`S`I<t>;<b>r	DECSTBM	Set top and bottom scrolling region margins
C`S`I<row>;<column>R	CPR	Report cursor position
C`S`I<n>X	ECH	Erase <n> characters on line
C`S`IØ"q	DECSCA	Select erasable character

Control Function	Mnemonic	Description
CSI0$}	DECSASD	Top 24 lines = active display
CSI0$~	DECSSDT	Do not display status line
CSI0;1234c	WRQRQSN	Serial number request
CSI0;1235c	WRQRQUPI	UPI request
CSI0c	DA	Request primary device attributes
CSI0g	TBC	Tab clear
CSI0i	MC	Print screen
CSI0J	ED	Erase from cursor to end of screen
CSI0K	EL	Erase from cursor to end of line
CSI0n	DSR	Report no device malfunction
CSI0x	DA	Request terminal parameters
CSI1"q	DECSCA	Select protected character
CSI1$}	DECSASD	Status line set to active display
CSI1$~	DECSSDT	Status line set to indicator
CSI1$u	DECRQTSR	Request terminal state report
CSI1$w	DECRQPSR	Request cursor information report
CSI12h	SRM	Local echo off
CSI12l	SRM	Local echo on
CSI1J	ED	Erase from top of screen to cursor
CSI1$}	DECSASD	Status line set to active display
CSI1$~	DECSSDT	Status line set to indicator
CSI1$u	DECRQTSR	Request terminal state report
CSI1$w	DECRQPSR	Request cursor information report

Control Function	Mnemonic	Description
CSI12h	SRM	Local echo off
CSI12l	SRM	Local echo on
CSI1J	ED	Erase from top of screen to cursor
CSI1K	EL	Erase from beginning of line to cursor
CSI1x	DA	Request terminal parameters
CSI2"q	DECSCA	Select erasable character
CSI2$~	DECSSDT	Status line: host writable
CSI2$u	DECRQTSR	Request color table report (VT340)
CSI2$w	DECRQPSR	Request tab stop report
CSI2;<n1>;<n2>;<receive baud>;<transmit baud>;1;Øx		
	DA	Response to CSIØx
CSI2Øh	LNM	Auto linefeed on
CSI2Øl	LNM	Auto linefeed off
CSI2h	KAM	Keyboard lock
CSI2J	ED	Erase entire screen
CSI2K	EL	Erase entire line
CSI2l	KAM	Keyboard unlock
CSI3;<n1>;<n2>;<receive baud>;<transmit baud>;1;Øx		
	DA	Response to CSI1x
CSI3g	TBC	Clear all tabs
CSI3h	—	Display controls on
CSI3l	—	Display controls off
CSI3n	DSR	Report device malfunction

Control Function	Mnemonic	Description
CSI4h	IRM	Insert mode
CSI4i	MC	Printer controller mode off
CSI5i	MC	Printer controller mode on
CSI4l	IRM	Replace mode
CSI5n	DSR	Request operating status
CSI24t	DECSLPP	With 24 lines per page, sets number of pages to 6
CSI25t	DECSLPP	With 25 lines per page, sets number of pages to 5
CSI36t	DECSLPP	With 36 lines per page, sets number of pages to 4
CSI48t	DECSLPP	With 48 lines per page, sets number of pages to 3
CSI61"p	DECSCL	VT102 emulation
CSI62"p	DECSCL	VT200 emulation 8-bit controls
CSI62;Ø"p	DECSCL	VT200 emulation 8-bit controls
CSI62;1"p	DECSCL	VT200 emulation 7-bit controls
CSI62;2"p	DECSCL	VT200 emulation 8-bit controls
CSI63"p	DECSCL	VT300 emulation 8-bit controls
CSI63;Ø"p	DECSCL	VT300 emulation 8-bit controls
CSI63;1"p	DECSCL	VT300 emulation 7-bit controls
CSI63;2"p	DECSCL	VT300 emulation 8-bit controls
CSI72t	DECSLPP	With 72 lines per page, sets number of pages to 2

Control Function	Mnemonic	Description
CSI144t	DECSLPP	With 144 lines per page, sets number of pages to 1
CSI6n	CPR	Request cursor position
CSIc	DA	Request primary device attributes
CSIg	TBC	Tab clear
CSIi	MC	Print screen
CSI4;<n>;...;<n>y	DECTST	Terminal test (disconnect)
CSI<n><SP>P	PPA	Page position absolute
CSI<n><SP>Q	PPR	Page position relative
CSI<n><SP>R	PPB	Page position backward
CSI<n>S	SU	Pan down
CSI<n>T	SD	Pan up
CSI<n>U	NP	Next page
CSI<n>V	PP	Previous page
DCS$q...ST	DECRQSS	Request control function setting
DCS<n1>;<n2>;<n3>!zD...DSt	DECDMAC	Define macro
DCS<n>;<n>;P3;qs...sST	—	Sixel data format
DCS<C>$w<def1>;<def2>;...;<defn>ST	DECLBD	Define locator device buttons (mouse)
DCS<C>;<L>|<def1>;<def2>;...;<defn>ST	DECUDK	Load user-defined keys
DCS<n>$r...ST	DECRPSS	Report control function setting

Control Function	Mnemonic	Description
DCSØ!u%5ST	DECAUPSS	Assign UPSS as DEC Supplemental Graphic
DCSØp	—	Enter ReGIS at point command exited
DCS1!uAST	DECAUPSS	Assign UPSS as ISO Latin-1
DCS1$p....ST	DECRSTS	Restore terminal state from DECTSR
DCS1$s....ST	DECTSR	Report terminal state
DCS1$t....ST	DECRSPS	Restore cursor from DECCIR
DCS1$u....ST	DECCIR	Report cursor information
DCS1234;Ps{<cmd>ST	WRQCMD	Invoke Reflection command
DCSØp	—	Enter ReGIS at point command exited; ReGIS commands are not displayed
DCS1p	—	Enter ReGIS and begin new command; ReGIS commands are not displayed
DCS2p	—	Enter ReGIS at point command exited; ReGIS commands are displayed
DCS3p	—	Enter ReGIS and begin new command; ReGIS commands are displayed
DCSp	—	Enter ReGIS at point command exited; ReGIS commands are not displayed
DCS2$p<data>ST	DECRSTS	Restore color table (VT340)
DCS2$s<data>ST	DECCTR	Report color table (VT340)
DCS2$t....ST	DECRSPS	Restore tab from DECTABSR
DCS2$u....ST	DECTABSR	Report tab stop
DCSPfn;Pcn;Pe;PcmW;Pw;Pt;Pcmh;Pcss{Dscs UUUUUUUU/LLLLLLLL;...ST	DECDLD	Downline loadable character set

Control Function	Mnemonic	Description
ESC(<chr>	SCS	Selects GØ
ESC)<chr>	SCS	Selects G1, 94-character set
ESC-<chr>	SCS	Selects G1, 96-character set
ESC*<chr>	SCS	Selects G2 (VT200), 94-character set
ESC+<chr>	SCS	Selects G3 (VT200), 94-character set
ESC%!0	—	Enter Tektronix mode
ESC%!1	—	Enter VT400-7 mode from Tektronix mode
ESC%!2	—	Enter VT100 mode from Tektronix mode
ESC%!3	—	Enter VT52 mode from Tektronix mode
ESC.<chr>	SCS	Selects G2 (VT200), 96-character set
ESC/<chr>	SCS	Selects G3 (VT200), 96-character set
ESC<	—	ANSI mode—exit VT52 emulation mode
ESC=	DECKPAM	Keypad mode application
ESC=	DECKPAM	Keypad mode application (VT52)
ESC>	DECKPNM	Keypad mode normal
ESC>	DECKPNM	Keypad mode normal (VT52)
ESC\	—	Exit ReGIS mode
ESC]	MC	Print screen (VT52)

Control Function	Mnemonic	Description
ESC^	MC	Auto print mode on (VT52)
ESC_	MC	Auto print mode off (VT52)
ESC|	LS3R	Map G3 into GR
ESC}	LS2R	Map G2 into GR
ESC~	LS1R	Map G1 into GR
ESC#3	DECDHL	Double-width- and height-line (top half)
ESC#4	DECDHL	Double-width- and height-line (bottom half)
ESC#5	DECSWL	Single-width- and height-line
ESC#6	DECDWL	Double-width- and single-height line
ESC#8	DECALN	Test pattern
ESC<SP>F	S7C1T	VT200 emulation 7-bit controls
ESC<SP>G	S8C1T	VT200 emulation 8-bit controls
ESC7	DECSC	Save cursor state
ESC8	DECRC	Restore cursor state
ESCA	—	Cursor up (VT52)
ESCB	—	Cursor down (VT52)
ESCC	—	Cursor forward (VT52)
ESCc	RIS	Reset to initial state (hard reset)
ESCD	—	Cursor backward (VT52)
ESCH	—	Home cursor (VT52)
ESCH	—	Set tab
ESCI	—	Reverse linefeed (VT52)

Control Function	Mnemonic	Description
ESCJ	—	Erase from cursor to end of screen (VT52)
ESCK	—	Erase to end of line (VT52)
ESCn	LS2	Map G2 into GL
ESCN	SS2	Map G2 into GL for next character
ESCo	LS3	Map G3 into GL
ESCO	SS3	Map G3 into GL for next character
ESCV	—	Print cursor line (VT52)
ESCW	—	Printer controller mode on (VT52)
ESCX	—	Printer controller mode off (VT52)
ESCY<r><c>	—	Cursor to <r> row <c> column VT52)
ESCZ	—	Request primary device attributes (VT52); Reflection replies ESC/Z
IND	IND	Index
NEL	NEL	Next line
RI	RI	Reverse linefeed
SI	LS0	Map GØ into GL
SO	LS1	Map G1 into GL

DG Control Sequences

This section details how to use Reflection for UNIX and Digital and Reflection for ReGIS Graphics to emulate the Data General 215 terminal.

Configuring Reflection for a DG Terminal

To configure Reflection for DG emulation:

1. On the Setup menu, click Terminal, then click the Terminal Type tab.
2. Select the **DG 215** terminal type.
3. Click OK.

Control Sequences	Description
`ctrl A`	Print form, from start of cursor line to end of page
`ctrl B`	Reverse attribute off
`ctrl C`	Enable blink attribute
`ctrl D`	Disable blink attribute
`ctrl E`	Read window address
`ctrl G`	Sound bell
`ctrl H`	Window home
`ctrl J`	New line
`ctrl K`	Erase eol
`ctrl L`	Erase window
`ctrl M`	Carriage return
`ctrl N`	Blink attribute on
`ctrl O`	Blink attribute off
`ctrl P <col><row>`	Write cursor address
`ctrl Q`	Print window

Control Sequences	Description
ctrl R	Roll enable
ctrl S	Roll disable
ctrl T	Underscore attribute on
ctrl U	Rnderscore attribute off
ctrl V	Reverse attribute on
ctrl W	Cursor up
ctrl X	Cursor right
ctrl Y	Cursor left
ctrl Z	Cursor down
ctrl \	Dim attribute on
ctrl]	Dim attribute off

Escape Sequences	Description
ctrl ^ C	Read model ID
ctrl ^ E	Reverse video off
ctrl ^ D	Reverse video on
ctrl ^ O	Shift in, selects primary character set
ctrl ^ N	Shift out, selects secondary character set
ctrl ^ F@	Select ANSI mode
ctrl ^ FU0	Select 7-bit transmission
ctrl ^ FU1	Select 8-bit transmission

WYSE Escape Sequences

This chapter details how to use Reflection for UNIX and Digital and Reflection for ReGIS Graphics to emulate the WYSE 50 or 60 terminals.

Configuring Reflection for the WYSE Terminal

To configure Reflection for WYSE emulation:

1. On the Setup menu, click Terminal, then click the Terminal Type tab.
2. Select a terminal type:
   - **WYSE 50+**: Emulate the WYSE 50 terminal.
   - **WYSE 60**: Emulate the WYSE 60 terminal.
3. Click OK.

Escape Sequence	Description	Wyse Emulation Type	
`ctrl Q`	Enable transmission		60
`ctrl+S`	Stop transmission		60
`ctrl E`	Send Ack (Answerback)	50	60
`esc e 6`	Ack mode off		60
`esc e 7`	Ack mode on		60
`esc C esc D F`	Full-duplex mode on	50	60
`esc C esc D H`	Half-duplex mode on	50	60
`esc B`	Block mode on	50	60
`esc C`	Block mode off	50	60
`esc e 8`	Data/Printer = Modem/Aux		60
`esc e 9`	Data/Printer = Aux/Modem		60

Escape Sequence	Description	Wyse Emulation Type	
`esc c 0 <bd><st><pr><wd>`	Set modem port parameters		60
`esc c 1 <bd><st><pr><wd>`	Set aux port parameters		60
`esc c 2 <handshake>`	Set modem port rcv handshake		60
`esc c 3 <handshake>`	Set aux port rcv handshake		60
`esc c 4 <handshake>`	Set modem port xmt handshake		60
`esc c 5 <handshake>`	Set aux port xmt handshake		60
`esc c 6 <max>`	Set maximum transmission		60
`esc SPACE`	Send terminal ID	50	60
`esc c ; <answer> ^Y`	Program answerback message		60
`esc c <`	Send answerback message		60
`esc c =`	Conceal answerback message		60
`esc e SPACE`	Answerback mode off		60
`esc e !`	Answerback mode on		60
`esc c 8 <hh><mm>`	Load time of day		60
`esc e R`	Ignore received nulls		60
`esc e S`	Accept received nulls		60
`esc U`	Monitor mode on	50	60
`esc u`	Monitor mode off	50	60
`esc X`	Monitor mode off	50	60
`esc k`	Local edit mode on	50	60
`esc l`	Local edit mode off	50	60
`ctrl G`	Sound bell	50	60
`ctrl N`	Unlock keyboard	50	60

Escape Sequence	Description	Wyse Emulation Type	
esc "	Unlock keyboard	50	60
ctrl O	Lock keyboard	50	60
esc #	Lock keyboard	50	60
esc e $	Keyclick off		60
esc e %	Keyclick on		60
esc e &	Caps lock on		60
esc e '	Caps lock off		60
esc e L	Margin bell off		60
esc e M	Margin bell on		60
esc ` J	Set margin bell at cursor		60
esc e ,	Key repeat off		60
esc e -	Key repeat on		60
esc e T	Caps lock = on		60
esc e U	Caps lock = off		60
esc c T	Default all modes		60
esc c V	Save modes to NVR		60
esc c W	Save modes and tabs to NVR		60
esc c X	Power-on reset		60
esc ~ /	Wyseword mode on		60
esc ~ .	Wyseword mode off		60
esc ~ 2	Application key mode on		60
esc ~ 3	Application key mode off		60
esc z <fkey><sequence> DEL	Program function key	50	60

Escape Sequence	Description	Wyse Emulation Type	
esc z <fkey> DEL	Clear function key	50	60
esc Z <dir><key><seq> DEL	Program key direction and def		60
esc Z <dir><key> DEL	Clear key definition		60
esc Z ~ <key>	Read key direction and def		60
esc c U	Clear all redefinable keys		60
esc c 7 <max>	Set maximum fkey xmt speed		60
esc ` 8	Screen off		60
esc ` 9	Screen on		60
esc e P	Screen saver off		60
esc e Q	Screen saver on		60
esc ^ 1	Reverse screen		60
esc ^ 0	Normal screen		60
esc ` <scroll>	Set scrolling speed/type		60
esc ` <cursor>	Set cursor display features		60
esc ` 0	Cursor display off		60
esc ` 1	Cursor display on		60
esc ` a	Editing status line on		60
esc ` b	Standard status line on		60
esc ` c	Status line off		60
esc F <message> CR	Program/display message on status	50	60
esc F CR	Clear message on status line	50	60
esc z (<text> CR	Program unshifted label line	50	60
esc z) <text> CR	Program shifted label line	50	60

Escape Sequence	Description	Wyse Emulation Type	
esc z (CR	Erase unshifted label line	50	60
esc z) CR	Erase shifted label line	50	60
esc z <field><label> CR	Program function key label	50	60
esc z <field> CR	Erase function key label	50	60
esc z DEL	Shifted label line off	50	60
esc f	Message to user line		60
esc ` :	80-column display		60
esc ` ;	132-column display		60
esc e F	Economy 80-col mode off		60
esc e G	Economy 80-col mode on		60
esc e .	Width change clear off		60
esc e /	Width change clear on		60
esc e (	24 data lines		60
esc e)	25 data lines		60
esc e *	42 data lines		60
esc e +	43 data lines		60
esc w <length>	Divide memory into pages		60
esc w B	Display previous page		60
esc J	Display previous page	50	60
esc w C	Display next page		60
esc K	Display next page	50	60
esc w <page>	Display specified page		60
esc x A <line>	Split screen horz. (simple)		60

Escape Sequence	Description	Wyse Emulation Type	
esc x 1 <line>	Split screen horz. clr (simple)		60
esc x C <line>	Split screen horz. (adjust)		60
esc x 3 <line>	Split screen horz. clr (Adjust)		60
esc]	Activate upper window		60
esc }	Activate lower window		60
esc J	Activate other window		60
esc K	Activate other window		60
esc x P	Lower horizontal split		60
esc x R	Raise horizontal split		60
esc w E	Roll window up in page		60
esc w F	Roll window down in page		60
esc x @	Redefine screen as one window		60
esc x 0	Redefine screen one window clr		60
esc d (	Autodrag cursor off		60
esc d)	Autodrag cursor on		60
esc w D	Reposition workspace		60
esc A <mf><attr>	Set attribute to message	50	60
esc G <attr>	Set character display attribute	50	60
esc e 0	Character attribute mode off		60
esc e 1	Character attribute mode on		60
esc e 2	Page attribute mode on		60
esc e 3	Line attribute mode on		60
esc ` <wpca>	Assign write protect attribute		60

Escape Sequence	Description	Wyse Emulation Type	
esc ! <attr>	Clear unprotected page to attribute	50	
esc G <lattr>	Assign line attribute		60
esc (	Write-protect mode off	50	60
esc)	Write-protect mode on	50	60
esc V	Clr cursor col to write protect space	50	60
esc '	Protect mode off	50	60
esc &	Protect mode on	50	60
esc H <ldraw>	Display graphic character	50	60
esc H ctrl B	Line draw graphics mode on	50	60
esc H ctrl C	Line draw graphics mode off	50	60
ctrl H	Cursor left (backspace)	50	60
ctrl L	Cursor right	50	60
ctrl K	Cursor up; no scroll	50	60
esc j	Cursor up; scroll (revers lf)		60
ctrl V	Cursor down; no scroll	50	60
ctrl J	Cursor down; scroll	50	60
ctrl M	Cursor to start of line	50	60
ctrl _	Cursor to start of next line	50	60
esc {	Home cursor		60
ctrl ^	Home cursor		60
esc _ <col>	Cursor to specific column		60
esc [<line>	Cursor to specific line		60
esc d .	End-of-line wrap off		60

Escape Sequence	Description	Wyse Emulation Type	
esc d /	End-of-line wrap On		60
esc e 4	Received CR = CR		60
esc e 5	Received CR = CRLF		60
esc d *	Autopage mode off		60
esc d +	Autopage mode on		60
esc O	Autoscroll mode on	50	60
esc N	Autoscroll mode off	50	60
esc ` H	Line lock mode on		60
esc ` I	Line lock mode off		60
esc = <line><col>	Cursor address 80 column page	50	60
esc w @<pg><ln><col>	Cursor add specific 80 column page		60
esc - <wnd/pg><ln><col>	Address specific 80 column window/page	50	60
esc a <lll>R<ccc>C	Address 80/120-column page	50	60
esc ?	Read cursor address 80-column		60
esc w `	Read 80-column page and address		60
esc /	Read 80-column window/page & address	60	
esc b	Read address 80/132-column page	50	60
esc 0	Clear all tab stops	50	60
esc 1	Set tab stop at cursor	50	60
esc 2	Clear tab stop at cursor	50	60
esc i	Tab cursor	50	60
ctrl I	Tab cursor	50	60
esc I	Backtab	50	60

Escape Sequence	Description	Wyse Emulation Type	
esc q	Insert mode on, replace off	50	60
esc r	Replace mode on, insert off	50	60
esc e "	Page edit mode off		60
esc e #	Page edit mode on		60
esc Q	Insert space character	50	60
esc E	Insert line of spaces	50	60
esc c M	Insert column of nulls		60
esc W	Delete cursor character	50	60
esc R	Delete cursor line	50	60
esc c J	Delete cursor column		60
esc *	Clear page to nulls	50	60
esc +	Clear page to spaces	50	60
esc ,	Clear page to write-protest space	50	60
esc ;	Clear unprot page to spaces		60
ctrl Z	Clear unprot page to spaces	50	60
esc :	Clear unprot page to nulls	50	60
esc . <char>	Clear unprot page to character	50	60
esc Y	Clear unprot pg to sp from cursor	50	60
esc y	Clear unprot pg to nul from cursor	50	60
esc c P	Clear unprot pg foreground to space		60
esc c Q	Clear unprot pg foreground to nul		60
esc T	Clear unprot ln to space from cursor	50	60
esc t	Clear unprot ln to nul from cursor	50	60

Escape Sequence	Description	Wyse Emulation Type	
esc c O	Clear unprot for cursor to eol space		60
esc c L	Clear unprot for cursor to eol nul		60
esc c R	Clear unprot line fore to space cursor		60
esc c S	Clear unprot line fore to nul cursor		60
esc c I <char>	Clear unprot column to character		60
esc c K	Clear unprot column to nulls		60
esc c N <width><height>	Draw box right of cursor		60
esc c G <line><col>	Draw box 80-column page		60
esc c G <line>~<col>	Draw box 132-column page		60
esc c F <line><col><char>	Fill unprot with characters 80-column		60
esc c F <line>~<col><char>	Fill unprot with characters 132-column		60
esc c H <line><col><char>	Fill entire with characters 80-column		60
esc c H <line>~<col><char>	Fill entire with characters 132-column		60
esc d '	Begin send/print at top of page		60
esc d &	Begin send/print at top of screen		60
esc M	Send cursor character	50	60
esc 6	Send cursor line	50	60
esc 4	Send unprotected cursor line	50	60
esc 7	Send page	50	60
esc 5	Send unprotected page	50	60
esc 8	Mark block beginning	50	60
esc 9	Mark block ending	50	60
esc s	Send entire block	50	60

Escape Sequence	Description	Wyse Emulation Type	
esc S	Send unprotected block	50	60
esc P	Print formatted page to cursor	50	60
esc @	Print format unprot page to cursor 50	60	
esc p	Print unformatted page to cursor	50	60
esc L	Print unformatted page to	50	60
ctrl T	Aux/transparent print off	50	60
ctrl R	Aux print mode on	50	60
ctrl X	Transparent print mode on	50	60
esc d #	Transparent print mode on		60
esc d SPACE	Aux receive mode off		60
esc d !	Aux receive mode on		60
esc d $	Bidirectional mode off		60
esc d %	Bidirectional mode on		60
esc c D	Select primary character set		60
esc c E	Select secondary character set		60
esc c B <bank>	Define primary character set		60
esc c C <bank>	Define secondary character set		60
esc c @ <bank><Set>	Load font bank with character set		60
esc c ? <bank>	Clear font bank		60
esc c A >bank><pp><b..b>^Y	Define and load soft font		60
esc e N	Auto font load off		60
esc e O	Auto font load on		60

Unisys T27 Escape Sequences

This section details how to use Reflection for UNIX and Digital and Reflection for ReGIS Graphics to emulate the Unisys A Series T27 terminals.

Configuring Reflection for the T27 Terminal

To configure Reflection for T27 emulation:

1. On the Setup menu, click Terminal, then click the Terminal Type tab.
2. Select the **UNISYS T27** terminal type.
3. Click OK.

Escape Sequence	Description
<ESC>W	Set forms mode
<ESC>X	Reset forms mode
<DC2>	Toggle forms mode
<SOH>	Exit forms mode
<ESC>E	Set search mode
<ESC>-<x>	Set search character (x < 0x80)
<ESC>-<ESC><SO><z><ESC><SI>	Set search character (z >= 0x80)
<ESC>F	Reset search mode
<LF>	Move pointer down
<DC3>	Move pointer up
<ESC>C	Move pointer right
<DC2>	Move pointer right
<BS>	Move pointer left (backspace)
<ESC>&	Align kbc to dcp
<HT>	Tab right

Escape Sequence	Description
<ESC>#	Clear variable tabs
<VT>	Vertical tab down
<DC4>	Home
<ESC>$<n>	Jump to page n
<ESC>^<hh><kk>	Position pointer
<ESC>"<c><r>	Position pointer
<CR>	Carriage return
<LF>	Carriage return
<ESC>6	Prevent align in cursor page
<ESC>!	Insert character by line
<ESC>@	Insert character by page
<ESC>%	Delete character by line
<ESC>M	Line delete
<ESC>P	Delete character by page
<ESC>L	Line insert
<ESC>>	Move line up
<ESC><	Move line down
<ESC>K	Clear to end of line
<DC1>	Clear to end of line
<ESC>J	Clear to end of page
<SOH>	Clear page
<ESC>S	Roll page up
<ESC>T	Roll page down

Escape Sequence	Description
<ESC>]	Print all
<ESC>;	Print all with form feed
<ESC>:	Print unprotected data
<ESC>)1	Query printer status
<FF>	Clear page
<ESC><FF>	Clear page
<ETB>	End highlight
<CAN>	Start video blink
<EM>	Start secure video
<SUB>	Start bright video
<ESC>[<n>a	Printer space compression
<ESC>3	Underline video highlight
<ESC>4	Reverse video highlight
<ESC>N	Set reverse video
<ESC>O	Set normal video
<ESC>Raaaaaccdd..dd	Store ASCII codes as data
<ESC>RBmmmnnnnppp	Configure data comm, screen and kpt buffers
<ESC>RC	Reconfigure terminal
<ESC>RDhhpp..pp00iiqq..qq00nnzz..zz0000	Selective key programming
<ESC>Rhaaaacchhhh..hh	Store data in hex codes
<ESC>RKppphhkk..kkApiiqq..qqA9nnzz..zzA9A9	Program function keys f1..f10
<ESC>RL	Transmit error log

Escape Sequence	Description
<ESC>RP	Copy temporary storage into nv ram
<ESC>RSccdd..dd	Display message in environmental user status line
<ESC>Rtaaaacc	Transmit memory contents to host
<ESC>	Escape
<ESC><SO>	Set shift out
<SO>	Set shift out
<ESC><SI>	Set shift in
<SI>	Set shift in
<ESC>'x	Character translation
<ESC>=	Reset keystroke lockout
<ESC>.	Toggle variable tabs
<VT>	Toggle variable tabs
<ESC>D	Set mobile home
<ESC>Y	Lower case disable
<ESC>Z	Lower case enable
<ESC><space>E	Continuous confidence test
<ESC><space>F	Printer interface test
<ESC><space>V	Display firmware version
<ESC><space>C	Display character set
<ESC><space>D	Load contents of permanent storage and reconfigure
<ESC>_<x>	Fill with x
<ESC>(	Transmit terminal screen to host

Escape Sequence	Description
<ESC>?	Toggle audible alarm
<BEL>	Toggle audible alarm
<ETX>	End of text processing
<EOT>	End of transmission

Appendix B

Character Sets and National Characters

Because Reflection is designed to be used as a terminal emulator, it uses the ASCII character set for most common characters (such as letters and numbers) and, the host character set for national and special characters. Microsoft Windows, on the other hand, uses the ANSI character set, which is a similar collection of characters. The character values in the range 32–126 are identical for both ASCII and ANSI. With the default host character set loaded, the differences occur in the upper range of values.

Even when identical characters exist in both character sets, they are often represented by different numbers. When you use the Alt key method (explained on page 278) to enter national characters, and the ANSI value is different from that in the host character set, Reflection displays the equivalent of the ANSI character if it can be found in the host character set. If there is no equivalent (such as the ANSI decimal value 247), Reflection displays a blank.

Since Reflection uses the host character set when transmitting and receiving characters, you will only be concerned with entering national characters when:

- Entering special characters in a host application, explained on page 278.
- Writing and reading ASCII disk files, explained in the online help.
- Entering foreign characters in a file name when transferring files to a UNIX host.
- Copying information from Reflection's terminal window—the text is automatically converted from the terminal character set to the ANSI character set when placed on the Windows Clipboard. (When a character has no equivalent in one or the other character set, Windows displays a symbol such as |, +, –, or _.)

This appendix describes how to enter national characters, then shows the character set charts supported by Reflection.

Entering National Characters

Entering national characters depends on three things:

- The character you want to produce
- What type of keyboard you have installed under Windows
- Whether you are operating in 7-bit or 8-bit mode

Some PCs have keyboards and keyboard drivers available for languages other than English. If the character you want to type is on your keyboard, simply press the key to produce the character. Reflection does nothing to alter your keyboard's characters no matter what keyboard or language you have selected.

Entering special characters from the Windows character set is explained next.

Entering Characters Using the Alt Key Method

This section describes how to enter national characters using the Alt key. If you're using either Reflection for UNIX and Digital or Reflection for ReGIS Graphics, see the Reflection *Terminal Reference Manual* for a description of how to enter characters using compose sequences (viewing and printing this manual is explained in the Reflection *User Guide*).

Using the Alt key method, you provide a decimal value from the ANSI character set to enter a character in the terminal window. To do this:

1. Log in to the host.
2. On the Setup menu, click Terminal, then click the Emulation tab.
3. Click the Advanced button.
4. Verify that the **National Replacement Set** list is set to its default value of **None**.
5. Click OK (twice) to close both dialog boxes.
6. Find the ANSI decimal value for the character in the figure shown on page 283.
7. Hold down Alt, type 0, then type the 3-digit decimal code on your numeric keypad.
8. Release Alt.

For example, if you hold down Alt and press 0, 1, 9, and 6 on the numeric keypad, an Ä appears when you release the Alt key.

Using Reflection Basic's Display Method

You can also enter characters in the terminal window using the Reflection Basic `Display` method. Doing so, you provide a decimal value from the host's character set; therefore, you can produce characters unique to the host that do not also appear in the ANSI character set. To do this:

1. Press Alt+L to open the Reflection command line.
2. Find the decimal value for the character from the ASCII character set (page 282). Or, find the decimal value for the character from the Roman 8 character set in Reflection for HP with NS/VT (shown on page 286), or the current UPS Set; by default, DEC Supplemental is used in Reflection for UNIX and Digital and Reflection for ReGIS Graphics (page 290).
3. Use the Reflection Basic Display method with this syntax:

```
Application.Display Chr$(decimal value)
```

For example, in Reflection for HP with NS/VT with the Roman 8 character set loaded, typing the following and pressing Enter displays the £ symbol in Reflection's terminal window:

```
Application.Display Chr$(187)
```

If the character you want to display is in the host character set, use this syntax:

```
Application.Display Chr$(187), rcNoTranslation
```

Using the same example in Reflection for UNIX and Digital or Reflection for ReGIS Graphics, with the default DEC Supplemental graphic character set loaded, the following displays the £ symbol in Reflection's terminal window:

```
Application.Display Chr$(163)
```

As another example, to display œ (an o e ligature character unique to DEC Supplemental) use the following command:

```
Application.Display Chr$(247)
```

HP Terminal Character Sets

When Reflection is emulating an HP terminal, it has a base character set (Roman 8) and a secondary character set (HP Line Drawing). The secondary set can be used as an "alternate" character set. The *active* character set is selected from the base or the alternate set. The active set determines both what you see in Reflection's terminal window when you type from the keyboard and the display of information received from the host.

The Roman 8 character set is a combination of:

- The U.S. ASCII character set (codes 0–127), shown on page 282.
- The national characters in the Roman Extension character set (codes 161–254), shown on page 286.

The Roman 8 character set becomes active when any one of the following occurs:

- You start Reflection.
- The cursor moves to a new line.
- Reflection receives a SI (shift in) control code, which was either transmitted by a host application or sent directly from you (by pressing Ctrl+O).

The alternate HP Line Drawing character set is loaded when:

- Reflection receives the SO control code (or you sent it directly by pressing Ctrl+N), and remains in effect until either of the following occurs:
  - Reflection receives an SI control code.
  - The cursor moves to a new line.
  - A display enhancement (underline, inverse video, and so on) is encountered.

The figure on page 288 shows the HP line drawing characters.

VT Terminal Character Sets

When Reflection is emulating a VT, it has the following character sets:

- DEC Supplemental Graphic; see page 290
- ISO Latin-1 Supplemental Graphic; see page 291
- National replacement sets; see the figures in the Reflection *User Guide*
- DEC Special Graphic; see page 292
- DEC Technical; see page 293
- Code page 437 (PC English) and code page 850 (PC Multilingual)
- Dynamically Redefinable Character Sets (DRCS)

All of the above character sets—except the dynamically redefinable character set—are *hard* character sets; that is, those built in to Reflection. The DRCS characters are soft characters that can be downloaded. Downloading and mapping character sets using control sequences is explained in the Reflection *Terminal Reference* manual (see the Reflection *User Guide* for more information on viewing and printing this manual).

The DEC Supplemental Graphic and ISO Latin-1 Supplemental Graphic character sets are composed of symbols and characters for the English language and many Western European languages. For example, the £ symbol and the Ä character are in the supplemental character sets.

Together, the ASCII character set and the DEC Supplemental Graphic set comprise the DEC Multinational character set. The ASCII set and the ISO Latin-1 Supplemental Graphic character set comprise the ISO Latin Alphabet Number 1 character set. The two sets have only a few differences, as shown in the character charts in this appendix.

National replacement character (NRC) sets contain most of the same characters as the ASCII set, plus characters from the supplemental graphic sets used by specific national languages. For example, the Ä character is contained in the Finnish, German, and Swedish NRC sets. NRC sets are used primarily in 7-bit operating environments that cannot access supplemental characters.

The DEC Special Graphic and DEC Technical character sets contain characters, line-drawing elements, and mathematical symbols; see page 292 and 293 for charts of these two sets.

ASCII Character Set

The ASCII character set consists of characters with decimal values 0–127; this set is identical to the Windows character set (ANSI) codes 32–126. The characters 0–31 are control codes; they appear on your screen with the symbols shown on page 294 only when display functions are enabled (display functions are explained in the online help).

Decimal → / Hex →						
32 20	(space)	48 30	0	64 40	@	80 50	P	96 60	`	112 70	p
33 21	!	49 31	1	65 41	A	81 51	Q	97 61	a	113 71	q
34 22	"	50 32	2	66 42	B	82 52	R	98 62	b	114 72	r
35 23	#	51 33	3	67 43	C	83 53	S	99 63	c	115 73	s
36 24	$	52 34	4	68 44	D	84 54	T	100 64	d	116 74	t
37 25	%	53 35	5	69 45	E	85 55	U	101 65	e	117 75	u
38 26	&	54 36	6	70 46	F	86 56	V	102 66	f	118 76	v
39 27	'	55 37	7	71 47	G	87 57	W	103 67	g	119 77	w
40 28	(	56 38	8	72 48	H	88 58	X	104 68	h	120 78	x
41 29	)	57 39	9	73 49	I	89 59	Y	105 69	i	121 79	y
42 2A	*	58 3A	:	74 4A	J	90 5A	Z	106 6A	j	122 7A	z
43 2B	+	59 3B	;	75 4B	K	91 5B	[	107 6B	k	123 7B	{
44 2C	,	60 3C	<	76 4C	L	92 5C	\	108 6C	l	124 7C	|
45 2D	—	61 3D	=	77 4D	M	93 5D	]	109 6D	m	125 7D	}
46 2E	.	62 3E	>	78 4E	N	94 5E	^	110 6E	n	126 7E	~
47 2F	/	63 3F	?	79 4F	O	95 5F	_	111 6F	o	127 7F	DEL

ASCII Character Set

ANSI Character Set

Reflection can send and receive ASCII characters, and characters from the supported host's character set. Windows, however, uses the ANSI character set. This does not present a problem for the characters in the range 32–126 (since both ANSI and ASCII have the same values in this range), but characters above 126 must be converted to ANSI before they can be displayed by other Windows applications. This is explained in the steps on page 278.

Decimal → / Hex →								
128 80 ■	144 90 ■	160 A0	176 B0 °	192 C0 À	208 D0 Đ	224 E0 à	240 F0 ð
129 81 ■	145 91 '	161 A1 ¡	177 B1 ±	193 C1 Á	209 D1 Ñ	225 E1 á	241 F1 ñ
130 82 ■	146 92 '	162 A2 ¢	178 B2 2	194 C2 Â	210 D2 Ò	226 E2 â	242 F2 ò
131 83 ■	147 93 ■	163 A3 £	179 B3 3	195 C3 Ã	211 D3 Ó	227 E3 ã	243 F3 ó
132 84 ■	148 94 ■	164 A4 ¤	180 B4 ´	196 C4 Ä	212 D4 Ô	228 E4 ä	244 F4 ô
133 85 ■	149 95 ■	165 A5 ¥	181 B5 µ	197 C5 Å	213 D5 Õ	229 E5 å	245 F5 õ
134 86 ■	150 96 ■	166 A6 ¦	182 B6 ¶	198 C6 Æ	214 D6 Ö	230 E6 æ	246 F6 ö
135 87 ■	151 97 ■	167 A7 §	183 B7 ·	199 C7 Ç	215 D7 ×	231 E7 ç	247 F7 ÷
136 88 ■	152 98 ■	168 A8 "	184 B8 ¸	200 C8 È	216 D8 Ø	232 E8 è	248 F8 ø
137 89 ■	153 99 ■	169 A9 ©	185 B9 1	201 C9 É	217 D9 Ù	233 E9 é	249 F9 ù
138 8A ■	154 9A ■	170 AA ª	186 BA º	202 CA Ê	218 DA Ú	234 EA ê	250 FA ú
139 8B ■	155 9B ■	171 AB «	187 BB »	203 CB Ë	219 DB Û	235 EB ë	251 FB û
140 8C ■	156 9C ■	172 AC ¬	188 BC 1/4	204 CC Ì	220 DC Ü	236 EC ì	252 FC ü
141 8D ■	157 9D ■	173 AD –	189 BD 1/2	205 CD Í	221 DD Ý	237 ED í	253 FD ý
142 8E ■	158 9E ■	174 AE ®	190 BE 3/4	206 CE Î	222 DE Þ	238 EE î	254 FE þ
143 8F ■	159 9F ■	175 AF —	191 BF ¿	207 CF Ï	223 DF ß	239 EF ï	255 FF ÿ

■ Indicates that this character is not printable by other Windows applications.

ANSI Character Set (128–255)

IBM PC Extended Character Set

Windows applications can display only those characters from the IBM PC extended character set (ECS) that also appear in the ANSI character set (for example, the character ¢). You can enter any common character, even if the ECS code is different from the ANSI code—Windows automatically performs the conversion for you.

Decimal → / Hex →								
128 80 Ç	144 90 É	160 A0 á	176 B0 ■	192 C0 ■	208 D0 ■	224 E0 ■	240 F0 ■
129 81 ü	145 91 æ	161 A1 í	177 B1 ■	193 C1 ■	209 D1 ■	225 E1 ß	241 F1 ±
130 82 é	146 92 Æ	162 A2 ó	178 B2 ■	194 C2 ■	210 D2 ■	226 E2 ■	242 F2 ■
131 83 â	147 93 ô	163 A3 ú	179 B3 ■	195 C3 ■	211 D3 ■	227 E3 ¶	243 F3 ■
132 84 ä	148 94 ö	164 A4 ñ	180 B4 ■	196 C4 ■	212 D4 ■	228 E4 ■	244 F4 ■
133 85 à	149 95 ò	165 A5 Ñ	181 B5 ■	197 C5 ■	213 D5 ■	229 E5 ■	245 F5 ■
134 86 å	150 96 û	166 A6 ª	182 B6 ■	198 C6 ■	214 D6 ■	230 E6 µ	246 F6 ■
135 87 ç	151 97 ù	167 A7 º	183 B7 ■	199 C7 ■	215 D7 ■	231 E7 ■	247 F7 ■
136 88 ê	152 98 ÿ	168 A8 ¿	184 B8 ■	200 C8 ■	216 D8 ■	232 E8 ■	248 F8 °
137 89 ë	153 99 Ö	169 A9 ⌐	185 B9 ■	201 C9 ■	217 D9 ■	233 E9 ■	249 F9 ■
138 8A è	154 9A Ü	170 AA ¬	186 BA ■	202 CA ■	218 DA ■	234 EA ■	250 FA ■
139 8B ï	155 9B ¢	171 AB 1/2	187 BB ■	203 CB ■	219 DB ■	235 EB ■	251 FB ■
140 8C î	156 9C £	172 AC 1/4	188 BC ■	204 CC ■	220 DC ■	236 EC ■	252 FC ■
141 8D ì	157 9D ¥	173 AD ¡	189 BD ■	205 CD ■	221 DD ■	237 ED ■	253 FD ²
142 8E Ä	158 9E ■	174 AE «	190 BE ■	206 CE ■	222 DE ■	238 EE ■	254 FE "
143 8F Å	159 9F ■	175 AF »	191 BF ■	207 CF ■	223 DF ■	239 EF ■	255 FF ■

■ Indicates that this character is not printable by other Windows applications.

IBM PC Extended Character Set (Code Page 437)

To enter a character in the terminal window from the IBM extended character set:

1. Log in to the host.
2. Click Terminal on the Setup menu, and on the Emulation tab click Advanced.
3. Verify that the **National Replacement Set** box is set to its default value of **None**.
4. Click OK (twice) to close both dialog boxes.
5. Find the ECS decimal value for the character in the figure shown on page 284.
6. Hold down Alt and type the 3-digit decimal code on your numeric keypad (do *not* type a `0` before the code, as you would to enter a national character using the method on page 278).
7. Release Alt.

For example, if you are using code page 437 (United States), hold down Alt and press 1, 5, and 5 on the numeric keypad. Windows converts 155 to its ANSI equivalent 162 (as if you had used Alt+0+1+6+2), and a ¢ symbol appears.

Roman 8 Extension Character Set (HP Emulation)

The Roman 8 Extension character set includes special and multinational characters used in non-U.S. ASCII national languages.

Decimal → / Hex →												
160 A0		176 B0	—	192 C0	â	208 D0	Å	224 E0	Á	240 F0	Þ
161 A1	À	177 B1	Ý	193 C1	ê	209 D1	î	225 E1	Ã	241 F1	þ
162 A2	Â	178 B2	ý	194 C2	ô	210 D2	Ø	226 E2	ã	242 F2	•
163 A3	È	179 B3	°	195 C3	û	211 D3	Æ	227 E3	Ð	243 F3	µ
164 A4	Ê	180 B4	Ç	196 C4	á	212 D4	å	228 E4	ð	244 F4	¶
165 A5	Ë	181 B5	ç	197 C5	é	213 D5	í	229 E5	Í	245 F5	3/4
166 A6	Î	182 B6	Ñ	198 C6	ó	214 D6	ø	230 E6	Ì	246 F6	–
167 A7	Ï	183 B7	ñ	199 C7	ú	215 D7	æ	231 E7	Ó	247 F7	1/4
168 A8	´	184 B8	¡	200 C8	à	216 D8	Ä	232 E8	Ò	248 F8	1/2
169 A9	`	185 B9	¿	201 C9	è	217 D9	ì	233 E9	Õ	249 F9	a
170 AA	^	186 BA	¤	202 CA	ò	218 DA	Ö	234 EA	õ	250 FA	º
171 AB	¨	187 BB	£	203 CB	ù	219 DB	Ü	235 EB	Š	251 FB	«
172 AC	~	188 BC	¥	204 CC	ä	220 DC	É	236 EC	š	252 FC	▮
173 AD	Ù	189 BD	§	205 CD	ë	221 DD	ï	237 ED	Ú	253 FD	»
174 AE	Û	190 BE	ƒ	206 CE	ö	222 DE	ß	238 EE	Ÿ	254 FE	±
175 AF	£	191 BF	¢	207 CF	ü	223 DF	Ô	239 EF	ÿ	255 FF	◊

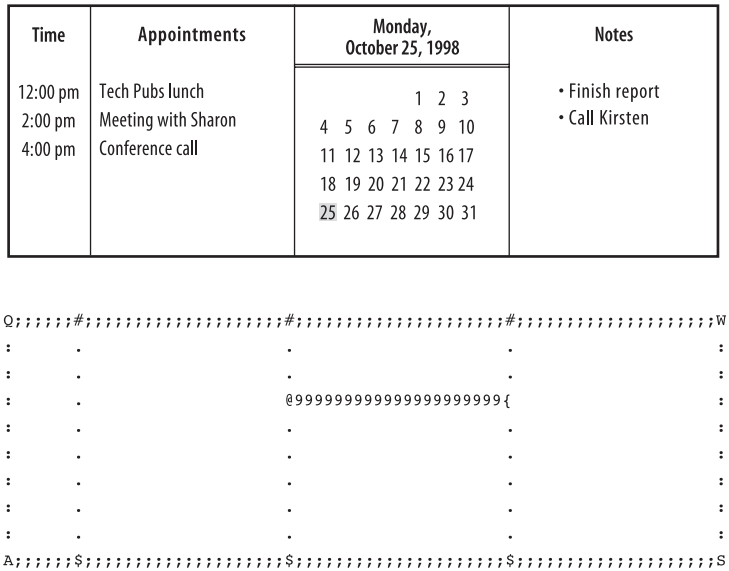
The Roman 8 Extension Character Set

HP Line Drawing Character Set (HP Emulation)

Reflection generates all the characters in the HP line drawing character set, which is an alternate character set comprising simple line and graphic elements. Often, the line drawing set is used with format mode to create forms, tables, and other images. Each letter key generates only one line drawing character, whether Shift is used or not. Most of the numeric and punctuation keys can generate two line drawing characters; one when the key alone is pressed, and another when the key and Shift are pressed together.

Press Ctrl+N to access the line drawing character set; press Ctrl+O to return to normal characters. Reflection reverts to the normal character set when the cursor moves to a new row.

The following figure shows the line drawing characters used to create a sample form:



Sample Form Created with Line Drawing Characters

In the tables that follow, the character "cell" is a shaded rectangle in order to show each line drawing character's position within the cell.

Decimal	ASCII	Line Drawing
32		
33	!	
34	"	
35	#	
36	$	
37	%	
38	&	
39	'	
40	(	
41	)	
42	*	
43	+	
44	,	
45	-	
46	.	
47	/	

Decimal	ASCII	Line Drawing
48	0	
49	1	
50	2	
51	3	
52	4	
53	5	
54	6	
55	7	
56	8	
57	9	
58	:	
59	;	
60	<	
61	=	
62	>	
63	?	

Decimal	ASCII	Line Drawing
64	@/`	
65	A/a	
66	B/b	
67	C/c	
68	D/d	
69	E/e	
70	F/f	
71	G/g	
72	H/h	
73	I/i	
74	J/j	
75	K/k	
76	L/l	
77	M/m	
78	N/n	
79	O/o	

Line Drawing Characters

Decimal	ASCII	Line Drawing
80	P/p	
81	Q/q	
82	R/r	
83	S/s	
84	T/t	
85	U/u	
86	V/v	
87	W/w	
88	X/x	
89	Y/y	
90	Z/z	
91	[	
92	\	
93	]	
94	^	
95	_	

Decimal	ASCII	Line Drawing
123	{	
124	|	
125	}	
126	~	

Line Drawing Characters (continued)

DEC Supplemental Graphic Character Set (VT Emulation)

The DEC Supplemental Graphic character set contains 94 graphic characters, including accented characters for many national languages. This set is the default character set loaded into the graphic right (GR) table when you start Reflection.

Decimal → / Hex →												
160 A0		176 B0	°	192 C0	À	208 D0	?	224 E0	à	240 F0	?
161 A1	¡	177 B1	±	193 C1	Á	209 D1	Ñ	225 E1	á	241 F1	ñ
162 A2	¢	178 B2	2	194 C2	Â	210 D2	Ò	226 E2	â	242 F2	ò
163 A3	£	179 B3	3	195 C3	Ã	211 D3	Ó	227 E3	ã	243 F3	ó
164 A4	?	180 B4	?	196 C4	Ä	212 D4	Ô	228 E4	ä	244 F4	ô
165 A5	¥	181 B5	µ	197 C5	Å	213 D5	Õ	229 E5	å	245 F5	õ
166 A6	?	182 B6	¶	198 C6	Æ	214 D6	Ö	230 E6	æ	246 F6	ö
167 A7	§	183 B7	·	199 C7	Ç	215 D7	Œ	231 E7	ç	247 F7	œ
168 A8	¤	184 B8	?	200 C8	È	216 D8	Ø	232 E8	è	248 F8	ø
169 A9	©	185 B9	1	201 C9	É	217 D9	Ù	233 E9	é	249 F9	ù
170 AA	ª	186 BA	º	202 CA	Ê	218 DA	Ú	234 EA	ê	250 FA	ú
171 AB	«	187 BB	»	203 CB	Ë	219 DB	Û	235 EB	ë	251 FB	û
172 AC	?	188 BC	1/4	204 CC	Ì	220 DC	Ü	236 EC	ì	252 FC	ü
173 AD	?	189 BD	1/2	205 CD	Í	221 DD	Ÿ	237 ED	í	253 FD	ÿ
174 AE	?	190 BE	?	206 CE	Î	222 DE	?	238 EE	î	254 FE	?
175 AF	?	191 BF	¿	207 CF	Ï	223 DF	ß	239 EF	ï	255 FF	

□ Not part of the character set.

DEC Supplemental Graphic Character Set

ISO Latin-1 Supplemental Graphic Character Set (VT Emulation)

The ISO Latin-1 Supplemental Graphic character set contains 96 graphic characters, including many of the same characters as the DEC Supplemental Graphic set.* To select ISO Latin-1, click Terminal on the Setup menu and on the Emulation tab select this value from the **Host character set** list.

Decimal → / Hex →												
160 A0	(space)	176 B0	°	192 C0	À	208 D0	Ð	224 E0	à	240 F0	ð
161 A1	¡	177 B1	±	193 C1	Á	209 D1	Ñ	225 E1	á	241 F1	ñ
162 A2	¢	178 B2	²	194 C2	Â	210 D2	Ò	226 E2	â	242 F2	ò
163 A3	£	179 B3	³	195 C3	Ã	211 D3	Ó	227 E3	ã	243 F3	ó
164 A4	¤	180 B4	´	196 C4	Ä	212 D4	Ô	228 E4	ä	244 F4	ô
165 A5	¥	181 B5	µ	197 C5	Å	213 D5	Õ	229 E5	å	245 F5	õ
166 A6	¦	182 B6	¶	198 C6	Æ	214 D6	Ö	230 E6	æ	246 F6	ö
167 A7	§	183 B7	·	199 C7	Ç	215 D7	×	231 E7	ç	247 F7	÷
168 A8	¨	184 B8	¸	200 C8	È	216 D8	Ø	232 E8	è	248 F8	ø
169 A9	©	185 B9	¹	201 C9	É	217 D9	Ù	233 E9	é	249 F9	ù
170 AA	ª	186 BA	º	202 CA	Ê	218 DA	Ú	234 EA	ê	250 FA	ú
171 AB	«	187 BB	»	203 CB	Ë	219 DB	Û	235 EB	ë	251 FB	û
172 AC	¬	188 BC	1/4	204 CC	Ì	220 DC	Ü	236 EC	ì	252 FC	ü
173 AD	–	189 BD	1/2	205 CD	Í	221 DD	Ý	237 ED	í	253 FD	ý
174 AE	®	190 BE	3/4	206 CE	Î	222 DE	Þ	238 EE	î	254 FE	þ
175 AF	¯	191 BF	¿	207 CF	Ï	223 DF	ß	239 EF	ï	255 FF	ÿ

☐ Unique to the ISO Latin-1 character set; the Host Character Set on the Emulation panel in the Terminal Setup dialog box must be set to ISO Latin-1.

ISO Latin-1 Supplemental Graphic Character Set

* The ISO Latin-1 character set is identical to the Windows character set (ANSI) codes 160–255.

DEC Special Graphic Character Set (VT Emulation)

The DEC Special Graphic character set contains 94 graphic characters, including letters, numbers, special symbols, and line-drawing characters. When mapped to the graphic left (GL) table, this set includes the CØ codes shown in the figure on page 298.

Decimal → / Hex →												
160 A0		176 B0	0	192 C0	@	208 D0	P	224 E0	◆	240 F0	— SCAN 3
161 A1	!	177 B1	1	193 C1	A	209 D1	Q	225 E1	▒	241 F1	— SCAN 5
162 A2	"	178 B2	2	194 C2	B	210 D2	R	226 E2	H_T	242 F2	— SCAN 7
163 A3	#	179 B3	3	195 C3	C	211 D3	S	227 E3	F_F	243 F3	— SCAN 9
164 A4	$	180 B4	4	196 C4	D	212 D4	T	228 E4	C_R	244 F4	├
165 A5	%	181 B5	5	197 C5	E	213 D5	U	229 E5	L_F	245 F5	┤
166 A6	&	182 B6	6	198 C6	F	214 D6	V	230 E6	°	246 F6	┴
167 A7	'	183 B7	7	199 C7	G	215 D7	W	231 E7	±	247 F7	┬
168 A8	(	184 B8	8	200 C8	H	216 D8	X	232 E8	N_L	248 F8	│
169 A9	)	185 B9	9	201 C9	I	217 D9	Y	233 E9	V_T	249 F9	≤
170 AA	*	186 BA	:	202 CA	J	218 DA	Z	234 EA	┘	250 FA	≥
171 AB	+	187 BB	;	203 CB	K	219 DB	[	235 EB	┐	251 FB	π
172 AC	,	188 BC	<	204 CC	L	220 DC	\	236 EC	┌	252 FC	≠
173 AD	—	189 BD	=	205 CD	M	221 DD	]	237 ED	└	253 FD	£
174 AE	.	190 BE	>	206 CE	N	222 DE	^	238 EE	┼	254 FE	·
175 AF	/	191 BF	?	207 CF	O	223 DF	(space)	239 EF	— SCAN 1	255 FF	

Not part of the character set.

DEC Special Graphic Character Set

DEC Technical Character Set (VT Emulation)

The DEC Technical character set contains 94 graphic characters, including symbols and characters used in technical applications. When mapped to the graphic left (GL) table, it includes the CØ codes shown in the figure on page 298.

Decimal → / Hex →	160 A0	176 B0	192 C0	208 D0	224 E0	240 F0
	161 A1 ⎷	177 B1 ⎾	193 C1 ∝	209 D1 Ψ	225 E1 α	241 F1 ψ
	162 A2 ⌠	178 B2 ∠	194 C2 ∞	210 D2 ⎩	226 E2 β	242 F2 ρ
	163 A3 ⎯	179 B3 ⎲	195 C3 ÷	211 D3 Σ	227 E3 χ	243 F3 σ
	164 A4 ⌡	180 B4 ⎳	196 C4 Δ	212 D4 ⎨	228 E4 δ	244 F4 τ
	165 A5 ⌡	181 B5 ⎺	197 C5 ∇	213 D5 ⎬	229 E5 ε	245 F5 ⎭
	166 A6 ⎮	182 B6 ⎻	198 C6 Φ	214 D6 √	230 E6 φ	246 F6 ƒ
	167 A7 ⌈	183 B7 ⟩	199 C7 Γ	215 D7 Ω	231 E7 Υ	247 F7 ω
	168 A8 ⌊	184 B8 ⎧	200 C8 ¨	216 D8 Ξ	232 E8 η	248 F8 ξ
	169 A9 ⌉	185 B9 ⎫	201 C9 ≃	217 D9 γ	233 E9 ι	249 F9 υ
	170 AA ⌋	186 BA ⎭	202 CA Θ	218 DA ⊂	234 EA θ	250 FA ζ
	171 AB ⎛	187 BB ⎫	203 CB ×	219 DB ⊃	235 EB κ	251 FB ←
	172 AC ⎜	188 BC ≤	204 CC Λ	220 DC ∩	236 EC λ	252 FC ↑
	173 AD ⎝	189 BD ≠	205 CD ⇔	221 DD ∪	237 ED ⎩	253 FD →
	174 AE ⎞	190 BE ≥	206 CE ⇒	222 DE ∧	238 EE ν	254 FE ↓
	175 AF ⎨	191 BF ∫	207 CF ≡	223 DF ∨	239 EF ∂	255 FF

☐ Not part of the character set.

DEC Technical Character Set

Control Characters

Control characters govern cursor movement, data communications operations, and other terminal actions. They include CØ controls with decimal values 0–31, and C1 controls with decimal values 128–159.

Normally, control characters do not display. However, if the **Control characters** option (on the Screen tab in the Display Setup dialog box) is set to **Display**, control characters appear as two-letter mnemonics.

Reflection recognizes only those codes below denoted by an asterisk (*).

CØ Controls (Decimal Ø-32)

ASCII Decimal	Keystroke	Display	Definition
0	Ctrl+@	$^{N}_{U}$	Null
1	Ctrl+A	$^{S}_{H}$	Start of header
2	Ctrl+B	$^{S}_{X}$	Start of text
3	Ctrl+C	$^{E}_{X}$	End of text
4	Ctrl+D	$^{E}_{T}$	End of transmission
5*	Ctrl+E	$^{E}_{Q}$	Enquiry
6	Ctrl+F	$^{A}_{K}$	Acknowledge
7*	Ctrl+G	$^{B}_{L}$	Bell
8*	Ctrl+H	$^{B}_{S}$	Backspace
9*	Ctrl+I	$^{H}_{T}$	Horizontal tab
10*	Ctrl+J	$^{L}_{F}$	Linefeed
11*	Ctrl+K	$^{V}_{T}$	Vertical tab
12*	Ctrl+L	$^{F}_{F}$	Form feed
13*	Ctrl+M	$^{C}_{R}$	Carriage return
14*	Ctrl+N	$^{S}_{O}$	Shift out
15*	Ctrl+O	$^{S}_{I}$	Shift in
16	Ctrl+P	$^{D}_{L}$	Data link escape

CØ Controls (Decimal Ø-32)

ASCII Decimal	Keystroke	Display	Definition
17*	Ctrl+Q	$^{D}_{1}$	Device control 1 (XON)
18	Ctrl+R	$^{D}_{2}$	Device control 2
19*	Ctrl+S	$^{D}_{3}$	Device control 3 (XOFF)
20	Ctrl+T	$^{D}_{4}$	Device control 4
21	Ctrl+U	$^{N}_{K}$	Negative acknowledge
22	Ctrl+V	$^{S}_{Y}$	Synchronous idle
23	Ctrl+W	$^{E}_{B}$	End of transmission block
24*	Ctrl+X	$^{C}_{N}$	Cancel
25	Ctrl+Y	$^{E}_{M}$	End of medium
26	Ctrl+Z	$^{S}_{B}$	Substitute
27*	Ctrl+[	$^{E}_{C}$	Escape
28	Ctrl+\	$^{F}_{S}$	Field separator
29	Ctrl+]	$^{G}_{S}$	Group separator
30	Ctrl+Shift+6	$^{R}_{S}$	Record separator
31	Ctrl+Shift+-	$^{U}_{S}$	Unit separator
32	Ctrl+Shift+2		Space (blank)

C1 Controls (Decimal 128-159)

ASCII Decimal	Display	7-bit Equiv	Definition
128	$^{8}_{0}$		Ignored
129	$^{8}_{1}$		Ignored
130	$^{8}_{2}$		Ignored
131	$^{8}_{3}$		Ignored
132*	$^{I}_{N}$	$^{E}_{S}$C D	Index
133*	$^{N}_{E}_{L}$	$^{E}_{S}$C E	Next line
134	$^{S}_{S}$		Start selected area
135	$^{E}_{S}$		End selected area

C1 Controls (Decimal 128-159)

ASCII Decimal	Display	7-bit Equiv	Definition
136*	$^{H}_{S}$	^{ESC} H	Horizontal tab set
137	$^{H}_{J}$		Horizontal tab set with justification
138	$^{V}_{S}$		Vertical tab set
139	$^{P}_{D}$		Partial line down
140	$^{P}_{U}$		Partial line up
141*	$^{R}_{I}$	^{ESC} M	Reverse index
142*	$^{S}_{2}$	^{ESC} N	Single shift 2
143*	$^{S}_{3}$	^{ESC} O	Single shift 3
144*	$^{D}_{C}$	^{ESC} P	Device control string
145	$^{P}_{1}$		Private use 1
146	$^{P}_{2}$		Private use 2
147	$^{S}_{E}$		Ignored
148	$^{C}_{C}$		Cancel character
149	$^{M}_{W}$		Message waiting
150	$^{S}_{P}$		Start protected area
151	$^{E}_{P}$		End protected area
152	$^{9}_{8}$		Ignored
153	$^{9}_{9}$		Ignored
154	$^{9}_{A}$		Ignored
155*	$^{C}_{S}$	^{ESC} [	Control sequence introducer
156*	$^{S}_{T}$	^{ESC} \	String terminator
157	$^{O}_{S}$		Operating system command
158	$^{P}_{M}$		Privacy message
159	$^{A}_{P}$		Application program command

Some functions still work when you display the control codes:

- ^L, ^F, and ^V cause a carriage return and linefeed that move the cursor to a new line. Reflection displays the character before performing the new line function.
- ^D^C1 (XON) and ^D^C3 (XOFF) maintain flow control for serial connections, if pacing is enabled in the More Settings-Connection Setup dialog box.

Display Control Character Set

The display control character set is a special character set used when the **Control characters** group box (on the Screen tab in the Display Setup dialog box) is set to **Display**. CØ is loaded temporarily into the graphic left (GL) table, and C1 into graphic right (GR) to show how control characters appear on screen (see the Reflection *Terminal Reference* manual for more information on the in-use character set table).

The ISO Latin-1 supplemental character set is used in GR to present displayable graphic characters (numbers, letters, and so on) with decimal values 160–255.

In 8-bit environments, C1 controls can be sent directly. In a 7-bit environment, you can send an 8-bit C1 control character by converting it to an equivalent 7-bit escape sequence. The 8-bit controls are single character codes (such as ^SI), whereas their 7-bit equivalents are two-character sequences (such as ^[C). To form an equivalent 7-bit escape sequence from an 8-bit control character:

1. Subtract the hexadecimal value 40 from the C1 control code's value.
2. Precede the result with the ^[character (^[).

For example, the ^IND character (decimal 132) has a hexadecimal value of 84. To convert ^IND to a 7-bit equivalent, first subtract hexadecimal 40:

84 hex - 40 hex = 44 hex

Hexadecimal 44 is the letter D (as seen in the figure on page 298). Therefore, to represent the ^IND character in a 7-bit environment, you would use ^[CD (^[D).

Here's another way to use these charts. To generate control codes 0–31, press Ctrl, then the character four columns to the right of the mnemonic. For example, to type the ^[character (decimal 27), press Ctrl+[(the [is four columns to the right of the ^[mnemonic). That is, add hex 40 to the control character to get the ASCII character to press along with the Ctrl key.

For control codes 128–159, press Esc, then press the ASCII character that's four columns to the left of the mnemonic. That is, subtract hex 40 from the control character's value to get the ASCII character to press with the Esc key. For example, the 7-bit equivalent for $^{SS}_{3}$ (decimal 143, hex 8F) is Esc+O (the letter O is four columns left of the $^{SS}_{3}$, at hex 4F).

Decimal → / Hex →							
00 00 $^{N}_{U}$	16 10 $^{D}_{L}$	32 20 (space)	48 30 0	64 40 @	80 50 P	96 60 `	112 70 p
01 01 $^{S}_{H}$	17 11 $^{D}_{1}$	33 21 !	49 31 1	65 41 A	81 51 Q	97 61 a	113 71 q
02 02 $^{S}_{X}$	18 12 $^{D}_{2}$	34 22 "	50 32 2	66 42 B	82 52 R	98 62 b	114 72 r
03 03 $^{E}_{X}$	19 13 $^{D}_{3}$	35 23 #	51 33 3	67 43 C	83 53 S	99 63 c	115 73 s
04 04 $^{E}_{T}$	20 14 $^{D}_{4}$	36 24 $	52 34 4	68 44 D	84 54 T	100 64 d	116 74 t
05 05 $^{E}_{Q}$	21 15 $^{N}_{K}$	37 25 %	53 35 5	69 45 E	85 55 U	101 65 e	117 75 u
06 06 $^{A}_{K}$	22 16 $^{S}_{Y}$	38 26 &	54 36 6	70 46 F	86 56 V	102 66 f	118 76 v
07 07 $^{B}_{L}$	23 17 $^{E}_{B}$	39 27 '	55 37 7	71 47 G	87 57 W	103 67 g	119 77 w
08 08 $^{B}_{S}$	24 18 $^{C}_{N}$	40 28 (	56 38 8	72 48 H	88 58 X	104 68 h	120 78 x
09 09 $^{H}_{T}$	25 19 $^{E}_{M}$	41 29)	57 39 9	73 49 I	89 59 Y	105 69 i	121 79 y
10 0A $^{L}_{F}$	26 1A Ş	42 2A *	58 3A :	74 4A J	90 5A Z	106 6A j	122 7A z
11 0B $^{V}_{T}$	27 1B $^{E}_{C}$	43 2B +	59 3B ;	75 4B K	91 5B [	107 6B k	123 7B {
12 0C $^{F}_{F}$	28 1C $^{F}_{S}$	44 2C ,	60 3C <	76 4C L	92 5C \	108 6C l	124 7C |
13 0D $^{C}_{R}$	29 1D $^{G}_{S}$	45 2D -	61 3D =	77 4D M	93 5D]	109 6D m	125 7D }
14 0E $^{S}_{O}$	30 1E $^{R}_{S}$	46 2E .	62 3E >	78 4E N	94 5E ^	110 6E n	126 7E ~
15 0F $^{S}_{I}$	31 1F $^{U}_{S}$	47 2F /	63 3F ?	79 4F O	95 5F _	111 6F o	127 7F $^{D}_{T}$
C0 CODES		GL CODES ASCII GRAPHIC					

Display Controls (Left Half) with C0 Codes

Decimal → / Hex →								
128 80 8_0	144 90 D_C	160 A0 A_0	176 B0 °	192 C0 À	208 D0 Ð	224 E0 à	240 F0 ð
129 81 8_1	145 91 P_1	161 A1 ¡	177 B1 ±	193 C1 Á	209 D1 Ñ	225 E1 á	241 F1 ñ
130 82 8_2	146 92 P_2	162 A2 ¢	178 B2 ²	194 C2 Â	210 D2 Ò	226 E2 â	242 F2 ò
131 83 8_3	147 93 S_E	163 A3 £	179 B3 ³	195 C3 Ã	211 D3 Ó	227 E3 ã	243 F3 ó
132 84 I_N	148 94 C_C	164 A4 ¤	180 B4 ´	196 C4 Ä	212 D4 Ô	228 E4 ä	244 F4 ô
133 85 N_L	149 95 M_W	165 A5 ¥	181 B5 µ	197 C5 Å	213 D5 Õ	229 E5 å	245 F5 õ
134 86 S_S	150 96 S_P	166 A6 ¦	182 B6 ¶	198 C6 Æ	214 D6 Ö	230 E6 æ	246 F6 ö
135 87 E_S	151 97 E_P	167 A7 §	183 B7 ·	199 C7 Ç	215 D7 ×	231 E7 ç	247 F7 ÷
136 88 H_S	152 98 9_8	168 A8 ¨	184 B8 ¸	200 C8 È	216 D8 Ø	232 E8 è	248 F8 ø
137 89 H_J	153 99 9_9	169 A9 ©	185 B9 ¹	201 C9 É	217 D9 Ù	233 E9 é	249 F9 ù
138 8A V_S	154 9A 9_A	170 AA ª	186 BA º	202 CA Ê	218 DA Ú	234 EA ê	250 FA ú
139 8B P_D	155 9B C_S	171 AB «	187 BB »	203 CB Ë	219 DB Û	235 EB ë	251 FB û
140 8C P_U	156 9C S_T	172 AC ¬	188 BC 1/4	204 CC Ì	220 DC Ü	236 EC ì	252 FC ü
141 8D R_I	157 9D O_S	173 AD	189 BD 1/2	205 CD Í	221 DD Ý	237 ED í	253 FD ý
142 8E S_2	158 9E P_M	174 AE ®	190 BE 3/4	206 CE Î	222 DE Þ	238 EE î	254 FE þ
143 8F S_3	159 9F A_P	175 AF ¯	191 BF ¿	207 CF Ï	223 DF ß	239 EF ï	255 FF ÿ
C1 CODES		GR CODES ISO LATIN-1 SUPPLEMENTAL					

Display Controls (Right Half) with C1 Codes

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Z