Twin Client Reference

For Devices Manufactured by Compsee

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Table of Contents

Chapter 1 • Introduction 1-1

PowerNet Products Overview....1-1
PowerNet Twin Client Overview....1-1
In This Manual....1-2

Chapter 2 • Installation 2-4

Requirements....2-4
Downloading From the WEB....2-4
Running Setup from a Download File....2-4
Running Setup from CD-ROM....2-5
Installation....2-5
Running the Manager....2-7

Chapter 3 • Quick Start 3-9

Configuring the Manager....3-9
Downloading Files to the Terminal....3-14
AirLoad Execution....3-16
Manual Configuration Update....3-17
Starting a Telnet Session....3-19
Troubleshooting....3-20

Chapter 4 • Standard Setup 4-21

Setup Using Twin Client Manager....4-21
VT and HP Settings....4-21
5250 Settings....4-23
3270 Settings....4-24
Authorizing PowerNet....4-27

Chapter 5 • Advanced Setup 5-29

Selecting the Advanced Setup....5-29
Customizing the Keyboard....5-29

Customizing the Display 5-31
Customizing the Scanner 5-35
Setting Log Levels 5-36
Customizing Timers 5-37
Customizing Alarms 5-38
Customizing Printers 5-41
Miscellaneous Customizations 5-44

Chapter 6 • Advanced Integration 6-46

Keyboard/Mapping 6-46
Keyboard Macros 6-50
Scanner/Data Mapping 6-51
Scanner/Data Editing 6-53
Scan/Decoder Control 6-55
Display/Mapping 6-56
Display/Formatting 6-58
Printer/Init 6-58
Dialog 6-59
Extended Commands 6-64
Advanced Display Options for VT/HP 6-68
Advanced 3270 Keyboard Options 6-69
NEW ENVIRON Telnet Extension 6-71

Chapter 7 • The Display Formatter 7-74

Setting the Emulation 7-74
Starting the Emulator 7-75
Taking Snapshots 7-77
Formatting 7-78

Chapter 8 • Software Management 8-83

Auto-Configuration 8-83
Downloading Files to the Terminal 8-88
AirLoad Execution 8-90
Manual Configuration Update 8-91
Starting a Telnet Session 8-93

Troubleshooting 8-94

Appendix A • Character Sets 95

ISO 8859-1 Character Set 95
ASCII Character Set 99
ASCII Character Set 100

Appendix B • Keypad Configuration 101

Keypad Figures 101
Compsee Apex III Keyboard, 5250 102
Compsee Apex III Keyboard, 3270 103
Compsee Apex III Keyboard, VT/HP 104
Compsee Apex III Terminal Keypad Tables 105
Compsee Apex III Terminal Control Sequences 108

Chapter 1 • Introduction

PowerNet Products Overview

PowerNet products bridge the gap between portable wireless devices and network applications, making the entire wireless enterprise as productive, efficient, and reliable as possible. The PowerNet family of products supports the following:

- All Internet-compatible wireless networks, encompassing virtually all wireless LAN technologies on the market today. Spectrum One, a proprietary spread spectrum wireless technology in the 900Mhz band, is also supported.
- All Internet-compatible wire network media, including Ethernet and Token Ring.
- All major user interfaces, including HTML, VT/HP, 3270, and 5250.
- All possible network application architectures including direct client, client-server, and three-tier client server.

PowerNet consists of three major product families that work in unison to deliver a single, complete solution for the entire wireless enterprise. The focus of each of these products is described below.

- PowerNet **OpenAir**: Hardware and middleware solutions for the wireless automatic identification industry. This family includes the Linux-based PowerNet **IX,** Windows-based PowerNet **NT**, and the universal terminal client software**,** PowerNet **Twin Client.**
- PowerNet **Enterprise**: Hardware and middleware solutions for the general wireless market. This family includes the ground-breaking **Vision** wireless network management tool and a **WEB Browser** for character-based terminals
- PowerNet **DataLinc**: Application development tools for the wireless client-server environment. The family currently includes PowerNet **AirLinc** and PowerNet **ControLinc** for use with ODBC compliant databases.

PowerNet Twin Client Overview

PowerNet Twin Client is a software package that provides VT100, VT220, HP700/92, TN3270 (Telnet 3270), and TN5250 (Telnet 5250) emulation on portable terminals. It includes an easy-to-use Windows program for configuring and downloading the software to the portable terminals.

Modes of Operation

PowerNet Twin Client operates in either of two modes: *thick* client or *thin* client.

- Thick client mode (also referred to as *telnet client* mode) provides a telnet connection directly to host computers and their applications
- Thin client mode communicates directly with a PowerNet OpenAir or PowerNet AirLinc server, which in turn provides the connection to host computers and their applications.

The primary difference between the two modes is in processing load distribution: In thick mode, all application protocol processing is performed on the terminal, while in thin mode all of the processing takes place on an intermediate OpenAir or AirLinc server. Another important difference is optimization: In thin mode, the OpenAir or AirLinc server introduces display optimization, data compression, and several other techniques that can dramatically reduce wireless network traffic. These optimizations are not possible in thick mode.

All of the user interface features, functions, and capabilities remain the same, regardless of the mode of operation.

Major Features

PowerNet Twin Client for Compsee terminals offers the following benefits:

- **Management:** Administrators and integrators can monitor and modify the software revision and configuration of each portable terminal from any Windows PC attached to the TCP/IP network. Changes are downloaded to the terminals over the wireless LAN automatically.
- **Diagnostics:** Because Twin Client is fully integrated with PowerNet Vision, the network management tool, administrators and technicians can monitor terminal displays, keyboard activity, and diagnostic logs on the Twin Client terminals in real time, from any Windows PC attached to the TCP/IP network.
- **Formatting:** The PowerNet Terminal Screen Formatter feature is built-in, allowing integrators to tailor host application displays to suit the needs of the terminal operators without modifying the applications.
- **Internationalization:** Error message language translations and character sets are menu selections. No additional integration is necessary.
- **Migration:** Conversion to a PowerNet OpenAir or PowerNet AirLinc client-server environment is automatic because the "thin" client is included in the Twin Client software already downloaded to the terminal.

In This Manual

This manual is organized as follows:

- Chapter one provides an overview of the PowerNet product line and an introduction to the PowerNet Twin Client.
- Chapter two describes how to load the PowerNet Twin Client Manager software on a Windows 95, 98, 2000, or NT PC.
- Chapter three describes how to quickly configure the PowerNet Twin Client Manager and the terminal for automatic, over-the-air software download and subsequent Telnet session startup.

- Chapter four describes how to change the *Standard* setup options specific to VT/HP, 3270, and 5250 emulations. The simple, time saving features for converting existing Compsee Telnet client installations to PowerNet are also described here.
- Chapter five describes how to use the *Advanced* setup options for VT/HP, 3270, and 5250 emulations. These options are used to customize keyboard, display, scanner, timer, alarm, and printer operation.
- Chapter six describes how to use the PowerNet advanced integration tools to further customize terminal operation. The creation and use of mapping, macro, dialog, and scanner control objects are described.
- Chapter seven describes the use of the built-in PowerNet Formatter, and how to configure the portable terminal to use screen formatting.
- Chapter eight describes how to use the Auto-Configuration tool to manage and automatically maintain the software configuration of all terminals on the wireless network. Also described are software management procedures and options that are unique to Compsee terminals.
- Chapter nine is a reference for the ISO 8859-1 and ASCII character sets.
- Chapter ten is a reference for the default keyboard configurations for Compsee terminals using PowerNet Twin Client in advanced mode. Figures and tables are included for 3270, 5250, and VT/HP. Also included for reference are the Compsee terminal control sequences.

Chapter 2 • Installation

This chapter describes the installation of the PowerNet Twin Client software on a Windows 95, 98, 2000 or NT PC. The software is available on CDROM or it can be downloaded from the Connect web site. Instructions are provided for both methods.

Requirements

Installation of PowerNet Twin Client requires, at a minimum, the following:

- A Pentium-class processor
- 32 MB of RAM
- 10 MB of free hard disk space available
- Microsoft Windows 95, 98, 2000 or NT operating system

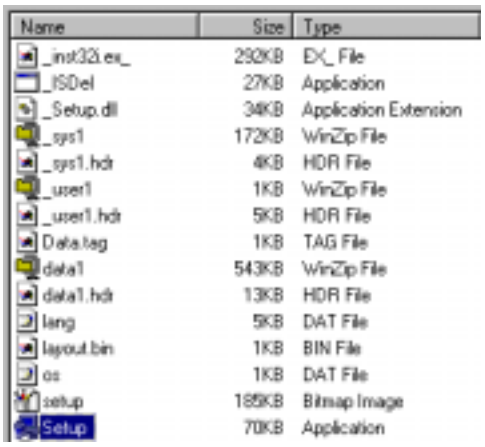
Downloading From the WEB

The PowerNet Twin Client software package can be downloaded from the Connect web site at http://www.connectrf.com. Click on *Partner Services* and then click on *Software Downloads*. Select the file named *PowerNet Twin Client for Compsee*.

Running Setup from a Download File

The downloaded file is a compressed archive. After extraction using a utility such as *WinZip* or *PKWARE*, folders are created on the hard disk as shown in the following figure

Click on the **Disk1** folder to view the files as shown in the following figure:



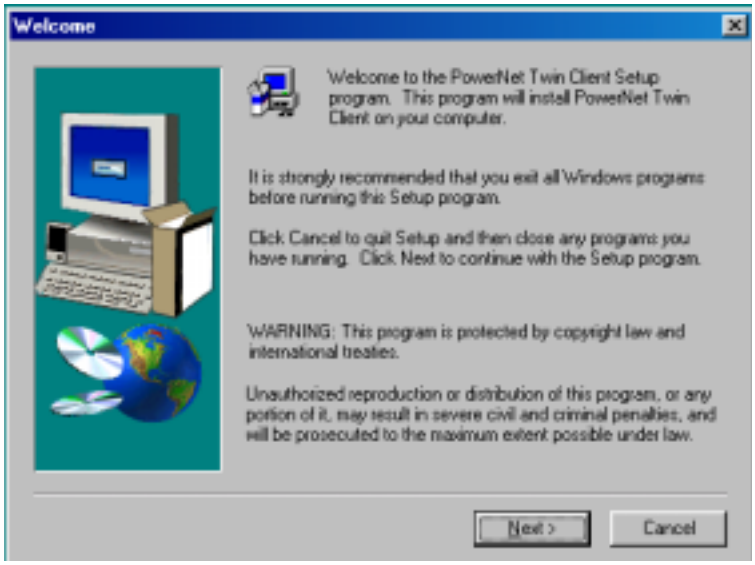
Click on the **Setup** application and proceed to the following section entitled *Installation* for further instructions.

Running Setup from CD-ROM

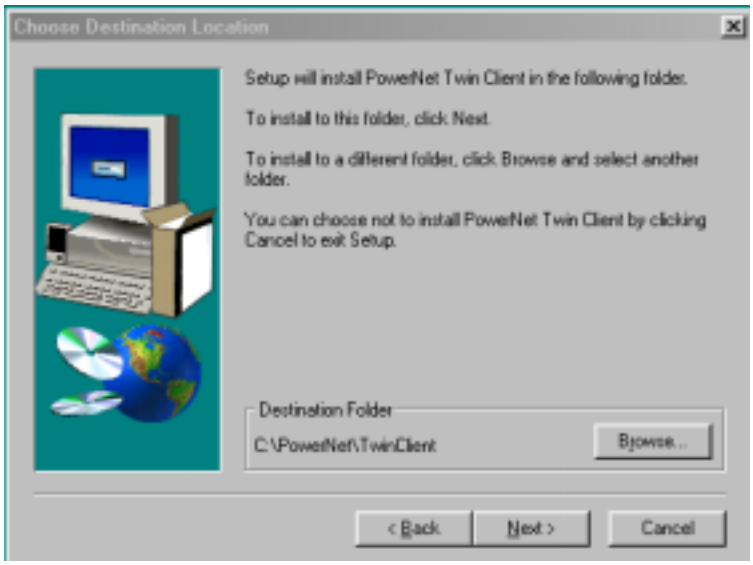
Insert the PowerNet CD into the CD-ROM drive of the PC. Click on Windows **Start, Run** and then click on the **Setup** application on the CD. Proceed to the next section for instructions

Installation

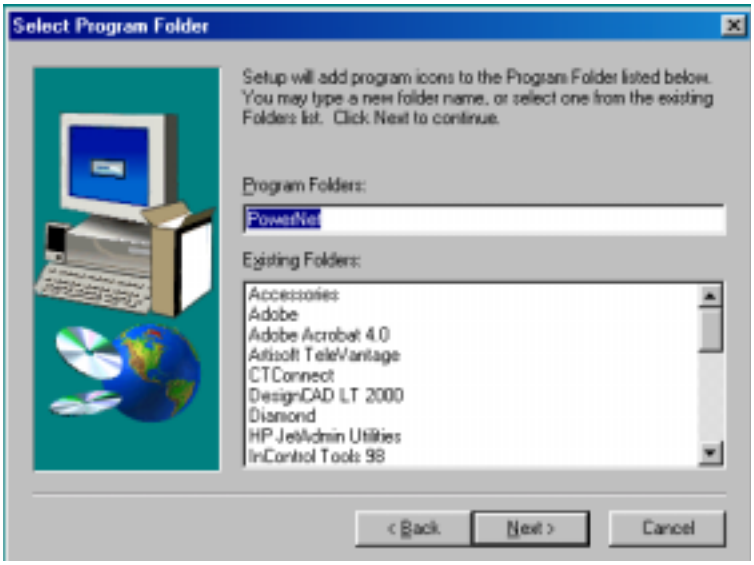
The InstallSheild wizard runs and presents the following screen:



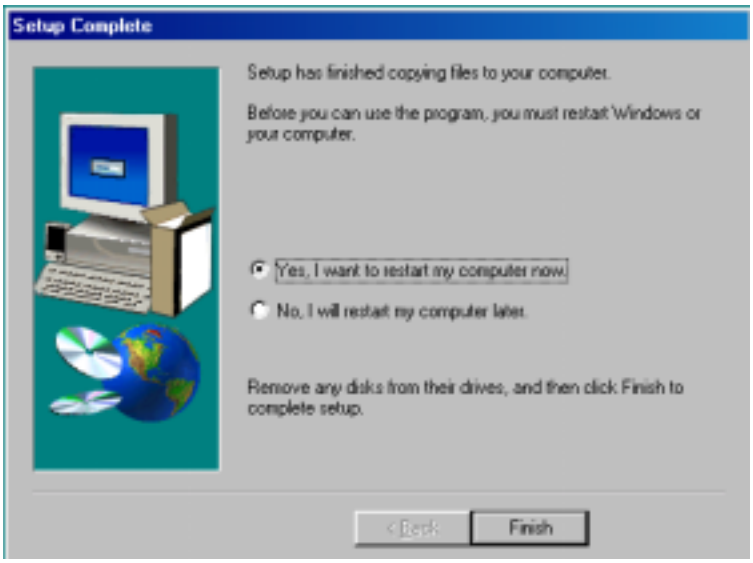
Click on Next to begin the installation process.



To change the default Destination Location, click on Browse and select a location. Then click on Next.



The default folder is PowerNet. This default may be changed either by selecting an existing program group or by typing in a new name at the prompt. Then click on Next



When the installation is complete, reboot the system to initialize the PowerNet software.

a. To reboot the system immediately, click on Finish.

b. To reboot later, click on  and then click on Finish.

Running the Manager

The PowerNet Twin Client Manager is the utility that manages the terminal software and configurations.

Select **Start, Programs, PowerNet, Twin Client Manager**. The PowerNet Twin Client Manager screen appears as shown in the following figure. This is the administrator's main screen; and all functions are accessed from its menu bar, tool bar, and tabs.

Menu Bar

The menu bar provides access to the functions used to configure the terminals and manage their software. Subsequent chapters of this manual explain each menus and it options.

Toolbar

Under the menu bar, the tool bar provides shortcuts to major features. The toolbar can be turned on or off by changing the Toolbar parameter found on the **View** menu. The shortcuts available from the toolbar are as follows:

 Create a new terminal configuration.

 Open an existing terminal configuration.

 Save the current terminal configuration.

 Download the configuration to terminal.

 Download software to terminal.

 Automatically configure terminals over the wireless network.

 PowerNet Twin Client Manager version.

The PowerNet Twin Client Manager is now successfully installed and ready for use. The next chapter provides detailed instructions for quickly configuring the terminal and starting a telnet session.

Chapter 3 • Quick Start

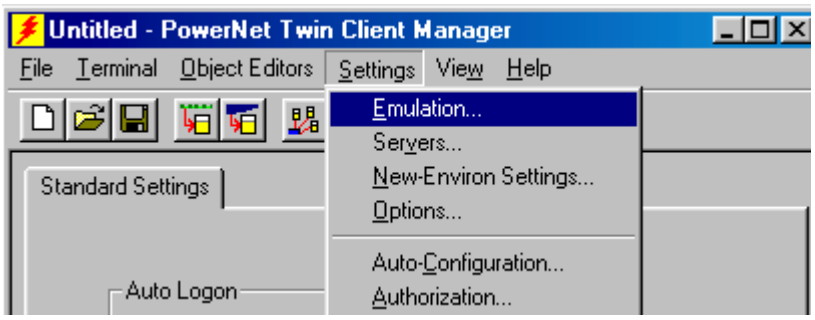
This chapter describes how to prepare the Twin Client Manager and the Compsee terminal for a Telnet session with the host. Following an initial serial download, the terminal software and configuration is managed automatically, over the wireless network.

Configuring the Manager

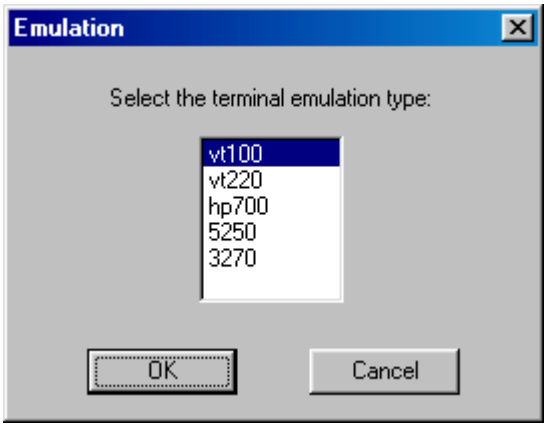
The first step is to configure the Twin Client Manager to meet site-specific requirements, and then prepare it for the automatic management of the terminal software and IP addresses. This simple procedure will require only a few minutes to complete.

Setting the Emulation

Click on **Start**, **Programs**, **PowerNet**, **Twin Client Manager,** then select the **Settings** menu, as shown below.

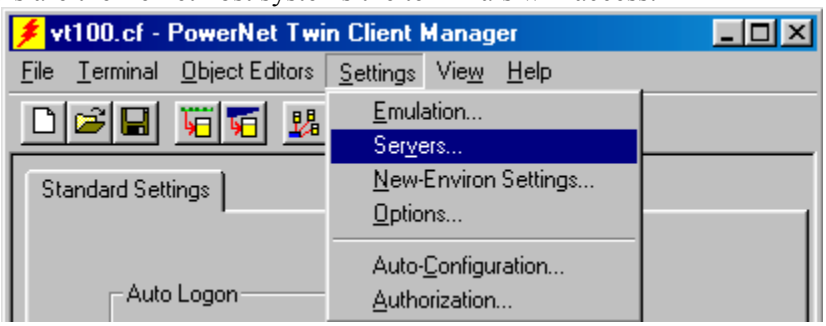


Click on **Emulation**, select the desired emulation, and then click **OK**.

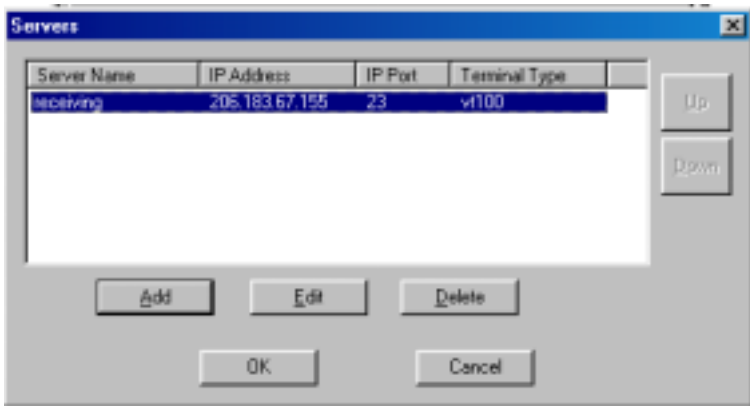


Setting the Servers

The Servers are the Telnet host systems the terminals will access.



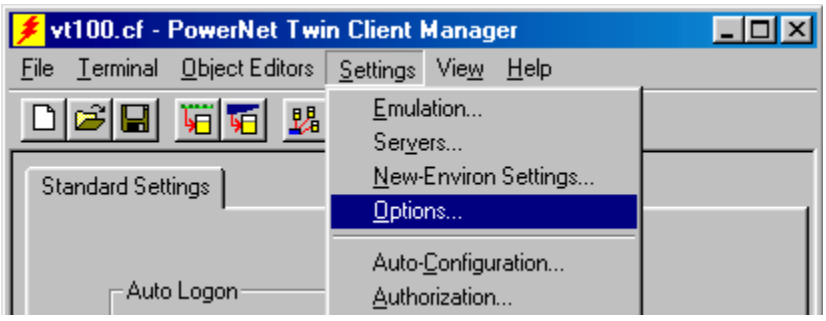
To set these addresses from the Settings menu, click on Servers and then click on Add. Enter the name of each server, its IP Address and IP port (normally 23 for Telnet servers), and emulation type. Then click on OK.

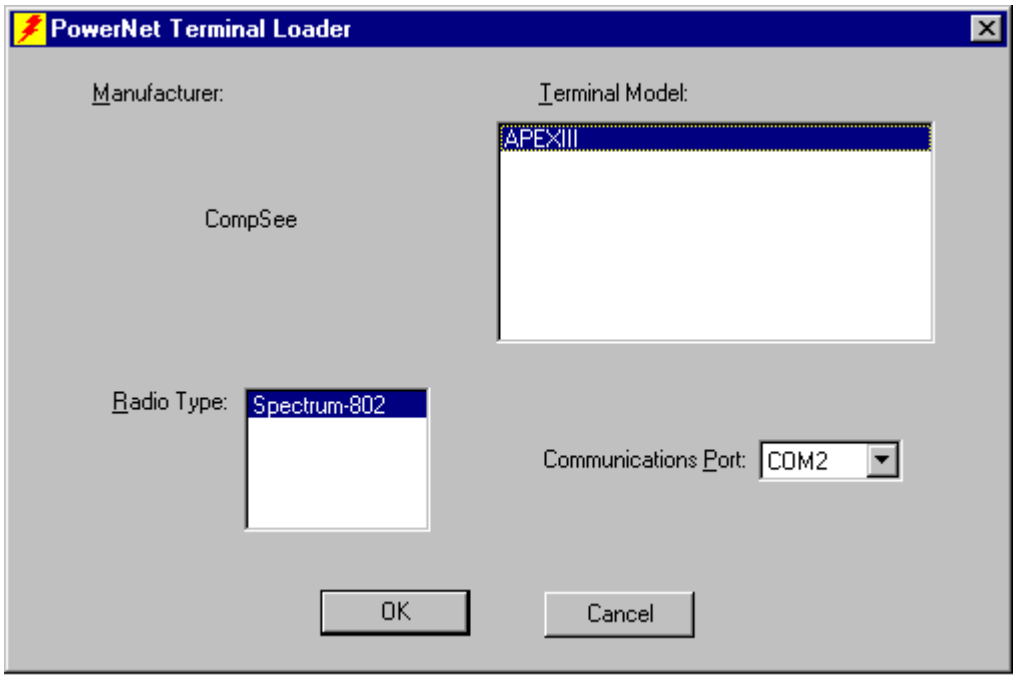


Repeat this step for each telnet server the terminals are required to access. If an error is made in the name, IP Address, IP Port number, or Terminal emulation type, click on the line that is in error and then click on the Edit button to make the corrections.

Setting Terminal Model and COM Port

The default terminal model is APEXIII, and the default serial connection to the Compsee cradle is through COM1. To change the COM port assignment, click on the Options menu as shown.

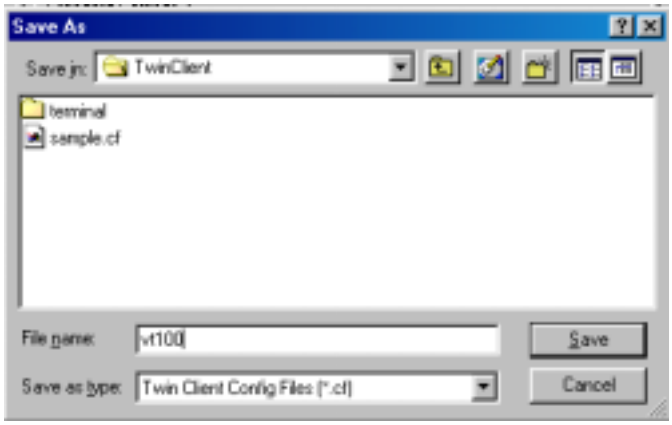




Saving the Configuration

Click File, Save As, and enter a name for this configuration.

For the purpose of this example, the name is vt100.



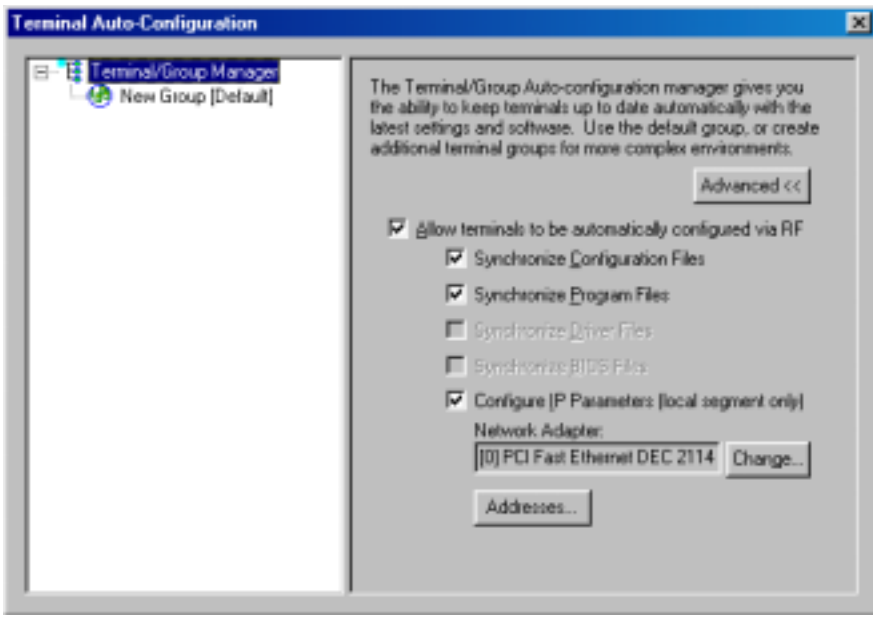
Setting Auto-Configuration

The configuration download and IP address assignment for each terminal will take place automatically by setting the Auto-Configuration options.

Click on the Auto-Configuration option in the Settings menu.

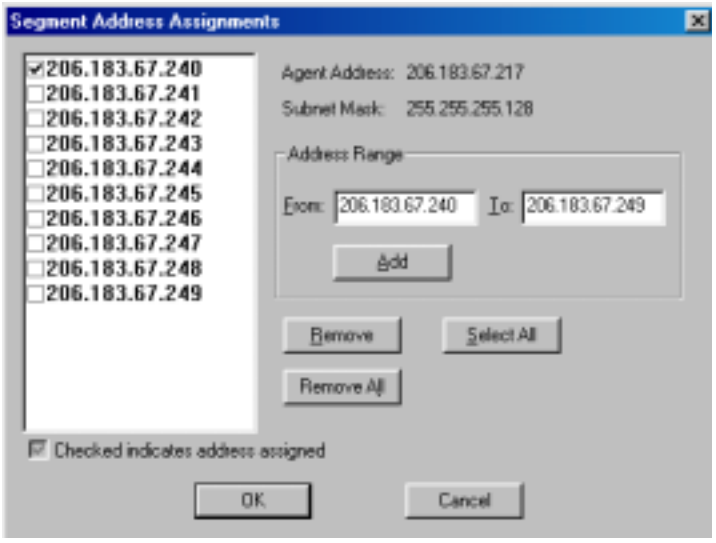
Note: If the Auto-Configuration window does not display the options, click on the Advanced<< button.

If multiple network adapters are installed on the PC, ensure that the desired network adapter is selected. Clicking on the Change button can change the adapter selection.

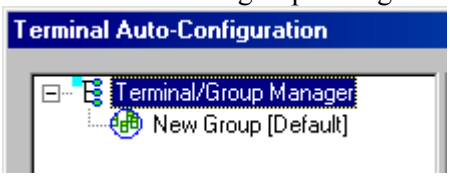


This powerful software management tool is described in detail in Chapter 8. For now, it is sufficient simply to use it for assignment of the initial terminal configuration and IP address, all of which can be easily changed later. Ensure that all of the check boxes are checked as shown above.

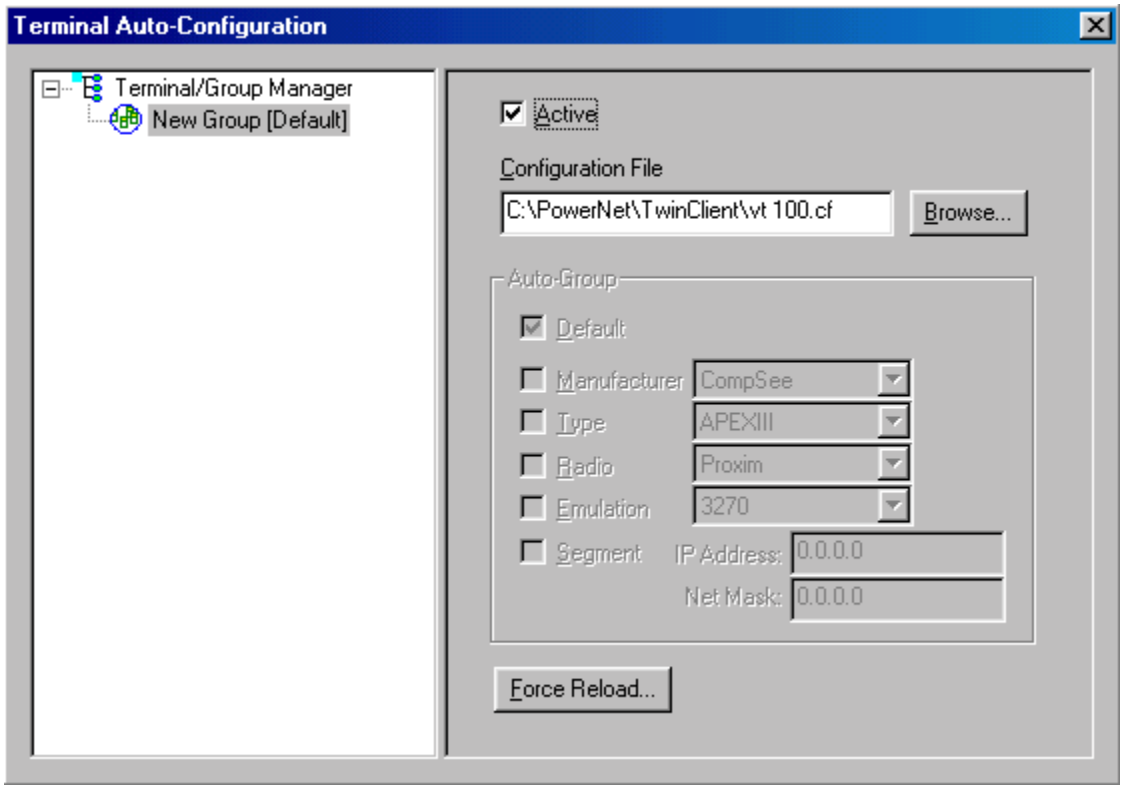
To assign terminal IP addresses automatically over the wireless network, check all of the boxes as shown above. Then click on the Addresses button and enter the desired range in the From and To boxes as shown in the following figure.



After setting the address range, click on OK to return to the Auto-Configuration screen and then click on the box next to the terminal group manager.



The display expands to include the default terminal Group. Next, click on the **New Group** icon and use the Browse button to select the configuration file saved earlier.



Check the Active box, and the system is now configured to automatically download IP addresses, software, and configuration files to the terminals. Click on the box at upper right corner to return to the main menu.

Note: The software does not need to be authorized now. It can be authorized later, after a Telnet session has been established. The procedure is described in Chapter 4 section entitled *Authorizing PowerNet*.

Downloading Files to the Terminal

Connecting the Cradle

The terminal download requires a serial connection between the terminal and the PC through a cradle. In preparation for this download perform the following:

- Connect the selected serial port on the PC to the cradle with the Compsee serial cable.
- Verify that the cradle is powered on.

Prepare Terminal to Receive File

On the portable terminal, power the terminal **OFF**, then boot the terminal by pressing the Power and Scan key

The terminal boots to the DOS prompt. To activate the IRDA port for the serial file transfer, from the terminal, type IR ON and press ENTER

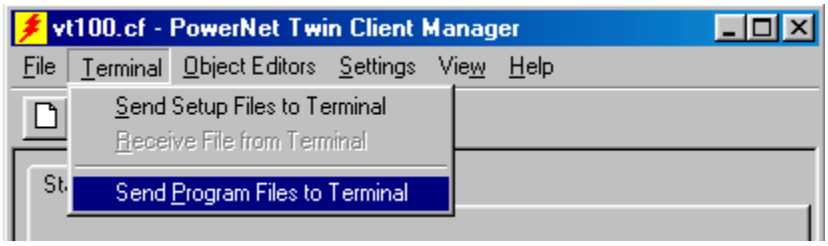
```
C:\>IR ON
```

From the terminal type LD, and press ENTER

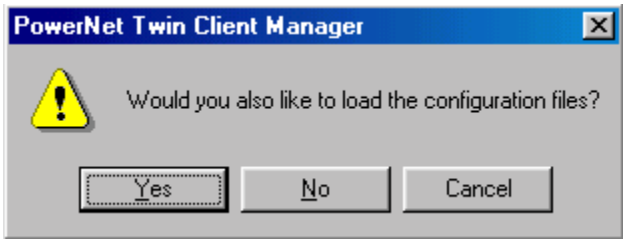
```
C:\>LD
```

Twin Client Manager Program File Download

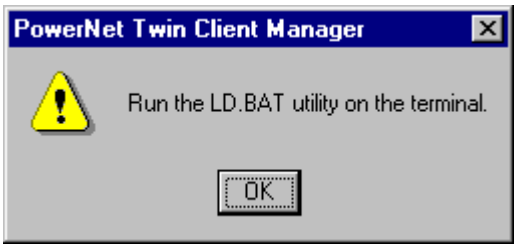
. Click on Terminal, then Send Program Files to Terminal.



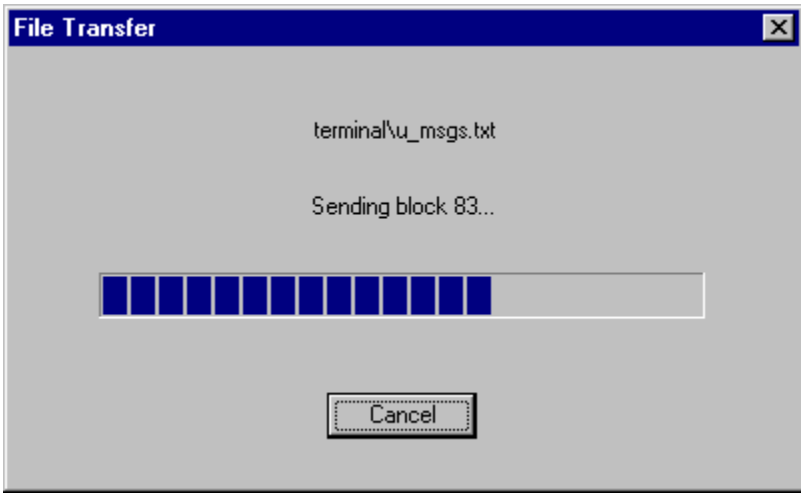
Click YES, to download configuration files.



From the Twin Client Manager, Click OK



The program and configuration files will be transferred from the PC to the terminal.



After the file transfer is complete, cold boot the terminal, by pressing the POWER and SCAN key

AirLoad Execution

Once the terminal reboots, Airloader will automatically search for the Airloader server. If no server is found, the following message will appear on the terminal.

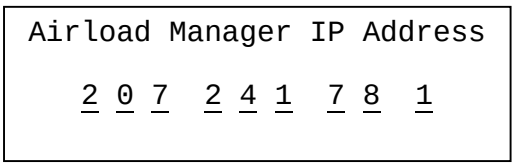
```
  No Airload Manager was found
        on this segment.

Do you want to enter the IP
address of the Airload
Manager?  Yes/No
```

Select YES to download Airloader. Enter the Airloader Manager IP address.

Select NO, if the Airloader Manager IP address is unknown or if and the Airloader manager is not preferred.

If yes is selected, enter the IP address. If no is selected, proceed to *Manual Configuration Update.*



Press ENTER to save

Cold Boot the terminal and proceed to *Starting a Telnet Session*.

Manual Configuration Update

The configuration files can be downloaded manually if:

- The configuration files have been modified, since the initial download
- The configurations had not been downloaded previously

Connecting the Cradle

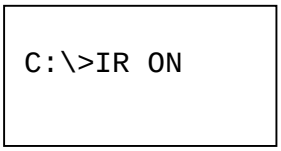
The terminal download requires a serial connection between the terminal and the PC through a cradle. In preparation for this download perform the following:

- Connect the selected serial port on the PC to the cradle with the manufacturers cable.
- Verify that the cradle is powered on.

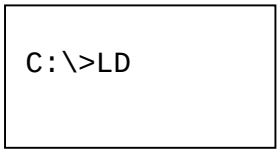
Prepare Terminal to Receive Files

On the portable terminal, power the terminal **OFF**, then boot the terminal pressing the Power and Scan key

The terminal boots to the DOS prompt. To activate the IRDA port for the serial file transfer, from the terminal, type IR ON and press ENTER

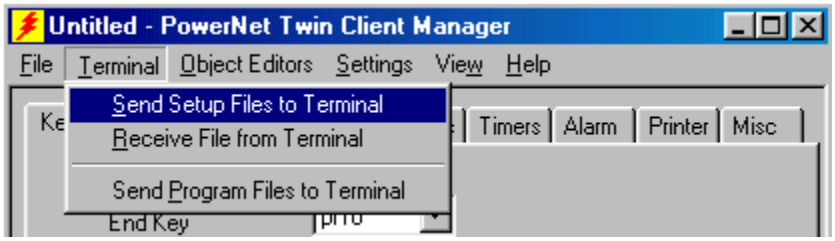


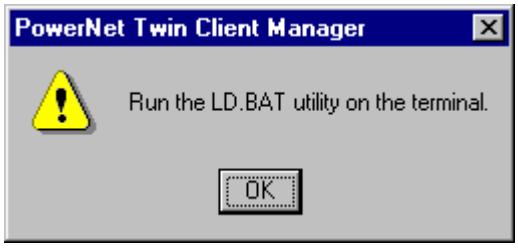
From the terminal type LD, and press ENTER



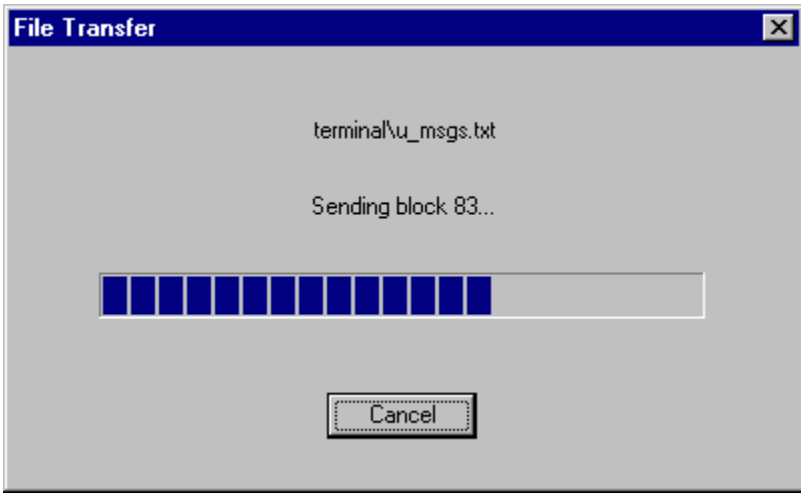
Twin Client Manager Setup File Download

From the Twin Client Manager select Terminal, Send Setup Files to Terminal, to execute the configuration file update.



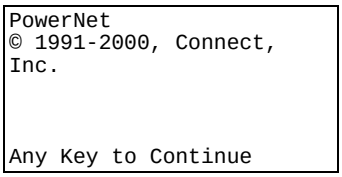


The program and configuration files will be transferred from the PC to the terminal.



After the file transfer is complete, cold boot the terminal, by pressing the POWER and SCAN key

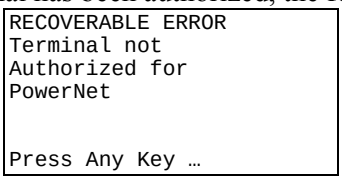
After the terminal reboots, a successful wireless connection and download is indicated by the display of the PowerNet main menu shown below:



The terminal is now ready to establish a Telnet session with the host system.

Starting a Telnet Session

At the PowerNet main menu on the terminal, press any key to establish the connection. Until the terminal has been authorized, the following screen is displayed:



It is not necessary to authorize the terminal at this time, so press any key to continue. The terminal will establish a connection with the host system and start emulation. If the terminal fails to connect to the host, refer to the following table for the possible causes and the related corrective actions.

Failure Cause	***Corrective Action***
Incorrect Host IP address	Correct the Host List address on the terminal. Refer to the Chapter 4 sub-section *Terminal Setup Using PowerNet Menus* for instructions.
Incorrect netmask value	Access Radio Setup menu and correct the netmask value. Refer to the Chapter 4 sub-section *Terminal Setup Using PowerNet Menus* for instructions

After a Telnet session has been successfully established, the terminal will remain in session for a maximum of 30 minutes at a time until it has been authorized. Once authorized, there is no software restriction the session time. The instructions for authorizing the terminal are presented in Chapter 4

Troubleshooting

The following table describes the error messages that will be displayed on the terminal in the event of a download failure, and can be used as a guide to correcting the problem.

Error Indication	***Possible Cause***	***Corrective Action***
No AirLoad Manager Found.	AirLoad Manager not active, or not installed on the LAN segment	Ensure that the PC with Twin Client Manager is on the same segment and that the PC is operating. If the PC is not on the same segment, enter the address of the PC in response to the terminal prompt.
Unable to open connection	IP stack on terminal failed to load	Reload Program Files and reboot
Timeout waiting for data	Transient communications failure	Reboot terminal. If problem persists, check the RFSYNC.log in the PowrNetTN directory
Download aborted	Socket closed during download	Ensure PC is operating. Reboot terminal and retry
Manager inactive	PC not operating	Restart the Airload PC server

After taking the corrective action, the terminal must be cold booted by pressing the POWER and SCAN keys

.

Chapter 4 • Standard Setup

The default terminal setup is sufficient for most installations. However, to meet site-specific requirements it may be necessary to customize terminal operation. The standard setup options simplify this process and can be modified using any one of the following methods:

- Using the Twin Client Manager.
- Using the PowerNet terminal menu system.

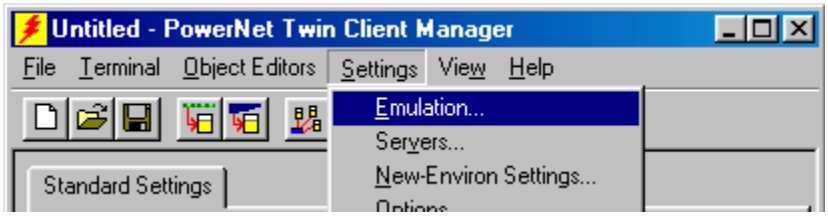
This chapter describes how to use the Twin Client Manager, the terminal menu systems, and barcodes to setup the terminal. Also described are the methods for authorizing the terminal software.

Setup Using Twin Client Manager

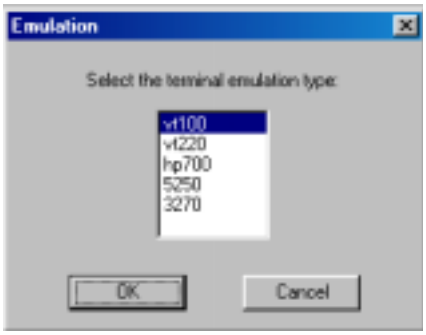
The Twin Client Manager provides a **Standard Settings** tab for automatic setup of the terminals. The options within this tab vary according to the emulation selected, each of which is described in the following sections.

VT and HP Settings

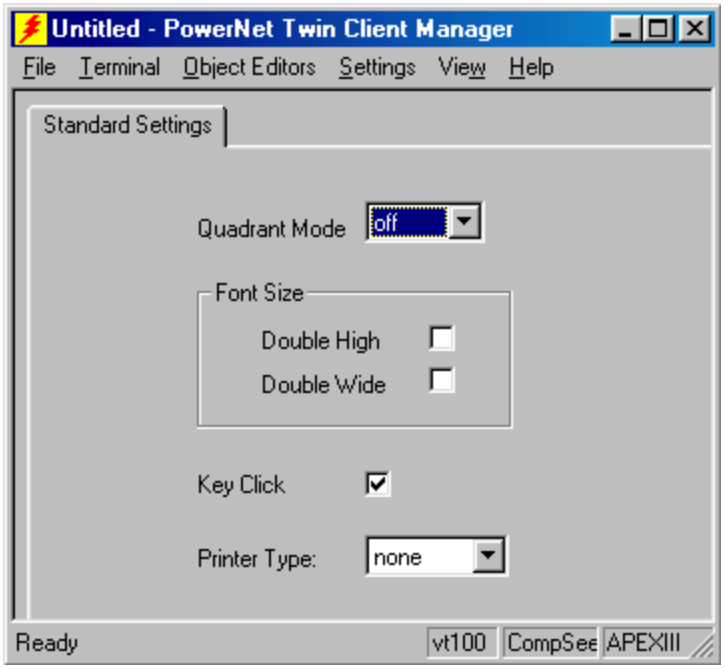
Select the VT and HP emulation setup by clicking on the **Settings** menu and then the **Emulation** menu, as shown below.



Then click on the VT100, VT220, or HP700 selection, as shown on the following page.



Click on OK after the selection is made, and return to the main Twin Client Manager menu. The standard settings tab will now reflect the settings for VT/HP emulation



Quadrant Mode

This scrolling list option defines the rules by which the terminal display is positioned in the larger host display. As defined by Twin Client, quadrants are fixed position"windows" in the host display, and the terminal display is located on whatever quadrant contains the current cursor position.

Font Size (Double High and Double Wide Font)

These check boxes enable (checked) or disable (un-checked) the display of characters in double high and double wide font.

Key Click

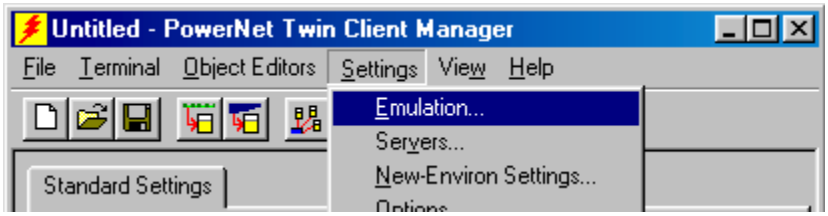
This option is used to automatically transmit a keystroke to the vt100 host when the vt100 field matches the selected attribute. The automatic keystroke generation can be based on whether the input is scanned, or keyed, or both.

Printer Type

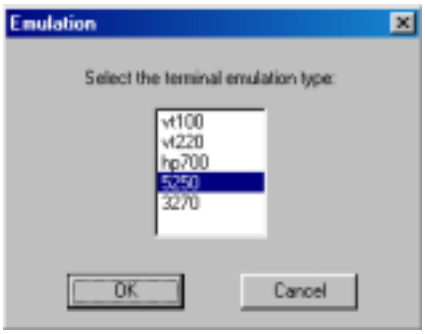
This scrolling list selects the attached printer type. The default value is none, indicating no printer is attached.

5250 Settings

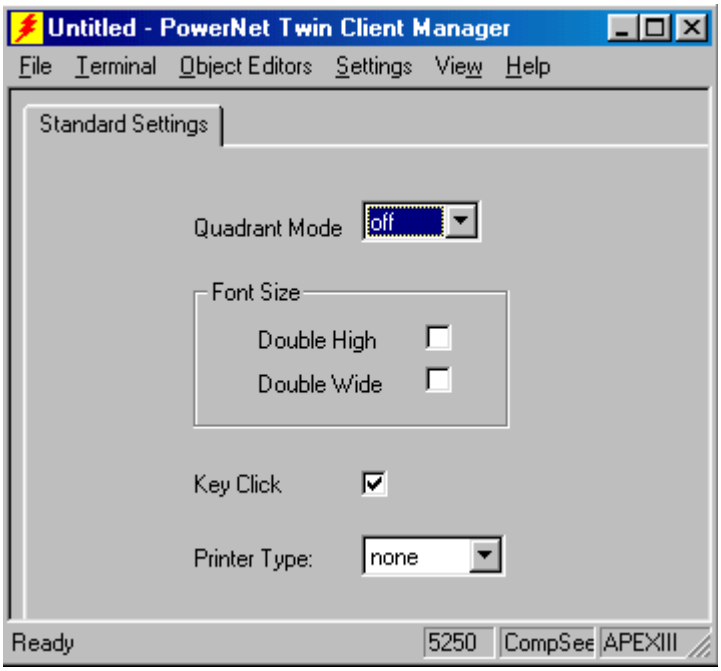
Select the 5250 emulation setup by clicking on the **Settings** menu and then the **Emulation** menu, as shown below.



Then click on the 5250 selection, as shown below.



Click on OK after the selection is made, and return to the main Twin Client Manager menu. The standard settings tab will now reflect the settings for 5250 emulation



Quadrant Mode

This scrolling list option defines the rules by which the terminal display is positioned in the larger host display. As defined by Twin Client, quadrants are fixed position"windows" in the host display, and the terminal display is located on whatever quadrant contains the current cursor position.

Font Size (Double High and Double Wide Font)

These check boxes enable (checked) or disable (un-checked) the display of characters in double high and double wide font.

Key Click

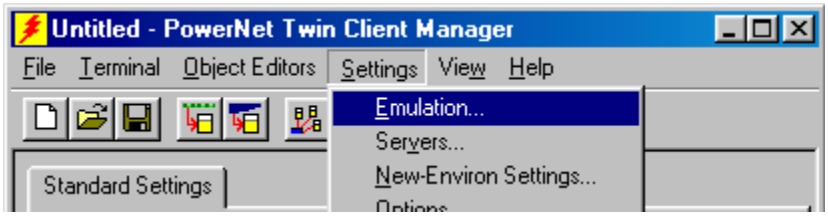
This option is used to automatically transmit a keystroke to the vt100 host when the vt100 field matches the selected attribute. The automatic keystroke generation can be based on whether the input is scanned, or keyed, or both.

Printer Type

This scrolling list selects the attached printer type. The default value is none, indicating no printer is attached.

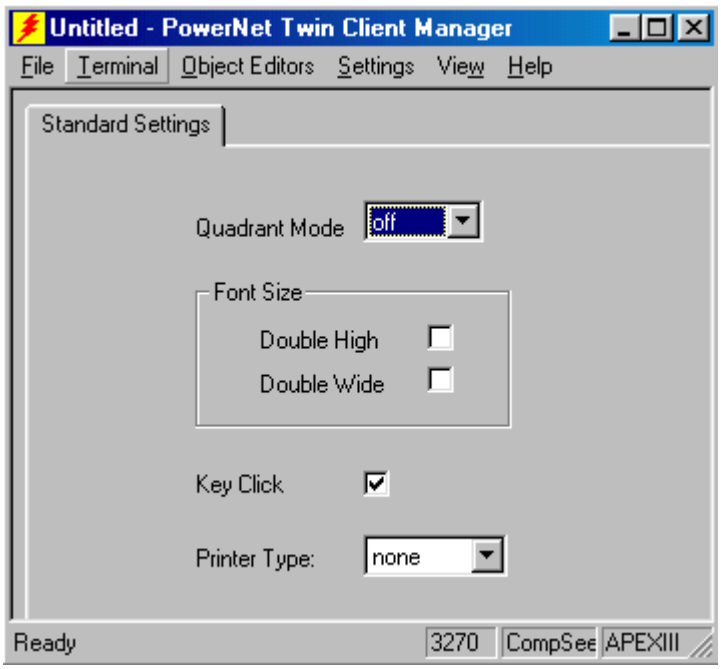
3270 Settings

Select the 3270 emulation setup by clicking on the **Settings** menu and then the **Emulation** menu, as shown below.



Then click on the **3270** selection, as shown below.

Click on **OK** after the selection is made, and return to the main Twin Client Manager menu. The standard settings tab will now reflect the settings for 3270 emulation



Quadrant Mode

This scrolling list option defines the rules by which the terminal display is positioned in the larger host display. As defined by Twin Client, quadrants are fixed position"windows" in the host display, and the terminal display is located on whatever quadrant contains the current cursor position.

Font Size (Double High and Double Wide Font)

These check boxes enable (checked) or disable (un-checked) the display of characters in double high and double wide font.

Key Click

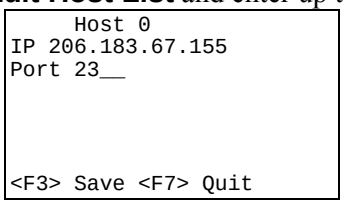
This option is used to automatically transmit a keystroke to the vt100 host when the vt100 field matches the selected attribute. The automatic keystroke generation can be based on whether the input is scanned, or keyed, or both.

Printer Type

This scrolling list selects the attached printer type. The default value is none, indicating no printer is attached.

Editing the Host List

If the host IP address or addresses were not pre-configured as described earlier in the section *Setting the Servers*, or if you wish to change those settings using the terminal menus, select **Edit Host List** and enter up to four Host IP addresses as required.

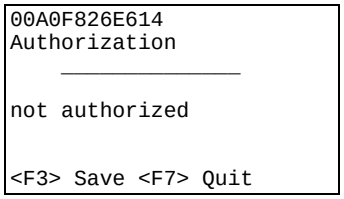


Press FNC and 3 to save the configurations.

Editing the Authorization

The client software can be authorized automatically, as described in the next section. This menu option permits authorization of each terminal manually. Select **Edit Authorization** to obtain the terminal's *Identification Code*, which is then used to obtain the Authorization code from the Connect web site as described in the next section.

The 12 digit hexidecimal value displayed at the top of the terminal screen is the Identification Code for the terminal.



Type the authorization code into the field as it appears on the WEB site. Punctuation characters, such as the hyphen (-), are not required. Press FNC and 3 to save the authorization code.

Switching Modes

The PowerNet Twin Client normally operates in "thick" mode, which provides direct connection to Telnet hosts. It can also operate in "thin" mode, through a PowerNet OpenAir server. Select the **Switch Modes** menu option to switch between thin and thick modes of operation. Note that the host socket address for the PowerNet OpenAir servers is 1800, which must also be changed in the **Edit Host List** menu described at the beginning of this section.

Running the Emulator

After all desired changes have been made, select the **Run Emulator** option to return to the PowerNet main menu. Then press any key to establish the Telnet session and begin emulation. Refer to the Chapter 3 sub-section, *Starting a Telnet Session*, for further instructions.

Authorizing PowerNet

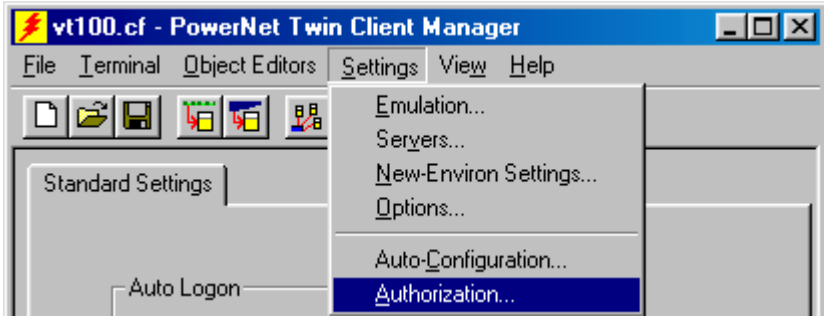
Each PowerNet Twin Client will run for 30 minutes at a time without authorization. Uninterrupted operation for a production environment is the result of authorizing the software. Authorization codes are obtained from the Connect web site at http://www.connectrf.com on the **Partner Services** page. Click on the **Generate Authorization** icon at the top of the page. A **PowerNet Key** is required and can be obtained by contacting Connect Sales at 630.353.1800or email sales@connectrf.com.

Automatic Authorization

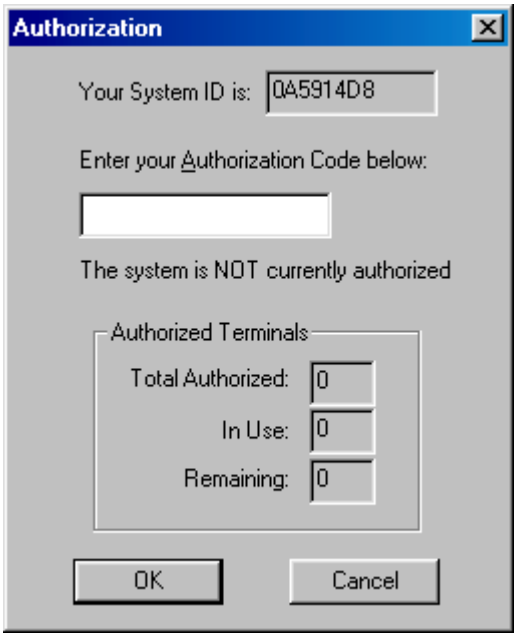
The Twin Client Manager can automatically authorize the terminal over the wireless network if the following requirements are met:

- A PC running Twin Client Manager is connected to the wire LAN segment with at least one access point within range of the terminal.
- The **System ID** of the PC on which Twin Client Manager is installed has been used to obtain a site license Authorization code from the Connect web site.

To obtain the System ID of the Twin Client Manager, click on the **Authorization** option in the **Settings** menu, as shown below.



The Authorization window is displayed as shown below.



The **System ID** (in this case, 0A5914D8) is the value that is entered as the **Identification Code** on the Connect WEB site authorization page.

Manual Authorization

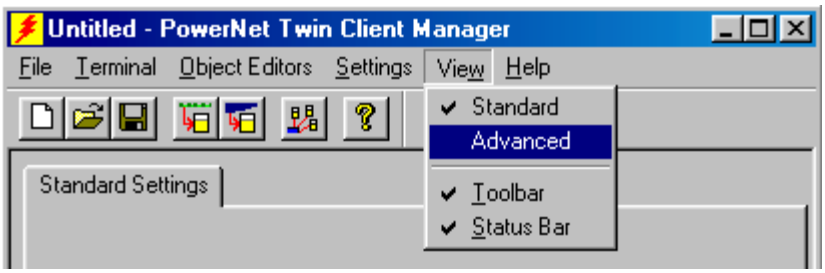
The procedure for manually setting the Authorization code on the terminal is described in the previous section entitled *Editing the Authorization*.

Chapter 5 • Advanced Setup

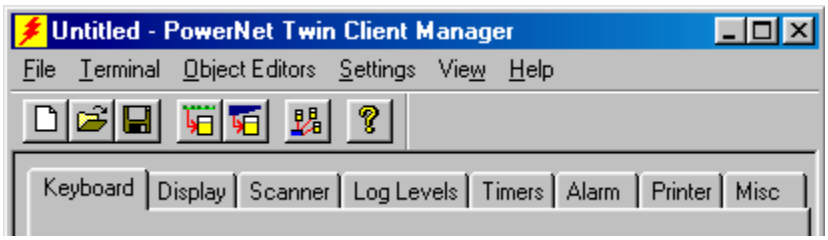
The PowerNet Twin Client permits the customization of all aspects of terminal operation without custom programming. This chapter describes all of the advanced setup options. Additional advanced customization features, using the Object Editors, are described in Chapter 6.

Selecting the Advanced Setup

The Twin Client Manager is installed in the Standard Setup mode. To change to the Advanced mode, click on the **View** menu and then on **Advanced**.



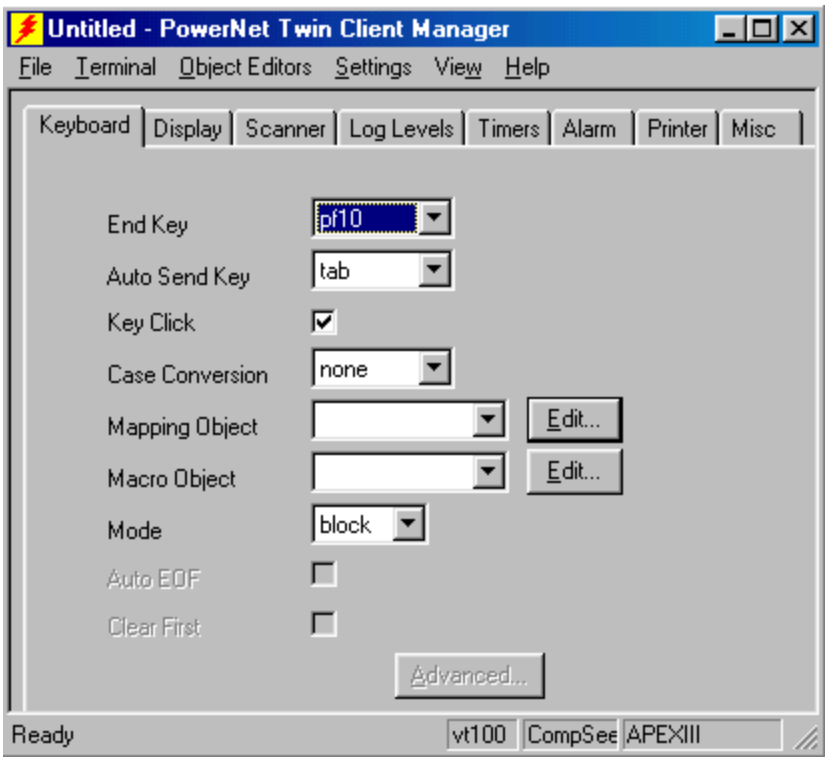
As a result, a new set of tabs are displayed, as shown below.



The following sections in this chapter describe each of the tabs and the options within each tab.

Customizing the Keyboard

Clicking on the Keyboard tab displays the setup options related to the terminal keyboard and its operation.



End Key

This scrolling list selection is used to set the terminal key that terminates both the host connection and the wireless session. The default is **pf10.**

Auto Send Key

This scrolling list selection is used to set the keystroke to be sent automatically by the terminal when an input field on the terminal is filled with keyed input. That is, if an input field is 9 characters long, and 9 characters are manually keyed into the field, the Auto Send key is automatically transmitted with the 9 characters. The default is **tab.** Selecting **noop** disables this feature.

Note: Selecting the Length Check option on the Scanner tab disables the Auto Send Key.

Key Click

This check box enables (checked) or disables (un-checked) audible key clicks from the terminal . Default is on (checked).

Case Conversion

This scrolling list selection allows automatic conversion of keyed input to upper or lower case. The default value is **none**, meaning no conversion takes place.

Mapping Object

This feature of PowerNet Twin Client allows for custom keyboard development. For example, the **tab** key can changed to generate a **pf4**. This is an advanced integration tool and its use is described in Chapter 6.

Macro Object (VT/HP Only)

This feature is used to assign a key sequence to a specific terminal key. For example, the PF1 key can be set to generate a sequence such as **receiving**. This is an advanced integration tool and its use is described in Chapter 6.

Mode (VT/HP Only)

This scrolling list selection controls the transmission characteristics of the VT/HP emulations. In **char** mode, each keystroke generates an individual transmission. In **block** mode, a transmission takes place only after a control key, such as **ENTER** or a **PF** key, is depressed. The block mode is more efficient. Refer to Chapter 6, *Advanced Display Options for VT/HP*, for more details on setting block mode operation.

Note: When set to **char** mode, the **Collection timer** value in the Timers tab should be set to between 30 and 50 milliseconds for maximum performance.

Auto EOF (3270,5250 only)

This check box option enables (checked) or disables (un-checked) the automatic erasure of all data to the right of keyed or scanned data in an input field. The default value is disabled (un-checked).

Clear First (3270,5250 only)

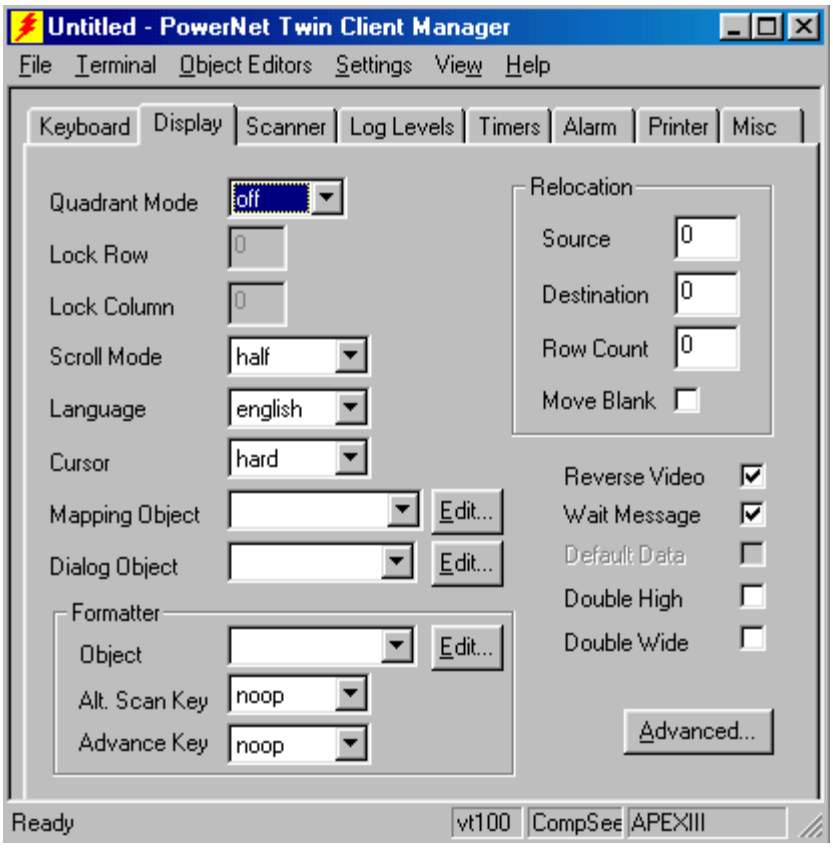
This check box option enables (checked) or disables (un-checked) the automatic erasure of all data in a field prior to keyed or scanned data input. The default value is disabled (un-checked).

Advanced (3270 only)

Clicking the Advanced button brings up the Advanced 3270 Keyboard screen and provides a variety of special key generation options. This is an advanced integration tool and its use is described in Chapter 6.

Customizing the Display

Clicking on the Display tab shows the options related to the terminal display and its operation.



Quadrant Mode

This scrolling list option defines the rules by which the terminal display is positioned in the larger host display. As defined by Twin Client, quadrants are fixed position"windows" in the host display, and the terminal display is located on whatever quadrant contains the current cursor position.

Off disables quadrant processing and Twin Client simply centers the current host input field in the terminal display.

On enables quadrant processing. However, input fields that cross quadrant boundaries result in a shift to the left in order to locate as much of the current input field on the terminal display.

Soft always positions on a quadrant boundary regardless of input field boundaries. Viewing keys are enabled.

Hard is the same as **`Soft`** except the viewing keys are disabled.

Lock locks the terminal display origin (upper left corner) to fixed row and column (*x*,*y*) coordinates in the host display. The coordinates are zero-based.

Lock Row Defines the Y coordinate for display position locking. Range is zero (0) to maximum number of rows on the host screen. Default is zero (0).

Lock Column Defines the X coordinate for display position locking. Range is zero (0) to the maximum number of columns on the host screen. Default is zero (0).

Scroll Mode

This scrolling list option selects the rule used for moving the terminal display within the host display using the viewing keys.

Half scrolls the terminal display in half-screen increments. For example, given a 16-column screen, the screen is scrolled left and right 8 columns at a time.

Full scrolls the terminal display in full screen increments. For example, given a 16-column screen, the screen is scrolled left and right 16 columns at a time.

Language

This scrolling list option selects the display character mapping and the translation table used for error messages displayed on the terminal. The default value is English. The file `umsgs.txt`, which is installed with PowerNet Twin Client, contains all of the current language translations.

In the event a specific language is not translated, or if a specific message is not correctly translated, visit the Connect web site at http://www.connectrf.com and check the Support page for a related Tech Note. If the issue has not been addressed, email support@connectrf.com and request a Product Change Request (PCR).

Cursor Appearance

This scrolling list option selects the manner in which the cursor is displayed on the terminal. The default value is **`hard`**.

Type	*Appearance*
`Soft`	Blinking Underscore (_)
`hard`	Blinking Block ■
`hide`	None

Mapping Object

This feature is used to modify the displayed character set. This is an advanced integration option and its use is described in Chapter 6.

Dialog Object

This feature is used to build session automation scripts, and is an advanced integration option described in Chapter 6.

Formatting

This feature is used to re-format the host display onto the terminal display. This is and advanced integration option and is described in Chapter 6.

Relocation Group

This option group allows rows of the host display to be relocated automatically. This option is particularly useful when the application generates important error messages on a specific row that is not necessarily within the terminal's display area

Source

Defines the starting row (zero-based) in the host display that is relocated to the destination row of the host display. The default is zero (0).

Destination

Defines the starting source row location (zero-based) in the host display. Default is zero (0).

Row Count

Specifies the number of host display rows to be relocated, starting with the row defined by the Source option and continuing from top to bottom of the display. The default, zero (0), disables row relocation.

Move Blank

This check box enables unconditional relocation (checked), or enables relocation only when data is present on the source row or rows (un-checked). The default is un-checked.

Reverse Video

This check box enables (checked), or disables (un-checked), the processing of the reverse video display attribute on the terminal. The default value default is on (checked).

Wait Message

This check box enables (checked), or disables (unchecked), the display of the message Waiting for Data on the terminal display. This message is used to indicate that the terminal has transmitted data to the host application and is waiting for a response. The default value is enabled (checked).

Default Data **(3270/5250 only)**

This check box enables (checked), or disables (unchecked), editing of data present in the current input field prior to entry of new data by the terminal operator.

Double High and Double Wide

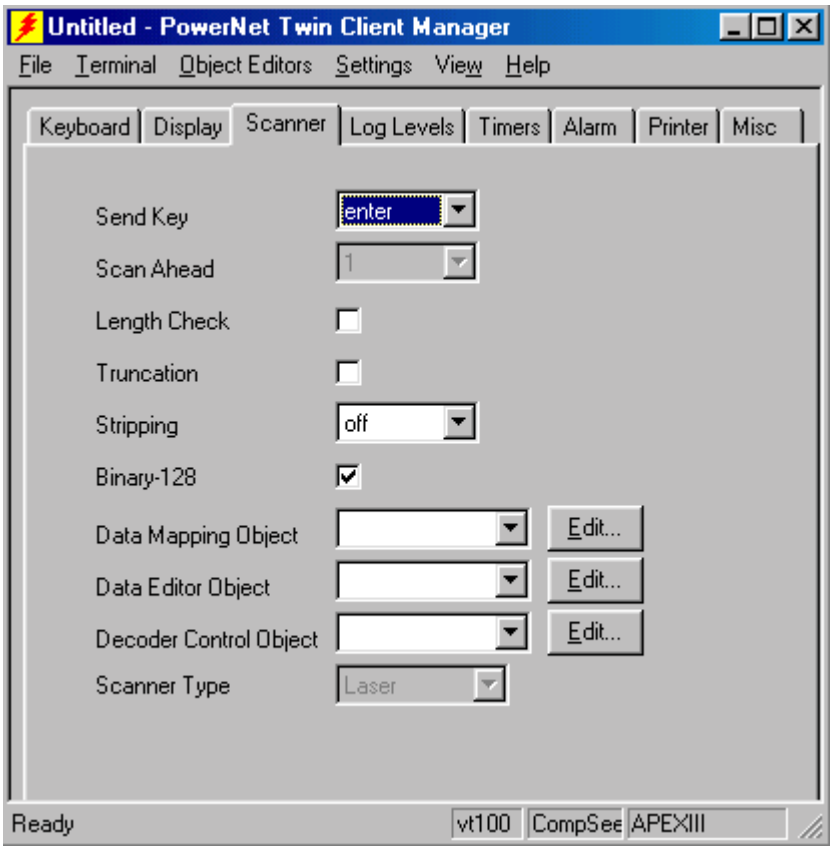
These check boxes enable (checked), or disable (unchecked), the display of characters on the terminal screen in double high and double wide fonts, respectively.

Advanced **(VT/HP only)**

This button accesses setup options for controlling all aspects of VT display attribute mapping and masking. This is an advanced integration tool and its use is described in Chapter 6.

Customizing the Scanner

Clicking on the Scanner tab shows the options related to the terminal scanner and its operation.



Send Key

This scrolling list option defines the control key automatically transmitted with scanned data. The list of keys depends on the type of emulation in use. The **noop** key indicates that no automatic control key will be sent. The default value is **ENTER**.

Scan Ahead

This scrolling list option defines the number of scans that can be transmitted by the terminal without a response from the host system. The maximum is 24, and the default is 1.

Length Check

This check box option enables (checked), or disables (unchecked), scanned input data length checking. When this option is enabled and the scanned input data exceeds the length of the input field, an error message is automatically generated on the terminal and the data is not transmitted. The default value is disabled (unchecked)

Note: Enabling Length Check disables the Truncation option (described below).

Truncation

This check box option enables (checked), or disables (unchecked), the automatic truncation of scanned data that is greater than the length of the input field. With both Truncation and Length Checking disabled, oversized scans are automatically applied to subsequent input fields as needed. If either option is enabled, this automatic application is disabled. The default value is disabled (unchecked).

Stripping

This scrolling list option controls the rule for automatically removing trailing spaces and underscore characters. The rules are defined as follows:

Rule	***Operation***
`off`	No stripping is performed.
`space`	Trailing spaces are stripped.
`score`	Trailing underscores are stripped.
`both`	Both trailing spaces and underscores are stripped.

Binary-128

This check box enables (checked), or disables (unchecked), the processing of binary code 128 bar codes on the terminal. The default value is enabled (checked).

Caution: If this option is disabled and binary-128 barcodes are used, the results are unpredictable.

Data Mapping, Data Editor, and Decoder Control

These are advanced integration tools and are described in Chapter 6.

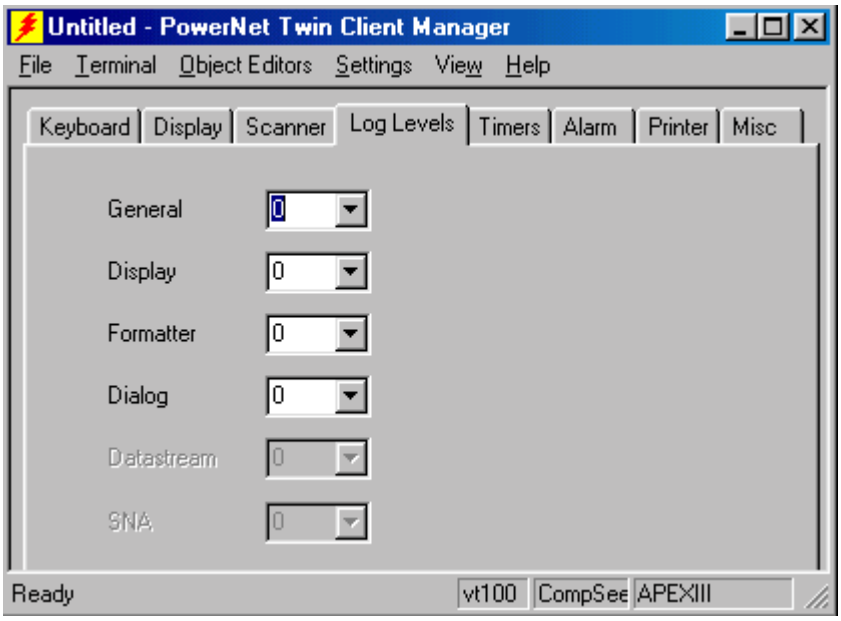
Scanner Type

This scrolling list option defines the type of special scanner attachment in use, if present.

Setting Log Levels

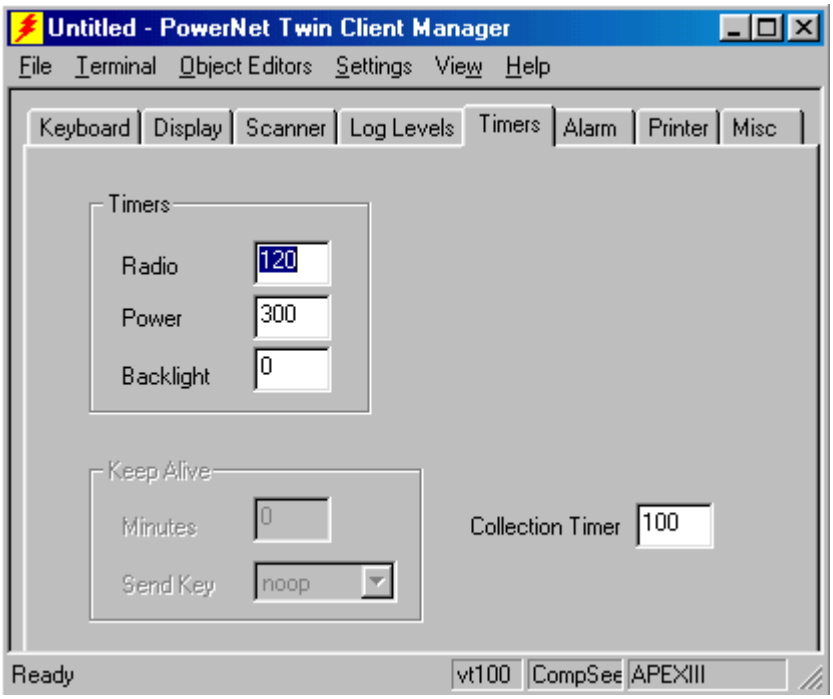
The terminal maintains a logging facility that can be used by Technical Support and Engineering to assist in problem resolution. These levels should always be set to zero (0)

and can be adjusted during a telnet session, using the PowerNet Vision network management tool.



Customizing Timers

Clicking on the Timers tab shows the options related to the terminal timers, as shown below.



Timers Group

Radio

This numeric input field defines the length of time, in seconds, during which the terminal activates the radio and waits for a response from the host application. After the time is exceeded, an error message is displayed on the terminal. The default value is 120.

Power

This numeric input field defines the length of the time, in seconds, after which inactivity of the scanner, keyboard, or radio results in a power saving shutdown of the terminal. The default is 300 (5 minutes).

Backlight

This numeric input field defines the length of time, in seconds, during which the terminal's display backlight remains on after keyboard or scanner input. When set to a value other than 0, the terminal turns on the backlight for the amount of time specified. Backlight use reduces battery life. The default value is 5.

Keepalive **(3270/5250 only)**

This option group circumvents host application connection timeouts by automatically generating the selected keystroke when the terminal is inactive for the specified period of time, in minutes.

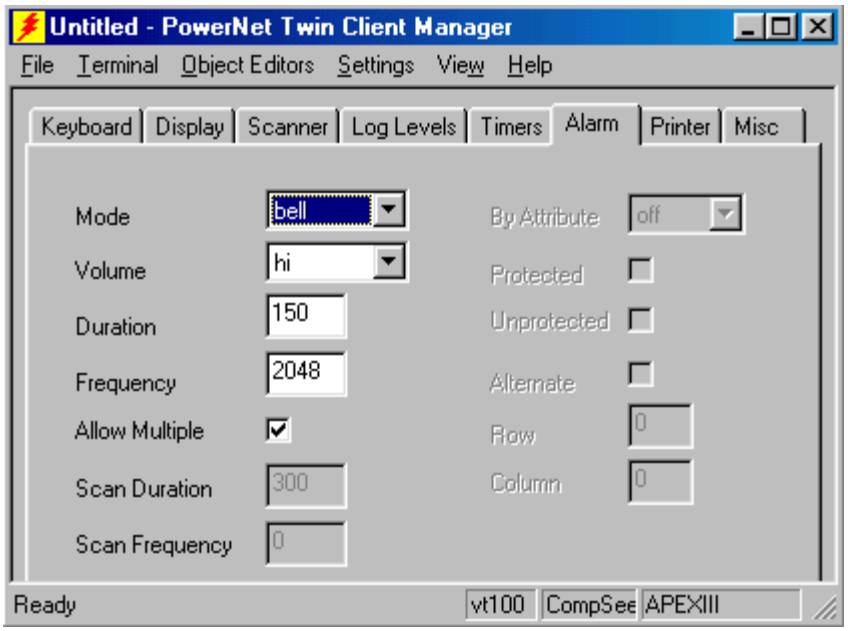
Collection Timer **(VT/HP only)**

This scrolling list option specifies the number of milliseconds the terminal waits for inactivity from the host before processing received data. This feature is useful in situations where the application and network latency fragments host transmissions to the terminal, and also when host applications generate intermediate displays that are not used. The default value is 100.

Note: For maximum performance, adjust the collection time to 30-50ms when **Mode** on the **Keyboard** tab is set to **`char`**.

Customizing Alarms

Clicking on the Alarm tab shows the options related to the terminal alarm mechanisms, as shown below.



Mode

This scrolling list option defines the operation of the audible alarm and scanner light on the terminal. Default is **bell**.

- **Off** disables the audible alarm.
- **Bell** enables the audible alarm as a double beep.
- **Flash** enables the scan indicator light as the alarm – no audible alarm sounds.
- **Both** enables the double beep and the scan indicator light as the alarm.
- **Spec1** enables the audible alarm as a single beep.
- **Spec2** enables a single beep and the scan indicator light as the alarm.

Volume

This scrolling list option set the volume of the audible alarm. The default is setting is **hi**.

Duration & Frequency

The next two options, duration and frequency, are used to make a distinction between alarms and scan decode tones when the **Mode** is set to **spec1** or **spec2**.

Duration

This numeric entry field defines the length of the alarm sound in milliseconds. The default is 150.

Frequency

This numeric entry field defines the frequency of the audible alarm in Hertz. The default, zero (0) selects the terminal's factory-set default which is terminal model dependent. The default value is 2048.

Allow Multiple

This check box enables (checked), or disables (unchecked), multiple alarms in a single host transmission

Scan Duration & Frequency

The next two options, scan duration and frequency, relate to the tones generated when the scan decoder successfully identifies a symbology.

Scan Duration

This numeric input field defines the duration of the tone generated by a successful scan decode, in milliseconds. The default is 300.

Scan Frequency

This numeric entry field defines the frequency of the scan decode tone in Hertz. The default, zero (0), selects the terminal's factory-set default which is terminal model dependent.

By Attribute **(3270 only)**

This scrolling list entry defines how 3270 field attributes can be used to generate alarms. The choices are **off** (the default), **pen** for the light pen attribute, **num** for numeric attribute, **hi** for high intensity attribute, and **hal** for high intensity and light pen attributes.

Protected

This check box enables (checked), or disables (unchecked), the processing of the field attribute into audible alarms for all protected fields on the display.

Unprotected

This check box enables (checked), or disables (unchecked), the processing of the field attribute into audible alarms for all unprotected fields on the display.

Alternate **(5250 only)**

This check box enables (checked), or disables (unchecked), the conversion of a single digit character at a specified row and column on the 5250 display into the corresponding number of audible alarms.

Row

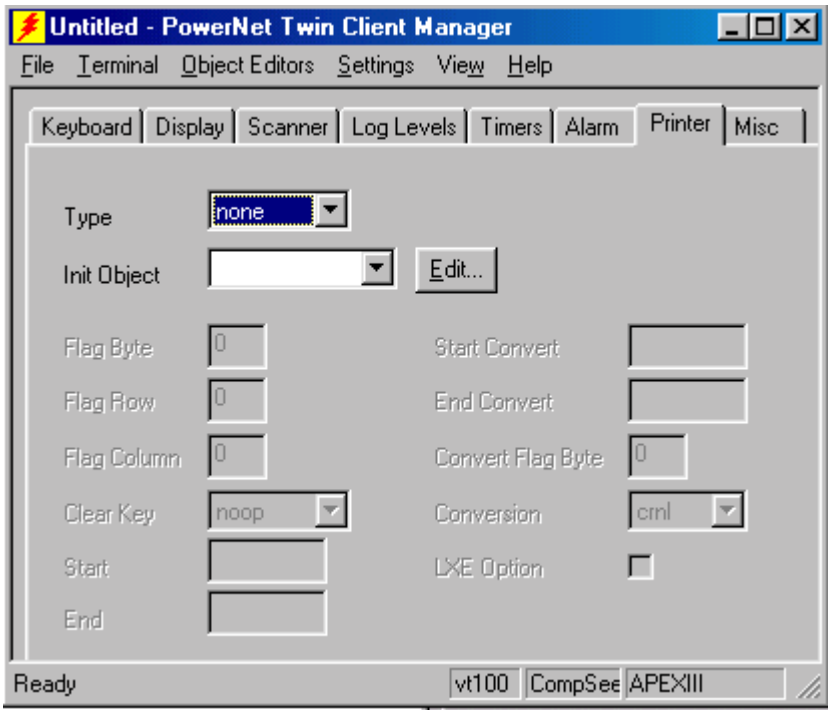
This numeric input field specifies the zero-based row number in the 5250 display of the alternate alarm digit.

Column

This numeric input field specifies the zero-based column number in the 5250 display of the alternate alarm digit.

Customizing Printers

Clicking on the Printer tab shows the options related to the terminal printer, as shown below.



Type

This scrolling list option defines the type of printer attached to the terminal. The default is **none**.

Init Object

This feature allows printer initialization commands to be sent to the terminal immediately after the terminal establishes a session. This is an advanced integration tool and is described in Chapter 6.

Flag Byte, Row, Column, and Clear Key **(3270,5250 only)**

This group of options provides 3270 and 5250 host application direct control over the terminal printer. See the *Start and End* later in this section for an alternate method. VT/HP applications rely on standard escape sequences for the printing function.

Flag Byte

This numeric input field is a decimal value that corresponds to the ASCII-converted value of an EBCDIC character generated by the host application. When the Flag Byte is set to a non-zero value, the terminal checks the host display for the value at the specified row and column (see Flag Row and Flag Column below). If the Flag Byte is present, all data in the display that follows the Flag Byte is routed directly to the printer, up to the next occurrence of a Flag Byte value in the display or else the end of the display.

Flag Row

This numeric input field specifies the row (zero-based, range of 0 to23) where the Flag Byte (defined above) is located.

Flag Column

This numeric input field specifies the column (zero-based, range of 0 to79) where the Flag Byte (defined above) is located.

Clear Key

This scrolling list option defines the keystroke transmitted by the terminal after printing has completed. Set the key to **noop** to disable transmission.

Start and End **(3270 and 5250 only)**

This option group provides the host application direct control over the terminal printer.

Start

Specifies a unique character sequence that, when encountered in the host display, indicates that all subsequent characters up to but not including the End character sequence are to be transmitted to the printer attached to the terminal. The default value is blank which also indicates that this option is not in use.

Note: The print data limit is 1.5 K.

End

Specifies a unique character sequence that terminates collection of data from the host display area for transmission to the printer attached to the terminal. The default value is blank which also indicates that this option is not in use.

Start and End Convert **(3270/5250 only)**

This option group provides for conversion of print data collected with the Start and End option group from ASCII characters in hexadecimal format (0-9 and A-F) to binary. The feature allows binary data that might otherwise interfere with the emulation to be included in the display area. The host application is responsible for generating the hexadecimal data.

Start Convert

Specifies a unique character sequence (ASCII-converted) within the print data collected with the Start and End options that indicates the subsequent character pairs are hexadecimal values that are converted to binary. A blank value, default, indicates this option not in use.

End Convert

Specifies a unique character sequence (ASCII-converted) that terminates binary conversion. Default, blank, indicates that this option is not in use.

LXE Option **(3270/5250 only)**

This check box enables (checked), or disables (unchecked) the processing of print data embedded in the data stream according to LXE printing rules.

Conversion Flag Byte and Conversion **(3270 only)**

This option group defines the conversion of a single character (Conversion Flag Byte) found in the 3270 print data, to a printer control sequence defined by the Conversion scroll list.

Convert Flag Byte

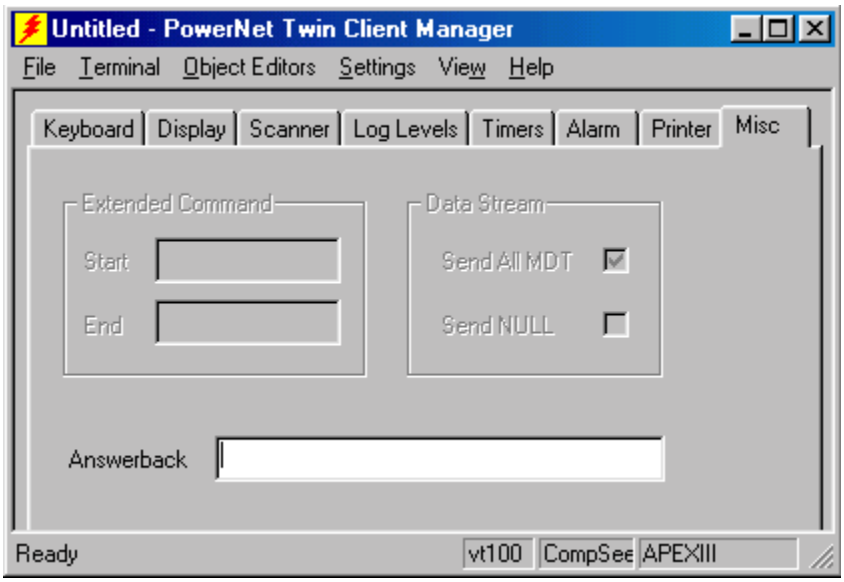
This numeric input field defines an ASCII value, in decimal, that will be converted to a printer control sequence as defined by the Conversion option. The default value is zero (0), which disables conversion.

Conversion

Specifies what the Flag Byte is converted to. The options are **crnl, cr**, and **nl** which represent ASCII carriage return new line, carriage return, and new line, respectively. The default value is **crnl**.

Miscellaneous Customizations

Clicking on the Misc tab shows the following options window:



Extended Command Group **(3270 and 5250 only)**

This option group provides 3270 and 5250 host applications with the same extended command set available to VT/HP applications. Refer to Chapter 6 for a detailed description of the Extended Commands.

Start

Specifies a unique character sequence that, when encountered within the host display, indicates that all subsequent characters up to but not including the End sequence, are to be interpreted as an Extended Command. Default, blank, indicates that the option is not in use.

End

Specifies a unique character sequence that terminates the Extended Command.

Data Stream Group **(3270 only)**

Send All MDT

This check box enables (checked), or disables (unchecked) the transmission of all fields with the MDT (Modified Data Tag) bit set. When disabled, only unprotected fields are transmitted. The default is enabled, which transmits all fields with the MDT set.

Send NULL

This check box enables (checked), or disables (unchecked) the transmission of NULL characters to the host system. The default value is disabled.

Note: For AS400 hosts, this option must be checked.

Answerback **(VT/HP only)**

This text input field defines the response returned to the host application when the answerback command (as defined under VT/HP emulation) is received. If this value is left blank, the terminal automatically returns an ASCII string corresponding to the emulation in use (vt100, vt220, or hp700).

Non-graphic characters may be embedded in the answerback field using the escape sequence `\nnn`, where the backslash is followed by three digits representing the octal value. Refer to Appendix A, *ASCII Character Set Octal Values*.

Inserting the sequence `$1` into the answerback string results in a substitution of the last octet of the terminal IP address in a 3 digit format (000-255).

Given a terminal with an IP address of 206.183.67.192, the following examples demonstrate how substitution and non-graphic escape sequences are processed.

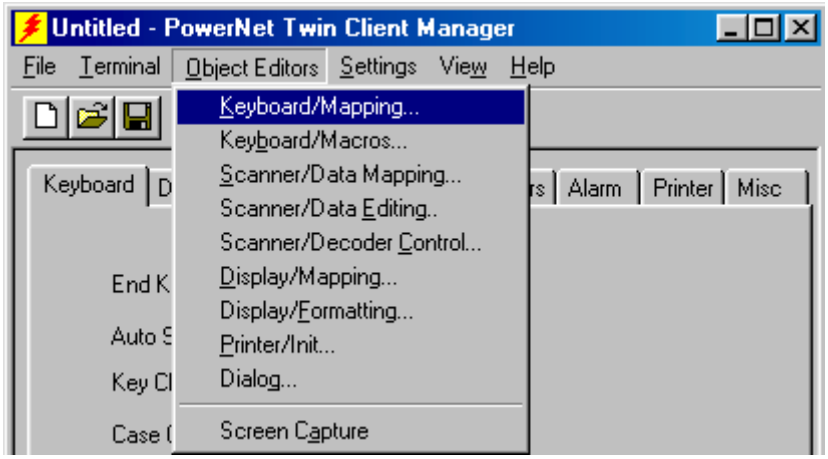
Answerback	***Data Sent in Response to Answerback Command***
Hello World	Hello World
$1	192
RF$1	RF192
RF$1\015	RF192<carriage return>

Chapter 6 • Advanced Integration

This chapter describes the use of the advanced integration features built in to the PowerNet Twin Client. These features make it possible to tailor Twin Client operation to meet special customer requirements without custom programming.

Integration *objects* are used to implement the PowerNet advanced integration capability. An editor is used to create and modify each object, and the objects are associated with a terminal configuration using the *Advanced* setup options described in the previous chapter. The objects then become part of the terminal's software configuration and as a result are supported by the powerful Auto-Configuration tools described in Chapter 8.

Clicking on the Object Editors menu of the PowerNet Twin Client Manager displays the editor menu.



The following sections describe the use of each object, how to create the object, and how to assign the object to a terminal configuration using the Advanced Setup options.

A detailed description of the Extended Commands, which are used by applications to dynamically control the terminal scanner and keyboard, is included in this chapter. The advanced emulation-specific configuration options referred to in the previous chapter are also described here.

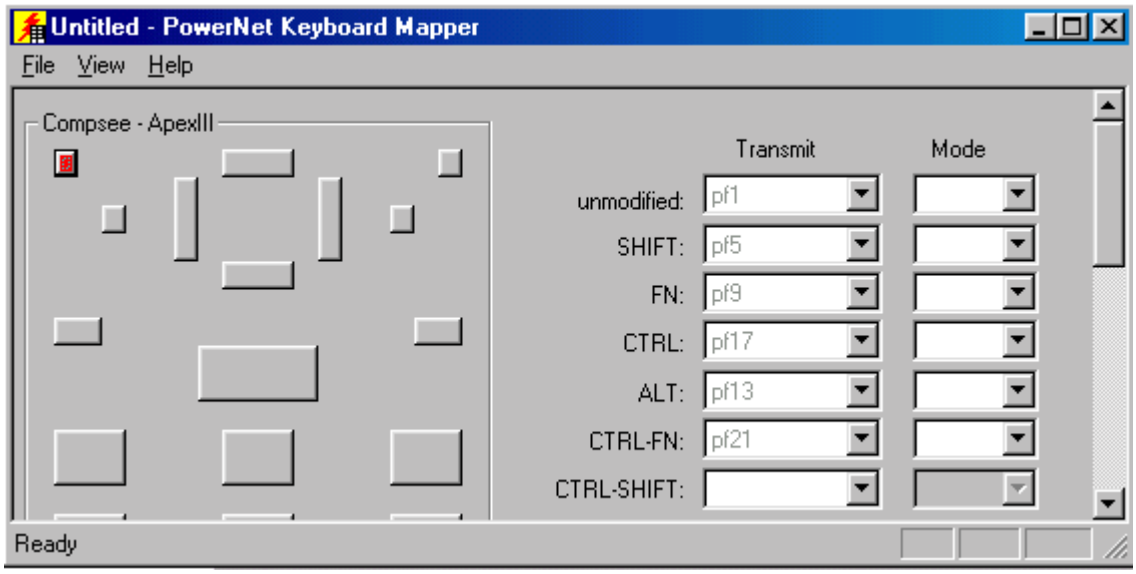
Keyboard/Mapping

The Keyboard/Mapping object is used to change the functionality of the terminal keyboard. This feature is most often used to simplify keyboard usage and reduce operator workload. It is also used to reduce re-training requirements when introducing new terminal models.

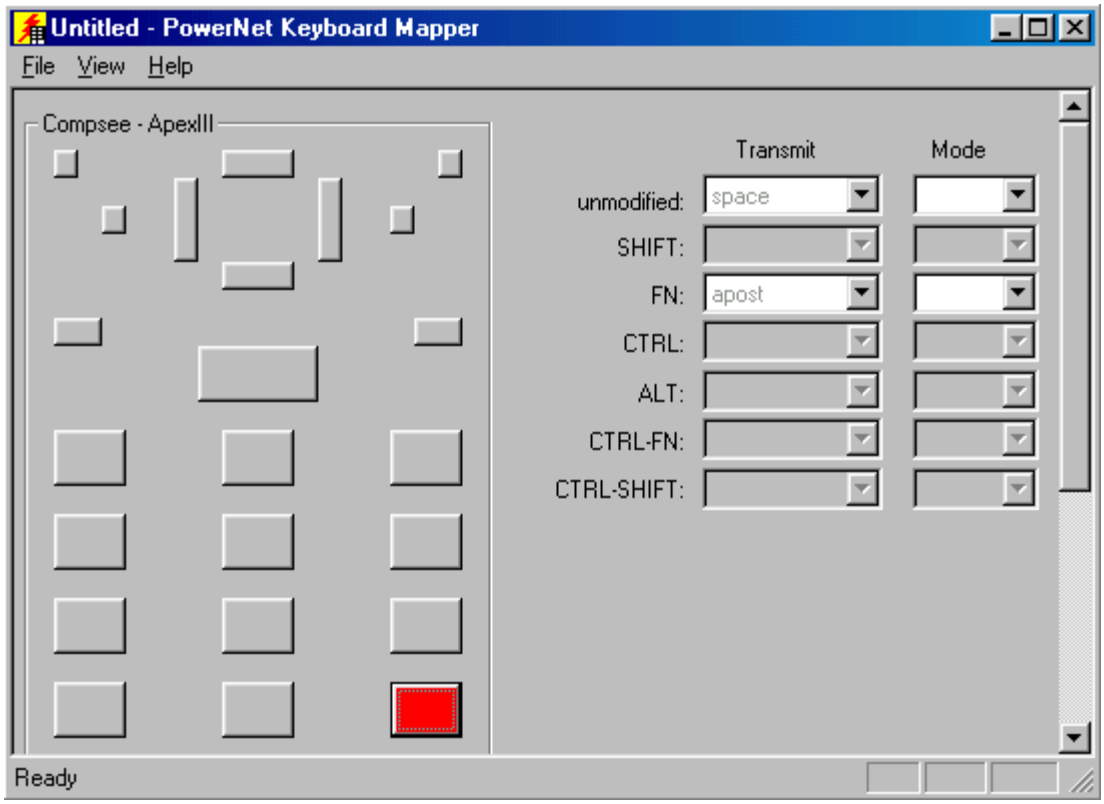
The need for keyboard mapping is a result of the size-restricted keypads common to all portable terminal devices. Compensating for the physical limitations, the manufacturer uses state *modifier* keys to expand the functionality of the keypad. As a result, many keys (e.g., the **UP-ARROW** key) require the operator to press two or more keys to emulate a single keystroke. Because many applications tend to rely heavily on a small group of keys, it is advantageous to map those frequently used keys to single key strokes, thus increasing both productivity and user acceptance.

Creating the Object

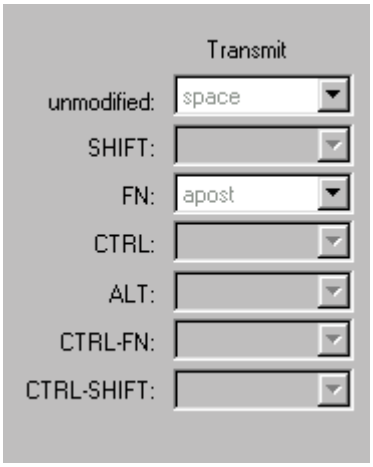
The Keyboard Mapper screen provides a mock-up of a keypad on the left side of the window, and options for key remapping on the right. By clicking on a key on the keypad mock-up, the available options that apply to that key appear on the right



By clicking on the key at the lower right corner of this model changes the display as follows:



The first column on the right side of the window, entitled Transmit, defines the emulation key assigned to the highlighted keypad button in each of the available keyboard *states* (unshifted, shifted, alpha lock, etc.). Each modified key state is initially blank, indicating that the PowerNet default is in effect and no changes will be made to that key or its Mode of operation. Refer to Appendix B for the table of default PowerNet key assignments for each Compsee terminal.



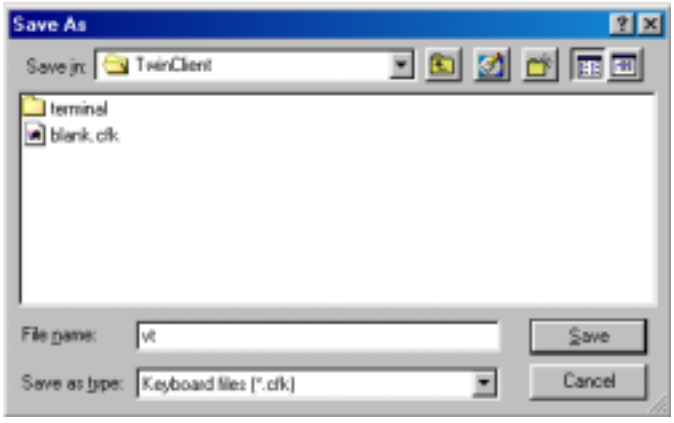
After a key is selected, the Mode options change depending on the key selection. The Mode column defines the action taken by the selected key combination.

The table of mode options, and their effect, is as follows:

xmit	Transmits the key.
noop	Disable the key
edleft	Non-destructive backspace (move) to the left of the cursor within a field.
edrite	Non-destructive space (move) to the right of the cursor within a field.
edbksp	Destructive backspace (move) to the left of the cursor within a field.
edeeof	Erase from current position to end of field.
edefld	Erase entire field.
lhelp	Displays terminal ID, date, time, and terminal software version number.
scan	Activate the scanner.

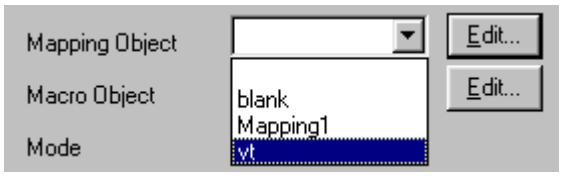
Saving and Assigning the Object

Save the object by clicking on File, Save As, and then enter a name. For the purposes of this example, the name is VT.



Click on Save. Return to the PowerNet Twin Client Manager menus by clicking on the button at the upper right corner of the Keyboard Mapper window.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Keyboard tab, then on the Mapping Object list button, and finally on the object name.



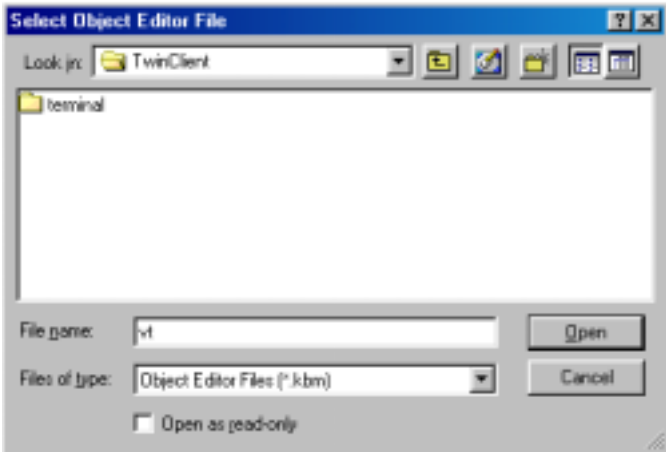
Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the keyboard mapping will take effect.

Keyboard Macros

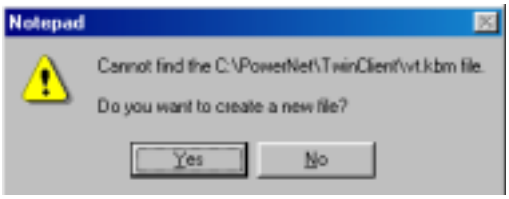
The Keyboard/Marco object is used to assign sequences of characters to the VT/HP programmable function keys. Using this feature, strings of characters can be assigned to a single keystroke.

Creating the Object

Create the object by clicking on Object Editors, then Keyboard/Macros, and then enter a file name. For the purposes of this example, the name is vt.



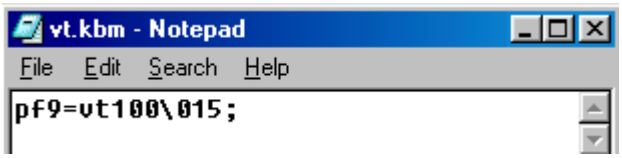
Click on the Open button, and then click on the YES button to create the new file.



The Notepad utility is then invoked. The Keyboard/Macro object is a text file with one entry per line. Each entry uses the following format,

```
<keyname>=<macro string>;
```

where <keyname> is pf1 to pf24, and <macro string> is the macro text assigned to that specific key. For example, to assign the text "vt100" followed by a carriage return to the pf9 key, the entry is:

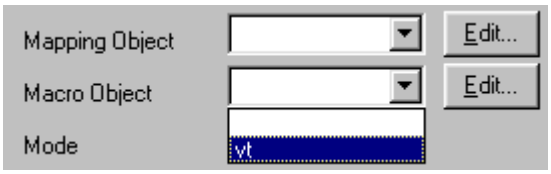


Note: **\015** represents the octal value for "carriage return". Refer to Appendix A, *ASCII Character Set Octal Values*.

Saving and Assigning the Object

Save the object by clicking on File, then on Save, and then on Exit,. which returns to the Twin Client Manager menu.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Keyboard tab, then on the Macro Object list button, and finally on the object name.



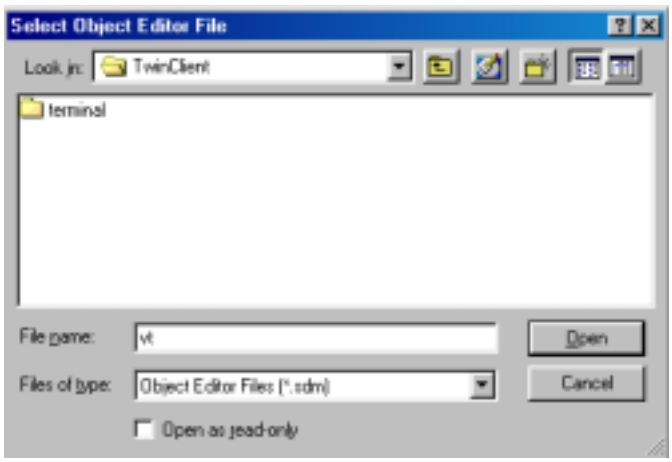
Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the keyboard macro will take effect.

Scanner/Data Mapping

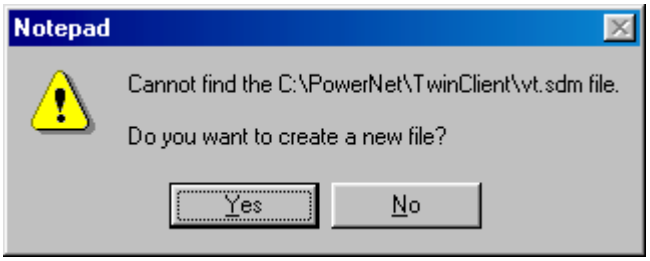
The scanner data mapping object defines barcode sequences that, when encountered in scanned data, are automatically converted to emulator keystrokes. This feature can be used to reduce or eliminate keyboard entry by the operator. That is, instead of pressing the F3 key to access a help screen, the operator scans a barcode that is *mapped* to the keystroke.

Creating the Object

Create the object by clicking on Object Editors, then Scanner Data/Mapping, and then enter a file name. For the purposes of this example, the name is vt.



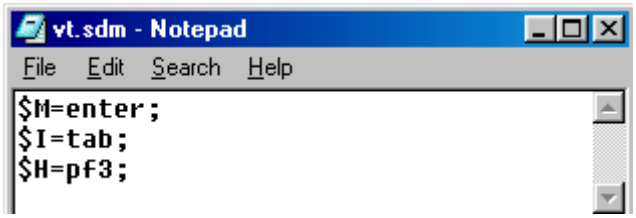
Click on the Open button, and then click on the Yes button to create the new file.



The Notepad utility is then invoked. The Scanner/Data mapping object is a text file with one entry per line. Each entry uses the following format,

`<barcode>=<keystroke>;`

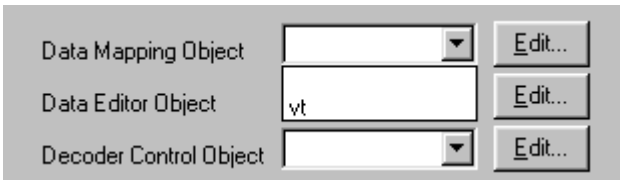
where `<barcode>` is the scanned barcode and `<keystroke>` is the keystroke to send when the barcode is scanned. The following example object demonstrates three scan data mappings, including the mapping of barcode $H to the F3 keystroke



Saving and Assigning the Object

Save the object by clicking on File, then on Save, and then on Exit,. which returns to the Twin Client Manager menu.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Scanner tab, then on the Data Mapping Object list button, and finally on the object name.



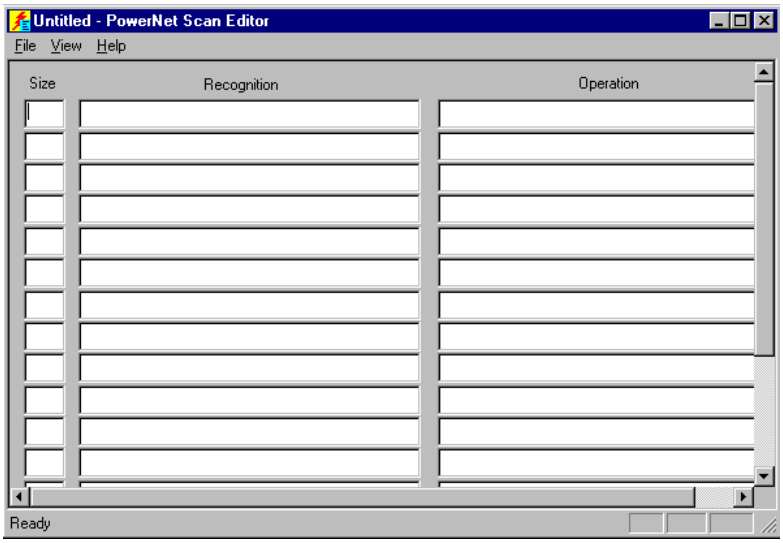
Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the scanner data mapping will take effect.

Scanner/Data Editing

The scanner data editing object defines the rules for recognizing barcode patterns, and then for performing automatic manipulations on the barcode before it is transmitted to the host application. This feature is most often employed when upgrading wedge-based systems.

Creating the Object

Create the object by clicking on Object Editors, then Scanner/Data Editing.



Barcode recognition is based on the Size (length) and Recognition specifiers. Once the pattern is recognized, Operation specifiers manipulate the barcode.

The **recognition** specifiers consist of the four characters, as shown in the following table.

A	Alpha character
N	Numeric character
*****	Any character
=	Must match next character

The **operation** specifiers consist of the following constructs:

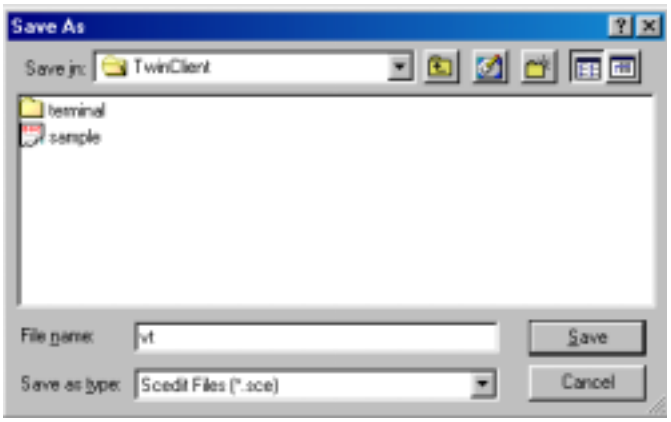
X Delete character
***** Copy as is
( ) Substitute
“ Insert

The following table illustrates how the recognition and operation specifiers identify and manipulate the data.

Barcode	Size	Recognition	Operation	Result
PN-1245	7	AA=-NNNN	“F”*******	FPN-1245
5A5567BBAT	10	**********	**********”M”	5A5567BBATM
TGR87	5	=T=GAN*	**(S)**	TGS87
78-RHG	6	NN=-AAA	**X***	78RHG

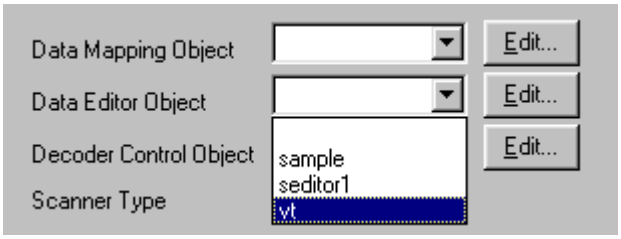
Saving and Assigning the Object

Save the object by clicking on File, Save As, and then enter a name. For the purposes of this example, the name is vt.



Click on Save. Return to the PowerNet Twin Client Manager menus by clicking on the button at the upper right corner of the Scan Editor window.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Scanner tab, then on the Data Editor Object list button, and finally on the object name.



Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the scan data editor object will take effect.

Scan/Decoder Control

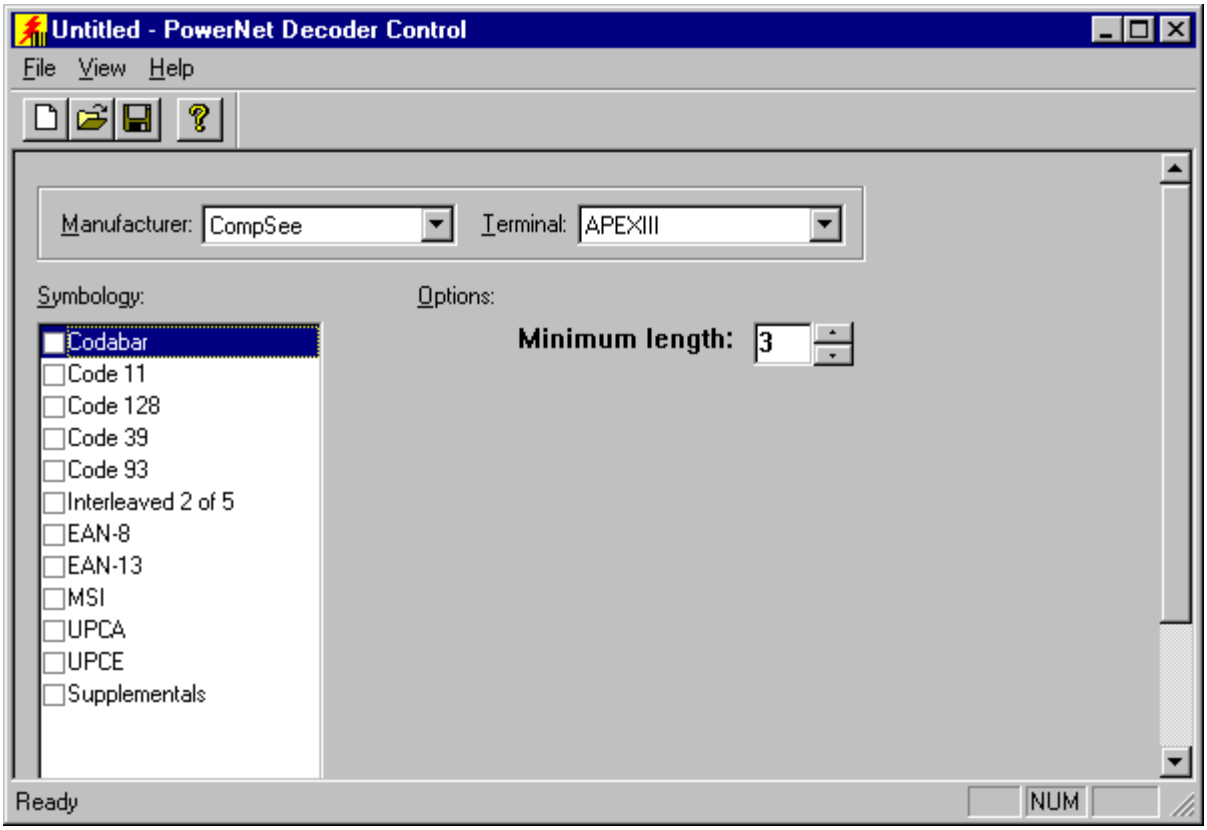
The scan/decoder control object modifies the operation of the scan decoder in the terminal. Any of the supported symbologies can be enabled or disabled, and all of the parameters associated with a specific symbology can be modified to meet specific customer requirements.

This feature is used primarily to reduce errors and increase performance. For example, a terminal used in a receiving application can be restricted to symbologies used only in the receiving department, thus reducing the opportunity for scan decoder errors and, in many cases, increasing scanner performance. As another example, the scan decoder can be instructed to return a successful scan only when the barcode is of a certain length. As a result, the opportunity for a scan decoder error is further reduced.

PowerNet Twin Client also allows the scanner to be controlled dynamically by the application. This is accomplished through the use of the *Extended Command* set, which is described later in this chapter.

Creating the Object

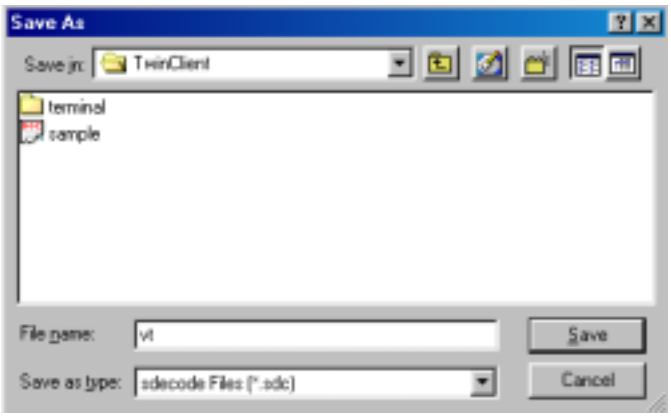
Create the object by clicking on Object Editors, then Scanner/Decoder Control.



The check box next to the symbology enables (checked) or disables (unchecked) the symbology. The options for a specific symbology are available for modification by highlighting the select symbology.

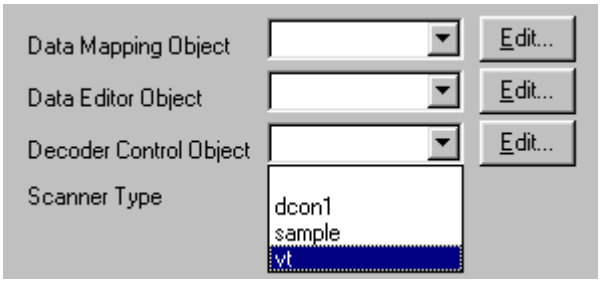
Saving and Assigning the Object

Save the object by clicking on File, Save As, and then enter a name. For the purposes of this example, the name is vt.



Click on Save. Return to the PowerNet Twin Client Manager menus by clicking on the button at the upper right corner of the Decoder Control window.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Scanner tab, then on the Decoder Control Object list button, and finally on the object name.



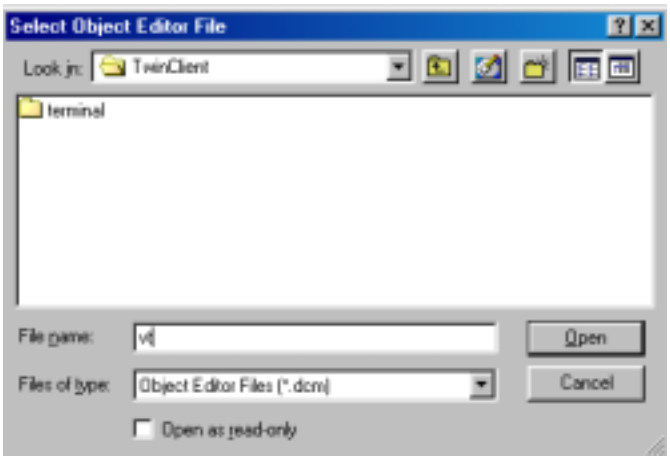
Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the scan decoder control object will take effect.

Display/Mapping

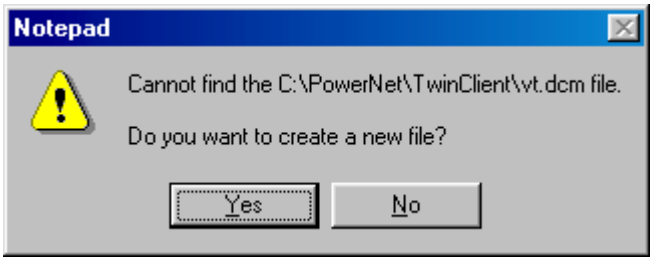
The display mapping object is used to correct variations between application character sets and the terminal display character set. The terminal display uses the ISO-8859-1 font set, which is an international standard adhered to by most, but not all, applications. The display mapping is used to resolve any discrepancies.

Creating the Object

Create the object by clicking on Object Editors, then Display/Mapping, and then enter a file name. For the purposes of this example, the name is vt.



Click on the Open button, and then click on the Yes button to create the new file.

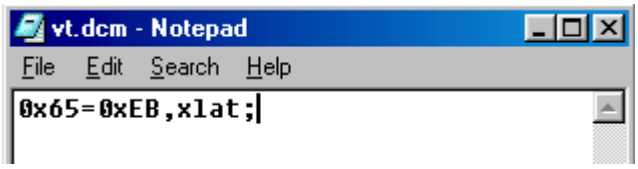


The Notepad utility is then invoked. The Display/Mapping object is a text file with one entry per line. Each entry uses the following format,

```
<application char>=<ISO-8859-1 char>,xlat;
```

where `<application char>` is the hexadecimal value of the character transmitted by the host application, and `<ISO-8859-1 char>` is the hexadecimal value of the desired terminal display character, followed by a comma, the word `xlat`, and a semicolon. Tables for both ISO-8859-1 and the ASCII character sets are in Appendix A.

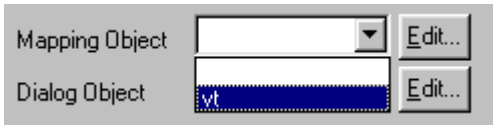
For the purposes of this example, the English character `e` (`0x65`) will be converted to an umlaut `ë` (`0xEB`) with the entry shown below. Note that that the two character hexadecimal values must be preceded by `0x`.



Saving and Assigning the Object

Save the object by clicking on File, then on Save, and then on Exit,. which returns to the Twin Client Manager menu.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Display tab, then on the Mapping Object list button, and finally on the object name.



Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the display mapping object will take effect.

Display/Formatting

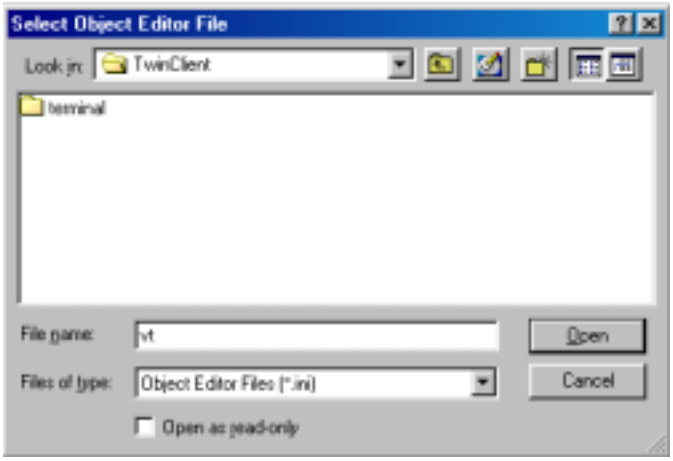
The display formatting object is used to make the host application interface easier to use, without modifying the host application. Chapter 7 is devoted to the description of this important integration feature.

Printer/Init

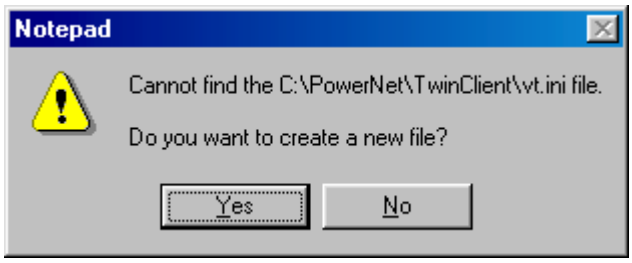
The printer initialization object is used to send initialization commands to the printer at the start of each terminal session. It can also be used to test printer operation.

Creating the Object

Create the object by clicking on Object Editors, then Printer/Init, and then enter a file name. For the purposes of this example, the name is vt.



Click on the Open button, and then click on the Yes button to create the new file.

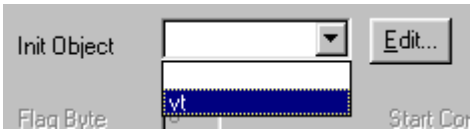


The Notepad utility is then invoked. The printer/init object is a text file, allowing for the entry of printer-specific commands. Refer to the documentation provided by the printer manufacturer for instructions.

Saving and Assigning the Object

Save the object by clicking on File, then on Save, and then on Exit, which returns to the Twin Client Manager menu.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Printer tab, then on the Init Object list button, and finally on the object name.



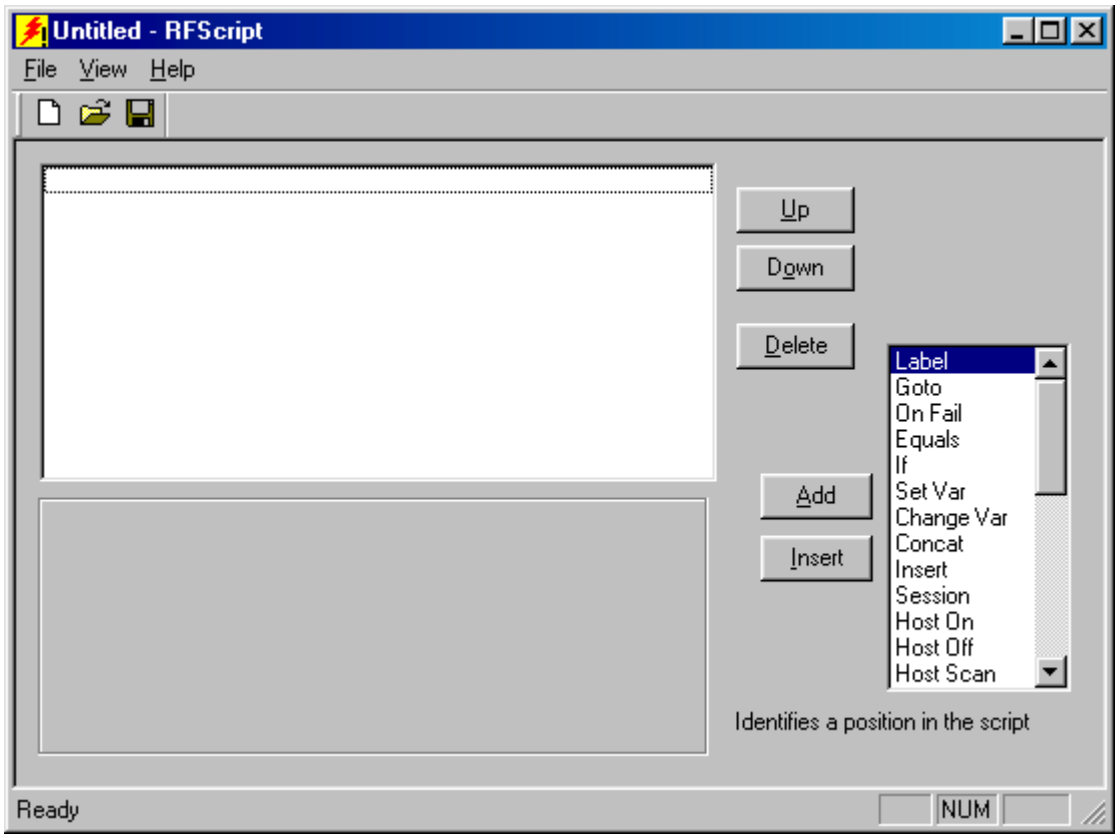
Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the init object will be transmitted to the printer at the start of the next Telnet session.

Dialog

The dialog object is a script used to automate difficult or repetitive user interactions with the host application. It can be used to create terminal screens, collect input, generate output, and make decisions based upon terminal keyboard or scanner input, and host application data.

Creating the Object

Create the object by clicking on Object Editors, then Dialog. Commands selected from scrolling list on the right are added or inserted into the scripting area on the left using the click buttons between the two areas. The bottom left portion of the window is used to collect arguments for those commands that require them.



Commands and Arguments

Commands control the actions taken within the script. They can be used to interact both with the host and the terminal, and to modify activity based on comparisons of both terminal and host data. The following table describes each command.

Commands

Label	Defines a target for the conditional branch commands **Onfail, Equal, If, Host State, Host Scan**, and the unconditional branch command, **Goto**.
Goto	Causes execution to begin unconditionally and immediately at the named target **Label**.
On Fail	Upon detection of a system error, execution continues at the named **Label**.
Equals	If the comparison is equal, branches to **Label**. Otherwise, execution continues with the next command.
If	If the conditions of the comparison operator are true, branches to **Label**. Otherwise, execution continues with the next command. The numeric value comparison operators, which treat the values being compared numerically, are = (equal). != (not equal), > (greater than), and < (less than). The string value comparison operators, which treat the values as character strings, are $= (equal) and $!= (not equal)

Commands

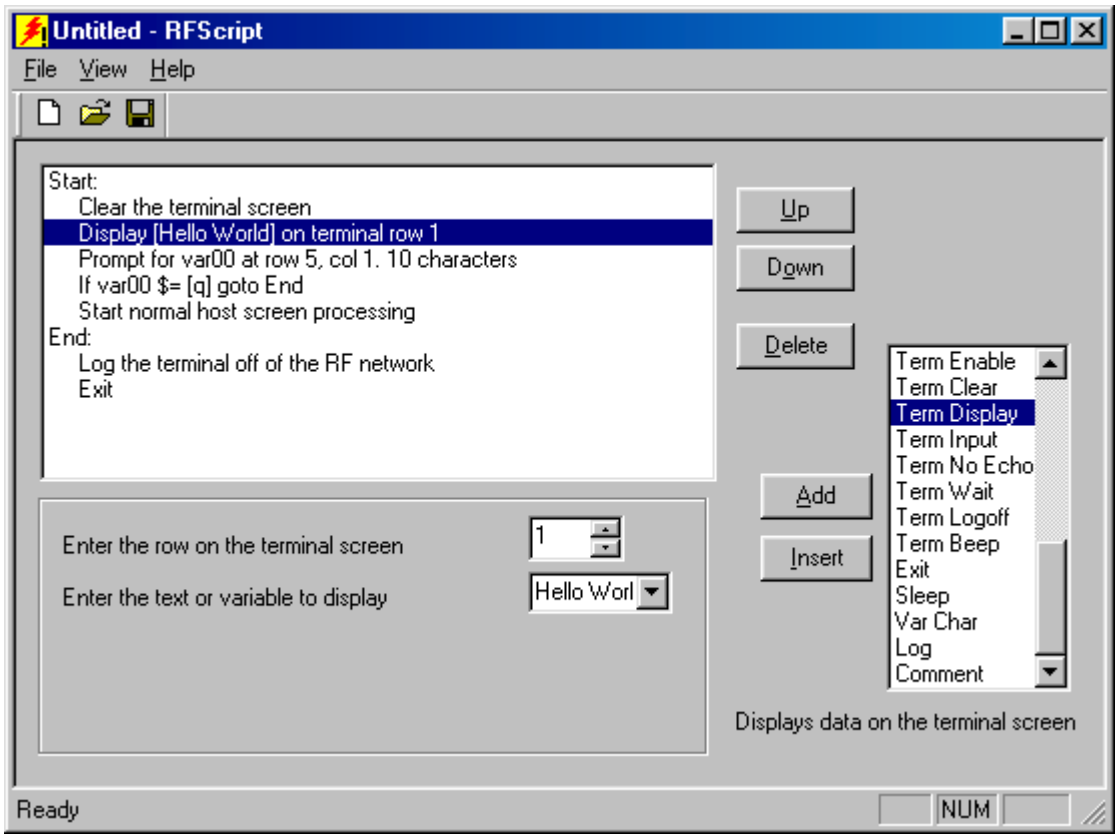
Set Var	Assigns a value to one of up to 36 variables.
Change Var	Adds to or subtracts from the value of a variable.
Concat	Adds characters to the end of a variable.
Session	Returns control of the session to the terminal operator. The operator returns control to the dialog object, at the next line, by pressing the key defined as the End Key in the Keyboard tab.
Host On	Initiates a TCP/IP connection to the host system.
Host Off	Terminates the TCP/IP connection to the host system.
Host Scan	Scans the host display for a value, and continues execution at the named label if the value is found.
Host Update	Refreshes the host display. This command is used after data has been sent to the host that may change the display, and prior to using the **Host Scan** or **Host State** conditional branch commands, or a **Host Copy** command.
Host Send	Transmits data and/or a keystroke to the host.
Host Copy	Copies characters from the host display to a variable.
Host State	If the state of the session matches the value supplied, execution begins at the named **Label**. The possible values are **inactive**, meaning the host session has not been established, and **plu**, which means the host session, has been established.
Settle	Allows time for the host application to settle.
Term Enable	Initializes the terminal configuration parameters.
Term Clear	Clears the terminal display of all characters.
Term Display	Puts a value or the value of a variable on the terminal display.
Term input	Prompts the terminal operator to input data.
Term No Echo	Prompts the terminal operator to input data, which will not be echoed on the terminal display.
Term Wait	Waits for any input from the terminal.
Term Logoff	Terminates the connection to the wireless network.
Exit	Terminates execution of the dialog object.
Sleep	Suspends all activity for the specified number of seconds.
Var Char	Sets the character used internally by the dialog processor to indicate the name of a variable. The character is normally logged $. This command is used only when the first character of a value used in one of the conditional branching commands begins with a $.
Log	Writes a message to the terminal log.

Commands

Comment Inserts documentation in the dialog object.

Adding Commands

The scrolling list box on the right side of the window is used to select a command. Click on the desired command and then click on the Add button to add the command to the dialog script.



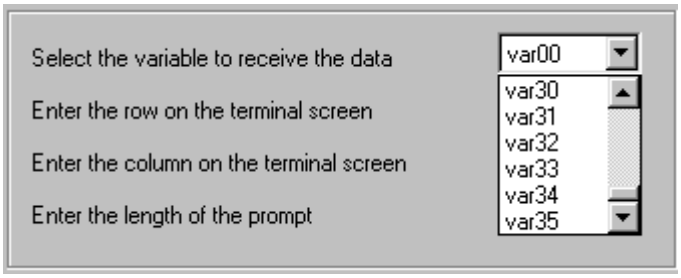
All commands that require arguments prompt for them in the box at the lower left side of the window. In the example above, the Term Display command requires a row number and either a variable or a character string. In this case the display string is Hello World. Note that the text entry field scrolls to the right so that text longer than the size of the box can be entered.

Inserting and Deleting Commands

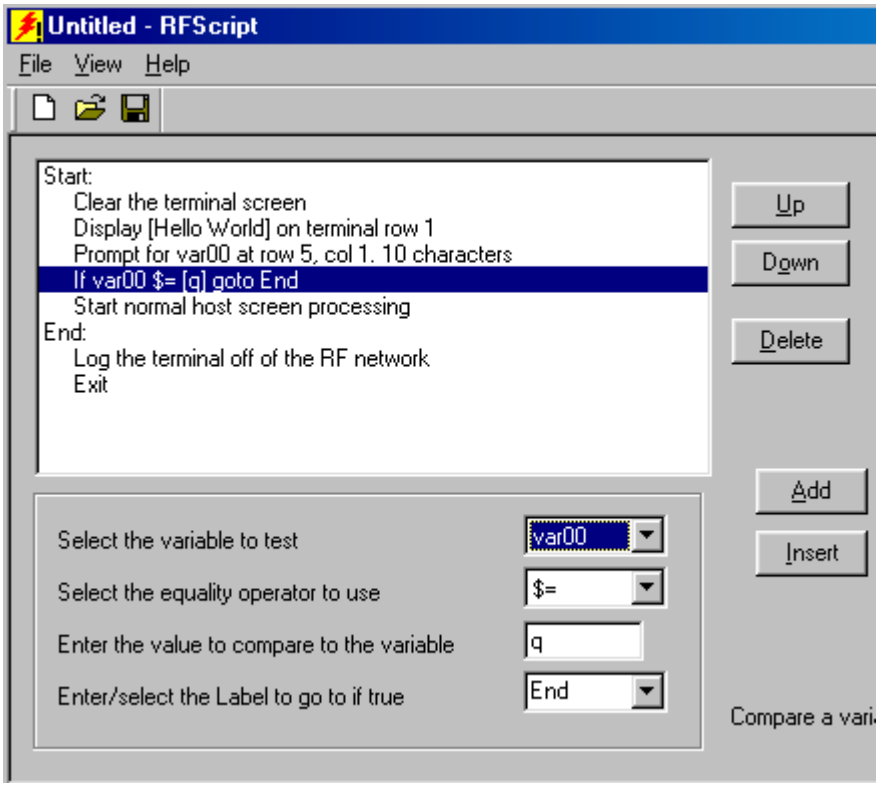
Click on the desired dialog line on the upper left side of the window to highlight the line, and then click on the Insert button to insert a new command above the selected line, or click on the Delete button to remove the line.

Using Variables and Labels

The dialog object provides up to 36 variables to store temporary data collected during the execution of the script.

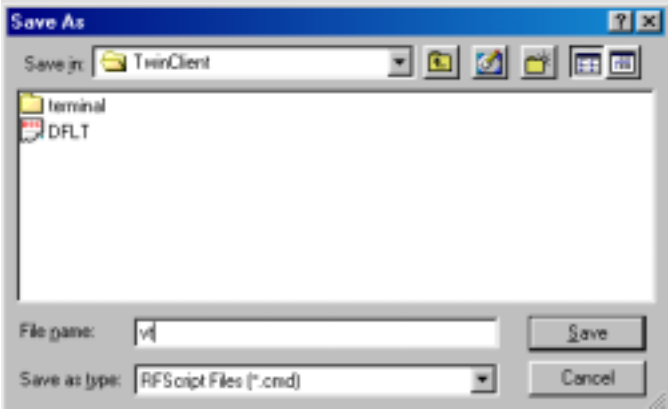


These variables can be compared to fixed values or other variables using the If command. If the comparison is true, execution branches to the specified label.



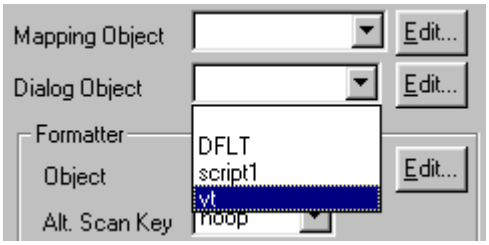
Saving and Assigning the Object

Save the object by clicking on File, Save As, and then enter a name. For the purposes of this example, the name is VT.



Then click on Save. Return to the PowerNet Twin Client Manager menus by clicking on the ☒ button at the upper right corner of the Decoder Control window.

Next, assign the object to a terminal configuration by opening a terminal configuration from the Files menu. Click on the advanced setup Display tab, then on the Dialog Object list button, and finally on the object name.



Save the updated terminal configuration by clicking on File, and then Save. The next time the terminal is cold-booted, the new configuration will be downloaded automatically and the dialog object will take effect.

Extended Commands

The host application can control the terminal's scanner and keyboard dynamically, while the terminal is in session, by issuing the extended commands described in the following sections.

Dynamic Decoder Control

The format and content of the commands that control the scan decoder are described in the following sub-sections.

CODABAR Control

Extended Command:

```
<ESC>[?0;<state>;<minlen>;0z
```

- `State:` Disable/enable codabar scanning. 0=disabled, 1=enabled.
- `Minlen:` Minimum valid barcode length. Valid values are 1–54.

CODE 11 Control

Extended Command:

```
<ESC>[?11;<state>;<depend>z
```

- `State:` Disable/enable code 11. 0=disabled, 1=enabled.
- `Depend:` Number of check digit. Valid values are 0, 1 or 27.

CODE 128

Extended Command:

```
<ESC>[?2;<state>;0z
```

- `State:` Disable/enable code 128 scanning. 0=disabled, 1=enabled.
- `Minlen:` Specify minimum valid barcode length. Valid values are from 1 to 54.
- `Maxlen:` Specifies the maximum valid barcode length. The maximum length must be greater than or equal to the minimum length. Valid values are from 1 to 54.

CODE 39

Extended Command:

```
<ESC>[?3;<state>;<depend>z
```

- `State:` Disable/enable code 39 scanning. 0=disabled, 1=enabled.
- `Depend:` Disable/enable full ASCII code 39 interpretation. 0=disabled, 1=enabled.

CODE 93

Extended Command:

```
<ESC>[?5;<state>;0z
```

- `State:` Disable/enable code 93 scanning. 0=disabled, 1=enabled.

INTERLEAVED 2 OF 5

Extended Command:

```
<ESC>[?7;<state>;<minlen>;0z
```

- `State:` Disable/enable interleaved 2 of 5 scanning. 0=disabled, 1=enabled.
- `Minlen:` Minimum valid barcode length. Valid values range from 1 to 54.

EAN-13

Extended Command:

```
<ESC>[?8;<state>;0;0;0z
```

- `State:` Disable/enable EAN-13 scanning. 0=disabled, 1=enabled.

EAN-8

Extended Command:

<ESC>[?9;<state>;0;0;0z

- State: Disable/enable EAN-8 scanning. 0=disabled, 1=enabled.

PLESSEY/MSI

Extended Command:

<ESC>[?10;<state>;<minlen>;<depend>z

- State: Disable/enable code MSI scanning. 0=disabled, 1=enabled.
- Minlen: Minimum valid barcode length Valid values are from 4 to 54.
- Depend: Specifies the number of required check digits. Valid values are 0, 1, or 2.

UPC-A

Extended Command:

<ESC>[?13;<state>;0;0;0z

- State: Disable/enable UPC-A scanning. 0=disabled, 1=enabled.

UPC-E0

Extended Command:

<ESC>[?14;<state>;0;0;0z

- State: Disable/enable UPC-E0 scanning. 0=disabled, 1=enabled.

UPC-E1

Extended Command:

<ESC>[?15;<state>;0;0;0z

- State: Disable/enable UPC-E1 scanning. 0=disabled, 1=enabled.

Supplemental Barcode Handling (UPC/EAN) Options

Extended Command:

<ESC>[?12;<state>;<minlen>;<maxlen>;<depend>z

- State: This flag should always be set to one.
- Minlen: Specifies if two character supplementals are enabled/disabled (only applies to transmit mode 1). 0=no codes with two character supplementals decoded, 1=codes with two character supplementals decoded.
- Maxlen: Indicates if five character supplementals are enabled/disabled (only applies to transmit mode 1). 0=no codes with five character supplementals decoded, 1=codes with five character supplementals decoded.
- Depend: Specifies the supplemental transmit mode. 0=no supplementals transmitted to host, supplemental enable/disable ignored. 1=only codes with the appropriate supplemental (from minlen/maxlen) decoded. 2=all codes sent as is, supplemental enable/disable ignored.

Disabling All Decoders

Extended Command:

```
<ESC>[?z
```

This command is used to disable all barcodes on the handheld. Typically this would be issued before turning on an individual barcode type just to make sure of the state of the active barcodes.

Input Mode Command

The input mode parameter sent from the application controls (via the host application) whether the terminal accepts input from the keyboard, the scanner or both. The format of this command is as follows:

```
<ESC>[!1;<mode>z.
```

The mode parameter can be one of the following:

Mode	Action	Description
0 (default)	Scan and Key	Data initially accepted from either the keyboard or scanner. Scanning, allowed on a partially keyed field, causes the keyed data to be discarded and the scanned data to be accepted.
1	Scan or Key	Data initially accepted from either the keyboard or scanner. Scanning is not allowed on a partially keyed field. If the operator clears the field then scanning is again allowed.
2	Scan Only	Data accepted only from the scanner. Use caution when using this command, bad barcode can block the user from completing input.
3	Key Only	Data accepted only from keyboard, the scanner off.

Key Input Mode Command

The processing of keyed input can be controlled dynamically, while the terminal is in session. The format of this command is as follows:

```
<ESC>[!2;<mode>z.
```

The mode parameter can be one of the following.

Mode	Description
0 (default)	Accepts characters between 0x20 and 0x7F.
1	Accepts alphabetic characters only.

2 Accepts numeric characters only.

3 Accepts alphanumeric characters only.

For example, to allow keyboard input of numeric characters only, use the following sequence:

<ESC>[!1;3z<ESC>[!2;2z

(HEX equivalent: 1B 5B 21 31 3B 33 7A 27 5B 21 32 3B 32 7A)

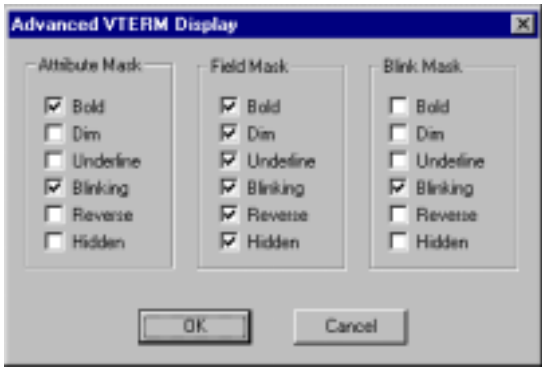
To reset the terminal back to normal input, use the following sequence:

<ESC>[!1;0z<ESC>[!2;0z

(HEX equivalent: 1B 5B 21 31 3B 30 7A 27 5B 21 32 3B 30 7A)

Advanced Display Options for VT/HP

The Advanced button in the advanced view Display tab is active when VT100, VT220, or HP700 emulation is selected. This option group controls how display attributes are processed, and it can also be used to simulate block mode operation (see the Mode option description in the Chapter 5 section *Customizing the Keyboard*).



Attribute Mask

This check box group enables (checked), or disables (unchecked), the display of the indicated character attribute. Compsee character-based terminal displays are capable of displaying only the Reverse and Blinking attributes. All other attributes, if enabled, are displayed in Reverse, except for those attributes checked in the Blink Mask group (see below).

Field Mask

The VT100 and VT220 protocols do not support the more efficient block mode of operation that is standard in the 3270 and 5250 protocols, since there are no VT100 or VT220 protocol commands for defining input fields.

However, PowerNet makes it possible to simulate block mode operation by using video display attributes to define input fields. Each box checked in the Field Mask window indicates a video attribute that will be recognized as an input field specification by the emulator. During a terminal session with a host, whenever the cursor is positioned on

character with the selected attribute(s), all characters to the right of that position with the same attribute are interpreted to specify the length of the input field.

Blink Mask

This check box group is used to enable (checked), or disable (unchecked), the conversion of the selected attribute to Blinking.

Advanced 3270 Keyboard Options

The Advanced button in the advanced view Keyboard tab is active when the 3270 emulation is selected. The option groups in this window are used to automate keystroke generation under the special conditions described in the following subsections. It is also used determine the action taken with oversized scans.

Attribute Key

This option is used to automatically transmit a keystroke to the 3270 host when the 3270 field matches the selected attribute. The automatic keystroke generation can be based on whether the input is scanned, or keyed, or both.

Note: When this feature is made active (setting the Key to a value other than noop and setting the Scan Field and or Key Field to a value other than off) it overrides all other automatic keystroke generation rules except for the Last Field Keys rules (described later in this section).

Key

This scrolling list box is used to select the 3270 keystroke sent with scanned or keyed input when the field matches the selected attribute setting specified in Scan Field and Key Field (described below). This option overrides all other automatic keystroke generation, except for Last Field processing. The default key setting of NOOP disables this function.

Scan Field

This scrolling list box selects the 3270 field attribute that, when data is scanned into the field, results in automatic transmission of the selected Key with the data to the host. The

choices are pen (for 3270 Light Pen Enabled), num (for 3270 Numeric Only), hi (for 3270 High Intensity) and hal (for 3270 High Intensity and Light Pen Enabled). The default value is off.

Key Field

This scrolling list box selects the 3270 field attribute that, when data is keyed into the field and the field is completely filled, results in automatic transmission of the selected Key with the data to the host. The choices are pen (for 3270 Light Pen Enabled), num (for 3270 Numeric Only), hi (for 3270 High Intensity) and hal (for 3270 High Intensity and Light Pen Enabled). The default value is off.

Last Field Keys

This option is used to automate keystroke generation when the keyed or scanned input is into the last field on the 3270 display.

Note: When this rule generates a keystroke, it overrides all other automatic keystroke generation rules (i.e., Scan Key, Auto Send Key, and Attribute Key).

Scanned Input

This scrolling list box is used to select the 3270 keystroke to be sent, when data is scanned into the last field on the 3270 display. The default value is noop, which disables this function.

Keyed Input

This scrolling list box is used to select the 3270 keystroke to be sent when data is keyed into the last field on the 3270 display, and the field is filled. The default value is noop, which disables this function.

Multiple Fields

This check box enables (checked) the Last Field Keys group only if the host display contains more than one input field.

Key Wrap

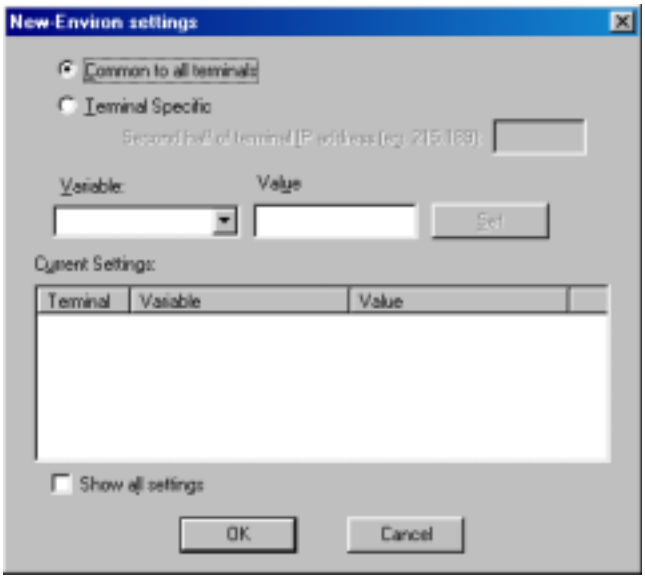
This check box enables (checked), or disables (unchecked) the automatic wrapping of oversized scanned input to subsequent 3270 input fields.

Note: This option has no effect if either Length Checking or Truncation options are enabled (see Chapter 5, *Customizing the Scanner*).

NEW ENVIRON Telnet Extension

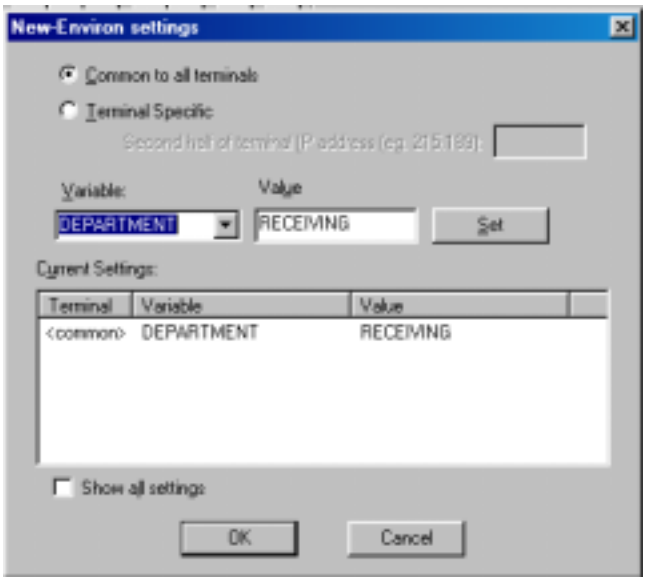
The NEW ENVIRON Telnet extension, also known as *Workstation ID*, is a mechanism for providing named variables with values to the host system via a Telnet negotiation at the beginning of each terminal session.

The New Environ option under the Twin Client Manager's Settings menu is used to create the variables, which are applied to all terminal configurations. Variables can be created that apply only to specific terminals (indicated by IP address). It is also possible to create variables that apply to all terminals.



Creating Common Settings

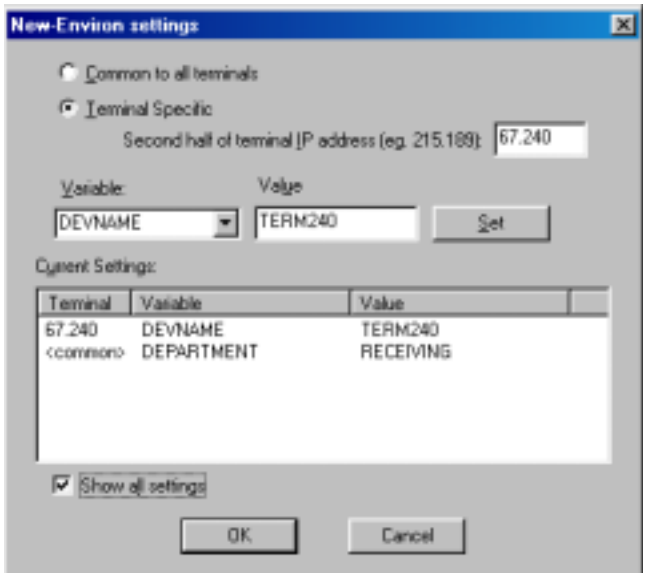
Variables that apply to all terminal sessions are created by clicking on the Common to all terminals button, and then entering the Variable and Value in the respective boxes. Then click on the Set button.



The variable and its value are then displayed in bottom list window.

Creating Terminal Specific Settings

Variables that apply to specific terminal sessions are created by clicking on the Terminal Specific button, and entering the last two octets of the terminal IP address. Then entering the Variable and Value in the respective boxes and click on the Set button.



Note: Click on the Show all settings check box to display both terminal specific and common variables.

Changing and Deleting Settings

Variable names and their values can be modified or deleted by clicking on the variable in the list window. Change the variable or value by editing the Variable and/or Value boxes, and click on the Set button. To delete the variable, press the Delete key on the PC.

Deleted variables will continue to appear in the pull down list until after the settings have been saved.

Saving New Environ

Click on the OK button to save the New Environ settings.

Chapter 7 • The Display Formatter

The display formatter adapts full screen Telnet applications to the portable terminal environment without any modification to the host application. This powerful tool is included with PowerNet Twin Client, and is also used with the OpenAir server when the Twin Client is operating the server-based "thin" mode.

A screen capture utility (included with the Twin Client Manager) is used to access the host application via Telnet and "capture" the host displays. Once captured, the screens are processed into a screen formatter *object* and assigned to a terminal configuration, which can then be downloaded automatically to the terminal, over the wireless network.

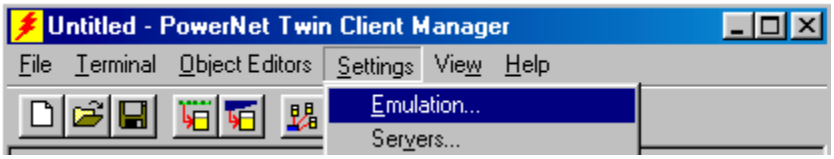
The PowerNet Display Formatter provides the following unique features:

- **Performance** – Optimized for minimum run-time overhead and maximum speed.
- **Transparency** – Fully transparent to the host application.
- **Capacity** – Up to 128 host screens per object, 16 terminal screens per host screen, and 32 input fields per terminal screen.
- **Simplicity** – Intuitive drag-and-drop interface for screen capture and formatting.
- **Flexibility** – Supports all Twin Client terminals.

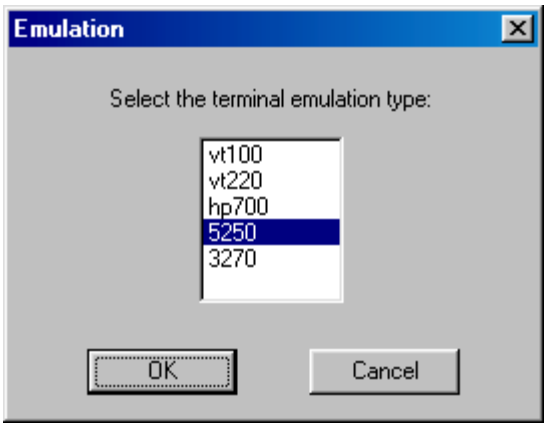
This chapter describes how to set the emulation, capture the host application displays, and process them into formatter objects for download to the terminal.

Setting the Emulation

The first step in the formatting process is to set the emulation (VT/HP, 3270, or 5250) in preparation for capturing the host application displays. Click on **Start**, Programs, PowerNet, Twin Client, Twin Client Manager**,** and then the Settings menu, as shown below.



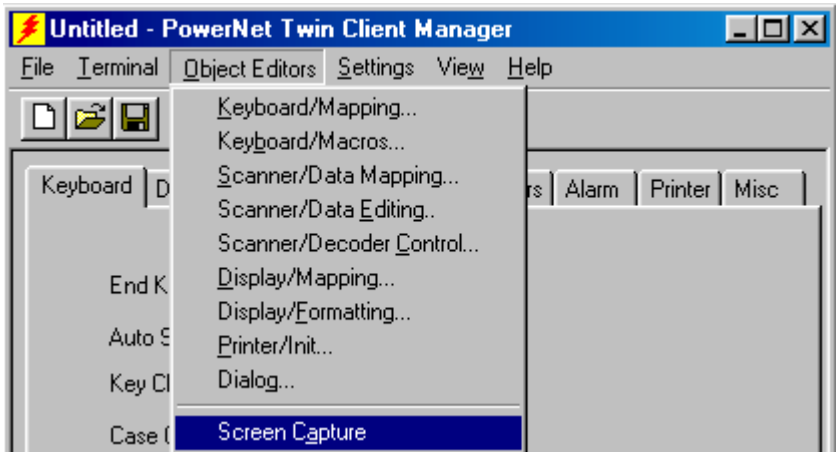
Click on Emulation and select an emulator from the list below.



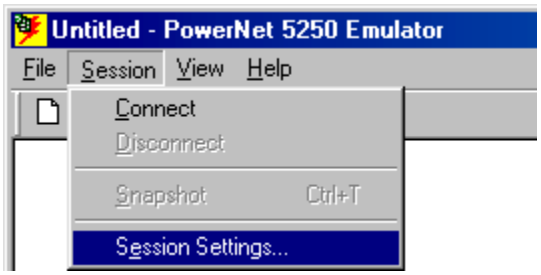
Then click on OK to return to the main PowerNet Twin Client menu.

Starting the Emulator

Start the emulator by clicking on the Object Editors menu and Screen Capture, as shown below

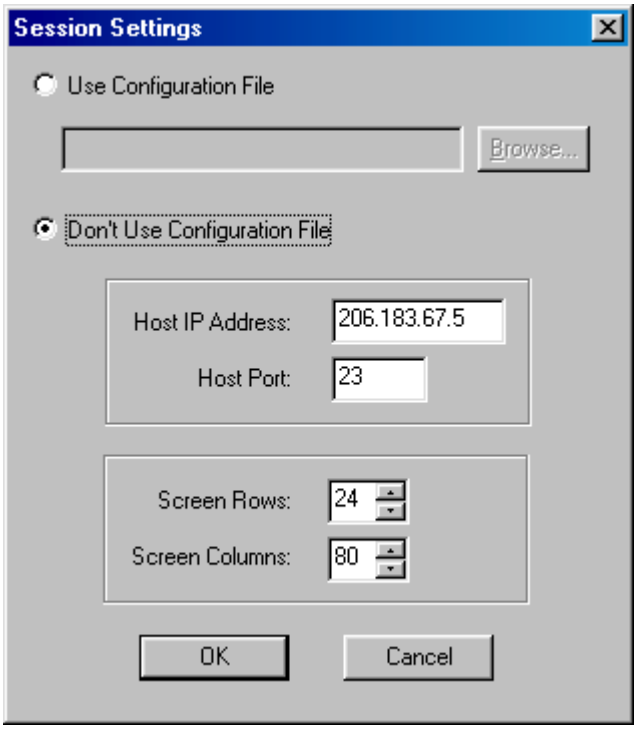


The emulation window is displayed. Click on the Session menu, and then click on Session Settings.

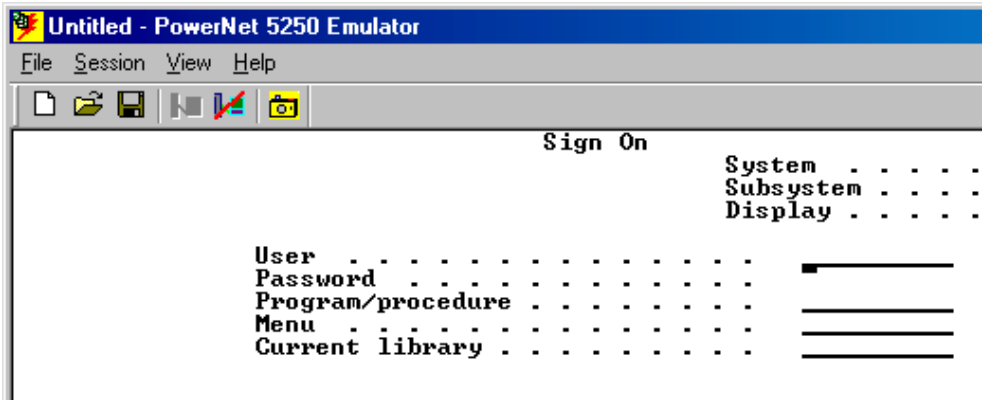


In the Session Settings menu, enter the Host IP address and port of the host system, and then Click on OK to return to the emulator main menu.

Note: The Host Port of 23 is standard for Telnet. However, for security reasons the port number may be set to other values. Consult the local network administrator if a connection cannot be established on port 23.



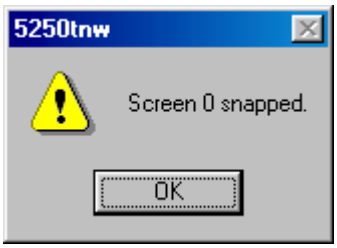
To start a telnet session with the host, click on the  toolbar icon, or click on the Session menu and then on Connect. In this example, the 5250 emulator is used and the host system is an IBM AS/400.



The host application displays are now ready to be captured.

Taking Snapshots

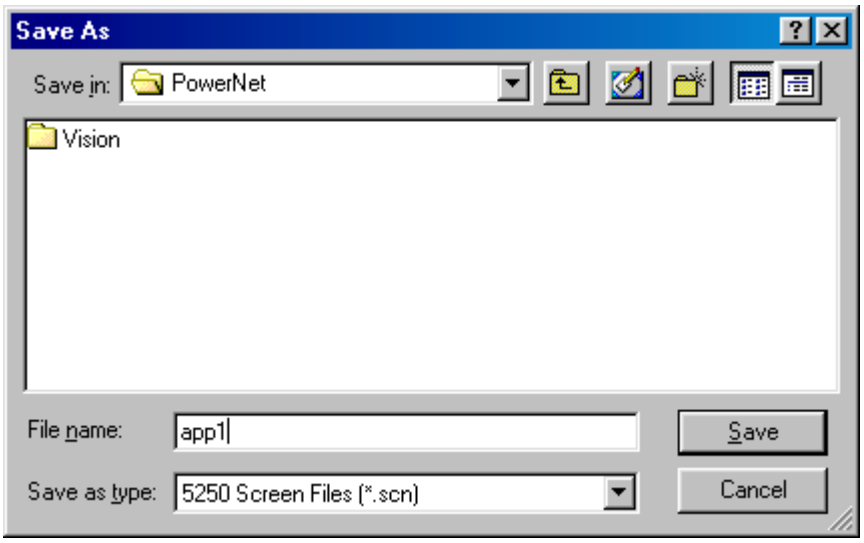
The host screens are captured by clicking on the toolbar icon while the desired screen is displayed. Alternately, click on Session and then Snapshot. The following pop-up indicates that the screen was captured.



Click on OK and continue to navigate the host application, taking snapshots of the screens to be formatted.

Saving the Screen File

Save the snapshots at any time by clicking on the toolbar icon. Alternately, click on Files and then Save As. The following window is displayed for entering the filename.



For this example, the filename is set to app1. Then click on the Save button to return to the emulator.

Exiting the Emulator

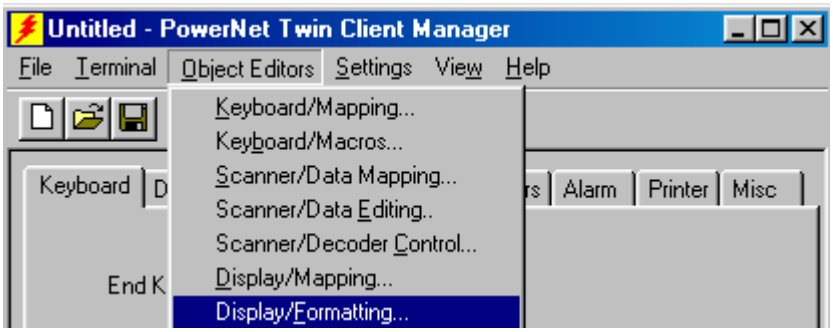
The telnet session is ended by clicking on the toolbar icon, or by clicking on Session and Disconnect. Return to the Twin Client Manager window to format the screens by clicking on the icon at the top right corner of the emulator, or by clicking on File and Exit.

Formatting

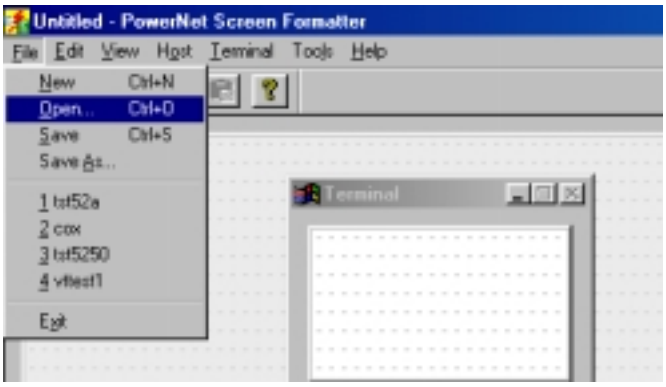
The screen file created in the previous sections can now be formatted. This section describes how to start the formatter, open a screen file, format the screens, save the formatted object, and finally to assign it to a configuration.

Starting the Formatter

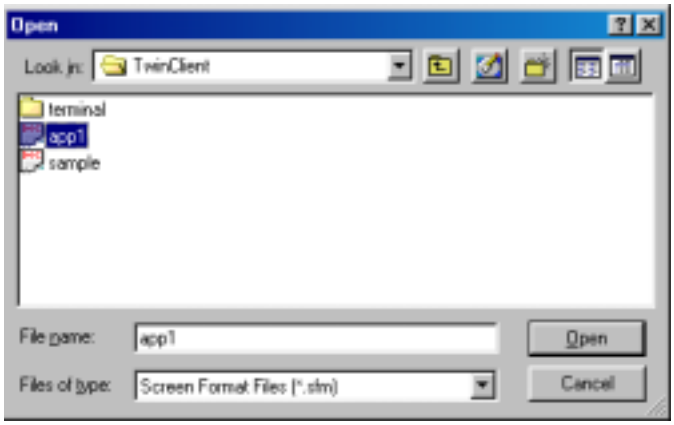
The formatter is started from the Twin Client Manager menu. Start the Twin Client Manager by clicking on **Start**, Programs, PowerNet, Twin Client, Twin Client Manager. Then click on Object Editors, as shown below.



Click on the Display/Formatting option and the formatter window is displayed. To open the screen file, click on File.

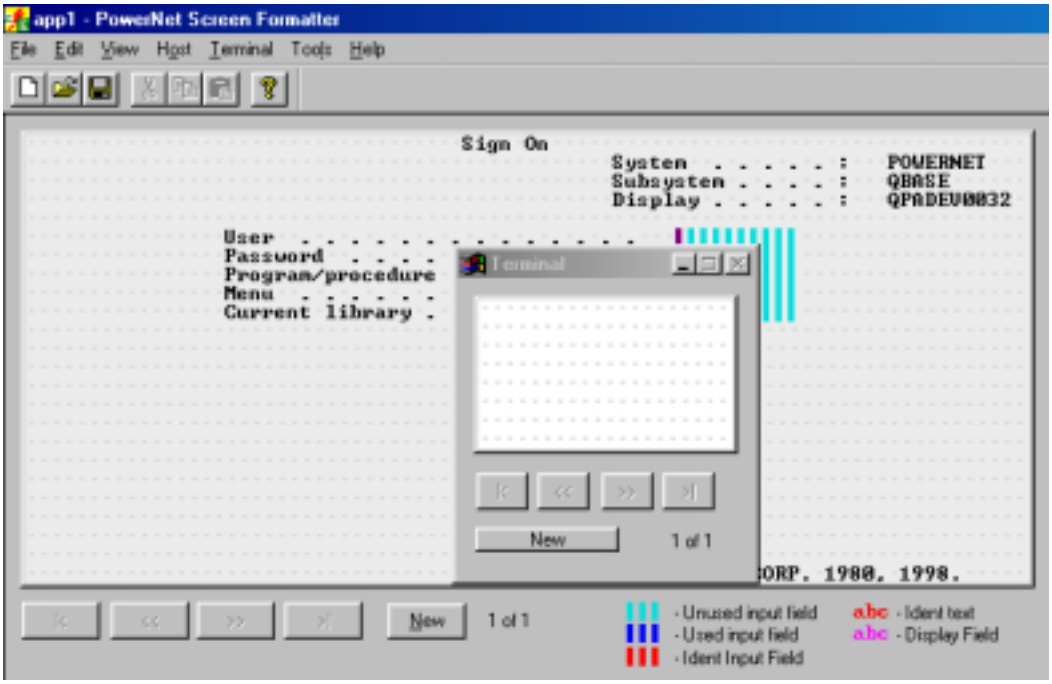


Then click on Open, and click on the screen filename.



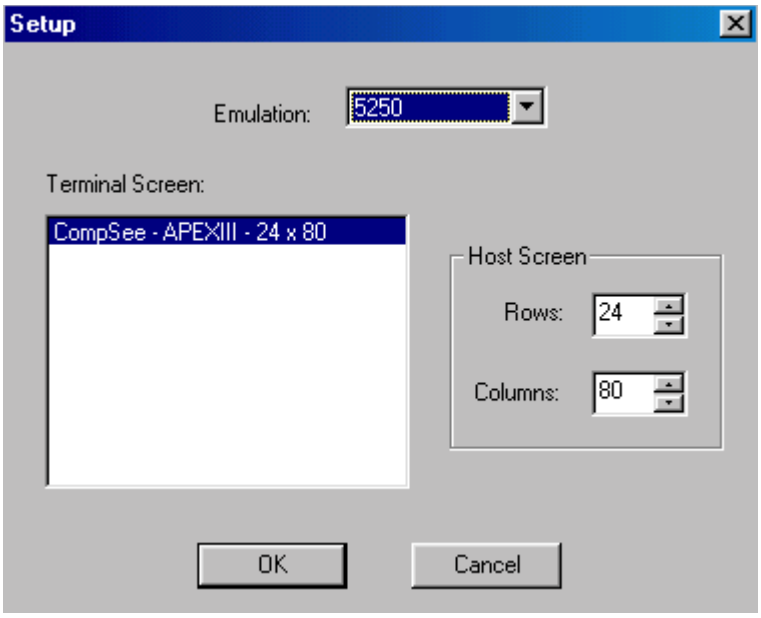
Then click on the Open button and the formatter window is displayed, including the first host display that was captured. The terminal display window, which is blank at this time since no formatting has taken place, is also shown.

Note: The **Terminal** display window floats on top of the host screen. If it needs to be moved, click on the title bar and and drag it to a different area of the host screen.



Setting Up the Formatter

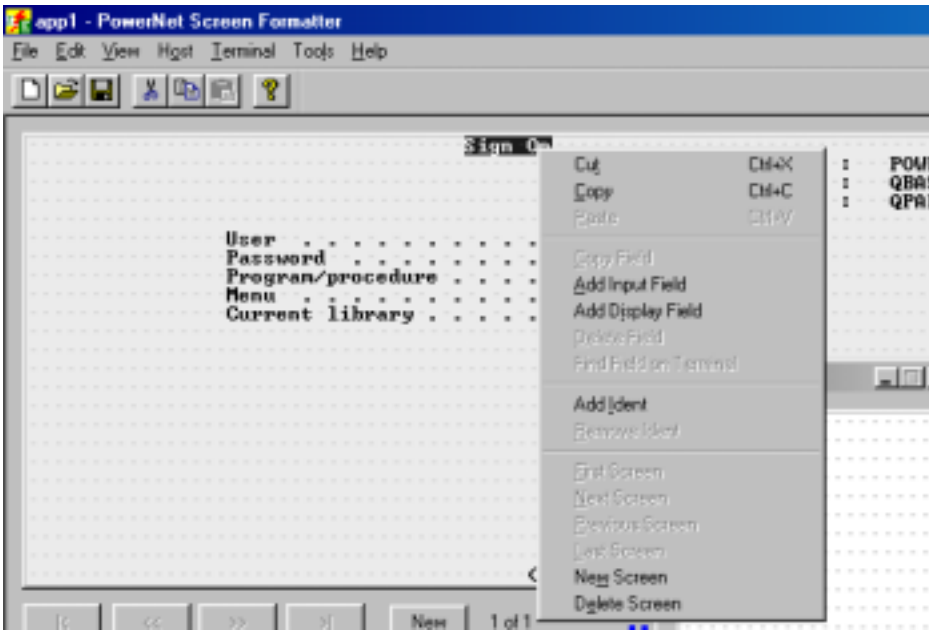
The terminal display must be set to match the terminal for which the formatter object is to be created. Click on the Tools menu and then Setup.



Click on the desired terminal display size, and also ensure that the host screen size is set correctly. Then click on OK to return to the formatter.

Adding Idents

Formatting requires that each host screen to be *uniquely identified*. One way to do this is to highlight unique text on the host screen (click on the left side of the text and drag the mouse to the right). Then click on the right mouse button, as show below.



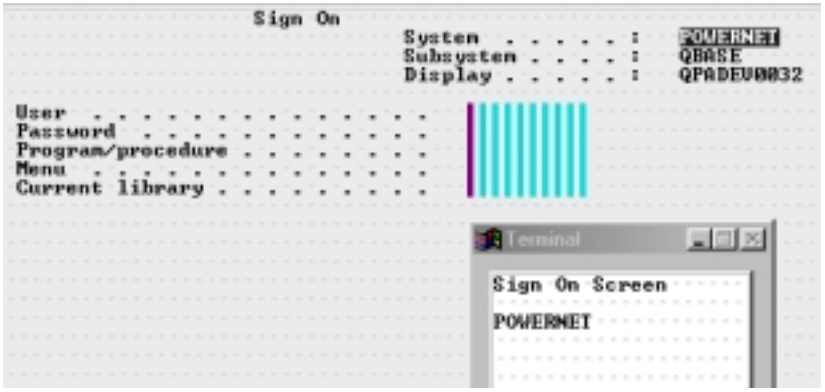
From the pull down menu, click on Add Ident. The highlighted field is now colored red on the host display, indicating that it is an Ident field. Up to 32 items can be highlighted on each host screen, so if a number of screens share similar features, they can be

uniquely identified by adding more Idents. In the event that a group of host displays differ only by position of input fields, input fields can be used for Idents also.

Adding and Copying Display Text

Text can be added to the terminal display by clicking on the Terminal window, moving the cursor to the desired display position, and typing in the text (in this case, **Sign On Screen**) as shown below.

It is also useful to copy variable text from the host display to the terminal display. To do this, move the cursor to the desired position in the host display and hold down the mouse button while moving the cursor to the right. The text to be copied will be highlighted as shown by the **POWERNET** text copied below. Then drag the highlighted text to the desired position in the terminal display and release the mouse button.



Copying Input Fields

Input fields are copied from the host display to the terminal display by the same method used to copy text. Click the left side of the input field and drag the cursor to the right. The input field will be highlighted. Now click on the field again and drag it to the desired position in the **Terminal** display.

Adding Terminal Screens

New terminal screens are created by using the New button at the bottom of the Terminal display window. This is useful when more that one terminal screen is required to format the relevant data on the host screen. Up to 16 terminal displays can be associated with each formatted host display. These are called terminal *pages*, and the page that is displayed on the terminal at any point in time depends on the location of the host cursor position. The page to which the corresponding input field is formatted is the one displayed.

When multiple pages are present, the directional arrows are used to navigate through the pages.

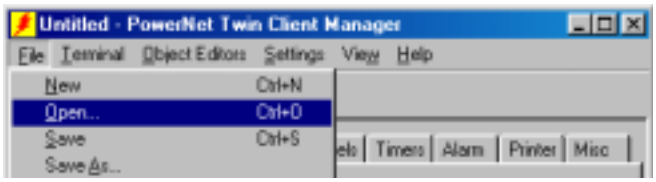
Saving the Formatter Object

The formatter object is saved by clicking on the toolbar icon, or by clicking on File and Save.

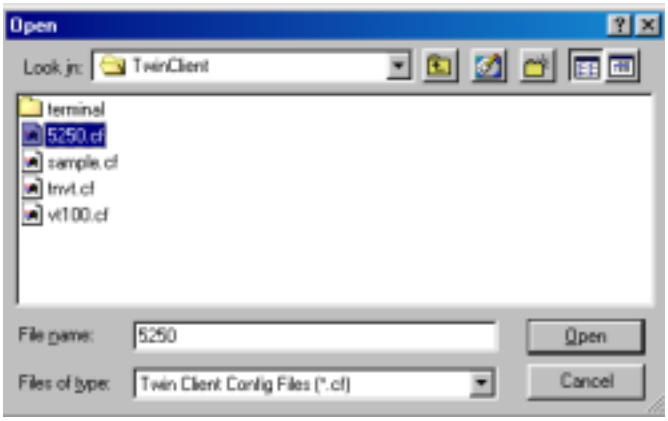
Assigning the Object to a Terminal Configuration

The formatter object is assigned to a terminal configuration by opening a terminal configuration in the Twin Client Manager, assigning the object to the Display Formatting Object, and saving the configuration.

To open a terminal configuration, click on File in the Twin Client Manager, as shown below:



Then click on Open, and click on the desired terminal configuration.



Then click on the advanced view Display tab, pull down the Display Formatter Object scrolling list box, and click on the object.

Save the newly modified terminal configuration using the toolbar icon, or click on File and then Save. The new configuration, incorporating the formatter object, is updated on the terminal, automatically, by cold booting the terminal.

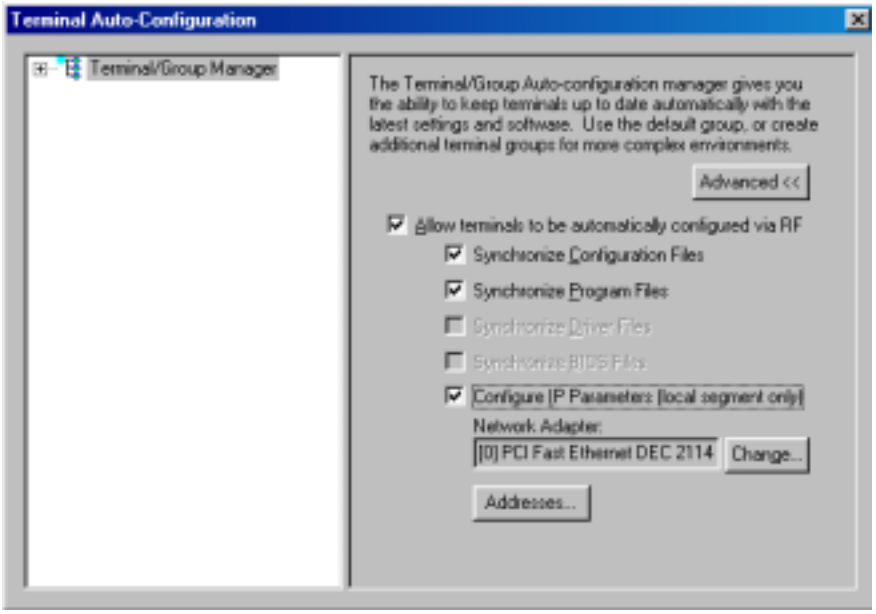
Chapter 8 • Software Management

In addition to providing functions for the download of files to the terminal via the traditional serial connection, the Twin Client Manager also provides for the management of terminal software and configurations automatically, over the wireless network.

This chapter describes the automated capability in detail. Additional manual operations involving serial download options are described at the end of this chapter.

Auto-Configuration

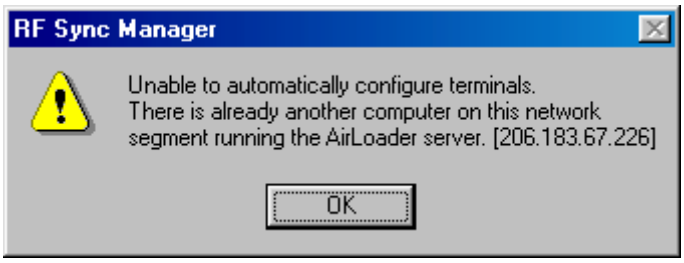
The software and supporting configuration files for all Twin Client terminals can be configured for automated management after installing the PowerNet TwinClient software in the terminals, as described in chapter 3. The Auto-Configuration is accessed from the Twin Client Manager Settings menu.



Note: If no options are displayed, click the Advanced << button.

Enabling Automatic Downloads

Click to put a check in the Allow terminals to be automatically configured via RF box to enable automatic downloading. In the event another PC on the network is already configured and active, the following warning message is displayed.



Synchronizing Configuration Files

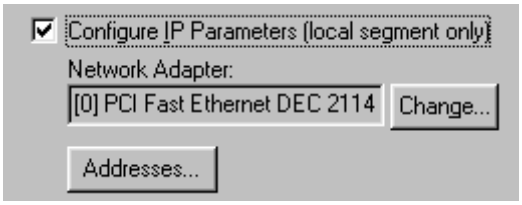
Click to put a check in the  box to enable automatic synchronization of configuration files on the terminal. When the terminal is cold booted, its configuration files will be compared with the most recent on the PC. The terminal is updated automatically if it does not have the latest revision.

Synchronizing Program Files

Click to put a check in the  box to enable automatic synchronization of program files on the terminal. When the terminal is cold booted, its configuration files will be compared with the most recent on the PC. The terminal is updated automatically if it does not have the latest revision.

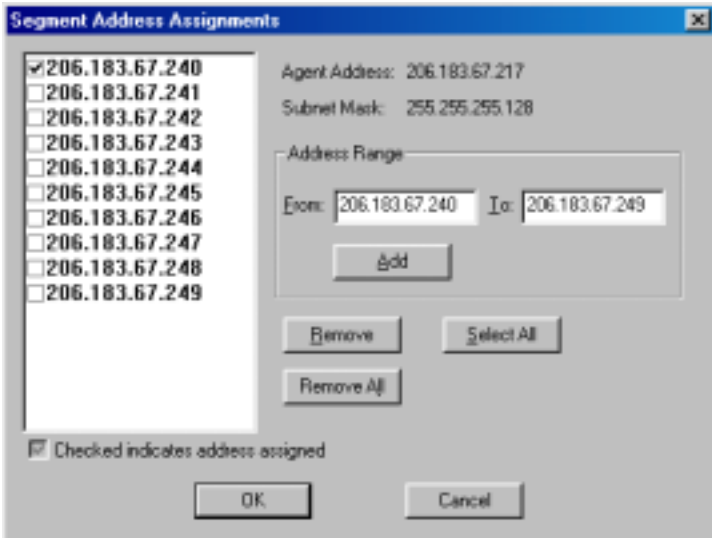
Automatic IP Address Assignment

New terminals will be assigned IP addresses automatically if the following box is checked.



Note: Do not check this option if a DHCP server is configured to manage address assignments.

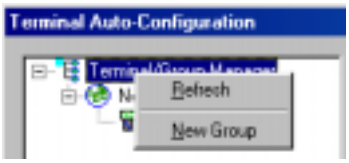
To set the addresses, click on the Addresses button to access the Segment Address Assignments dialog box, as shown in the following figure.



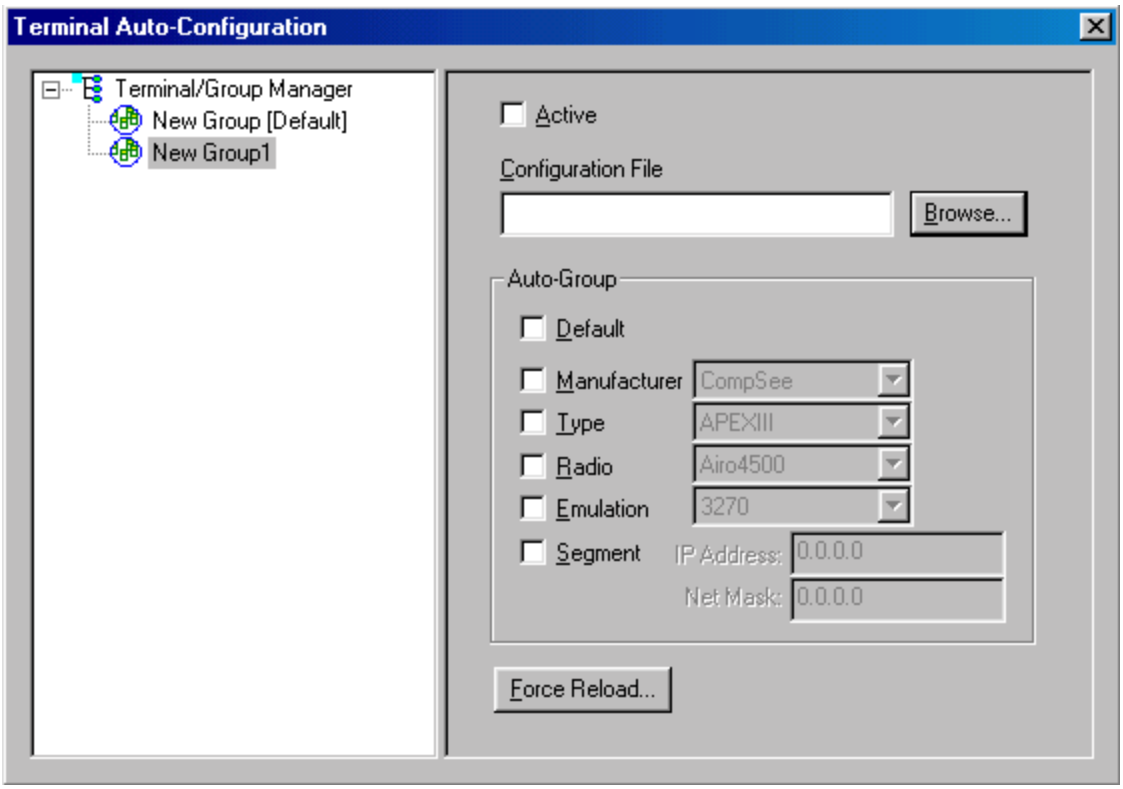
Enter the desired range in the From and To boxes as shown above, and then click on Add.

Creating New Groups

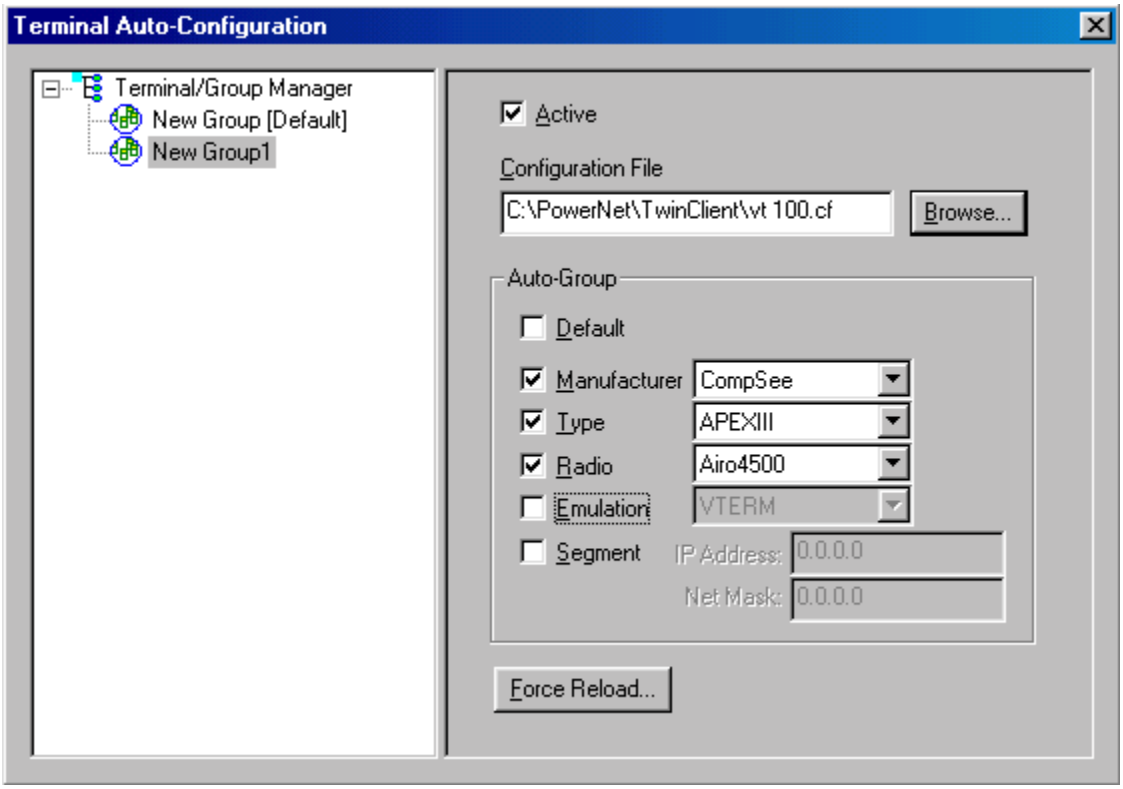
New groups, with different configurations, can be created by clicking on the Terminal Group Manager, and then clicking the right mouse button as shown.



After the new group has been created, the group settings option become available for change, as shown below.



After the Configuration File and all of the other parameters have been set, the group is made active by clicking on the Active check box.

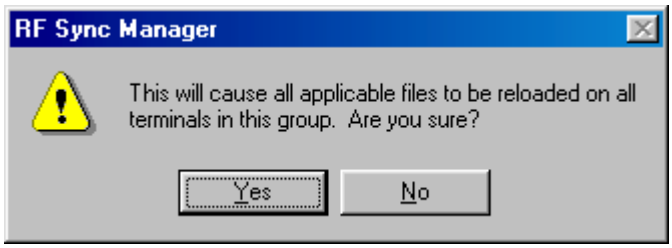


Setting the Segment

Checking the Segment button restricts a terminal group to a range of IP addresses. The IP Address can be any valid address on the segment as it is used only to identify the segment. The setting of the Net Mask can be used to restrict the range. This feature is useful for segregating terminal groups by location.

Setting Force Reload

Clicking on the Force Reload button forces all terminals within a group to be automatically updated. The following warning message appears:



Click on the Yes button to force the reload.

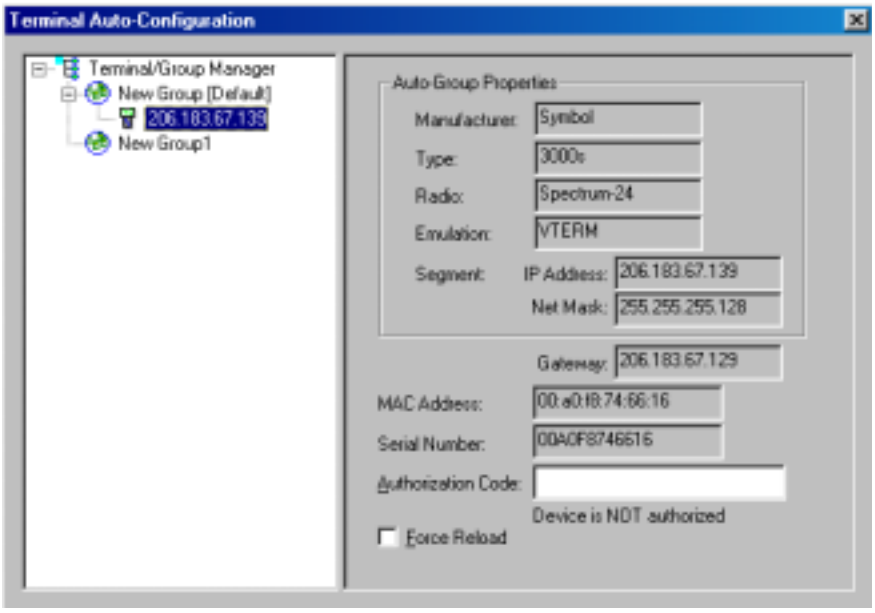
Setting the Default Terminal Group

New terminals that have not yet been assigned to any group are initially assigned to the default group in effect when they are cold-booted.

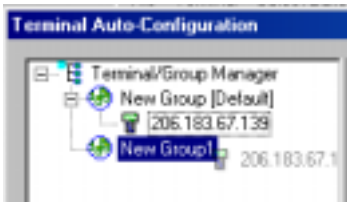
Any group can be made the default group by clicking on the group, and then clicking on the right mouse button. Then click on the Make Default option.

Reassigning Terminals

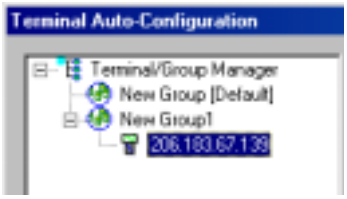
After a terminal has been configured and assigned to the default group, it can be reassigned to a new group by clicking on the terminal icon as shown below.



Then, holding the mouse button down, drag the terminal icon to the desired group as shown next.



Release the mouse button, which reassigns the terminal.



The next time the terminal is rebooted, it will be reconfigured as defined in the group specification.

Downloading Files to the Terminal

Connecting the Cradle

The terminal download requires a serial connection between the terminal and the PC through a cradle. In preparation for this download perform the following:

- Connect the selected serial port on the PC to the cradle with the Compsee serial cable.
- Verify that the cradle is powered on.

Prepare Terminal to Receive File

On the portable terminal, power the terminal **OFF**, then boot the terminal by pressing the Power and Scan key

The terminal boots to the DOS prompt. To activate the IRDA port for the serial file transfer, from the terminal, type IR ON and press ENTER

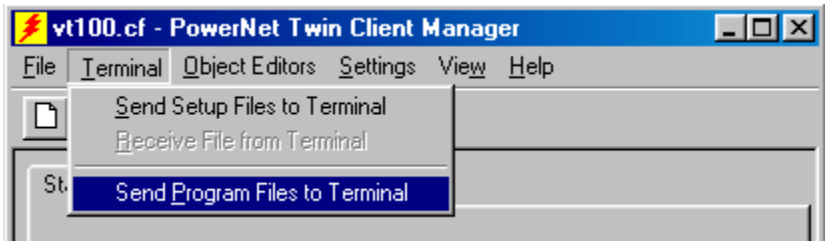
```
C:\>IR ON
```

From the terminal type LD, and press ENTER

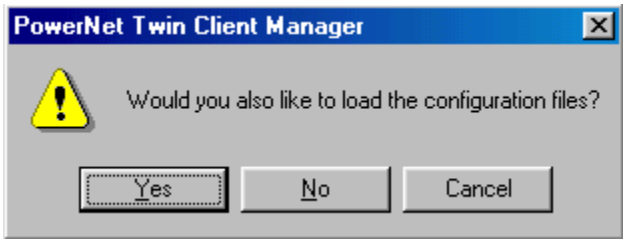
```
C:\>LD
```

Twin Client Manager Program File Download

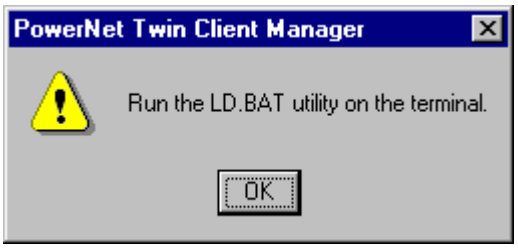
Click on Terminal, then Send Program Files to Terminal.



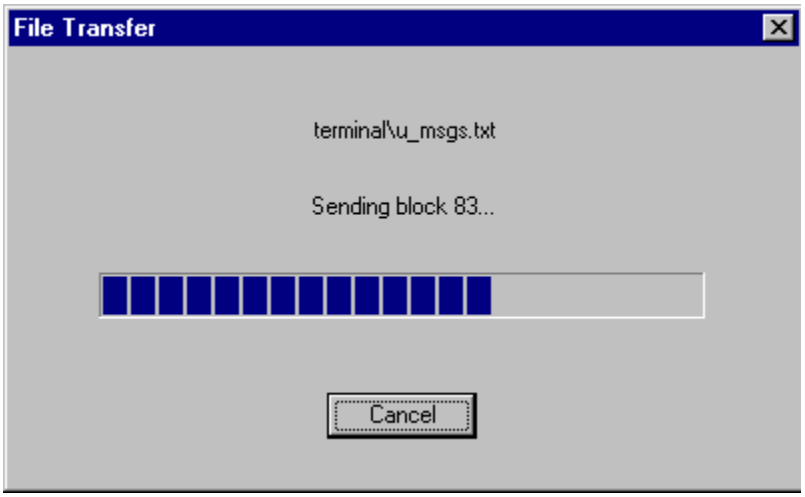
Click YES, to download configuration files.



From the Twin Client Manager, Click OK



The program and configuration files will be transferred from the PC to the terminal.



After the file transfer is complete, cold boot the terminal, by pressing the POWER and SCAN key

AirLoad Execution

Once the terminal reboots, Airloader will automatically search for the Airloader server. If no server is found, the following message will appear on the terminal.

```
No Airload Manager was found
      on this segment.

Do you want to enter the IP
address of the Airload
Manager?  Yes/No
```

Select YES to download Airloader. Enter the Airloader Manager IP address.

Select NO, if the Airloader Manager IP address is unknown or if and the Airloader manager is not preferred.

If yes is selected, enter the IP address. If no is selected, proceed to *Manual Configuration Update.*

```
Airload Manager IP Address

   2 0 7  2 4 1  7 8  1
```

Press ENTER to save

Cold Boot the terminal and proceed to *Starting a Telnet Session*.

Manual Configuration Update

The configuration files can be downloaded manually if:

- The configuration files have been modified, since the initial download
- The configurations had not been downloaded previously

Connecting the Cradle

The terminal download requires a serial connection between the terminal and the PC through a cradle. In preparation for this download perform the following:

- Connect the selected serial port on the PC to the cradle with the manufacturers cable.
- Verify that the cradle is powered on.

Prepare Terminal to Receive Files

On the portable terminal, power the terminal **OFF**, then boot the terminal pressing the Power and Scan key

The terminal boots to the DOS prompt. To activate the IRDA port for the serial file transfer, from the terminal, type IR ON and press ENTER

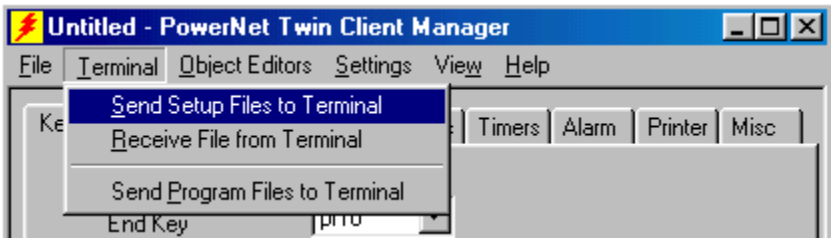
```
C:\>IR ON
```

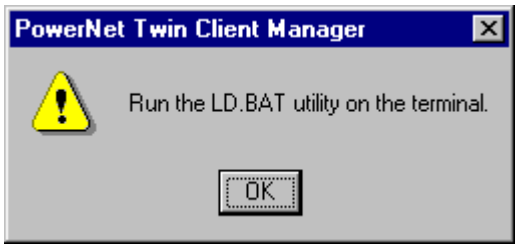
From the terminal type LD, and press ENTER

```
C:\>LD
```

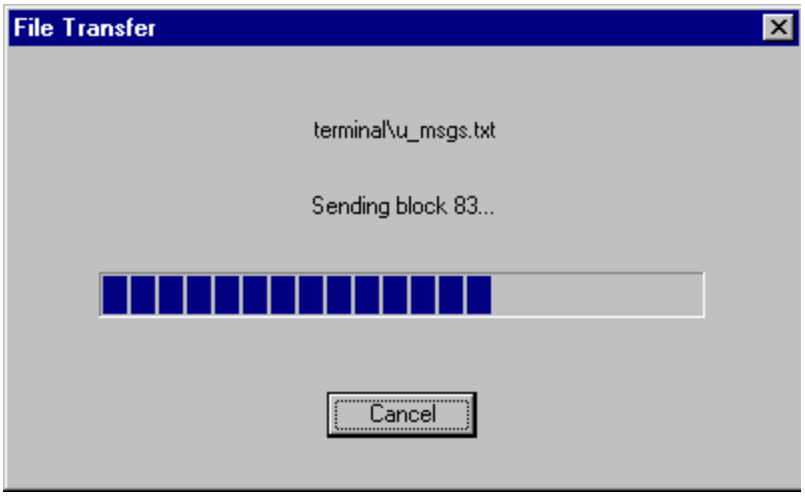
Twin Client Manager Setup File Download

From the Twin Client Manager select Terminal, Send Setup Files to Terminal, to execute the configuration file update.





The program and configuration files will be transferred from the PC to the terminal.



After the file transfer is complete, cold boot the terminal, by pressing the POWER and SCAN key

After the terminal reboots, a successful wireless connection and download is indicated by the display of the PowerNet main menu shown below.

```
PowerNet
© 1991-2000, Connect,
Inc.


Any Key to Continue
```

The terminal is now ready to establish a Telnet session with the host system

Starting a Telnet Session

At the PowerNet main menu on the terminal, press any key to establish the connection. Until the terminal has been authorized, the following screen is displayed:

```
RECOVERABLE ERROR
Terminal not
Authorized for
PowerNet


Press Any Key …
```

It is not necessary to authorize the terminal at this time, so press any key to continue. The terminal will establish a connection with the host system and start emulation. If the terminal fails to connect to the host, refer to the following table for the possible causes and the related corrective actions.

Failure Cause	***Corrective Action***
Incorrect Host IP address	Correct the Host List address on the terminal. Refer to the Chapter 4 sub-section *Terminal Setup Using PowerNet Menus* for instructions.
Incorrect netmask value	Access Radio Setup menu and correct the netmask value. Refer to the Chapter 4 sub-section *Terminal Setup Using PowerNet Menus* for instructions

After a Telnet session has been successfully established, the terminal will remain in session for a maximum of 30 minutes at a time until it has been authorized. Once authorized, there is no software restriction the session time. The instructions for authorizing the terminal are presented in Chapter 4

Troubleshooting

The following table describes the error messages that will be displayed on the terminal in the event of a download failure, and can be used as a guide to correcting the problem.

Error Indication	***Possible Cause***	***Corrective Action***
No AirLoad Manager Found.	AirLoad Manager not active, or not installed on the LAN segment	Ensure that the PC with Twin Client Manager is on the same segment and that the PC is operating. If the PC is not on the same segment, enter the address of the PC in response to the terminal prompt.
Unable to open connection	IP stack on terminal failed to load	Reload Program Files and reboot
Timeout waiting for data	Transient communications failure	Reboot terminal. If problem persists, check the RFSYNC.log in the PowrNetTN directory
Download aborted	Socket closed during download	Ensure PC is operating. Reboot terminal and retry
Manager inactive	PC not operating	Restart the Airload PC server

After taking the corrective action, the terminal must be cold booted by pressing the POWER and SCAN keys

.

Appendix A • Character Sets ISO 8859-1 Character Set

Description	Char	Dec	Hex
non-breaking space		160	A0
inverted exclamation	¡	161	A1
cent sign	¢	162	A2
pound sterling	£	163	A3
general currency sign	¤	164	A4
yen sign	¥	165	A5
Broken vertical bar	¦	166	A6
Section sign	§	167	A7
Umlaut (dieresis)	¨	168	A8
copyright	©	169	A9
feminine ordinal	ª	170	AA
left angle quote, guillemot left	«	171	AB
not sign	¬	172	AC
soft hyphen	-	173	AD
registered trademark	®	174	AE
macron accent	¯	175	AF
Degree sign	°	176	B0
plus or minus	±	177	B1
superscript two	²	178	B2
superscript three	³	179	B3
acute accent	´	180	B4
Microsign	µ	181	B5

Description	Char	Dec	Hex
paragraph sign	¶	182	B6
middle dot	·	183	B7
Cedilla	¸	184	B8
superscript one	¹	185	B9
masculine ordinal	º	186	BA
right angle quote, guillemot right	»	187	BB
fraction one-fourth	¼	188	BC
fraction one-half	½	189	BD
fraction three-fourths	¾	190	BE
inverted question mark	¿	191	BF
capital A, grave accent	À	192	C0
capital A, acute accent	Á	193	C1
capital A, circumflex accent	Â	194	C2
capital A, tilde	Ã	195	C3
capital A, dieresis or umlaut mark	Ä	196	C4
capital A, ring	Å	197	C5
capital AE diphthong (ligature)	Æ	198	C6
capital C, cedilla	Ç	199	C7
capital E, grave accent	È	200	C8
capital E, acute accent	É	201	C9
capital E, circumflex accent	Ê	202	CA
capital E, dieresis or umlaut mark	Ë	203	CB
capital I, grave accent	Ì	204	CC
capital I, acute accent	Í	205	CD
capital I, circumflex accent	Î	206	CE
capital I, dieresis or umlaut mark	Ï	207	CF
capital Eth, Icelandic	Ð	208	D0
capital N, tilde	Ñ	209	D1
capital O, grave accent	Ò	210	D2

Description	Char	Dec	Hex
capital O, acute accent	Ó	211	D3
capital O, circumflex accent	Ô	212	D4
capital O, tilde	Õ	213	D5
capital O, dieresis or umlaut mark	Ö	214	D6
multiply sign	×	215	D7
capital O, slash	Ø	216	D8
capital U, grave accent	Ù	217	D9
capital U, acute accent	Ú	218	DA
capital U, circumflex accent	Û	219	DB
capital U, dieresis or umlaut mark	Ü	220	DC
capital Y, acute accent	Ý	221	DD
capital THORN, Icelandic	Þ	222	DE
small sharp s, German (sz ligature)	ß	223	DF
small A, grave accent	à	224	E0
small A, acute accent	á	225	E1
small A, circumflex accent	â	226	E2
small A, tilde	ã	227	E3
small A, dieresis or umlaut mark	ä	228	E4
small A, ring	å	229	E5
small AE diphthong (ligature)	æ	230	E6
small C, cedilla	ç	231	E7
small E, grave accent	è	232	E8
small E, acute accent	é	233	E9
small E, circumflex accent	ê	234	EA
small E, dieresis or umlaut mark	ë	235	EB
small I, grave accent	ì	236	EC
small I, acute accent	í	237	ED
small I, circumflex accent	î	238	EE
small I, dieresis or umlaut mark	ï	239	EF

Description	Char	Dec	Hex
small Eth, Icelandic	ð	240	F0
small N, tilde	ñ	241	F1
small O, grave accent	ò	242	F2
small O, acute accent	ó	243	F3
small O, circumflex accent	ô	244	F4
small O, tilde	õ	245	F5
small O, dieresis or umlaut mark	ö	246	F6
division sign	÷	247	F7
small O, slash	ø	248	F8
small U, grave accent	ù	249	F9
small U, acute accent	ú	250	FA
small U, circumflex accent	û	251	FB
small U, dieresis or umlaut mark	ü	252	FC
small Y, acute accent	ý	253	FD
small THORN, Icelandic	þ	254	FE
small Y, dieresis or umlaut mark	ÿ	255	FF

ASCII Character Set

Decimal and Hexadecimal Values

	Dec	Hex		Dec	Hex		Dec	Hex		Dec	Hex
NUL	0	00	**SP**	32	20	**@**	64	40	**`**	96	60
SOH	1	01	**!**	33	21	**A**	65	41	**a**	97	61
STX	2	02	**"**	34	22	**B**	66	42	**b**	98	62
ETX	3	03	**#**	35	23	**C**	67	43	**c**	99	63
EOT	4	04	**$**	36	24	**D**	68	44	**d**	100	64
ENQ	5	05	**%**	37	25	**E**	69	45	**e**	101	65
ACK	6	06	**&**	38	26	**F**	70	46	**f**	102	66
BEL	7	07	**´**	39	27	**G**	71	47	**g**	103	67
BS	8	08	**(**	40	28	**H**	72	48	**h**	104	68
HT	9	09	**)**	41	29	**I**	73	49	**i**	105	69
NL	10	0A	*****	42	2A	**J**	74	4A	**j**	106	6A
VT	11	0B	**+**	43	2B	**K**	75	4B	**k**	107	6B
NP	12	0C	**,**	44	2C	**L**	76	4C	**l**	108	6C
CR	13	0D	**-**	45	2D	**M**	77	4D	**m**	109	6D
SO	14	0E	**.**	46	2E	**N**	78	4E	**n**	110	6E
SI	15	0F	**/**	47	2F	**O**	79	4F	**o**	111	6F
DLE	16	10	**0**	48	30	**P**	80	50	**p**	112	70
DC1	17	11	**1**	49	31	**Q**	81	51	**q**	113	71
DC2	18	12	**2**	50	32	**R**	82	52	**r**	114	72
DC3	19	13	**3**	51	33	**S**	83	53	**s**	115	73
DC4	20	14	**4**	52	34	**T**	84	54	**t**	116	74
NAK	21	15	**5**	54	35	**U**	85	55	**u**	117	75
SYN	22	16	**6**	54	36	**V**	86	56	**v**	118	76
ETB	23	17	**7**	55	37	**W**	87	57	**w**	119	77
CAN	24	18	**8**	56	38	**X**	88	58	**x**	120	78
EM	25	19	**9**	57	39	**Y**	89	59	**y**	121	79
SUB	26	1A	**:**	58	3A	**Z**	90	5A	**z**	122	7A
ESC	27	1B	**;**	59	3B	**[**	91	5B	**{**	123	7B
FS	28	1C	**<**	60	3C	****	92	5C	**|**	124	7C
GS	29	1D	**=**	61	3D	**]**	93	5D	**}**	125	7D
RS	30	1E	**>**	62	3E	**^**	94	5E	**~**	126	7E
US	31	1F	**?**	63	3F	**_**	95	5F	**DEL**	127	7F

ASCII Character Set

Octal Values

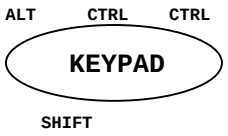
	Oct		Oct		Oct		Oct
NUL	000	**SP**	040	**@**	100	**`**	140
SOH	001	**!**	041	**A**	101	**a**	141
STX	002	**"**	042	**B**	102	**b**	142
ETX	003	**#**	043	**C**	103	**c**	143
EOT	004	**$**	044	**D**	104	**d**	144
ENQ	005	**%**	045	**E**	105	**e**	145
ACK	006	**&**	046	**F**	106	**f**	146
BEL	007	**´**	047	**G**	107	**g**	147
BS	010	**(**	050	**H**	110	**h**	150
HT	011	**)**	051	**I**	111	**i**	151
NL	012	*****	052	**J**	112	**j**	152
VT	013	**+**	053	**K**	113	**k**	153
NP	014	**,**	054	**L**	114	**l**	154
CR	015	**-**	055	**M**	115	**m**	155
SO	016	**.**	056	**N**	116	**n**	156
SI	017	**/**	057	**O**	117	**o**	157
DLE	020	**0**	060	**P**	120	**p**	160
DC1	021	**1**	061	**Q**	121	**q**	161
DC2	022	**2**	062	**R**	122	**r**	162
DC3	023	**3**	063	**S**	123	**s**	163
DC4	024	**4**	064	**T**	124	**t**	164
NAK	025	**5**	065	**U**	125	**u**	165
SYN	026	**6**	066	**V**	126	**v**	166
ETB	027	**7**	067	**W**	127	**w**	167
CAN	030	**8**	070	**X**	130	**x**	170
EM	031	**9**	071	**Y**	131	**y**	171
SUB	032	**:**	072	**Z**	132	**z**	172
ESC	033	**;**	073	**[**	133	**{**	173
FS	034	<	074	\	134	**|**	174
GS	035	=	075	**]**	135	**}**	175
RS	036	>	076	^	136	**~**	176
US	037	**?**	077	**_**	137	**DEL**	177

Appendix B • Keypad Configuration

This chapter describes the default PowerNet key assignments applied to Compsee terminals used in Twin Client advanced mode. The figures and tables identify the key assignments by terminal model and emulation.

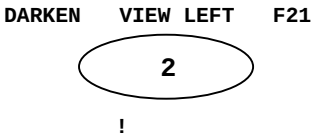
Keypad Figures

The keypad figures in this section are designed to be of use without color. The convention for describing the effect of modifier keys is as follows:



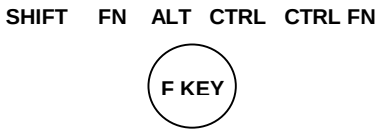
KEYTOP refers to the characters printed on the top of the key by the manufacturer. Below the keytop is the key value for each of the available modifier keys. In this example, the ALT, CTRL, CTRL-FN, SHIFT, and FN keys are the modifiers.

In the example figure above, the keystroke generated in the un-modified state is an **2**. The programmable function key DARKEN is generated by pressing the ALT modifier key before pressing the **2** key, a VIEW LEFT is generated by using the CTRL modifier key, a F21 is generated by using the CTRL-FN, a ! is generated by using the SHIFT modifier and a TAB is generated by using the FN modifier.

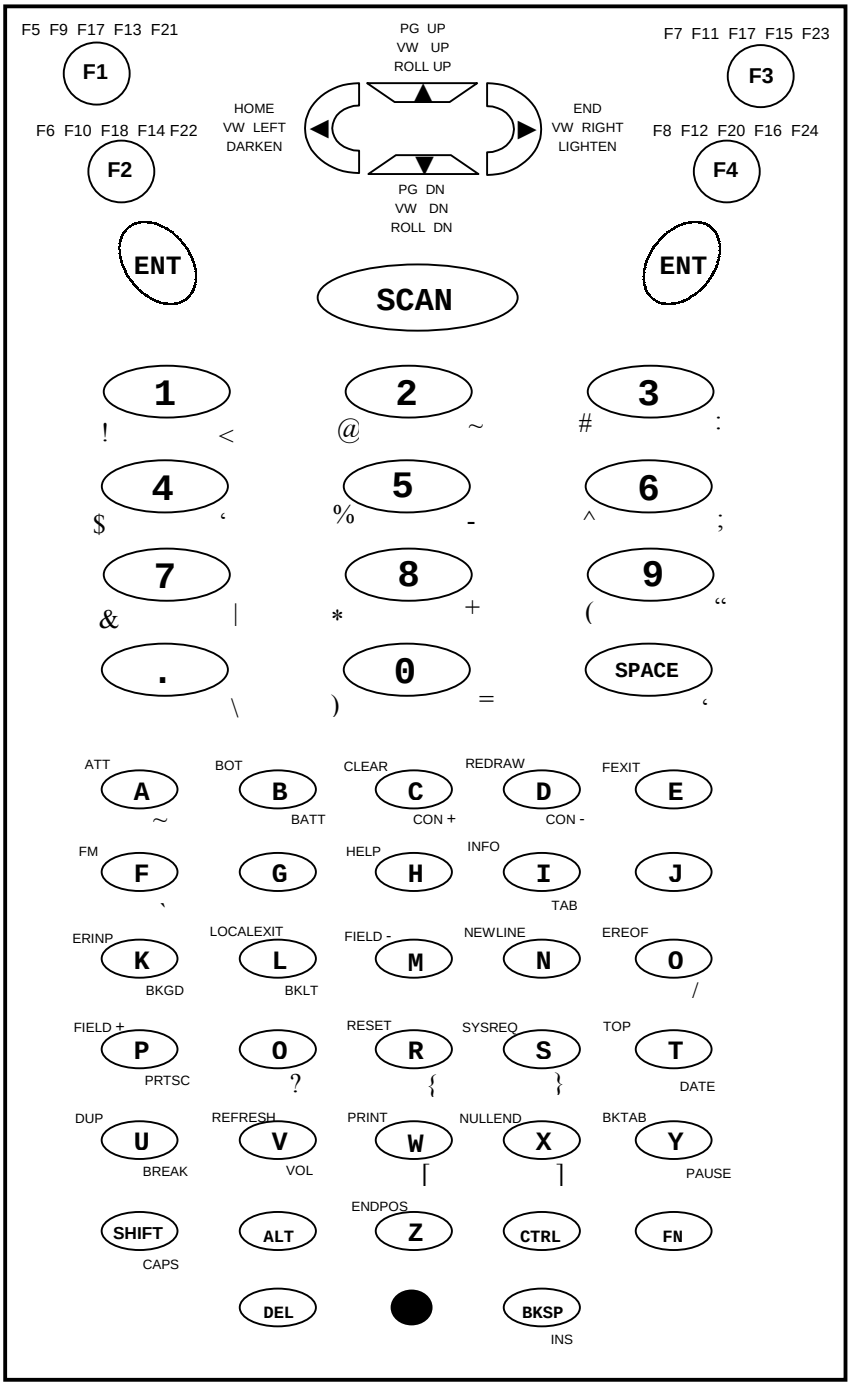


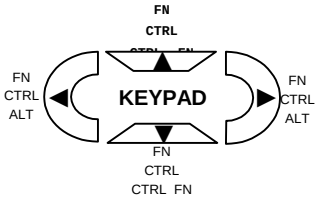
The table below illustrates the F-Keys and the modifiers.

F-Key	Modification
F1- F4	Unmodified
F5-F8	Shift
F9-F12	FN
F13-16	ALT
F17-20	CTLR
F21-24	CTLR FN



Compsee Apex III Keyboard, 5250





SHIFT FN ALT CTRL CTRL FN

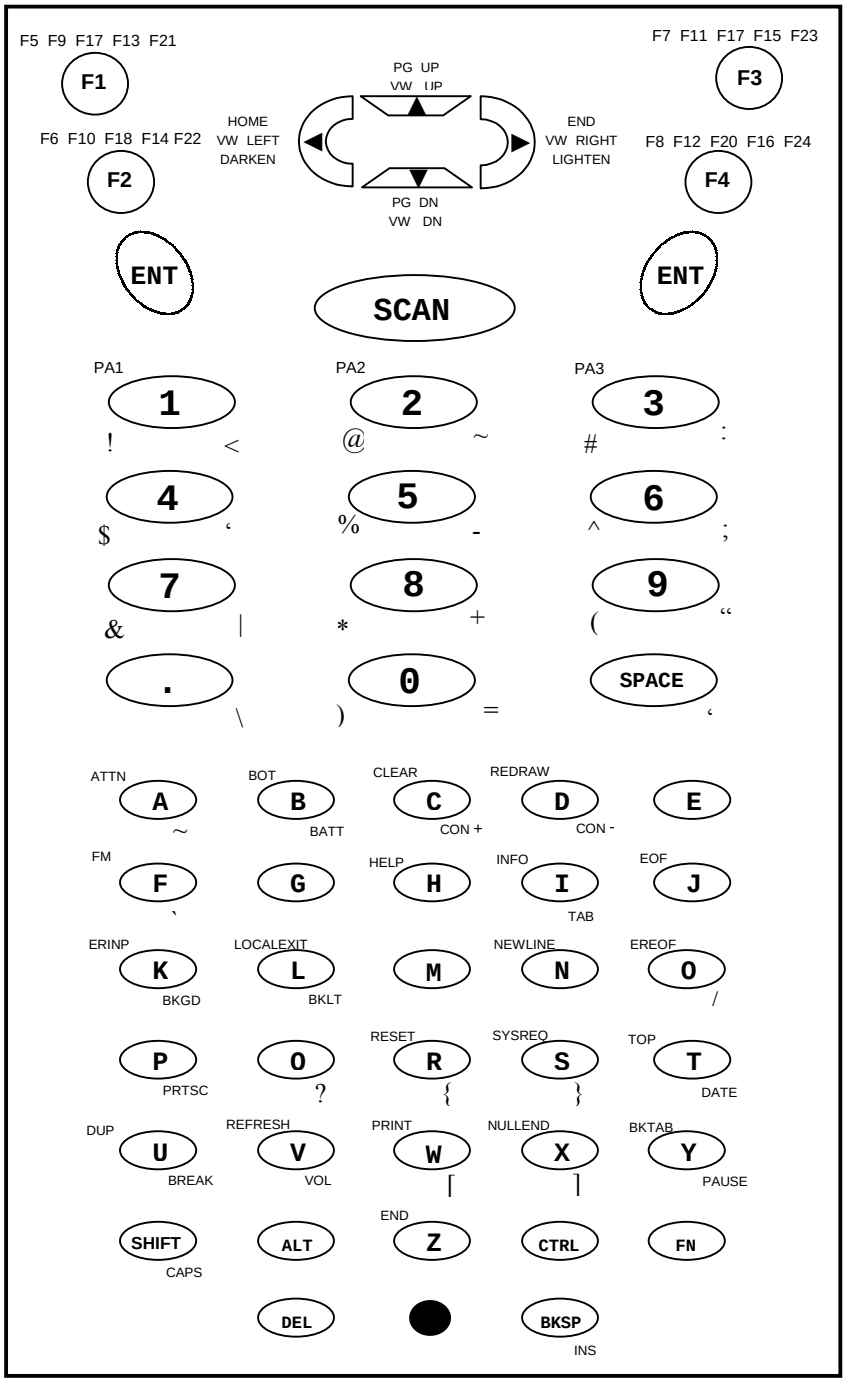
F KEY

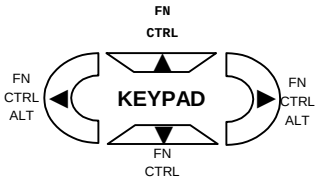
ALT CTRL

KEYPAD

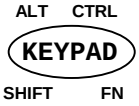
SHIFT FN

Compsee Apex III Keyboard, 3270

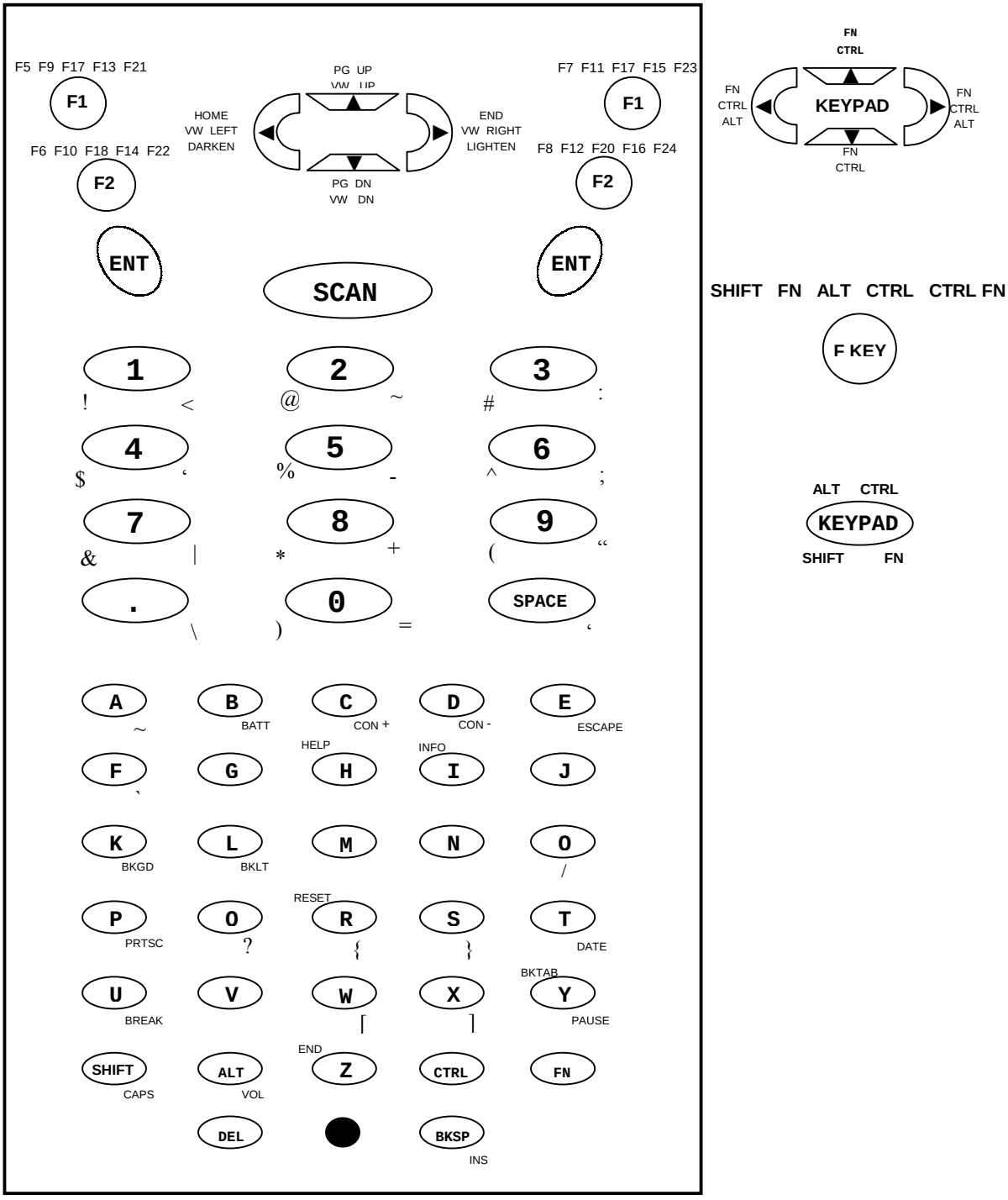




SHIFT FN ALT CTRL CTRL FN



Compsee Apex III Keyboard, VT/HP



Compsee Apex III Terminal Keypad Tables

The keypad tables in this section are organized by terminal model, keypad configuration, and emulation. The key values represent the default PowerNet keypad assignments applied to the terminal in Twin Client advanced mode.

Table entries that are blank indicate the key is not assigned, or not relevant to the emulation.

Keyboard Legend

KEY	5250	3270	VT/HP
ALT	<ALT>	<ALT>	<ALT>
ATTENTION	<ALT><a>	<ALT><a>	
BACK GROUND	<FN><k>	<FN><k>	<FN><k>
BACKLIGHT	<FN><l>	<FN><l>	<FN><l>
BACK TAB	<ALT><y>	<ALT><y>	<ALT><y>
BACKSPACE	<BKSP>	<BKSP>	<FN><BKSP>
BATT	<FN><b>	<FN><b>	
BOT	<ALT><b>	<ALT><b>	
BREAK	<FN><u>	<FN><u>	<FN><u>
CAPS	<FN><SHIFT>	<FN><SHIFT>	<FN><SHIFT>
CLEAR	<ALT><F1>	<ALT><F1>	
CONTRAST UP	<FN><c>	<FN><c>	<FN><c>
CONTRAST DN	<FN><d>	<FN><d>	<FN><d>
DARKEN	<ALT><LEFT>	<ALT><LEFT>	<ALT><LEFT>
DATE	<FN><t>	<FN><t>	<FN><t>
DEL	<DEL>	<DEL>	<DEL>
DOWN	<DOWN>	<DOWN>	<DOWN>
DUP	<ALT><u>	<ALT><u>	
END	<FN><RITE>	<ALT><z>	
END POS	<ALT><z>		
ENTER	<ENTER>	<ENTER>	<ENTER>
EOF		<ALT><j>	
EREOF	<ALT><o>	<ALT><o>	
ERINP	<ALT><k>	<ALT><k>	
ESCAPE			<FN><e>
FIELD ADVANCE	<ALT><p>		
FIELD EXIT	<ALT><e>		
FIELD MINUS	<ALT><m>		
FM	<ALT><f>	<ALT><f>	
FN	<FN>	<FN>	<FN>
HELP	<ALT><h>	<ALT><h>	<ALT><h>
HOME	<FN><LEFT>	<FN><LEFT>	
INFO	<ALT><i>	<ALT><i>	ALT><i>
INSERT	<SHIFT><BKSP>	<SHIFT><BKSP>	
LEFT	<ALT><LEFT>	<ALT><RITE>	
LIGHTEN	<ALT><RITE>	<ALT><RITE>	<ALT><RITE>
LOCAL EXIT	<ALT><l>	<ALT><l>	
NEWL	<ALT><n>	<ALT><n>	
NULL END	<ALT><x>	<ALT><x>	
PAGE UP	<FN><UP>	<FN><UP>	
PAGE DN	<FN><DN>	<FN><DN>	
PAUSE	<FN><y>	<FN><y>	<FN><y>

KEY	5250	3270	VT/HP
PRINT	<ALT><w>	<ALT><w>	
PRISC	<FN><p>	<FN><p>	<FN><p>
REDRAW	<ALT><d>	<ALT><d>	
REFRESH	<ALT><v>	<ALT><v>	
RESET	<ALT><r>	<ALT><r>	<ALT><r>
RITE	<ALT><RITE>	<ALT><RITE>	
ROLL DOWN	<CTRL><FN><DN>		
ROLL UP	<CTRL><FN><UP>		
SCAN	<SCAN>	<SCAN>	<SCAN>
SHIFT	<SHIFT>	<SHIFT>	<SHIFT>
SPACE	<SPACE>	<SPACE>	
SYS REQUEST	<ALT><s>	<ALT><s>	
TAB	<FN><i>	<FN><i>	<FN><i>
TOP	<ALT><t>	<ALT><t>	
UP	<UP>	<UP>	<UP>
VIEW DOWN	<CTRL><DN>	<CTRL><DN>	<CTRL><DN>
VIEW LEFT	<CTRL><LEFT>	<CTRL><LEFT>	<CTRL><LEFT>
VIEW RIGHT	<CTRL><RITE>	<CTRL><RITE>	<CTRL><RITE>
VIEW UP	<CTRL><UP>	<CTRL><UP>	<CTRL><UP>
VOL	<FN><v>	<FN><v>	<FN><v>
PA1		<ALT><1>	
PA2		<ALT><2>	
PA3		<ALT><3>	
1	<1>	<1>	<1>
2	<2>	<2>	<2>
3	<3>	<3>	<3>
4	<4>	<4>	<4>
5	<5>	<5>	<5>
6	<6>	<6>	<6>
7	<7>	<7>	<7>
8	<8>	<8>	<8>
9	<9>	<9>	<9>
0	<0>	<0>	<0>
F1	<F1>	<F1>	<F1>
F2	<F2>	<F2>	<F2>
F3	<F3>	<F3>	<F3>
F4	<F4>	<F4>	<F4>
F5	<SHIFT><F1>	<SHIFT><F1>	<SHIFT><F1>
F6	<SHIFT><F2>	<SHIFT><F2>	<SHIFT><F2>
F7	<SHIFT><F3>	<SHIFT><F3>	<SHIFT><F3>
F8	<SHIFT><F4>	<SHIFT><F4>	<SHIFT><F4>
F9	<FN><F1>	<FN><F1>	<FN><F1>
F10	<FN><F2>	<FN><F2>	<FN><F2>
F11	<FN><F3>	<FN><F3>	<FN><F3>
F12	<FN><F4>	<FN><F4>	<FN><F4>
F13	<ALT><F1>	<ALT><F1>	<ALT><F1>
F14	<ALT><F2>	<ALT><F2>	<ALT><F2>
F15	<ALT><F3>	<ALT><F3>	<ALT><F3>
F16	<ALT><F4>	<ALT><F4>	<ALT><F4>
F17	<CTRL><F1>	<CTRL><F1>	<CTRL><F1>
F18	<CTRL><F2>	<CTRL><F2>	<CTRL><F2>
F19	<CTRL><F3>	<CTRL><F3>	<CTRL><F3>
F20	<CTRL><F4>	<CTRL><F4>	<CTRL><F4>
F21	<CTRL><FN><F1>	<CTRL><FN><F1>	<CTRL><FN><F1>
F22	<CTRL><FN><F2>	<CTRL><FN><F2>	<CTRL><FN><F2>
F23	<CTRL><FN><F3>	<CTRL><FN><F3>	<CTRL><FN><F3>
F24	<CTRL><FN><F4>	<CTRL><FN><F4>	<CTRL><FN><F4>
! exclamation	<SHIFT><1>	<SHIFT><1>	<SHIFT><1>
@ AT sign	<SHIFT><2>	<SHIFT><2>	<SHIFT><2>
# pound	<SHIFT><3>	<SHIFT><3>	<SHIFT><3>

KEY	5250	3270	VT/HP
$ dollar	<SHIFT><4>	<SHIFT><4>	<SHIFT><4>
% percent	<SHIFT><5>	<SHIFT><5>	<SHIFT><5>
^ carat	<SHIFT><6>	<SHIFT><6>	<SHIFT><6>
& ampersand	<SHIFT><7>	<SHIFT><7>	<SHIFT><7>
(left paren	<SHIFT><9>	<SHIFT><9>	<SHIFT><9>
) right paren	<SHIFT><0>	<SHIFT><0>	<SHIFT><0>
- dash	<FN><5>	<FN><5>	<FN><5>
+ plus	<FN><8>	<FN><8>	<FN><8>
' single quote	<FN><SPACE>	<FN><SPACE>	<FN><SPACE>
*** asterisk**	<SHIFT><8>	<SHIFT><8>	<SHIFT><8>
, comma	<FN><4>	<FN><4>	<FN><4>
. period	<PERIOD>	<PERIOD>	<PERIOD>
/ forward slash	<FN><o>	<FN><o>	<FN><o>
[left bracket	<FN><w>	<FN><w>	<FN><w>
\ back slash	<FN><PERIOD>	<FN><PERIOD>	<FN><PERIOD>
] right bracket	<FN><x>	<FN><x>	<FN><x>
_ underline	<FN><2>	<FN><2>	<FN><2>
` grave accent	<FN><f>	<FN><f>	<FN><f>
: colon	<FN><3>	<FN><3>	<FN><3>
; semi-colon	<FN><6>	<FN><6>	<FN><6>
< less than	<FN><1>	<FN><1>	<FN><1>
= equal	<FN><0>	<FN><0>	<FN><0>
> greater than	<SHIFT><PERIOD>	<SHIFT><PERIOD>	<SHIFT><PERIOD>
? question	<FN><q>	<FN><q>	<FN><q>
{ left brace	<FN><r>	<FN><r>	<FN><r>
| vertical bar	<FN><7>	<FN><7>	<FN><7>
} right brace	<FN><s>	<FN><s>	<FN><s>
~ tilde	<FN><a>	<FN><a>	<FN><a>
“…..double quote	<FN><9>	<FN><9>	<FN><9>

Compsee Apex III Terminal Control Sequences

Cold Boot

Cold Boot Sequences Following Power OFF	
Terminal Model & Keypad	***Key Sequence***
Apex III	Power Off/On and Scan Key

Warm Boot

Warm Boot Sequences Following Power OFF	
Terminal Model & Keypad	***Key Sequence***
Apex III	Press and hold the CTRL and ALT keys and press the DEL