Twin Client Reference

Production:

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Chapter 1 • Introduction

PowerNet Products Overview

PowerNet products by Connect are devoted exclusively to making wireless networks as useful, efficient, and reliable as possible. PowerNet routes data from any portable RF terminal to any host computer quickly and efficiently.

PowerNet supports:

- All of the most popular 2.4 GHz and 900 MHz wireless systems
- All major network media, including Ethernet and Serial
- All major transport protocols, such as TCP/IP
- All common legacy terminal emulators, including VT100, VT220, 3270, and 5250
- Multiple dissimilar hosts, using your existing applications and networks
- Multiple RF LANs, allowing a single controller to support multiple locations, covering such large areas as airport terminals and distribution centers.
- Multiple portable terminal models (with more being added every day).

The PowerNet family of products works with almost all architectures, providing users the ability to change host computers and options as network requirements grow.

- OpenAir Linux – runs on Linux
- OpenAir Windows – runs on Windows
- PowerNet Twin Client - software for virtually all makes and models of wireless data collection terminals. Supports all common terminal emulations and client/server applications

PowerNet OpenAir provides the user with a fully-integrated hardware platform with either OpenAir Linux or OpenAir Windows software already integrated and installed, ready to plug in and use.

PowerNet AirLinc provides the user with the ability to develop complete wireless data collection applications that operate with any ODBC compliant database.

PowerNet Twin Client Overview

PowerNet Twin Client provides VT100, VT220, HP700/92, TN3270 (Telnet 3270), and TN5250 (Telnet 5250) terminal emulations directly from an RF terminal to any TCP/IP telnet-capable host application. Network controllers or servers are not necessary; the Windows-based Twin Client configuration utility is used to load the client software onto the RF terminal from a PC.

Twin Client, based on Connect's PowerNet server-based emulation software, contains much of that package's functionality and features. Additionally, users may change and expand the default configuration options that Twin Client downloads to the RF terminals, increasing their data-gathering capabilities.

PowerNet Twin Client Modes of Operation

PowerNet Twin Client can be used in two modes of operation: thick client or thin client.

- Thick client mode (sometimes referred to as Telnet Client mode) provides a Telnet connection to a Telnet-capable host computer. Terminals running in thick client mode become a network of RF devices that provide all the PowerNet features and command capabilities (except some file storage and printing) locally on the RF devices.

- Thin client mode uses a proprietary communications protocol to communicate directly with a PowerNet Server. RF terminals operating in thin client mode rely on most of the functionality of the system being located on the PowerNet Server, rather than on the RF devices.

PowerNet Twin Client Features

PowerNet Twin Client offers these benefits:

- **Centralized control** of terminal functionality - PowerNet Twin Client allows system administrators full control and support of remote RF devices from one system. Administrators can have full control of system tuning, functionality, and presentation parameters used in supporting remote RF devices.

- **Terminal Screen Design** - Windows-based configuration and formatting utility that enables terminal screen design and configuration.

- **Diagnostics/Logs** - You can set logging to report different levels and types of information and to report at variable time intervals. Logging generates reports as the system runs so diagnosis can begin soon after receiving a problem report.

- **Built in migration path** to other PowerNet products.

- **Full purchase credit** towards an upgrade to a PowerNet Server license

PowerNet User Interface Structure

The PowerNet Twin Client program opening screen contains all the features you will use to establish connections, configure your RF devices, and download programs.

Opening Screen

From Windows, with your mouse, select **Start**, **Programs**, **PowerNet**, and **Twin Client Manager**. The PowerNet Twin Client Configuration Utility screen appears. This is Twin Client's main screen; all functions are accessed from its menus and tabs.

Menus

The opening screen components discussed in this manual, **File**, **Terminal**, **Object Editors**, **Setting**, **View**, and **Help** are the options available from the Menu Bar. These functions set up and maintain the RF terminal(s) and provide system management.

Toolbar

Under the menu bar, the tool bar provides quick access to functions. The toolbar can be turned on or off by changing the Toolbar parameter found on the View menu. Positioning the mouse cursor over the toolbar icon displays a brief description of the tool's function. If the status line is enabled, a more detailed description of the tool is displayed on the status line as well. The toolbar can be relocated on the screen by clicking and dragging the toolbar box around the screen.

The application-specific functions available on the toolbar are as follows:

	Exit	Exits the configuration utility.
	New File	Opens a new file.
	Open File	Displays a list of files that may be opened.
	Save/Save as	Saves the file, or if unnamed, prompts for a name and saves.
	Download	Downloads configuration files from the PC to the RF terminal.
	Upload	Uploads files from the RF terminal to the PC.
	About	Displays the *About Configuration Utility...* box.

Configuration Tabs

Each configuration tab may be adjusted to set various parameters through either a drop-down selection box, a check box (setting the option active when checked), or through entering data into a text entry field. The functions available by using these configuration tabs are explained throughout this manual.

Status Bar

The status bar, located at the bottom of the screen, provides the current Terminal Emulation status within the menu bar. The status line can be turned on or off through the status selection of the View item on the menu bar.

Forms

Many Twin Client screens require entry into forms, which are useful for collecting information. Fields appear on forms in which you must select from various fixed choices or enter other information from the keyboard. Conventional Windows selections indicate whether a field is available from a pulldown, a selection box, a radio button, or requires specific keyboard input. This input may be a new field name or the address of a specific network component for which statistics are displayed.

Logs

System logs are dynamic and use their own format. The information, which is constantly being written to a log file, can be of use for system administrators who are trying to debug problems. Procedures for setting log levels can be found in Chapter 3.

In This Manual

This manual addresses the following tasks:

- Chapter one provides an overview of PowerNet Twin Client's capabilities and structure and explains what information you can find in this manual.
- Chapter two shows how to load Twin Client program and setup files onto your PC and onto your RF terminals. It explains the Configuration Utility, the backbone of Twin Client, and gives instructions for the basic setup of your RF terminals.
- Chapter three discusses adding capabilities to the basic RF terminal setup by modifying a configuration or creating a new, or special-purpose configuration.
- Chapter four gives advanced configuration options and VTerm extended commands. This material allows further fine-tuning of your terminal environment.
- Chapter 5 provides New Environ Telnet Extension details, such as creating named variables, creating common settings, creating terminal specific settings, changing and deleting settings, saving new environ settings, TN3270 negotiation, and new environ negotiation.
- Chapter 6 discusses options in the display formatter, such as setting the emulation, starting the emulator, taking snapshots, and formatting.

- Chapter 7 contains information on printing under 3270 and 5250 emulation.

Keys and Buttons

Certain keys move the cursor on a menu or form. The left mouse button is used for point and click functions, and the right mouse button gives submenus to certain selections such as **Menu**, **User**, **Screen**, and **Procedures** selections from the **Project Manager Screen**.

Key/Button Function

$<\uparrow>$　　The up arrow moves the cursor backward one field position in a form.

$<\downarrow>$　　The down arrow moves the cursor forward one field position in a form.

Bksp　　When the **Bksp** key is used in fields within a form, it moves the cursor backward one character space, deleting the character.

Del　　When the **Del** key is used in fields within a form, it moves the cursor forward one character space, deleting the character.

Tab　　The **Tab** key moves between fields on a form screen.

Related Documents

Each supported terminal has a Supported Equipment Manual containing information specific to that manufacturer's terminal at <u>http://www.connectrf.com/ster.htm.</u>

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Chapter 2 • System Installation/Setup

This chapter describes the necessary steps for installing PowerNet Twin Client software, helps you prepare your terminals, and gets you started with running Twin Client.

Minimum Installation Requirements

Installation of PowerNet Twin Client requires that the PC have basic hardware and software requirements installed on it:

- A Pentium level PC or Server
- 32 MB of RAM
- 10 MB of free hard disk space available
- Microsoft Windows 95, 98, ME, XP, or NT/2000 installed on the PC as an operating system

Installing PowerNet Twin Client for Windows

1. Download the PowerNet Twin Client software package from the Connect web site at http://www.connectrf.com. Click on *Partner Services* and then on *Software Downloads*.

2. The downloaded file is a compressed archive. After extraction using a utility such as WinZip or PKWARE, folders are created on the hard disk. Click on the **Disk1** folder to view the files. Click on the **Setup** application.

3. Click on **OK** to begin the installation process. The installation program runs an installation wizard and then presents the Setup screen.

   Note: Throughout the installation, click on the **Next** button to continue, or click on the **Cancel** button to exit the installation process.

4. Enter your Installation Key (identification number) when asked for it. (Your installation key is found online at http://www.connectrf.com.)

5. You are prompted for a target folder (default is **c:\PowerNet\TwinClient**). If you choose to change the default folder, click on **Browse**.

6. You are prompted for the name of a program group (folder) to install the PowerNet software into. The default group is **PowerNet**. You may change this default either by selecting an existing program group or by typing in a new name at the prompt.

7. The PowerNet installation program begins copying the files to the target folders.

8. When the installation program is complete, you must reboot the system to initialize the PowerNet software. (The system must be restarted in order for the PowerNet software to function correctly.)

    a. To reboot the system immediately, select **Finish**.

    b. To reboot the PowerNet server software later, select the **Restart Later** option, and click on **Finish**.

These steps complete the PowerNet Twin Client software installation process on your computer.

Preparing Terminals for PowerNet Twin Client

Once the installation process on your PC is complete, the next step is to prepare the handheld RF terminal(s) for software installation. The Configuration Utility transfers program and configuration files to the RF terminal(s) over a serial communications link, and configures them with the PowerNet Twin Client parameters.

Note: The following instructions are necessarily generic.

Selecting Terminal Types

1. Connect the appropriate serial cable from a serial port on the PC to the communications port of the terminal or cradle (docking station) before turning power on to the computer.

2. Start the Configuration Utility by clicking Windows **Start**, **Programs**, **PowerNet**, and **Twin Client Manager** (or click on the PowerNet Twin Client icon). The PowerNet TN Configuration Utility screen appears.
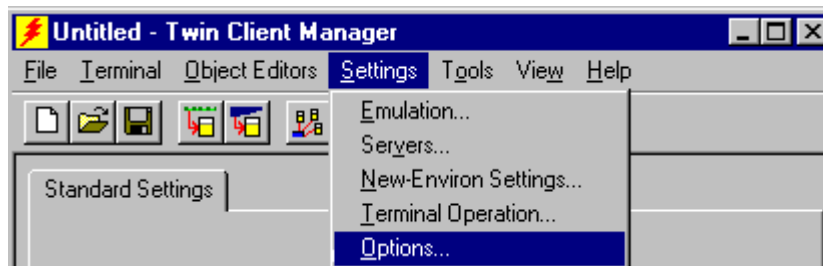
3. Select **Settings**, then **Options**. The PowerNet Terminal Loader screen appears.
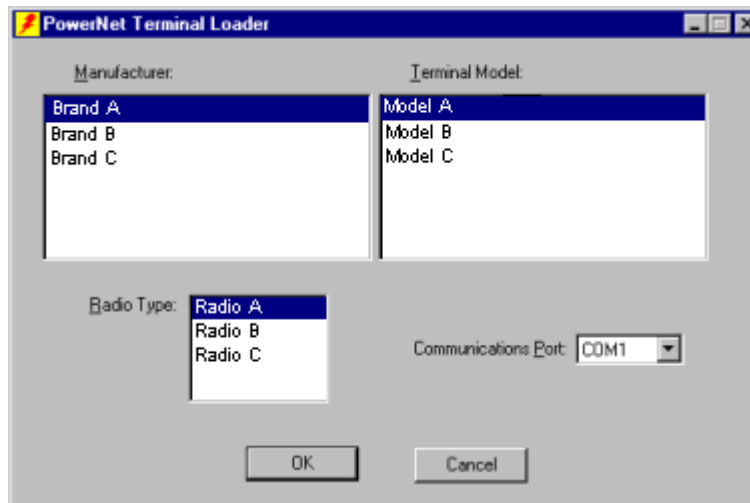
4. Select from the lists, the correct Manufacturer, Terminal Model, and Radio Type for your RF terminal(s).

5. Select the COM port your PC uses for the communications cable. Click **OK**.

6. Select **Settings**, and then **Emulations**. The Emulation screen appears.
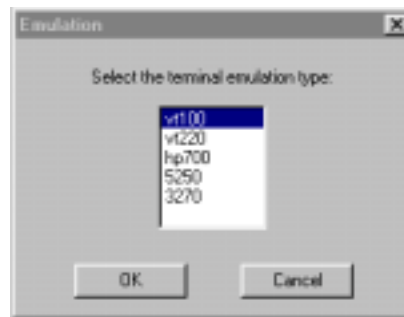
7. Choose the correct emulation for your terminal(s) and click **OK**.

8. Select **File**, and then **Save As**. Type the name **default** and click **Save**. The file is saved as default.cf.

Setting the Host's IP Address

The Servers are the Telnet host systems the terminals will access.
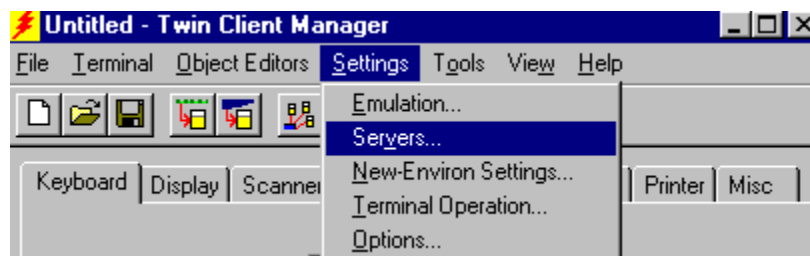
To set these addresses, from the **Settings** menu, click on **Servers**.
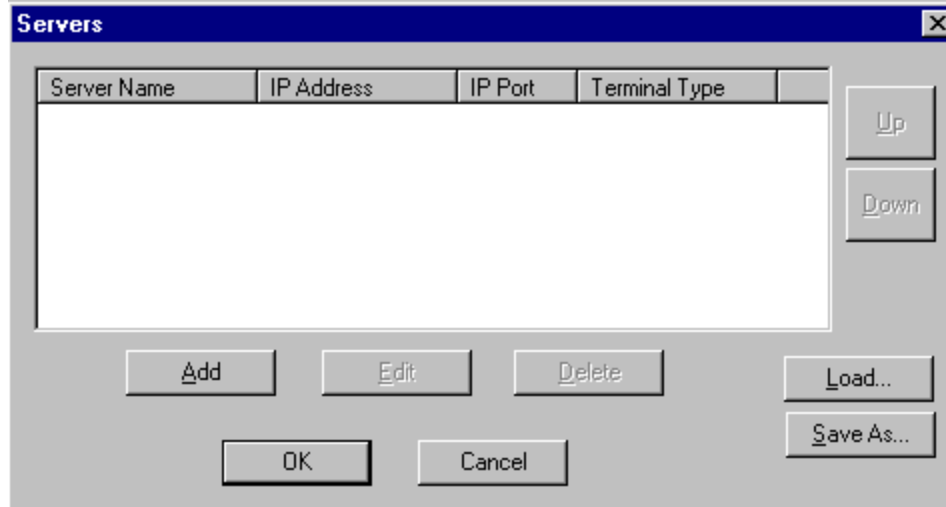
Click on **Add**.
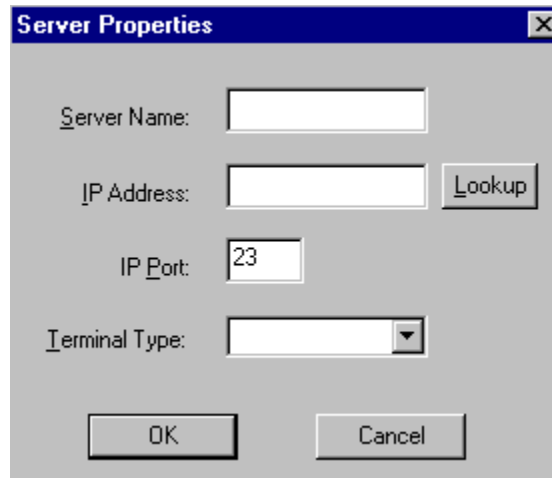
The **Terminal Type** scroll box is used to override the existing emulation type.

To do a DNS lookup, enter the name of the server, and click on the **Lookup** button.

Note: The DNS server must be running on the PC for this to work.

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.

Use the **Load** button if you want to load an .svr file. Use the **Save As** button if you want to save your file as an .svr file.

You are now ready to download the program and configuration files to the terminal.

Sending Program and Setup Files to the Terminal(s)

1. Turn on the power to your RF terminal or cradle and verify that a DOS prompt (C:\) appears in the terminal window.

2. On your PC, select **Terminal**, and then **Send Program Files to Terminal**. A message appears asking if you would like to also send setup files.

3. Click **Yes**. The program and configuration files are sent to the RF device. You will receive a Transfer Complete message when the transfer is successful.

Note: For more detailed instructions on a specific terminal, refer to its Supported Equipment Manual at http://www.connectrf.com/ster.htm.

Note: For keypad configuration information on a specific terminal, refer also to its Supported Equipment Manual at http://www.connectrf.com/ster.htm.

Terminal Setup Using Twin Client Menus

The Twin Client menu system is accessed by pressing uppercase **C** at the Twin Client main menu shown below.

```
Twin Client
© 1991-2003, Connect, Inc.

Keypress to Continue
```

To make a menu selection, use the **Up-Arrow** and **Down-Arrow** keys to navigate the menu, and press **Enter** to select the highlighted option.

Below are descriptions of possible menu options.

Edit Mobile Unit IP

The IP list contains the terminal IP address, the Subnet Mask and the Router IP address. Enter the appropriate address. Select **<F3>** to save and/or **<F7>** to Quit, as shown below.

```
IP  206.232.71.38
SN  255.255.255.0
RT  206.232.71.1

<F3> Save  <F7> Quit
```

Edit Server/Host IPs

If you wish to change the host IP address or addresses using the terminal menus, select this option and enter up to four Host IP addresses as required.

```
   Host 0
IP 206.183.67.155
Port 23__

<F3> Save <F7> Quit
```

Press **F3** to save the configurations.

Edit Radio Option

This function acts as a password to join the radio network. Terminals associating with an Access Point must supply a matching value, determined by their configurations, or their association requests will be ignored.

ID tsunami_____

<F3> Save   <F7> Quit

Edit License Key/Authorization

This menu option permits authorization of each terminal manually. Select this option to obtain the terminal's Identification Code, which is then used to obtain the Authorization code from the Connect web site.

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

```
00A0F826E614
Authorization
not authorized

<F3> Save <F7> Quit
```

Type the authorization code into the field as it appears on the WEB site. Punctuation characters, such as the hyphen (-), are required. Press **F3** to save the authorization code.

Run Site Survey

This option (a feature of Spectrum 1) is applicable to Release 5.0 and may be obsolete for your terminal.

Switch Client Modes

The Twin Client normally operates in Telnet mode, which provides direct connection to Telnet hosts. It can also operate in Server mode, through an OpenAir server. Select this menu option to switch between Server and Telnet modes of operation.

Set Contrast

Adjust the contrast as required by pressing the right and left arrow keys.
The Contrast screen appears as follows.

CONTRAST

F3> Save <F7>Quit

Run Client Emulator

After all desired changes have been made, select this option to return to the Twin Client main menu. Then press any key to establish the Telnet session and begin emulation.

Note: For information on terminal setup for a specific terminal, refer to its Supported Equipment Manual at http://www.connectrf.com/ster.htm.

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.

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 **Tools** menu, as shown below.
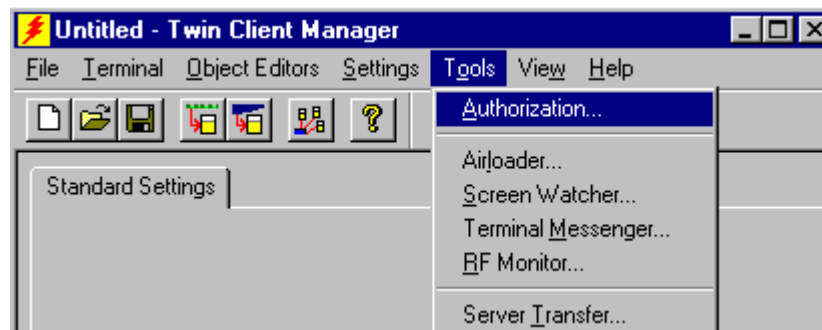
The Authorization window is displayed as shown below.
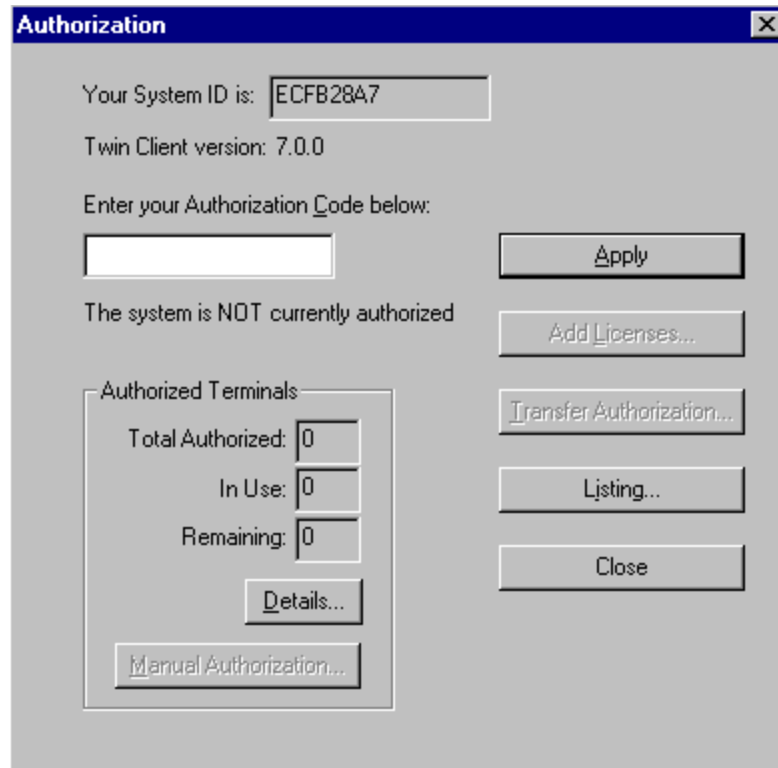
Your System ID appears in the first box of the screen.

Go to http://www.connectrf.com. Click on **Partner Services**. Click on the **Generate Authorization** icon at the top of the page. Follow the directions on the web site.

Authorized Terminals

The number of terminals authorized, the number of terminals in use, and the number of terminals remaining is provided in the Authorized Terminals box on the lower left side of the screen.

Click on the **Details** button to number the options in the screen below in the order of your priority.

Note: The terminal may or may not be able to utilize the Formatter feature depending on its authorization codes.

Authorization Details

The following list shows the number of terminals that can be authorized by this Twin Client manager based on options granted by site licenses.

Re-order the entries to prioritize which options are given to terminals authorized by Airloader.

Priority	Option(s)	Remaining
1	Screen formatter only	0
2	Both Formatter and Plus	0
3	Twin Client Plus only	0
4	Standard features only	0

Up

Down

* Staging not enabled.

OK   Cancel

Click on an option and move it using the **Up** and **Down** buttons.

Click on **OK** when finished.

The **Manual Authorization** button is an alternate method of obtaining an authorization code for a terminal. This method does not utilize Airloader, as does the other method.

Click on this button, manually enter your mac address in the screen that appears, and click on **OK**. This enables you to generate individual authorization codes.

Add Licenses

The Add Licenses feature is used when adding additional licenses to an already site licensed Twin Client manager.

An example of this is the instance in which Twin Client manager is licensed for 10 licenses, and the customer purchases another 10 licenses to make a total of 20 licenses.

From Twin Client manager, choose **Authorization** from under the **Tools** menu.

Click on the **Add Licenses** button.
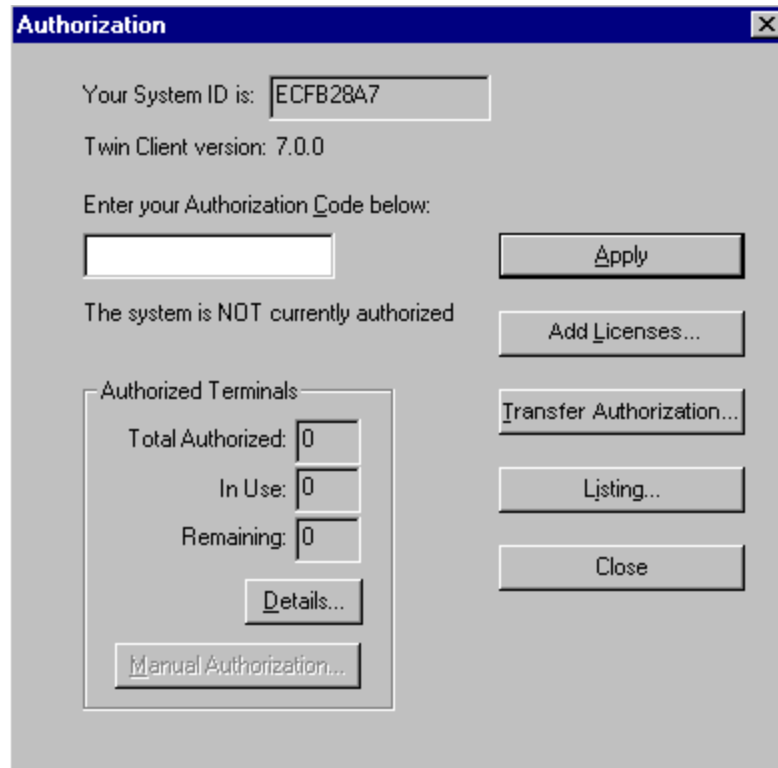
A pop-up box appears with the machine ID and a space for the additional licenses authorization code.
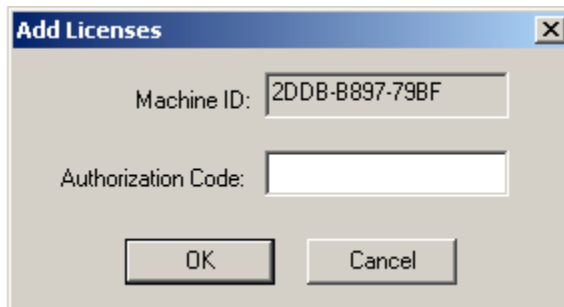
Enter the additional license's authorization code and click on OK.

Use the machine ID in the pop-up box instead of the original machine ID to get your authorization code.

If adding users, click on the Add Licenses button before generating the authorization code to get the most current machine ID.

Transfer Authorization

The Transfer Authorization feature is used when moving a site license from one PC to another.

After Twin Client manager is installed on a new PC, you will need the system/machine ID for it. This ID appears in the first box of the authorization screen.

From Twin Client manager, select **Authorization** from under the **Tools** menu.

Click on the **Transfer Authorization** button on the old PC.

You will be asked for the new system ID. Enter this new system ID. It will generate an authorization code for the new PC's Twin Client manager.

```
┌─ Authorization ──────────────────────────────── ⊠ ─┐
│                                                     │
│   Your System ID is: │ECFB28A7            │         │
│                                                     │
│   Twin Client version: 7.0.0                        │
│                                                     │
│   Enter your Authorization Code below:              │
│                                                     │
│   │                        │    ┌──────────────┐    │
│                                 │    Apply     │    │
│   The system is NOT currently authorized  └─────────┘│
│                                 ┌──────────────┐    │
│                                 │ Add Licenses...│    │
│   ┌─ Authorized Terminals ─┐    └──────────────┘    │
│   │                        │                        │
│   │ Total Authorized: │0 │  ┌────────────────────┐ │
│   │                      │  │Transfer Authorization..│ │
│   │        In Use: │0 │      └────────────────────┘ │
│   │                                                 │
│   │      Remaining: │0 │     ┌──────────────┐       │
│   │                         │   Listing... │       │
│   │      ┌─────────┐         └──────────────┘       │
│   │      │Details..│                                │
│   │      └─────────┘         ┌──────────────┐       │
│   │  ┌─────────────────┐     │    Close     │       │
│   │  │Manual Authorization..│  └──────────────┘       │
│   │  └─────────────────┘                            │
│   └────────────────────────┘                        │
└─────────────────────────────────────────────────────┘
```
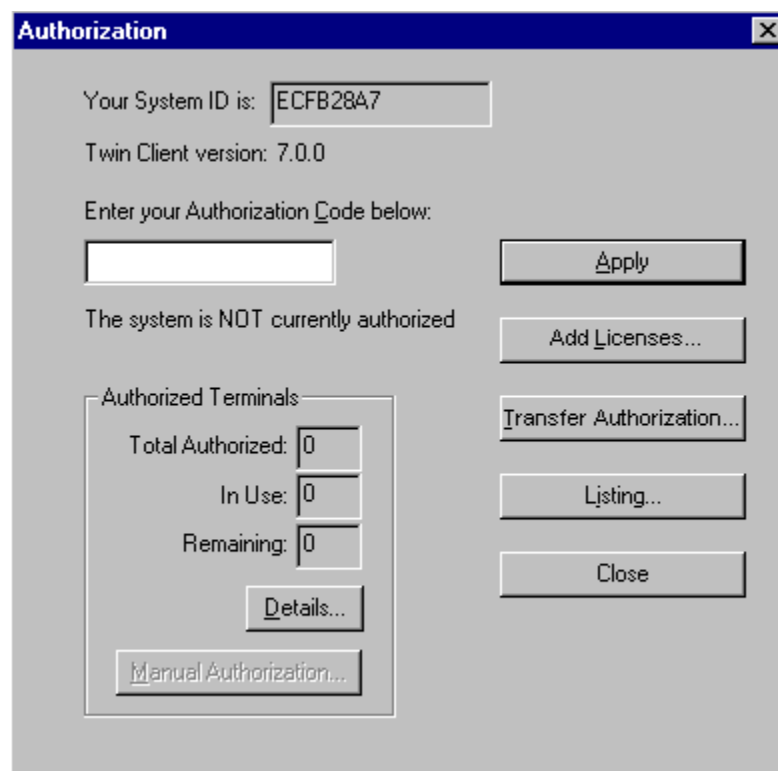
Note: This feature only works if there are licenses remaining on the old PC.

Listing

Click on the **Listing** button to view authorization codes issued.

The authorization codes used along with their corresponding serial numbers will appear.

Click on **OK** when finished.

Click on the **Close** button when finished.

Chapter 3 • Configuring Options

Overview of Configuring

Changing Settings: The PowerNet Configuration Utility allows you to change keyboard, display, scanner and other settings on your RF devices. By changing these settings, your terminal(s) are reconfigured to work optimally with different host applications and with specific data collection (scanning) situations.

Saving New Settings: You begin configuration by selecting and adjusting the settings that you want changed, then saving the new settings to a new configuration file. Once it is tested, this file can then be used for programming other terminals with the same settings. Using a configuration file allows you to quickly load multiple terminals, making a large, uniformly configured installation.

Advanced Options: Advanced configuring covers optional, significantly involved choices and commands. You will need to master the basic configuration techniques in this chapter before successfully learning and using advanced configuring.

Using Configuration Tabs

Each configuration tab on the PowerNet Twin Client Configuration Utility screen has options that may be adjusted to set various parameters.

To select a tab, position the mouse over the desired tab, and click the left mouse button. Once the tab is selected, the various configuration parameters for the option are displayed for your use: drop-down selection boxes, check boxes, and text entry boxes.

You may also select parameter options from the keyboard:

- Press the **Tab** key to navigate through the available fields. Each field is highlighted when selected.
- Press the up and down **arrow** keys when in a drop down selection box and scroll through the list of available options.
- Press the **space bar**, if at a check box, to toggle the option on or off.
- Type data directly with the keyboard into text fields.

Saving and Reusing a Configuration

After you have adjusted the settings to a configuration you want, save the configuration with a meaningful name so you will recognize it when you want to use it.

1. Select **Save As** from the **File** menu.

2. Type a name for your configuration.

3. Click **Save**. Your file is saved as a configuration (.cf) file.

When you want to use the file to program additional RF terminals with the same configuration, open the file you have just saved:

1. Select **Open** from the **File** menu.

2. Select the name of the configuration you saved.

3. Click **Open**. Apply the configuration to additional terminals.

The following subsections describe each component of the Configuration Utility, its available values, and information about its use.

Configuring with the Keyboard Tab

Keyboard shows options that you can adjust to determine how your RF terminal keyboards perform when interacting with the host application.
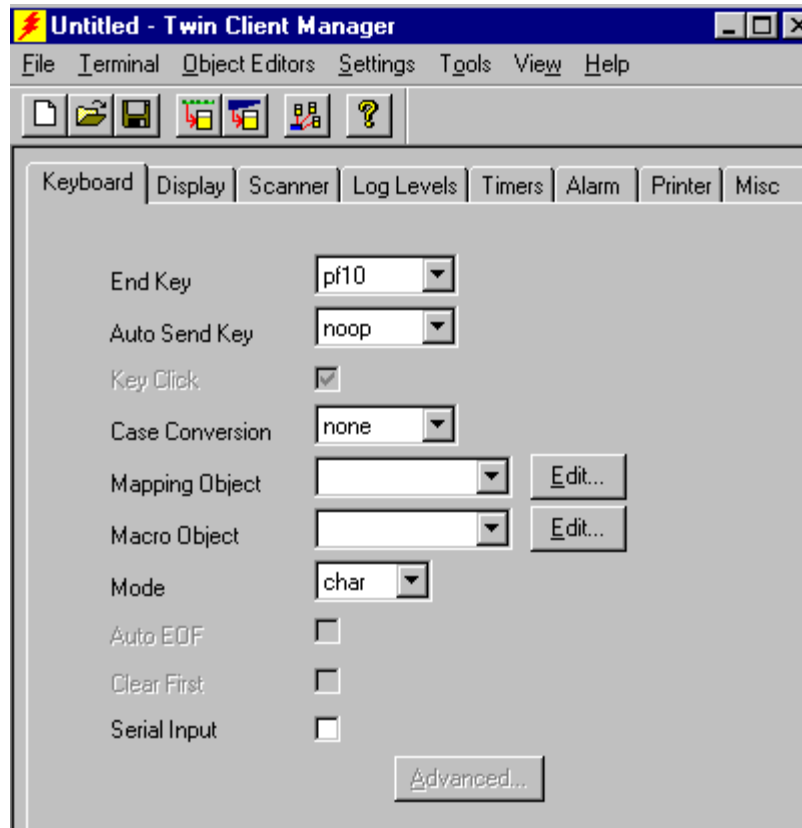
End Key

You can select a key on your RF terminal to signal the end of both the host connection and the RF session. The default is **PF10**.

Auto Send Key

Using this option enables you to define a keystroke to be sent automatically when an input field on the terminal is filled with keyed input. That is, if a field is set for 9 characters, and 9 characters are entered into the field, the auto send key is automatically transmitted with the 9 characters move from the terminal. The default is **stat**, which indicates that no keystroke is automatically generated.

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

Key Click

Checking this box gives you an audio simulation of key clicks from your terminal's keyboard. Default is on (checked).

Case Conversion

Use this option if your application requires all upper or all lower case letters. Selecting the required case, upper or lower, converts all alphabetic characters sent from the terminal to that case. Select none, if your application does not require case conversion. Default is none; no conversion takes place.

Caution: Applications may or may not be case-sensitive. Arbitrary case conversion without understanding your application's use of cases may cause problems.

Mapping Object

This feature of PowerNet Twin Client allows you to map the numeric keys to a specified host terminal key for ease of use. For example, you can specify that pressing the key **2** on the terminal will send a **PF24** key stroke to the host application. Refer to the Keyboard Mapping section in chapter 4, "Advanced Options" for more information on the content and format of this feature.

Macro Object (VT/HP Only)

A macro is a sequence of keystrokes resulting from pressing a single key. You can create a sequence that will be repeated every time you press a certain key on your RF terminal. Refer to the Keyboard Macros section in Advanced Configuring Options for more information on the content and format of this feature.

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.

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)

Check this option if you want to automatically clear a field of existing data before any new data is entered into the field. In the event the terminal does not transmit any data for the input field (as happens when only the **Tab** key is pressed), no action is taken.

Clear First (3270,5250 only)

Check this option if you want the current input field cleared before beginning entry into the next field.

Advanced (3270 only)

Clicking the Advanced button on the Keyboard tab brings up the Advanced 3270 Keyboard screen. Refer to Advanced 3270 Keyboard in Advanced Configuring Options for more information on the content and format of this feature.

Configuring Screens with the Display Tab

The Display screen shows options that you can adjust to determine how your RF terminal screens perform when interacting with the host application. The use of the Display Objects (Mapping, Dialog, and Formatter) are discussed in chapter 4, "Advanced Options".
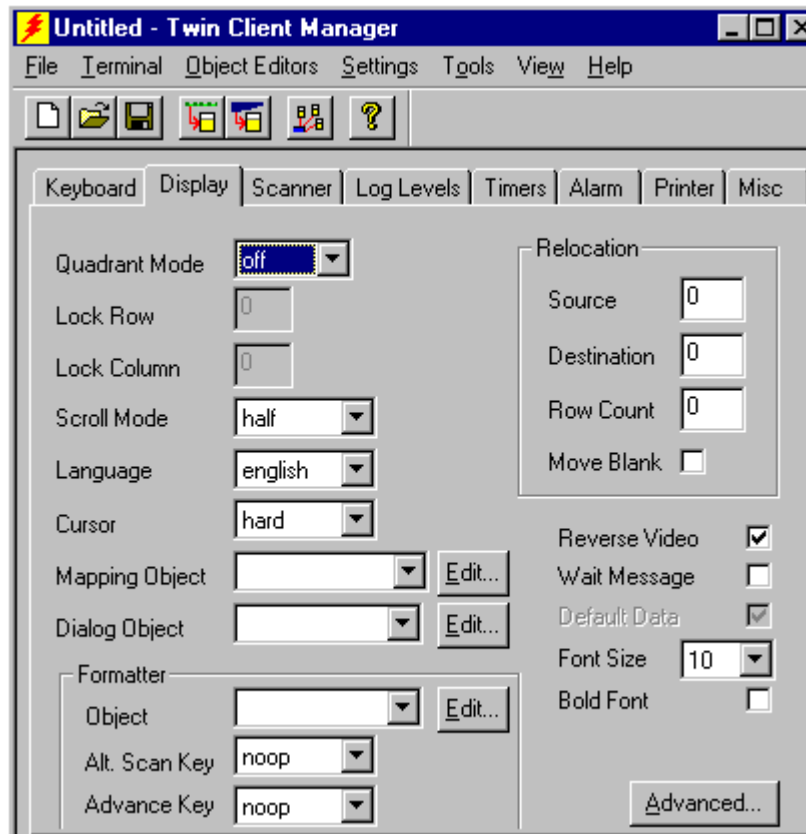
Quadrant Mode

You can select a portion of the host screen to display on your terminal screen. The amount of the host screen shown is based on the RF terminal's screen size. The value you select dictates how the terminal screen shows a portion of the host session screen.

- **Off** disables quadrant processing, so the software attempts to center 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 or right.

- **Soft** always positions on a quadrant boundary regardless of input field boundaries. Viewing keys on the terminal are enabled so you can shift the terminal screen.

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

- **Lock** locks the terminal display to specific row and column (x, y) coordinates on the host display. If you choose this option, you must then specify the coordinates in the following two boxes.

  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.

  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.

Scroll Mode

Scroll Mode defines the scrolling method used when you are using the terminal's 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

You can choose the language for system message displays.

Cursor Appearance

All handheld terminals can show several cursor types. You can set their appearance to one of the following:

Soft – Underscore (_)

Hard – Block   ■

Hide – Nothing

Mapping Object

This feature is used to modify the displayed character set, and is an advanced integration option.

Dialog Object

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

Formatting

This feature is used to re-format the host display onto the terminal display, and is an advanced integration option.

Relocation Group

You can select a row or group of rows of the host screen and relocate them on the terminal screen automatically. For example, consider a terminal with 12 rows and a host application of 24 rows, where application error messages always appear in the 24th row, but the majority of the normal application information is in the first 12 rows. In this case, it is advantageous to relocate the 24th host display row to the 12th row, so that the terminal operator can see the error messages without having to scroll down to the bottom of the host display screen.

Source

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

You can choose to display null or space characters (blank data) from the host display onto your RF terminal screen by putting a check mark in this box.

Reverse Video

If the terminal manufacturer allows display specific features, Reverse Video allows you to display a reverse video on the terminal display. Default is on, checked.

Wait Message

Checking this box enables you to display the message: waiting for data on the terminal. The wait message generally appears when data is unavailable, and your terminal's telnet session is waiting for it to become available.

Default Data (for 3270 and 5250 only)

If you check this field, the contents of the input field in the command are transmitted to the terminal software. In this way, you can edit the data, then have the entire contents of the input field sent out by the terminal back to the server if anything other than a control key (such as **Enter**, **Tab**, or a function key) is pressed. If you leave this field unchecked, the field appears as underscores, regardless of what the host is supplying.

Double High and Double Wide/Bold Size and Bold Font

The double high and double wide check boxes enable (checked), or disable (unchecked), the display of characters on the DOS terminal screen in double high and double wide fonts, respectively. On a CE terminal, the double high and double wide check boxes are replaced with a font size scrolling list box and a bold font check box. The font size scroll box provides a choice of font size for the display of characters. The bold font check box enables (checked) or disables (unchecked) the display of characters in bold font.

Formatter Object

This feature is used to reformat the host display onto the terminal display. This is an advanced integration option.

Alt Scan Key

This scrolling list option within the formatter 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.

Advanced Key (VT/HP only)

This is the key that will be sent automatically for the formatter feature when using VT emulation to skip unformatted fields. Set this key to whatever is required by the application to move from field to field. This will allow you to skip unneeded fields and the formatter will automatically bypass them. This is not required for 3270 or 5250 emulation as there is a standard method for moving between fields.

Configuring with the Scanner Tab

The Scanner tab gives you the capability of determining how the RF terminal scanner performs when it interacts with the host application.
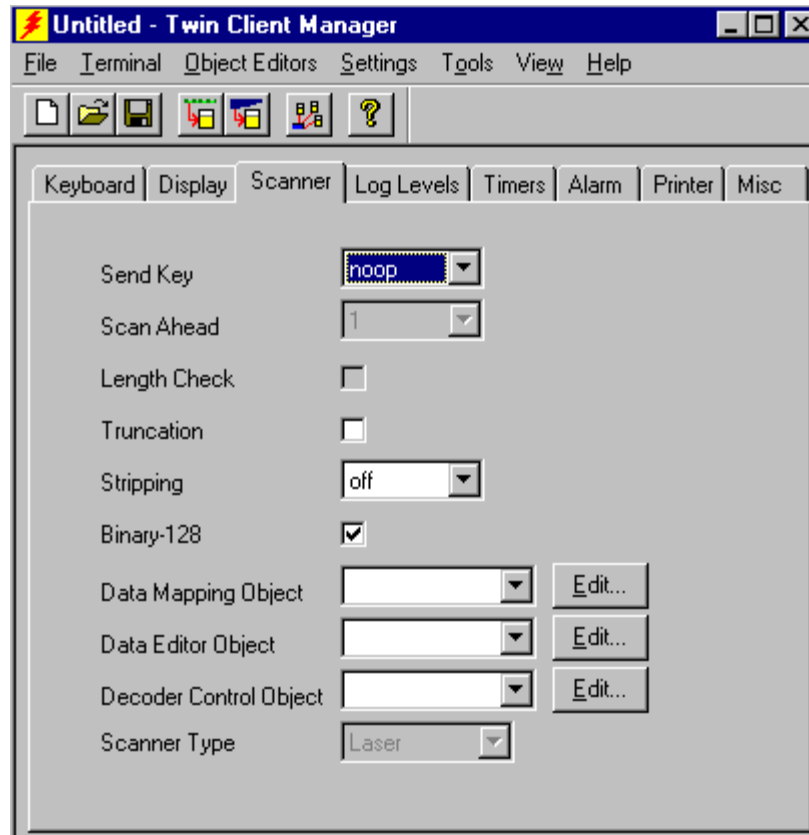
Send Key

Using this key allows you to set up an automatic transmission of data once the field is filled. For instance, if you are scanning inventory, after each swipe that scans in a product code, the send key becomes active and causes the product code to be sent automatically. You can choose among **Enter** and 24 **PF** keys and others (this is the value that is added to the end of the actual scanned data to indicate the end of a field…)

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.

Set to 0, scan ahead is disabled and you cannot scan again until the host response has been received.
Set to 1, there is no scan ahead limit.
Set to 2 and above, and the software will let you scan that many times until a host response is received. So if you set it to 3, it will allow you to scan only 2 more times before the host responds to the first scan.

You can choose to have workers not slowed down by high traffic by storing scanned data in the RF terminal's buffer until it can be processed by the network. To be sure that the buffer's capacity is not exceeded, check the documentation for your terminals, then calculate the safe number of entries and enter that into the scan ahead field.

Use the following calculation to help you decide the safe number to store. (Assumption: your RF terminal can hold 400k in its buffer.)

400 / (bar code length * 2)

For example, if you regularly scan 13-character barcodes, your calculation would be:

400 / (13 * 2) = 15.38

Round the answer down to 15 and choose that number in the Scan Ahead field.

Note: If you often must store more than 2-5 entries in the buffer, this may indicate a problem with the host application or the server.

Length Check

If you check Length Check, an error message is generated by the terminal if the scanned input is greater than the length of the field or if an attempt is made to enter a non-control key (**Enter**, **Tab**, arrows, function keys, etc.) after the field is filled.

Note: Selecting Length Check disables the Auto Send key operation on the Keyboard and the Truncation option, below.

Truncation

If the length of the scanned input is greater than the length of the input field, you can choose to automatically cut the extra characters from the end of the scanned data.

Note: If you enable this Truncation feature, automatic field wrapping is disabled.

Stripping

You can choose to eliminate trailing spaces and underscores from scanned input. Select **Both** to strip both spaces and underscores, or either **Space** or **Score**.

Binary-128

To enable the processing of binary code 128 bar codes on the terminal, check this box.

Caution: Do not scan binary code 128 bar codes without this box being checked, or the results may be unpredictable.

### Data Mapping Object, Data Editor Object, and Decoder Control Object

These are all advanced options. Refer to the Scanner Mapping section in chapter 4, "Advanced Options" for more information on the content and format of this feature.

Scanner Type

Choose the type of scanner that is specific to your terminal. If you do not know, read your terminal's manual for scanner type usage. Values used are specific to unique terminal types and cannot be interchanged. Your choice signals PowerNet Twin Client on a remote terminal which scanner type to use for input.

Configuring with the Log Levels Tab

A log is a file of network activity. Examining a log file can show information useful for system diagnostics.
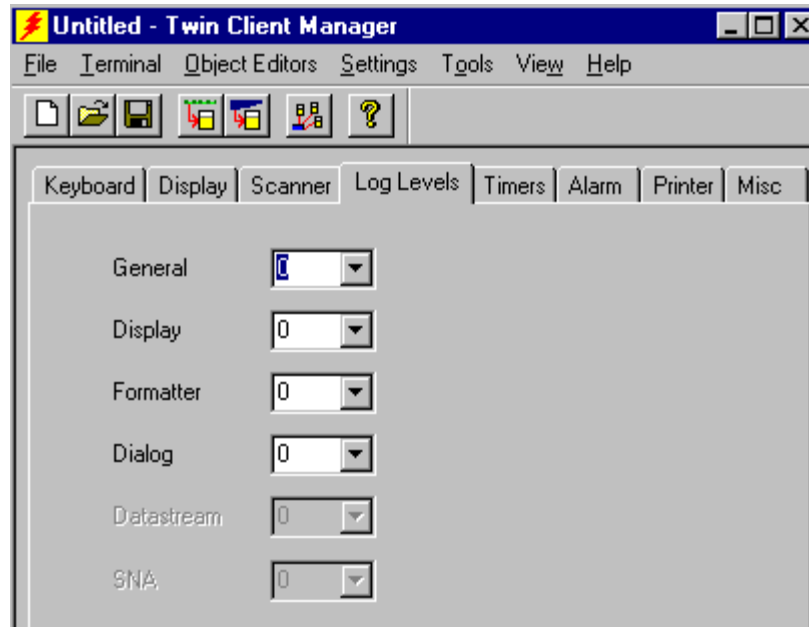
Generally leave log levels set to 0 (zero) for normal operation. For diagnostic situations only, a log level of 1 or 2 usually provides enough information for troubleshooting. Exercise care in setting these logging levels because the log files themselves are maintained on the remote RF device. If you choose to leave the log files active, the data that accumulates consumes space on the terminal's virtual disk.

General

Defines the general logging level for the handler. There are 10 log levels, from 0 to 9, with a level of 9 collecting the most information. Default is zero (0).

Display

Defines the level of logging for host and terminal display logging. A level higher than 7 results in a hex dump of the displays. Default is zero (0).

Formatter

Defines the level of logging for the screen formatting routines. Default is zero (0).

Dialog

Defines the level of logging for dialog routines. Default is zero (0).

Datastream

Refers to the emulation datastream parsing information. Default is 0.

A log file is created on the c:\ of the terminal called rf.log. To get it off the terminal, run ld.bat at the DOS prompt, and from Twin Client Manager, select **Terminal** and then **Receive File from Terminal** and type rf.log for the name of the file. The received file is stored in the \\Twinclient folder on the PC.

Configuring the Timers Tab

By using the Timers tab, you can determine how the RF terminal radio timer performs when interacting with the host application. These timing parameters may be modified to adjust the radio performance when interacting with the host application – which may, in turn, increase the battery life of the terminal.
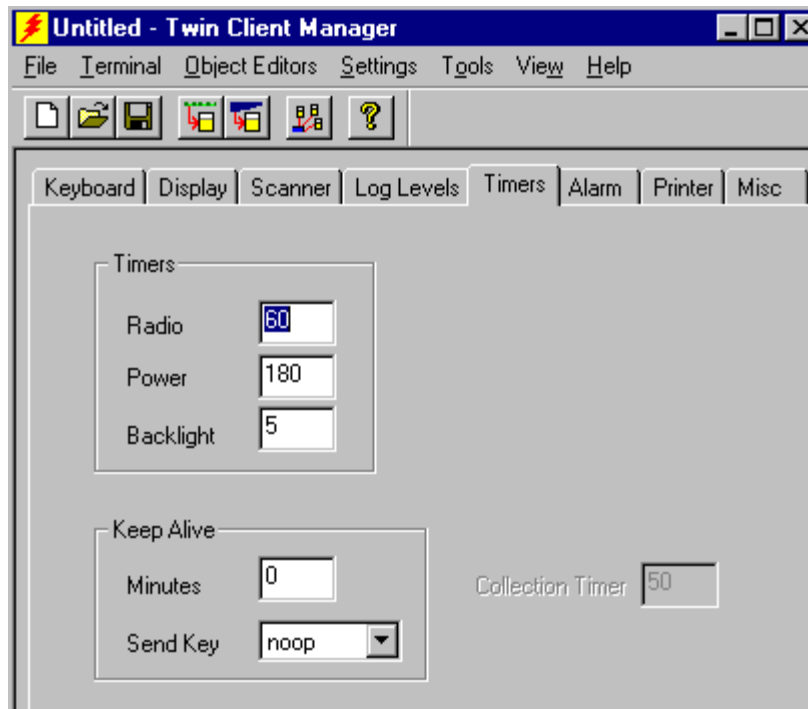
Timers

The following timers help keep sessions active, or help you increase the life of your terminal's battery by starting power saving shutdowns.

Radio

Type the length of time, in seconds, during which the terminal activates the radio and waits for a response from the host application. After the wait-time is exceeded, an error message is displayed on the terminal. Decreasing the value increases battery life since the radio becomes inactive for long periods of time. Default is 120 (2 minutes).

Power

Type the length of the time, in seconds, after which inactivity from the scanner, keyboard, or radio results in a power saving shutdown of the terminal. Default is 300 (5 minutes). This does not occur if the terminal is in session with the host.

Backlight

Type the 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. Frequent backlight use reduces battery life, requiring that the battery need recharging more often.

Keepalive (3270, 5250 only)

This group of options defeats RF terminal connection timeouts by having the PowerNet server send a keystroke to the host. Normally, a terminal session with the host is terminated if there is no notification within a specific time interval. This keystroke appears to be from the terminal and keeps the terminal session alive.

Minutes

The site administrator should supply this timeout interval in minutes. Valid data entries are 0–99 minutes. Default, zero (0), turns this timer off.

Send Key

Choose the key that is sent to the host if you have chosen to use the Keepalive function, above. The default value is noop, which disables the Keepalive function. The selections are **pf1-pf24**, **pa1-pa3**, **enter**, **tab**, **bktab**, **clear**, **sysreq**, **e_eof**, **reset**, **noop**, and **attn**.

Collection Timer (vt100, vt220, hp700 only)

Specifies the number of milliseconds the terminal waits after receiving data from the host before processing the data. This setting is used to avoid sending intermediate screens to the terminal, resulting in unnecessary RF traffic and rapidly changing screens on the terminal.

For example, many applications display the "background" data for a screen then delay while the actual data is prepared for display. Without a proper collection timer setting, the terminal would display the background and then be updated again with the foreground data when it was ready. By using this collection timer, only one screen update is sent to the terminal, with all of the data in it. The default value is 100. Adjust the collection time to 30-50ms if Mode on the Keyboard tab is set to char.

Configuring Alarms with the Alarm Tab

You can adjust parameters to determine how the RF terminal alarm (beep) function performs when interacting with the host application by using the Alarm tab.
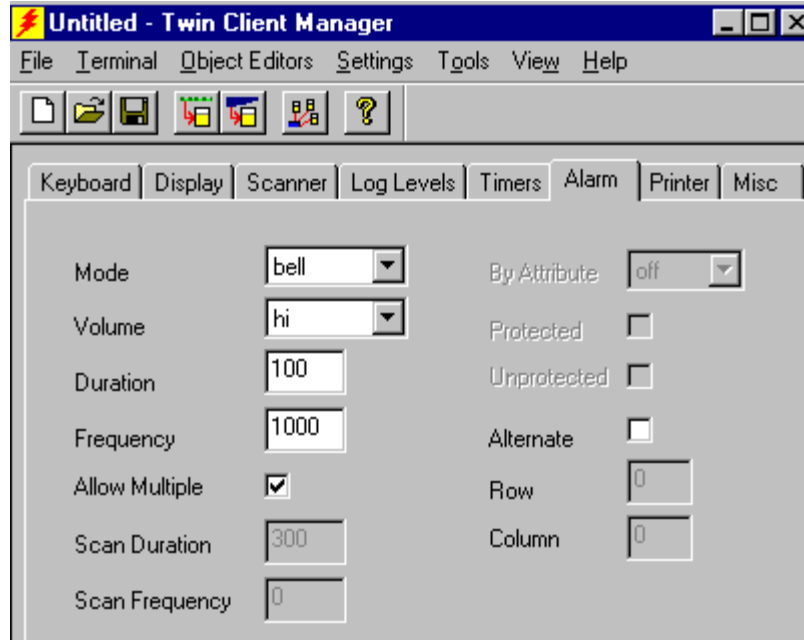
Mode

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

Choose the volume of the audible alarm on the terminal. Default is hi.

Alarm Duration & Frequency

The next two options, duration and frequency, enable you to configure alarm sounds differently to allow users to tell the difference between alarms and scan decode tones. Use these with Mode set to **spec1** or **spec2**.

Duration

Set the length of time in milliseconds that you want the audible alarm on the terminal to sound. Default is 150.

Frequency

Set the frequency of the audible alarm on the terminal in Hertz. Default, zero (0), represents the factory set, optimum default frequency for the particular model of terminal.

Allow Multiple

Check this box if you want to enable multiple alarm commands generated by the host application in a single terminal update sequence. This means that if the host sends down multiple bells to a screen, the terminal alarm beeps as set for each of the bell commands. If this box is not checked, the bells are combined and the terminal only gives one alarm.

Scan Duration & Frequency

The next two options, scan duration and frequency, enable you to configure scan sounds differently to allow users to tell the difference between alarms and scan decode tones.

Scan Duration

Set the duration of the audible alarm generated by a scan operation on the terminal, in milliseconds. Default is 300.

Scan Frequency

Set the pitch of the audible alarm generated by a scan operation on the terminal, in Hertz. Default, zero (0), represents the factory set, optimum default frequency for the particular model of terminal.

By Attribute (for 3270 only)

The next two options, protected and unprotected, enable you to choose alarm processing by field input attribute. Values are **off** (the default), **pen** for lightpen scanning, **num** for numeric, **hi** for high intensity, and **hal** for high intensity and lightpen.

Protected

Check this box to enable alarms on protected fields.

Unprotected

Check this box to enable alarms on unprotected fields.

Alternate (5250 only)

Check this box to allow the host application to place a single digit display character at a specified row and column within the presentation space for conversion to the indicated number of alarms at the terminal.

Row

When Alternate (above) is checked, row is x; it specifies the zero relative row number in the host presentation space where the alternate alarm digit is found.

Column

When Alternate (above) is checked, column is y; it specifies the zero relative column number in the host presentation space where the alternate alarm digit is found.

Configuring with the Printer Tab

Printer shows parameters that you may adjust to determine how a printer attached to the RF terminal interacts with the host application.
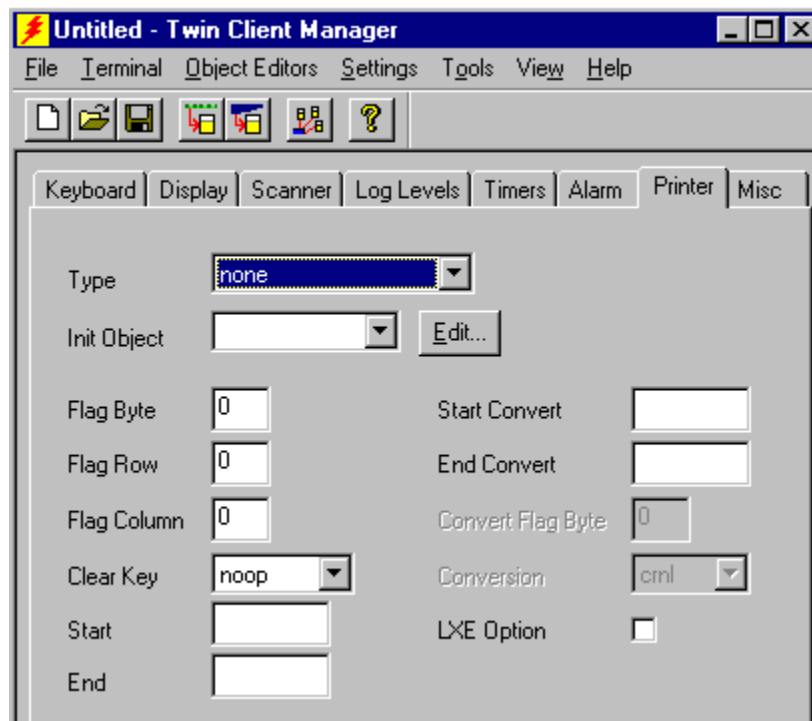
Type

Defines the type of printer attached to the terminal. The default is none.

Init Object

This feature of PowerNet Twin Client allows you to define printer commands to be sent to the terminal immediately after the terminal establishes a session.

Flag Byte (most options below are 3270,5250 only)

The presentation space of each screen from the host is examined for a beginning flag byte. It signals that the data following is printer data rather than screen data. The starting byte location is defined in the following Flag Row and Flag Column.

The handler continues searching the data stream for another flag byte to signal the end of the print data. In other words, the data encapsulated between the two Flag Bytes are sent to the printer.

Choose for the flag byte a number within a range of 0 to 127 that normally does not occur within the host application nor is contained within the print data.

Flag Row The row (within a range of 0 to23) where the flag byte (defined above) starts. It allows the software to narrow its search for the flag byte. It is a zero-based number where the lowest row (top of the screen) is zero (0). Default is zero.

Flag Column The column number (within a range of 0 to79) for the flag byte. It is a zero-based number where the lowest row (leftmost side of the screen) is zero (0). Default is zero.

Clear Key

Once printing is completed, this key is sent to the host application to signal that the printer has completed the printing task. This signal ensures that the printer is not instructed to print again before finishing printing the current task. The selections are **pf1-pf24**, **pa1-pa3**, **enter**, **tab**, **baktab**, **clear**, **sysreq**, **e_eof**, **reset**, **noop**, and **attn**.

Start

Specifies a unique character sequence that, when encountered in the host display area, 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 Convert

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

LXE Option

Check the box and the scanner operates with LXE applications.

Convert Flag Byte (3270 only)

Specifies the ASCII value in a 0 to 127 range, in decimal, that is converted according to the setting of the Conversion option if encountered in a sequence of print data. This is the byte used as the signal byte for printing. The presentation space of each screen from the host is examined for this byte. It signals that the data following is printer data rather than screen data. The starting byte location must be known. The software then continuously looks for another flag byte to signal the end of the print data. The selection of the flag byte should not occur in normal print data. Default, zero (0), disables this function.

Conversion (3270 only)

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**.

Using the Miscellaneous Tab

This screen becomes activated as a display area for the VT Extension Group, the Data Stream Group, and Answerback.
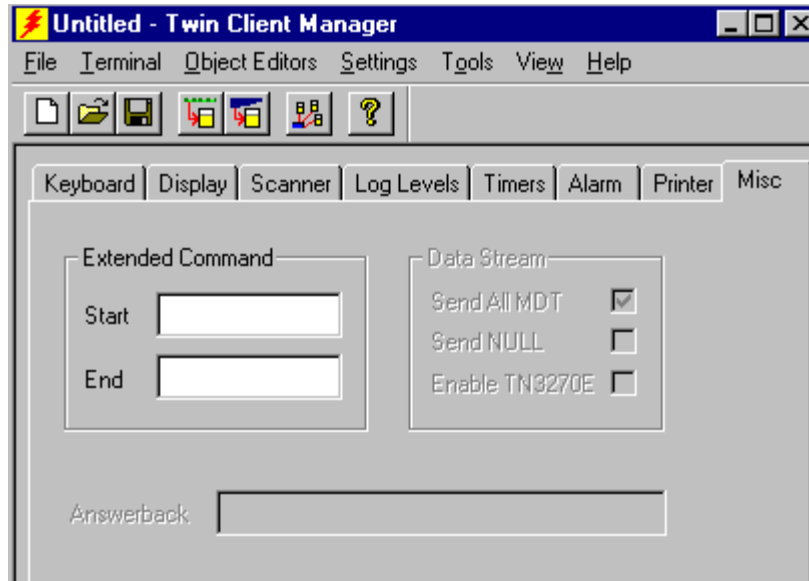
Extended Command Group (3270,5250 only)

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

Determines how fields with the Modified Data Tag bit set are selected for transmission to the host application. If set to no, only unprotected fields modified by the terminal operator are transmitted. If set to yes, all fields with the MDT bit set (protected and unprotected) are transmitted. Default, yes, is checked.

Send NULL

If checked, all null characters are transmitted to the host.

Note: For AS400 hosts, this field should be checked.

Answerback (vt100, vt220, hp700 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. Inserting the sequences "$A", "$B", "$C", and "$D" into the answerback string results in a substitution of four octets, three octets, two octets, and the last octet of the terminal IP address, respectively, as shown below.

$A - all four octets of the IP address (206.183.067.226)
$B - the last 3 octets (183.067.226)
$C - the last 2 octets (067.226)
$D - the last octet (226)

Given a terminal with an IP address of 206.183.67.226, the following examples demonstrate how substitution and non-graphic escape sequences are processed.

Answerback	*Data Sent in Response to Answerback Command*
$A	206.183.067.226
RF$A	RF206.183.067.226
RF$A\015	RF206.183.067.226<carriage return>
$B	183.067.226
RF$B	RF183.067.226
RF$B\015	RF183.067.226<carriage return>
$C	067.226
RF$C	RF067.226
RF$C\015	RF067.226<carriage return>
$D	226
RF$D	RF226
RF$D\015	RF226<carriage return>

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Chapter 4 • Advanced Options

Defining Configuration Objects

Operation of PowerNet Twin client can be tailored to meet your special requirements, ease operators' workloads, and increase productivity without custom programming. You can create *objects* that modify Twin Client operation and include them in your terminals' configuration file. These objects can be used to:

- Alter the operation of the keyboard, scanner, printer, and display
- Automate portions of the terminal session.

The objects can be created and modified directly from within the Keyboard, Display, Scanner, and Printer tabs of the PowerNet TN Client Configuration Utility screen by clicking on the **Edit** button next to the object name field. However, to make the explanations easier to understand, all procedures are assumed to start with clicking on the Object Editors menu, selecting the appropriate object type, and designing the editors.

After you have defined all the objects, you include them in your terminal configuration by clicking on and choosing them from the tabs.
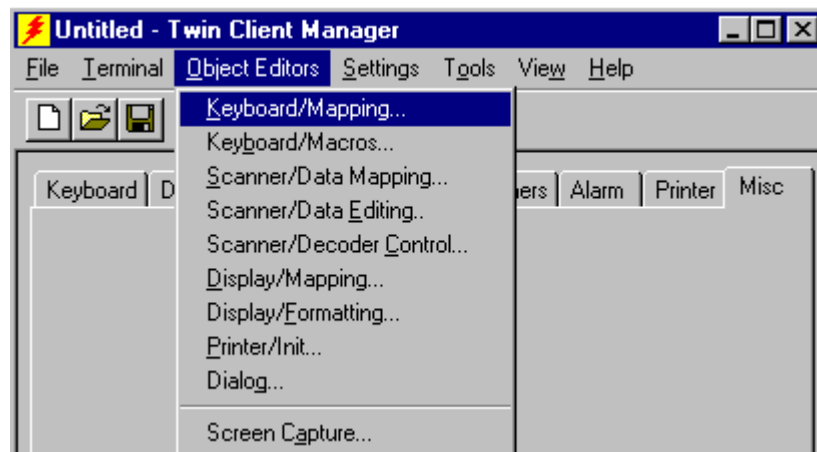
Relating Terms

The following terms mean the same thing; they simply are named slightly differently depending upon if they are on the object editor menu list or on the configuration tabs.

| Object Editors Menu	Configuration Tab Options
Keyboard/Mapping	Mapping Object

Keyboard/Macros	Macro Object
Scanner/Data Mapping	Data Mapping Object
Scanner/Data Editing	Data Editor Object
Scanner/Decoder Control	Decoder Control Object
Display/Mapping	Mapping Object
Display/Formatting	Formatter Object
Printer/Init	Init Object
Dialog	Dialog Object *(display)*
Screen Capture	

# Designing Keyboard Objects

Keyboard Mapping

This feature of PowerNet Twin Client allows you to map key(s) on your terminal to a particular host key. For example, you can specify that pressing the **4** key on the terminal sends a **PF24** key stroke to the host application.

1. From the PowerNet TN Client Configuration utility screen, select **Object Editors, Keyboard Mapping**. The PowerNet Terminal Type screen appears.
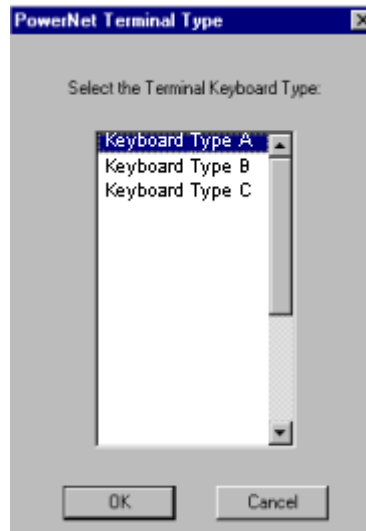
2. Select the type of terminal keyboard you are using and click **OK**. The PowerNet Keyboard Mapper screen appears.

Note: The following screen shot is an example of one of the many Key Mapper terminal screens that may appear.
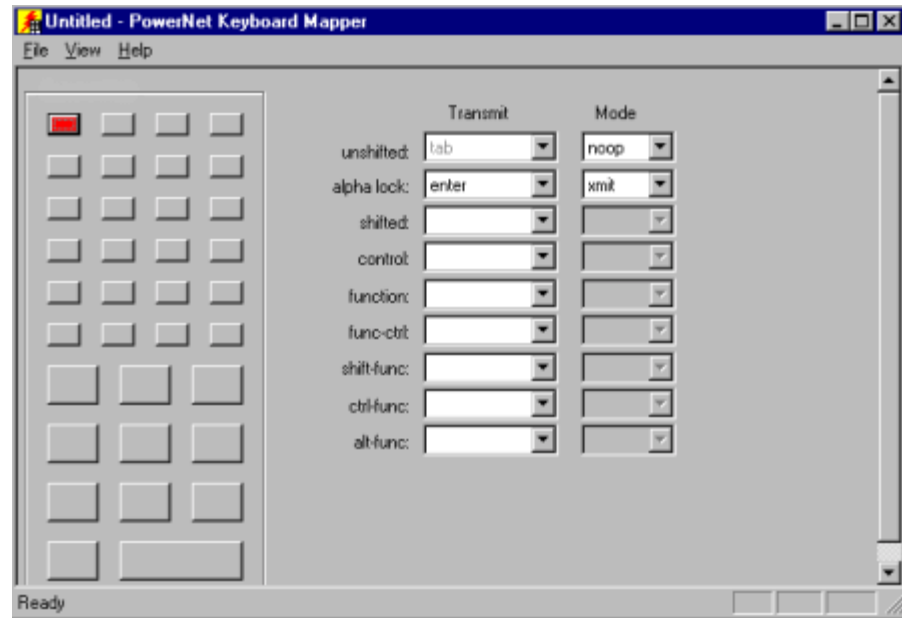
The Keyboard Mapper screen has a mock-up of a keypad on the left and options for key remapping on the right. When you select a key on the keypad mock-up, available remap options appear on the right.

State modifiers, such as "alpha lock" or "shifted" are keys on this keyboard that can be used in combination with the key you have selected. They vary depending upon the terminal you select.

Transmit possibilities allow for many actions or characters, such as "backtab" or "tilde" that might not appear on the terminal keyboard.

Mode defines what happens with the key combination you select. The list of possible modes is as follows:

Mode

local Handles the specified key locally on the terminal; sends (if required, as in the case of alphanumeric characters) when **Enter** is pressed on the terminal.

xmit Transmits the key immediately to the host.

lamp Turns on the terminal backlight.

light Lightens the display contrast.

dark Darkens the display contrast.

noop Do nothing.

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.

<div align="center">**Mode**</div>

edeeof   Destructive space (move) to the right of the cursor within a field, to the end of the field.

edefld   Edit mode.

lhelp   Displays the terminal ID, date, time, and terminal software version number.

scan   Sets a key that, when pressed, triggers the scanner to scan.

Creating a Keyboard Mapping Object

To create a Keyboard Mapping Object, complete the following steps.

1. Select a key with the mouse from the keypad mock-up. It turns red.

   - Choose the state modifier "unmodified" to use the key alone, then choose the mode and information to transmit that you wish.

   - Choose the desired state modifier to make a key combination, then choose the mode and information to transmit that you wish.

2. When you have finished defining desired keys, select **File**, and then **Save As**.
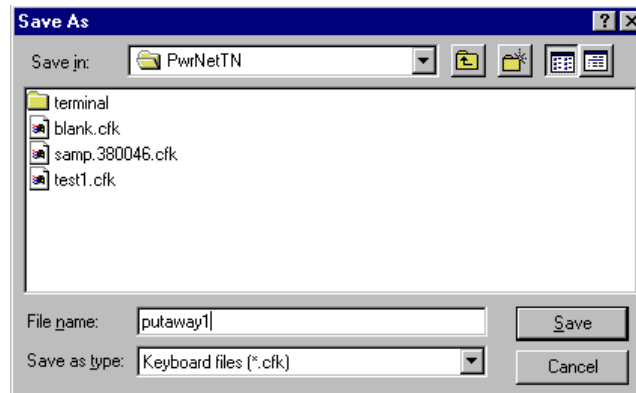
3. Enter a name for the new keyboard mapping object and click **Yes** to save the file you have created. The PowerNet TN Client Configuration Utility screen appears.

To modify a mapping object:

1. Select the key to be modified from the keypad mock-up, using the mouse, arrow or tab keys.

2. Select the keyboard state modifier with which the key is to be modified.

3. Click to select the particular key code to implement. Key codes can be selected by pressing the first letter of the desired code repeatedly until the code appears on the screen. You may also use the Up or Down arrow keystrokes to scroll through the transmit list and select the key code.

4. Select **File**, and then **Save** to save your changes.
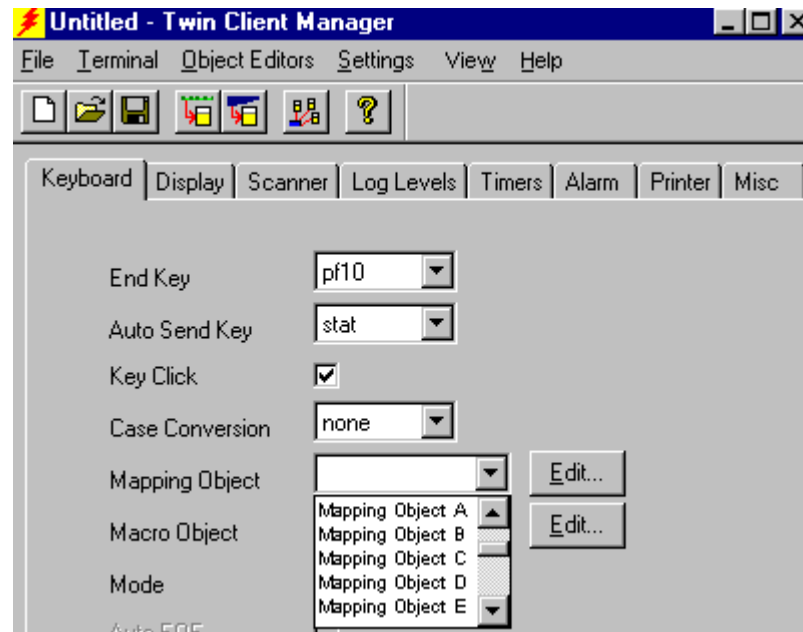
Linking a Keyboard Mapping Object to a Configuration

1. Using the PowerNet TN Client Configuration Utility, select the **Keyboard** tab.

2. Select a mapping object from the Mapping Object pull-down list.

3. Select **File**, and then **Save As** to save your PowerNet Twin Client configuration. Either choose an existing configuration file to attach the mapping object to, or enter a new name for a new configuration.

Later, when you program your RF terminal using the PowerNet Twin Client Configuration utility, your keyboard mapping file is loaded.

Keyboard Macros

This feature of PowerNet Twin Client allows you to assign special characters, or sequences of characters, to specific keys. As a result, when the terminal key is pressed, the macro is sent to the host. There are no pre-defined keyboard macros. A macro is user-defined. Macros include pf1 through pf24, in addition to the following.

Attn	Escape	Pa3
Bktab	Find	Print
Bksp	Fm	Redraw
Bottom	Home	Refresh
Clear	Ins	Remove
Del	Localexit	Reset
Dup	Newl	Return
End	Num	Select
Enter	Nullend	Sysreq
Eof	Pa1	Tab
Erase	Pa2	Top

Macros are constructed using the following format:

<keyname>=<macro string>

where <keyname> is the terminal key's name and <macro string> is the macro text assigned to that specific key.

For example, if you wanted to send the text "vt100" followed by moving the cursor to a new line when a user presses the **PF9** key, you would define the following in the macro object file: pf9=vt100\015;

Multiple keyboard macros can be defined in a single macro object, however, each line of the macro object must be terminated by a semicolon.

Macro:	Pressing the terminal key causes:
pf1=login5\015;	**PF1** sends "login" followed by CR
pf2=passwd5\015;	**PF2** sends "passwd" followed by CR
pf3=vt100\015;	**PF3** sends "vt100" followed by CR
pf4=appname\015;	**PF4** sends "appname" followed by CR

Note: \015 represents the octal value for "carriage return". See Octal Values, below.

Using Octal Values

The following table lists the octal value and the associated ASCII equivalent character for special characters that may need to be incorporated into macro strings.

Octal Value	ASCII	Octal Value	ASCII
000	NUL	022	DC2
001	SOH	023	DC3
002	STX	024	DC4
003	ETX	025	NAK
004	EOT	026	SYN
005	ENQ	027	ETB
006	ACK	030	CAN
007	BEL	031	EM
010	BS	032	SUB
011	HT	033	ESC
012	LF	034	FS
013	VT	035	GS
014	FF	036	RS
015	CR	037	US
016	SO	040	SP
017	SI	073	;
020	DLE	075	=
021	DC1		

Creating a Keyboard Macro Object

To create a Keyboard Macro Object, complete the following steps.

From the PowerNet TN Client Configuration utility screen, select **Object Editors**, and then **Keyboard Macros**. The Select Object Editor file screen appears.
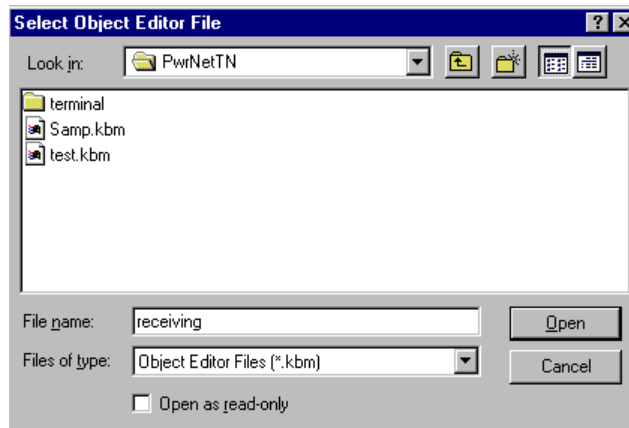
1. Enter a name for the macro you are creating and click **Open**.

2. Click **Yes** when asked if you want to create a new file.

3. Define the desired keyboard macro(s) as described earlier in this section.

4. Select **File**, and then **Exit**. Click **Yes**, when prompted, to save the macro object you have created.

Linking a Keyboard Macro Object to a Configuration

1. Using the PowerNet TN Client Configuration Utility, select the **Keyboard** tab.

2. Select a macro object from the Macro Object pull-down list.

3. Select **File**, and then **Save As** to save your PowerNet Twin Client configuration. Either choose an existing configuration file to attach the mapping object to, or enter a new name for a new configuration.

Later, when you program your RF terminal using the PowerNet Twin Client Configuration utility, your keyboard macro file is loaded.

Viewing a Sample Keyboard Macro Object

1. Using the PowerNet TN Client Configuration Utility, select the **Keyboard** tab.

2. Click the Edit button at the right side of the Macro Object line. The Select Object Editor file screen appears, listing macro files already created.

3. Select an existing file by clicking twice on the name. It automatically starts Notepad and displays the macro file.
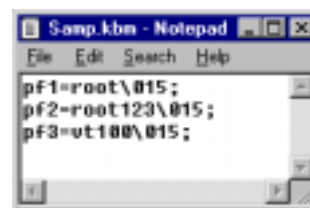
You can edit the existing text and save it as a new file.

Designing Scanner Objects

Scanner Mapping

Scanner Data Mapping allows you to map a specific barcode to a keystroke that is automatically sent to the host. For example, a barcode such as $G can be transformed into a 5250 Enter keystroke.

Entries in scanner data mapping objects are constructed using the following format:

barcode = keystroke;

barcode is the scanned barcode and keystroke is the keystroke to send when the barcode is scanned.

Creating a Scanner Data Mapping Object

With data mapping, you can create a unique barcode (such as $G) and assign it to send a function (such as Tab) when scanned. For example, you can alternate scanning this "Tab barcode" with scanning inventory barcodes to create a tab-delimited inventory list.
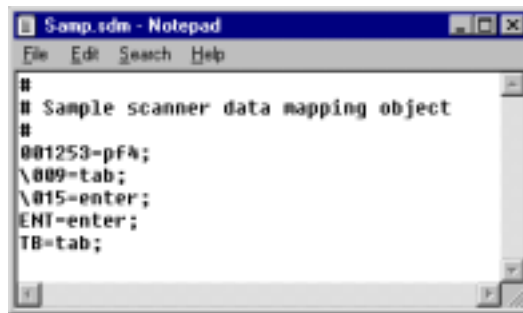
When you are ready to create or edit your Scanner Macro Object file, complete the following steps.

1. Using the PowerNet Twin Client Configuration Utility, select **Object Editors**, and then **Scanner Data Mapping**. The Select Object Editor file screen appears.

2. Enter a name for the map you are creating and click **Open**.

3. Click **Yes** when asked if you want to create a new file.

4. Define all of the necessary scanner maps, using the guidelines previously explained.

5. Select **Exit** from the **File** menu.

6. Click **Yes**, when prompted, to save the object you have created. The PowerNet Twin Client Configuration tool then becomes active on the screen.

Linking the Scanner Mapping Object to a Configuration

1. From the PowerNet TN Configuration Utility, select the **Scanner** configuration tab.

2. Select the object name that you have just saved from the Mapping Object pull-down list.

3. Select **Save** from the **File** menu to save your configuration.

4. Later, when you download the configuration to the terminal using the PowerNet Twin Client Configuration utility, the scanner object is included.

Scanner Data Editor

PowerNet Twin Client gives you the ability to automatically edit scanned data based on its pattern. This data editor allows you to manipulate data entry without requiring complex host application modification or costly re-labeling of barcoded items.
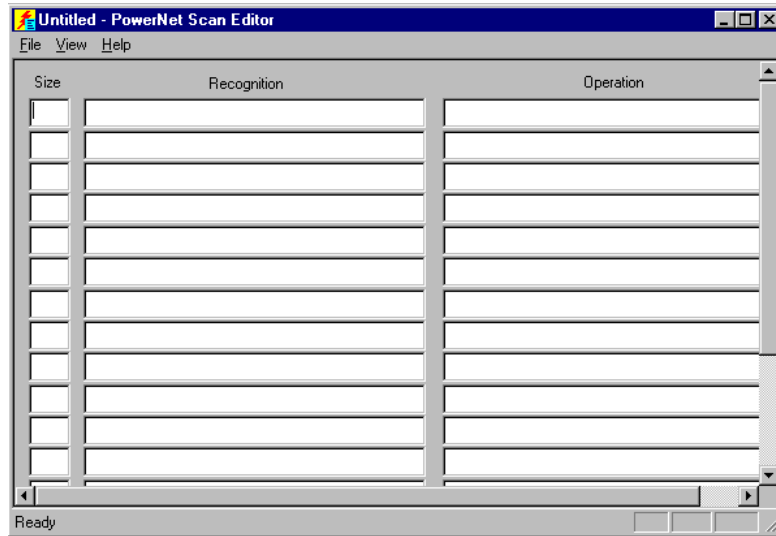
Scan editing is based on the length (Size) and pattern of the scanned data (Recognition). Once the pattern of the scanned entry has been recognized, one or more operations manipulate the scanned data.

Recognition building blocks are comprised of:
  A Alpha character
  N Numeric character
  * Any character
  = Must match next character

Operational building blocks are comprised of
  X Delete character
  * Copy as is
  ( ) Substitute
  "" Insert

Consider the following table that illustrates how the recognition and operation building blocks manipulate scanned data.

| Scanned Value	Size (length)	Recognition pattern	Operation	End Value
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

Creating a Scanned Data Editing Object

To create a Scanned Data Editing object, complete the following steps.

1. Using the PowerNet Twin Client Configuration Utility, select **Object Editors**, and then **Scanner Data Editing**. The PowerNet Scan Editor screen appears.

2. Enter a name for the object you are creating and click **Open**.

3. Define all of the necessary scanner maps, using the guidelines previously explained.

4. Select **File**, and then **Save As** and enter a name when prompted. Click **Save**. The PowerNet Twin Client Configuration tool then becomes active on the screen.

Linking a Scanned Data Editor to a Configuration

1. Using the PowerNet Twin Client configuration tool, select the Scanner tab.

2. Select the Scanned Data Editing object that you have just saved from the Data Editor Object pull-down list.

3. Click on the desired entry to link it to the PowerNet Twin Client configuration

4. Select **File**, and then **Save** to save your new configuration.

5. Later, when you download the configuration to the terminal, the object will be included.

Variable Length Operation
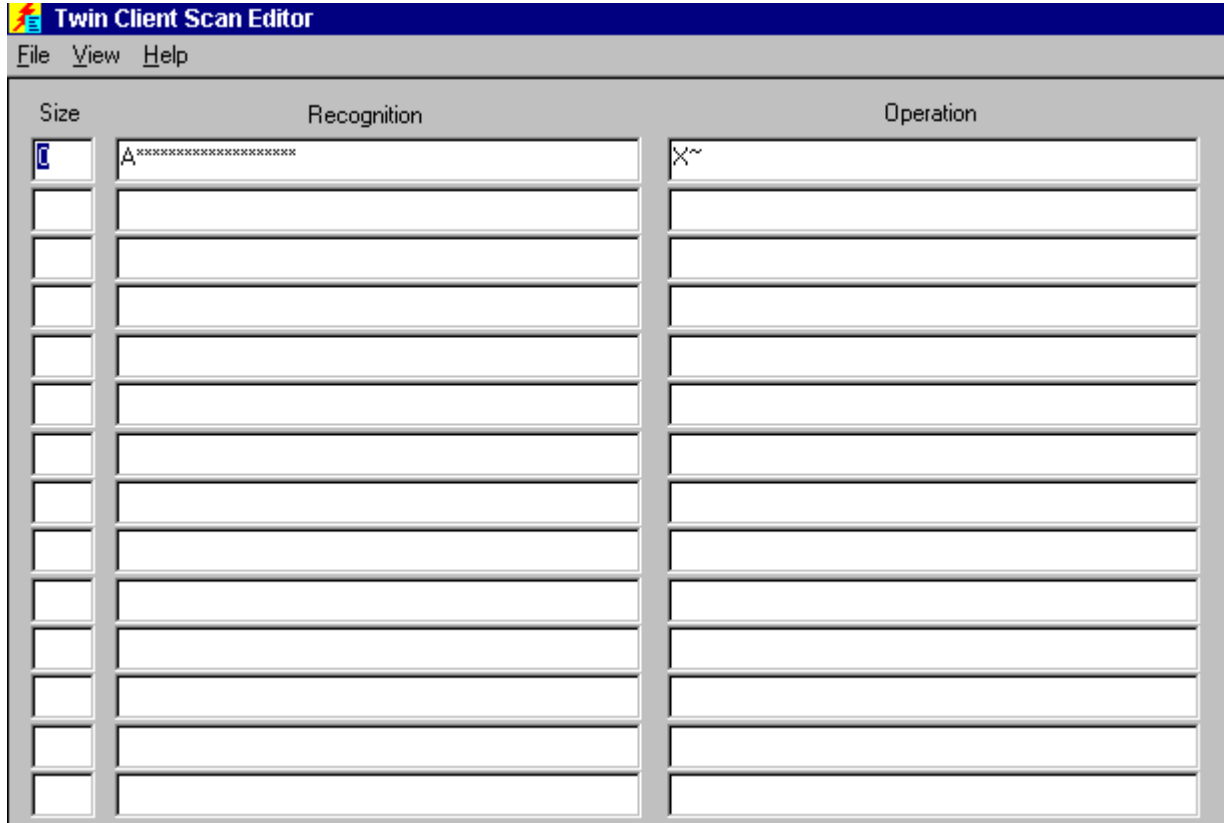
The scan editor allows operations to be done on variable length labels.

The variable length character is the ~ (tilde) and it must go into the operation side of the rule.

Rules:
1. The size must be set to zero.
2. The tilde must be in the operation side.

Example: This example will delete the first character from any bar code size that starts with any ALPHA character.

Scanner Decoder Control

The operation of the scan decoder can be modified with the Decoder Control object. Any of the supported barcodes can be enabled or disabled, and the characteristics of each barcode can be modified using the Decoder Control Editor shown below.

Extended command sequences for dynamic scan decoder control are described later in this section.

Creating a Decoder Control Object

To create a Scanned Decoder Control object, complete the following steps.

1. Using the PowerNet Twin Client Configuration Utility, select **Object Editors**, and then **Scanner Decoder Control**. The PowerNet Decoder Control screen appears.

2. Click to choose a manufacturer and terminal type from the pull-down lists.

3. Click on the desired bar code types in the Symbology window to enable or disable them.

4. Choose from the options associated with the selected bar code types.

5. Select **File**, and then **Save As** when you have completed the definition for your Scan Decoder Object.

6. Enter a name and click **Save**.

Linking a Decoder Control Object to a Configuration

1. Using the PowerNet Twin Client configuration tool, select the Scanner tab.

2. Select the object that you have just saved from the Decoder Control Object pull-down list.

3. Click on the desired entry to link it to the PowerNet Twin Client configuration.

4. Select **File**, and then **Save** to save your new configuration.

5. Later, when you download the configuration to the terminal, the object will be included.

Note: When the terminal session is started, PowerNet checks for the presence of a decoder control object. If the object exists, the first action taken is to disable all barcodes. This means that you must add command lines to turn back on all of the codes desired. If the file does not exist or does not contain any commands, then all barcodes are enabled.

Note: When turning a decoder on, Minlen, Maxlen, and Depend all default to zero. If the zero state is not wanted, add the modifying line.

Extended Commands

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

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

CODABAR Control

PowerNet TN Extended Command:

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

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

- Minlen: Minimum valid barcode length. Valid values are 1–54.
- Maxlen: Maximum valid barcode length. The maximum length must be greater than or equal to the minimum length. Valid values are 1–54.

CODE 11 Control

PowerNet TN Extended Command:

<ESC>[?11;<state>;<minlen>;<maxlen>;<depend>z

- State: Disable/enable code 11. 0=disabled, 1=enabled.
- Minlen: Minimum valid barcode length. Valid values are from 4 to 54.
- Maxlen: Maximum valid barcode length. The maximum length must be greater than or equal to the minimum length. Valid values are from 4 to 54.
- Depend: Number of check digit. Valid values are 0, 1 or 27.

CODE 128

PowerNet TN Extended Command:

<ESC>[?2;<state>;<minlen>;<maxlen>;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

PowerNet TN Extended Command:

<ESC>[?3;<state>;<minlen>;<maxlen>;<depend>z

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

CODE 49

PowerNet TN Extended Command:

<ESC>[?4;<state>;0;0;0z

- State: Disable/enable code 49 scanning. 0=disabled, 1=enabled.

CODE 93

PowerNet TN Extended Command:

<ESC>[?5;<state>;<minlen>;<maxlen>;0z

- State: Disable/enable code 93 scanning. 0=disabled, 1=enabled.
- Minlen: Minimum valid barcode length. Valid values are 1–54.
- Maxlen: Maximum valid barcode length. The maximum length must be greater than or equal to the minimum length. Valid values are 1–54.

D 2 of 5

PowerNet TN Extended Command:

     <ESC>[?6;<state>;<minlen>;<maxlen>;0z

- State: Disable/enable code 25. 0=disabled, 1=enabled.
- Minlen: Minimum valid barcode length Valid values range from 1–54.
- Maxlen: Maximum valid barcode length. The maximum length must be greater than or equal to the minimum length. Valid values range from 1–54.

INTERLEAVED 2 OF 5

PowerNet TN Extended Command:

     <ESC>[?7;<state>;<minlen>;<maxlen>;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.
- Maxlen: Maximum valid barcode length. The maximum length must be greater than or equal to the minimum length. Valid values range from 1–54.

EAN-13

PowerNet TN Extended Command:

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

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

EAN-8

PowerNet TN Extended Command:

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

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

PLESSEY/MSI

PowerNet TN Extended Command:

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

- State: Disable/enable code MSI scanning. 0=disabled, 1=enabled.
- Minlen: Minimum valid barcode length Valid values are from 4 to 54.
- Maxlen: Maximum valid barcode length. The maximum length must be greater than or equal to the minimum 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

PowerNet TN Extended Command:

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

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

UPC-E0

PowerNet TN Extended Command:

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

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

UPC-E1

PowerNet TN Extended Command:

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

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

Supplemental Barcode Handling (UPC/EAN) Options

PowerNet TN 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

PowerNet TN 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.

Determining Input Mode

The input mode parameter sent from the application controls (via the host application) decides whether the terminal accepts input from the keyboard, the scanner or both.

Sending this sequence to the terminal controls the characteristics of the input fields following.

The sequence used for this function is:

> <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.

Dynamic Keyed Input Data Control

The terminal keyboard input characters can be controlled dynamically, while the terminal is in session, by sending the extended command sequence to the terminal, as described in the following.

> <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)

# Designing Display Objects

Display Mapping

This feature of PowerNet Twin Client allows you to substitute characters so the terminal displays correctly, if a portion of the character sets between your terminal and your server are incompatible.

Display Mapping object files are constructed using the following syntax (pattern):

<character from host> = <character desired>, xlat;

where <character from host> is the character sent by the server, and <character desired> is the DOS character wanted on the terminal's screen. Each line ends with xlat and a semicolon.

Multiple character mapping definitions can be specified in a single file, however, each line containing a character definition must end with a semicolon.
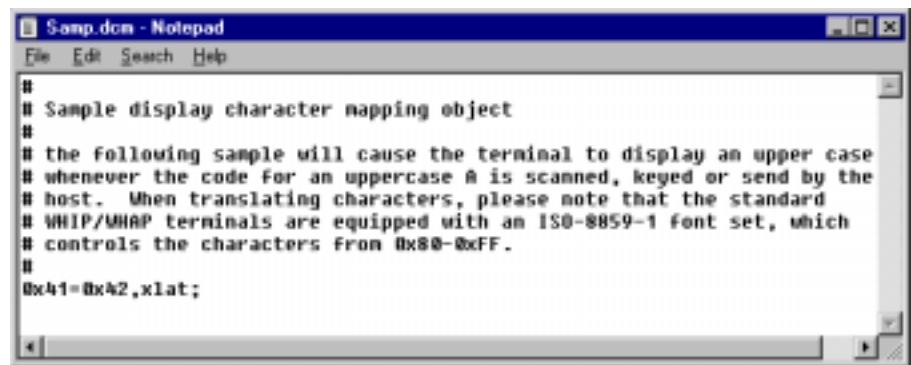
The sample display character mapping above shows an important concept worth noting: an explanation of the object mapping is put into the file to remove any later doubts of the value. The # in front of a line shows that it is a remark and will not show on the terminal's screen.

Creating a Display Mapping Object

When you are ready to create or edit your Display Mapping Object file, complete the following steps.

1. From the PowerNet TN Client Configuration utility screen, select **Object Editors**, and then **Display Mapping**. The Select Object Editor file screen appears.

2. Enter a name for the mapping object you are creating and click **Open**.

3. Click **Yes** when asked if you want to create a new file.

4. Define all of the necessary display macros, using the guidelines explained previously.

5. Select **File**, and then **Exit**. Click **Yes**, when prompted, to save the mapping object you have created.

Linking the Display Mapping Object to a Configuration

1. Using the PowerNet Twin Client Configuration Utility, select the **Display** configuration tab.

2. Select a macro object from the Mapping Object pull-down list.

3. Select **File**, and then **Save As** to save your PowerNet Twin Client configuration. Either choose an existing configuration file to attach the mapping object to, or enter a new name for a new configuration.

Later, when you download the configuration to the terminal using the PowerNet Twin Client Configuration utility, your display mapping file is included.

Display Formatting

See Chapter 6.

Designing Printer Objects

This feature of PowerNet Twin client gives you the capability of determining how the terminal's printer performs when it interacts with the host application.

Printer Initialization

This object editor allows you to download an initialization file for the printer that defines printer commands to be sent to the terminal immediately after the terminal establishes a session.

Note: The upper limit of print data is 1.5 K.

Creating a Printer Init Object

To create your Printer Init Object, complete the following steps.

1. Using the PowerNet Twin Client Configuration Utility, select **Object Editors**, and then **Printer Init**. The PowerNet Select Object Editor File screen appears.

2. Enter a name for the object you are creating and click **Open**.

3. Click **Yes** when asked if you want to create a new file.

4. Define the desired Printer macros, using the guidelines previously explained.

5. Select **File**, and then **Exit**. Click **Yes**, when prompted, to save the macro object you have created.

Linking a Printer Object to a Configuration

1. Using the PowerNet TN Client Configuration Utility, select the Printer tab.

2. Select the object that you have just saved from the Init Object pull-down list.

3. Select **File**, and then **Save As** to save your new configuration.

4. Later, when you download the configuration to the terminal, the object will be included.

Designing Dialog Objects

Dialog objects are often used to automate difficult or repetitive user interactions with the host application. You can create terminal screens, collect input, generate output, and make decisions based upon terminal keyboard or scanner input, and host application output. Dialog objects are executed automatically when a terminal session with the host is started.

Creating a Display Dialog Object

When you are ready to create your Display Dialog Object file, complete the following steps.

2. From the PowerNet TN Client Configuration utility screen, select **Object Editors**, and then **Dialog**. The dialog editor RFScript screen appears.
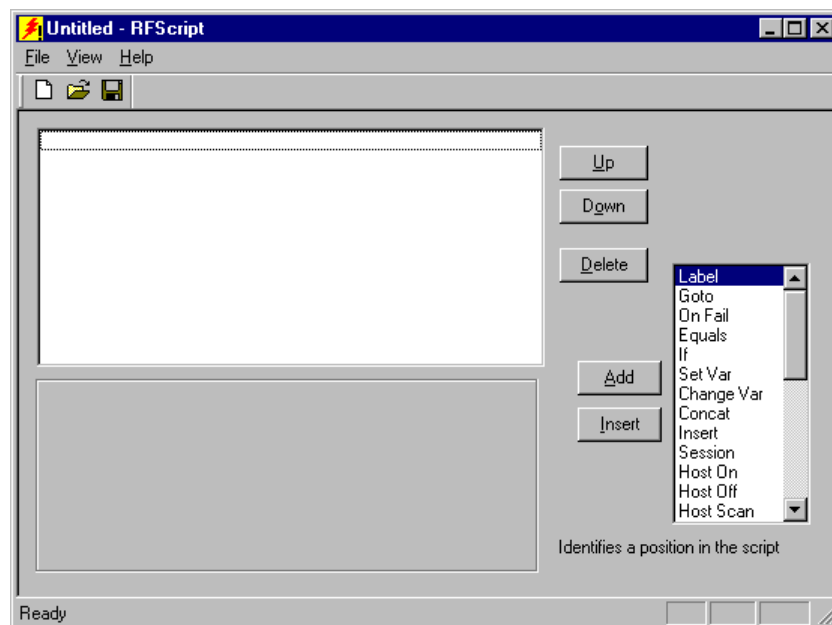
2. Commands in the scrolling window on the right can be added or inserted into the dialog object displayed on the left by clicking on the Add or Insert buttons.

3. The view of the object window can be adjusted by clicking on the Up and Down buttons, and commands can be deleted from the object by clicking on the Delete button.

Using Commands

Commands are used to take action within a program. They can be used to perform such actions as comparing variables, delaying execution of the script program, clearing a terminal screen, displaying data on the terminal screen, and sending information to the

host application. If a command requires arguments, the box at the bottom left prompts for the required information.

Following is the list of available commands.

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)
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.

Commands

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 normaLoglly $. This command is used only when the first character of a value used in one of the conditional branching commands begins with $.
Log	Writes a message to the terminal log.
Comment	Inserts documentation in the dialog object.

Screen Capture

See Chapter 6.

Advanced 3270 Keyboard Options

Clicking the Advanced button on the Keyboard tab brings up the Advanced 3270 Keyboard screen.

Attribute Key section

The keys in this section give you the ability to set up an automatic transmission of data once the field is filled.

Key

Specifies the key that is sent to the host following scanned or keyed input when the field matches the selected attribute setting, as specified in Scan Field and Key field, following. This option overrides all other automatic keystroke generation, except for Last Field processing. The default key setting of **noop** disables this function.

Scan Field

The default value is off. Available values for this field are **pen** (for lightpen), **num** (for numerical), **hi** (for highlighted) and **hal** for high intensity and lightpen.

Key Field

The default value is off. Available values for this field are **pen** (for lightpen), **num** (for numerical), **hi** (for highlighted) and **hal** for high intensity and lightpen.

Last Field Keys section

The keys in this section specify the keybstrokes automatically generated following scanned input, or keyed input that fills the field, when the field is the last field on the host screen. This option overrides all other automatic keystroke generation when these conditions are met.

Scanned Input

Specifies the keystroke automatically generated if input is scanned into the last field. The default value is **noop**, which disables this function.

Keyed Input

Specifies the keystroke automatically generated if input is keyed into the last field, and the field is filled. The default value is **noop**, which disables this function.

Multiple Fields

Specifies that last field key processing takes place only if the host display contains more than one input field and the conditions for keyed or scanned input are met.

Key Wrap

Check this box to enable long input strings to wrap to the next input field.

Advanced Display Options for VT/HP

Used only with VT100, VT220, and HP700, this mask, or screen, applies to reverse video to choose which attributes should be used for input.
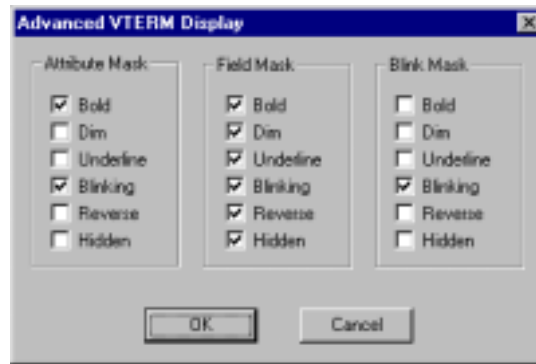
Attribute Mask

Click to choose the video attributes to be recognized by the emulator and displayed on the terminal screen. Note that the blinking attribute will always display in **bold** on the terminal.

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 because 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

Click to choose the characteristics of an incoming video field that will cause it to be displayed in blinking text on the terminal screen. Note that the blinking attribute is always converted to **bold** on the terminal display.

Chapter 5 • New Environ Telnet Extension

Creating Named Variables

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.
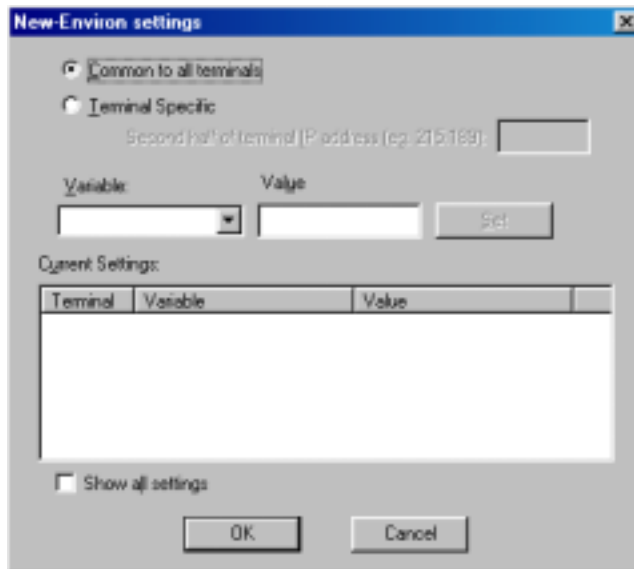
Creating Common Settings

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 Settings

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

TN3270E Negotiation

The following defines the TN3270E negotiation, permitting the transfer of some of the TN3270E Sub-negotiation variables such as **Lunames** from the Telnet terminal to the host during session initialization.

Note: This pertains to 3270 emulation.

TN3270E is implemented on OpenAir Linux using two text files located in the working directory (refer to /etc/.CRF/WORKDIR). The **tnenvcom.cf** file allows for the definition of variables that will be shared by all devices, and the **tnenv.cf** file allows for the definition of terminal-specific variables. These files are currently created and maintained with the system editor.

Line Entry Format, **tnenvcom.cf**:

VARIABLE=VALUE;

Example *__DEVTYP=IBM-3278-2;*CONNECT=RFZ81;__

This will assign all terminals the luname of RFZ81.

Line Entry format, **tnenv.cf**:

IDENT:VARIABLE=VALUE;[VARIABLE=VALUE]…!

Where IDENT is either the last two octets of the terminal's IP address, or the three digit Spectrum address (065-511). Multiple variables can be defined, separated by semicolons. The entry is terminated with an exclamation.

Example file:

#IP terminals fully qualified octets 7 characters:

010.031:*DEVTYPE=IBM-3278-2;*CONNECT=RF3278.001;!

010.032:*DEVTYPE=IBM-3278-2;*CONNECT=RF3278.002;!

This will assign the terminal with an IP address of xxx.yyy.010.031 a device type of IBM-3278-2 to the luname of RF3278.001.

New Environ Negotiation

The following defines the New Environ negotiation, permitting the transfer of environmental variables from the Telnet terminal to the host during session initialization.

Note: This pertains to the 5250 and VT emulations.

New Environ is implemented on OpenAir Linux using two text files located in the working directory (refer to /etc/.CRF/WORKDIR). The **tnenvcom.cf** file allows for the definition of variables that will be shared by all devices, and the **tnenv.cf** file allows for the definition of terminal-specific variables. These files are currently created and maintained with the system editor.

Line Entry Format, **tnenvcom.cf**:

VARIABLE=VALUE;

Line Entry format, **tnenv.cf**:

IDENT:VARIABLE=VALUE;[VARIABLE=VALUE]…!

Where IDENT is either the last two octets of the terminal's IP address, or the three digit Spectrum address (065-511). Multiple variables can be defined, separated by semi-colons. The entry is terminated with an exclamation.

Example file:

#IP terminals fully qualified octets 7 characters:

010.031:DEVNAME=RF5291.001;!

#Spectrum ONE fully qualified radio ID 3 characters

065:DEVNAME=RF5291.002;!

Chapter 6 • 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 an optional feature, used with the OpenAir server when the Twin Client is operating in the Server 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 Twin Client 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 Manager**, and then on the **Settings** menu, as shown below.
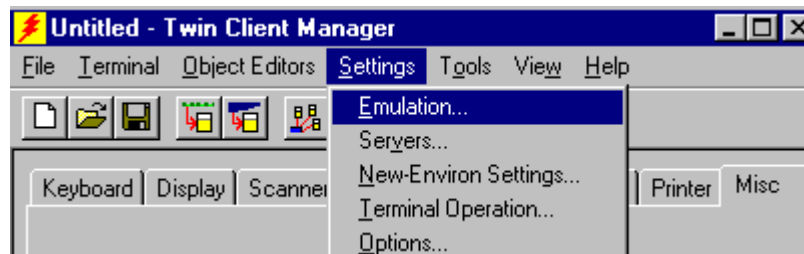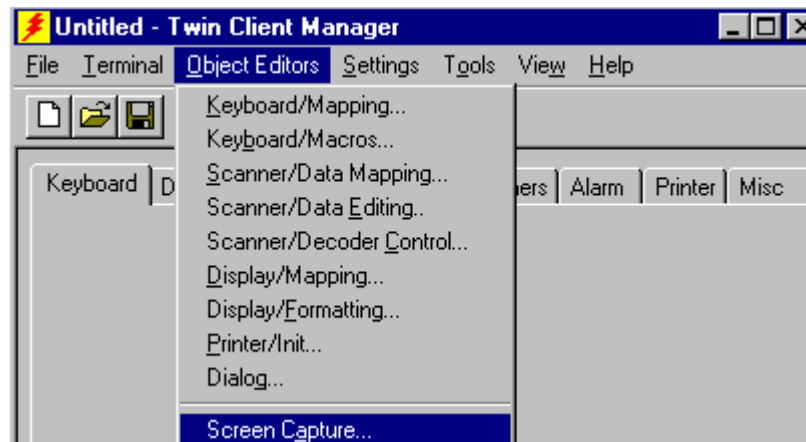

Click on **Emulation** and select an emulator from the list below.
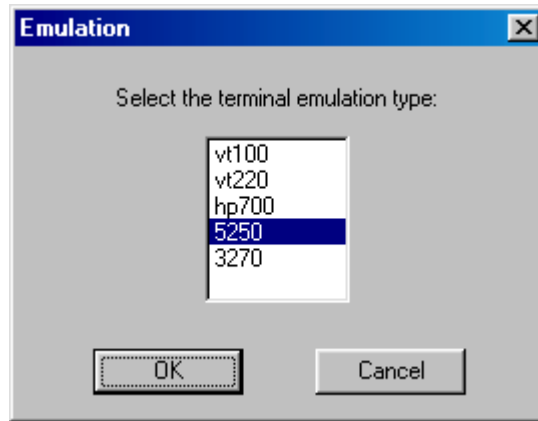
Then click on **OK** to return to the main Twin Client menu.

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.
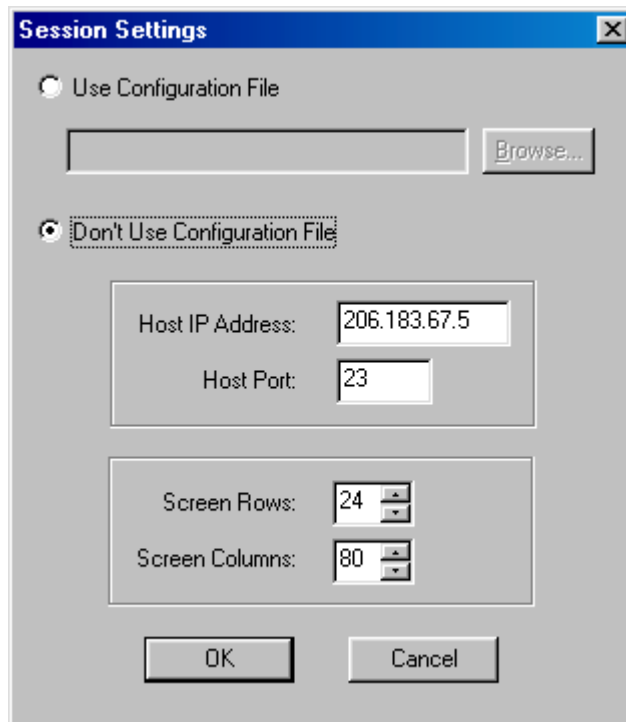
To start a Telnet session with the host, click on the [icon] toolbar icon, or click on the **Session** menu and then on **Connect**. In this example, the 5250 emulator is used and the host system is an IBM AS/400.
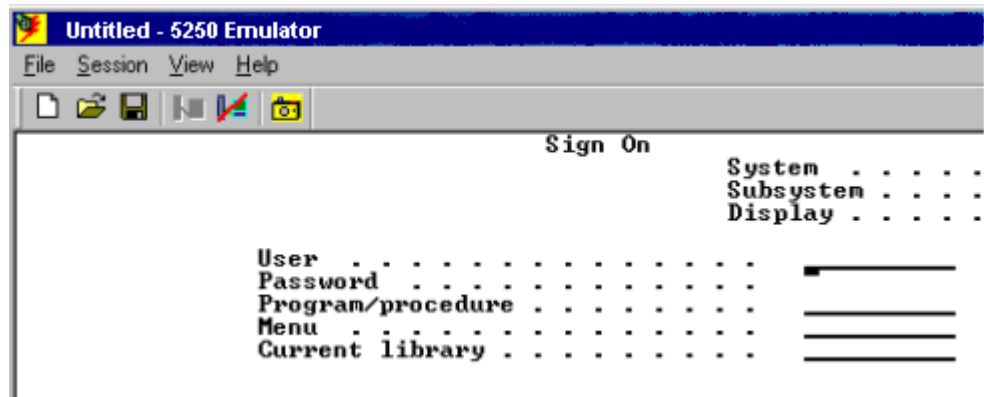
The host application displays are now ready to be captured.

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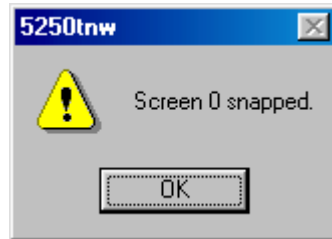
Click on **OK** and continue to navigate the host application, taking snapshots of the screens to be formatted.

Saving the Screen File

Save the snapshots at any time by clicking on the 💾 toolbar icon. Alternately, click on **File** and then **Save As**. The following window is displayed for entering the filename.
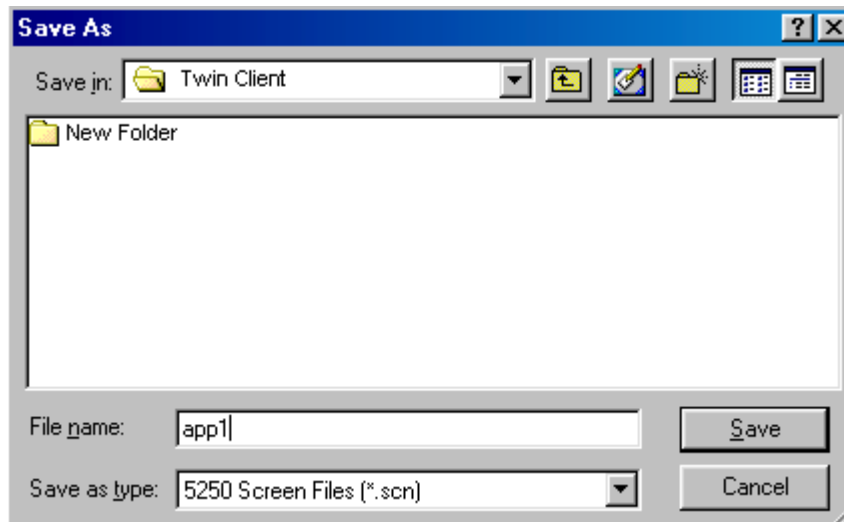
For this example, the filename is set to app1. Then click on the **Save** button to return to the emulator.

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.
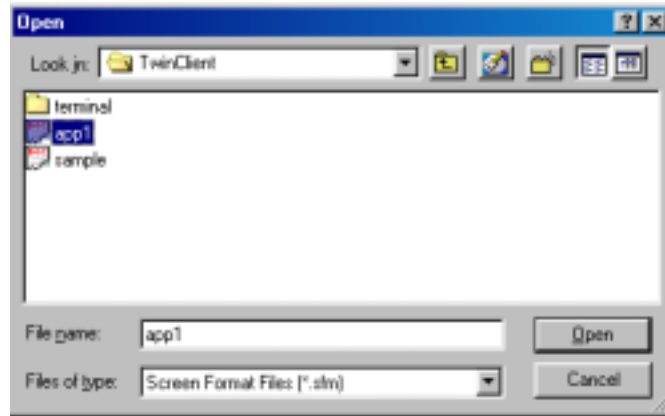
Starting the Formatter

The formatter is started from the Twin Client Manager menu. Start the Twin Client Manager by clicking on, **Start**, **Programs**, **PowerNet**, and **Twin Client Manager**. Then click on **Object Editors**, as shown below.
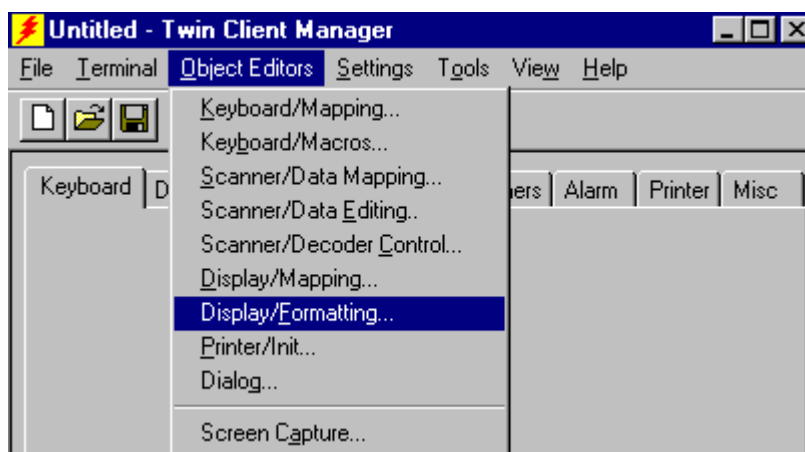
Click on the **Display/Formatting** option and the formatter window is displayed. To open the screen file, click on **File**.
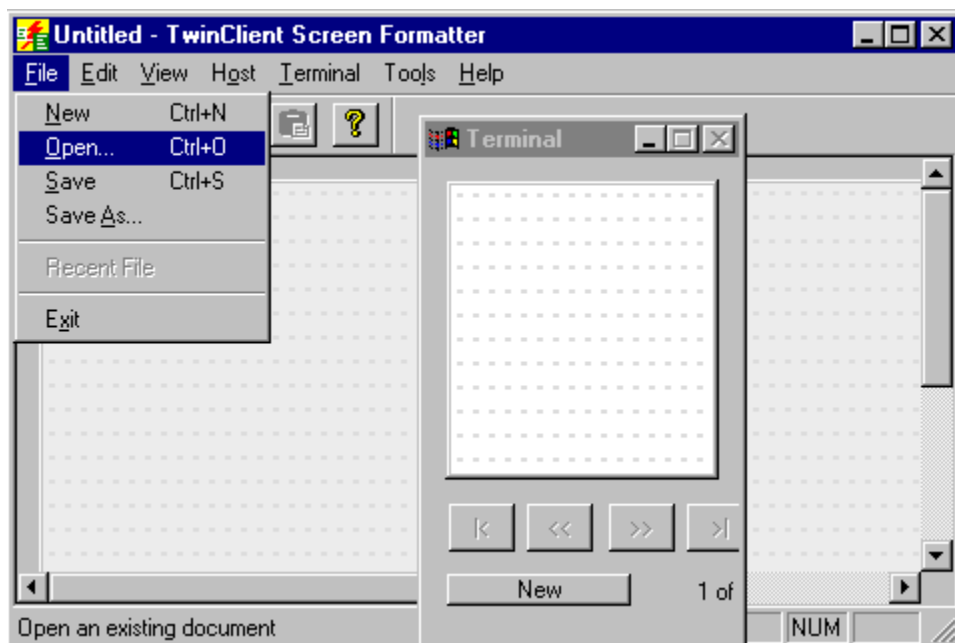

Then click on **Open**, and click on the screen filename.

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 drag it to a different area of the host screen.
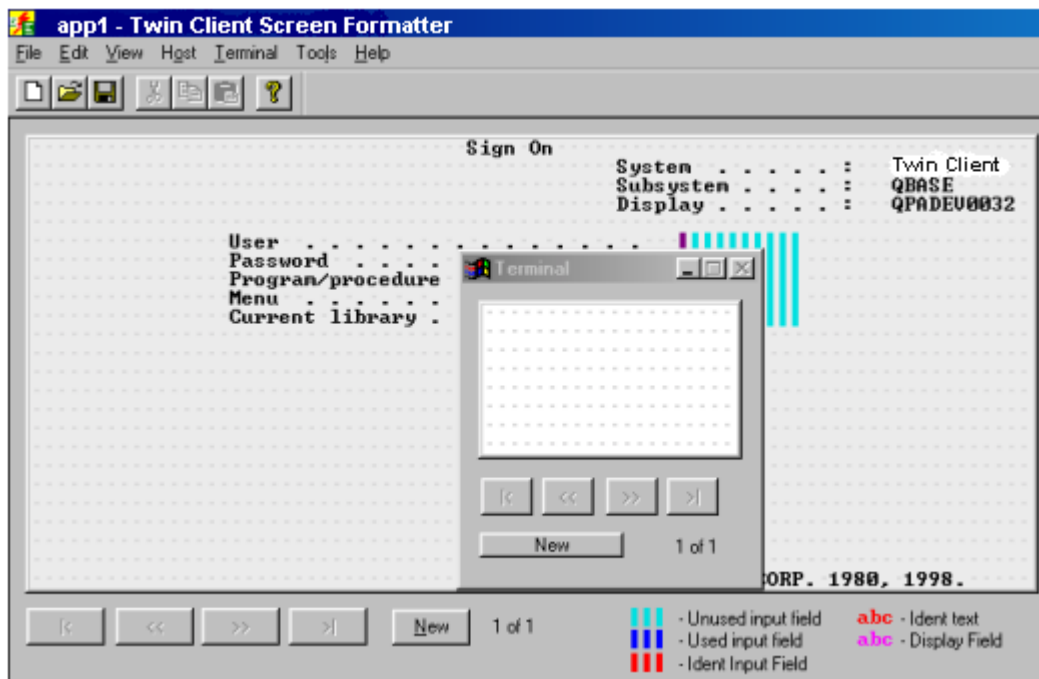
Setting Up the Formatter

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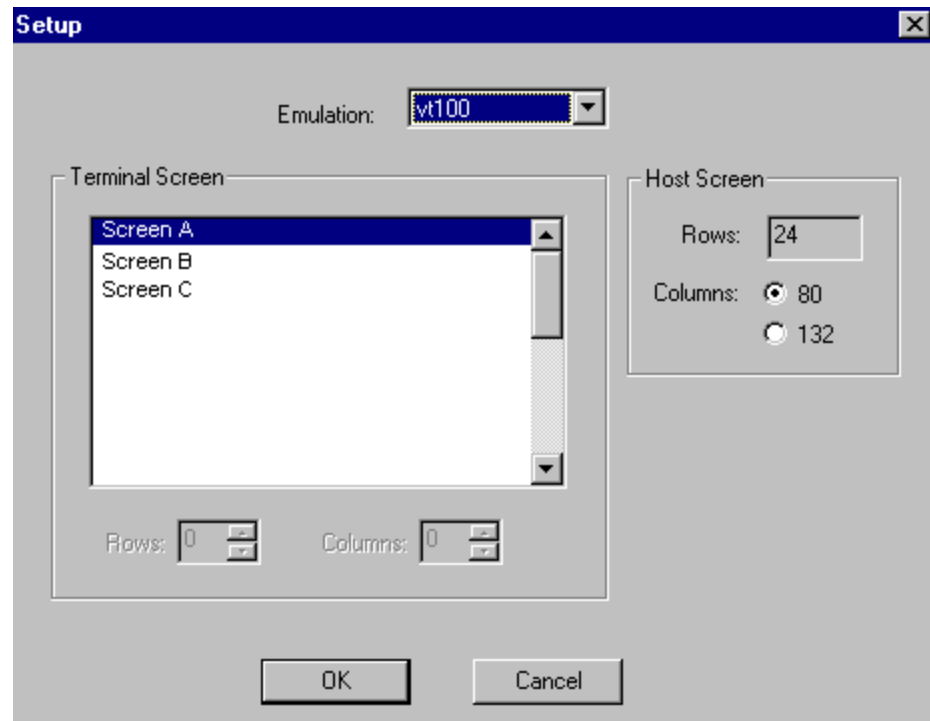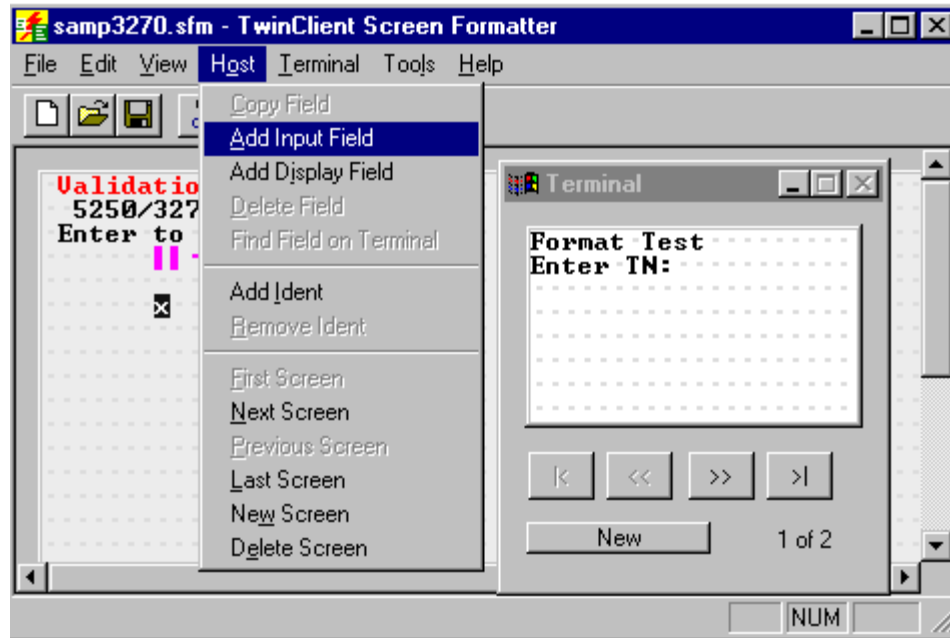
Click on the desired terminal display size, and also ensure that the host screen size is set correctly. Then click on **OK** to return to the formatter.

Copying an Input Field

An input field is 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 an Input Field

To add an input field, create text in the screen formatter window, highlight it, and chose **Add Input Field** from the **Host** menu. The input filed added in the example below is a lower-case letter "**x**".

Adding and Copying Variable Display Text

Variable 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, **variable text**) as shown below.

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. Then, right-click on the text to be copied. This text will be highlighted as shown by the words "**variable text**" copied below. Then drag the highlighted text to the desired position in the terminal display and release the mouse button.
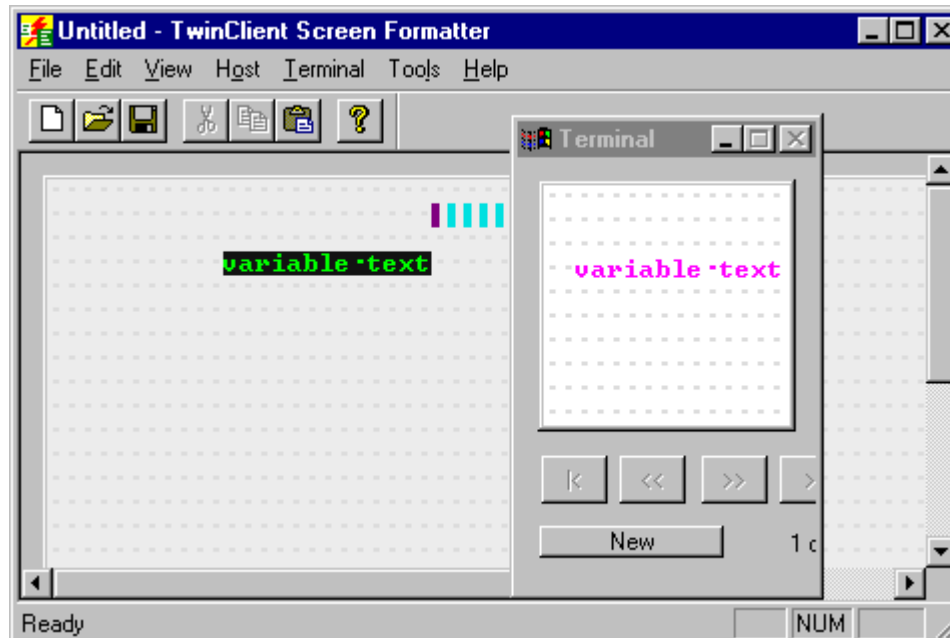
Deleting a Field

Select the text to be deleted by highlighting it, and choose **Delete Field** from the **Host** menu.
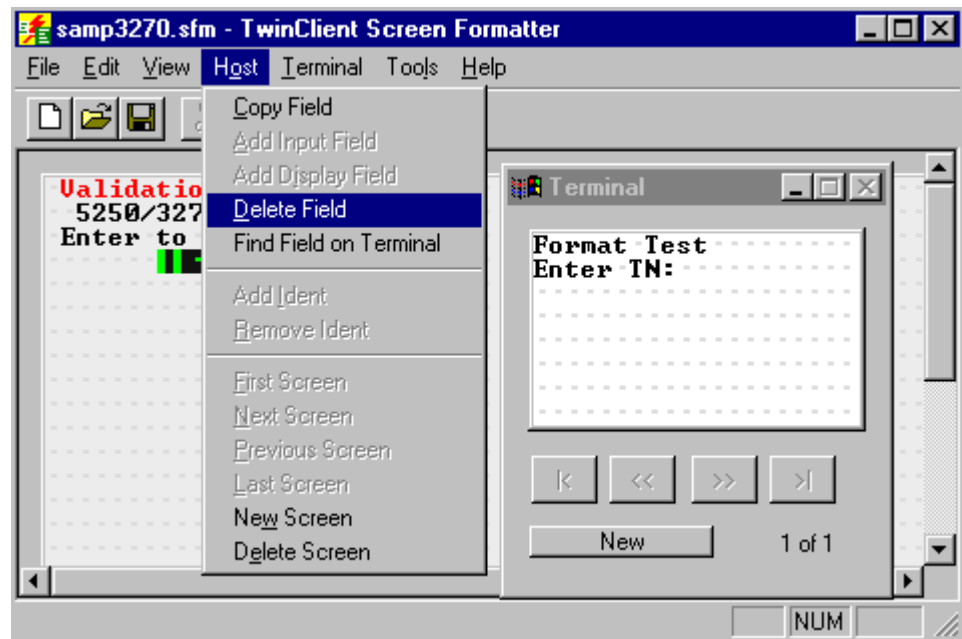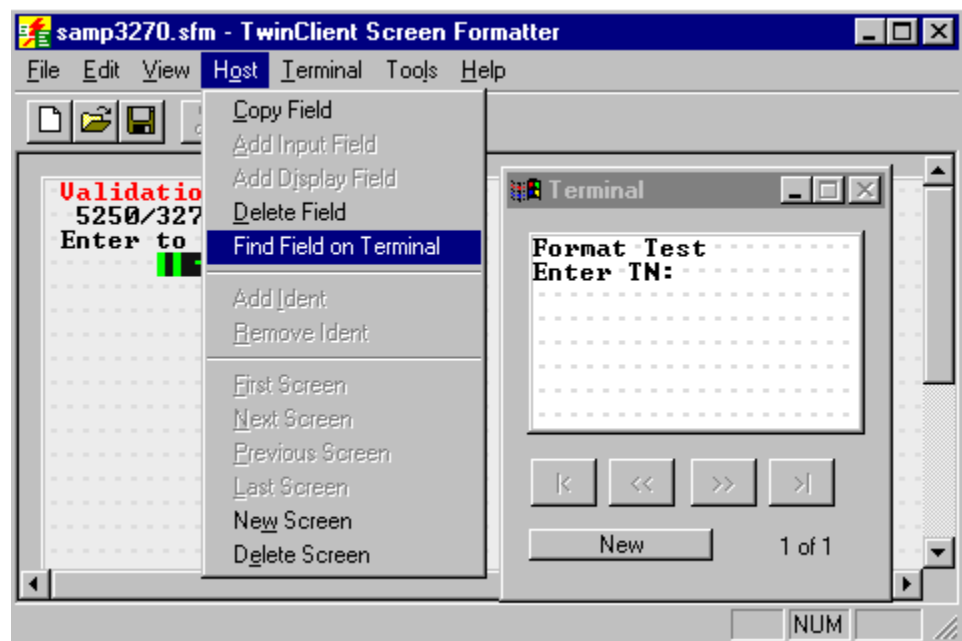

Finding a Field on the Terminal

To find a field on the terminal, and choose **Find Field on Terminal** from the **Host** menu.

Adding an Ident

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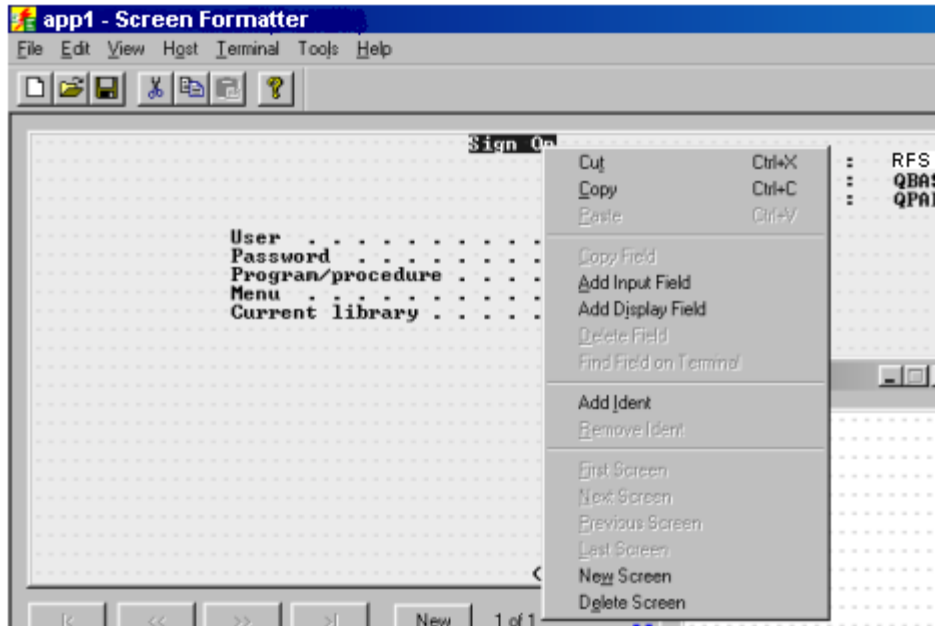
From the pull down menu, click on **Add Ident**. The highlighted field is now colored red on the host display, indicating that it is an Ident field. Up to 32 items can be highlighted on each host screen, so if a number of screens share similar features, they can be uniquely identified by adding more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

Removing an Ident

Remove an Ident field by highlighting it, and then selecting **Remove Ident** from the **Host** menu.
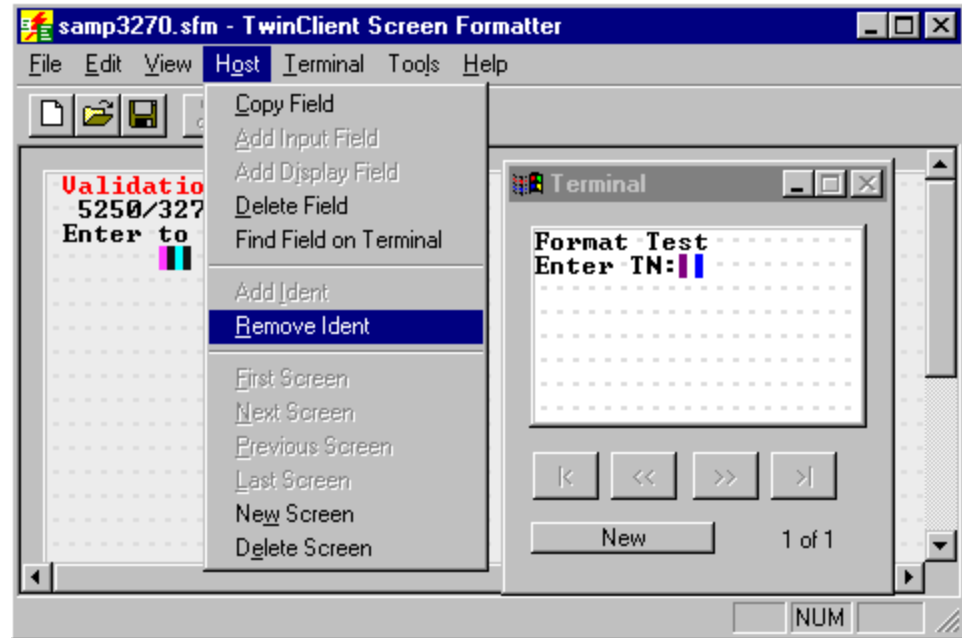
Navigating the Screen Formatter

To move to the first screen in the screen formatter, choose **First Screen** from the **Host** menu.
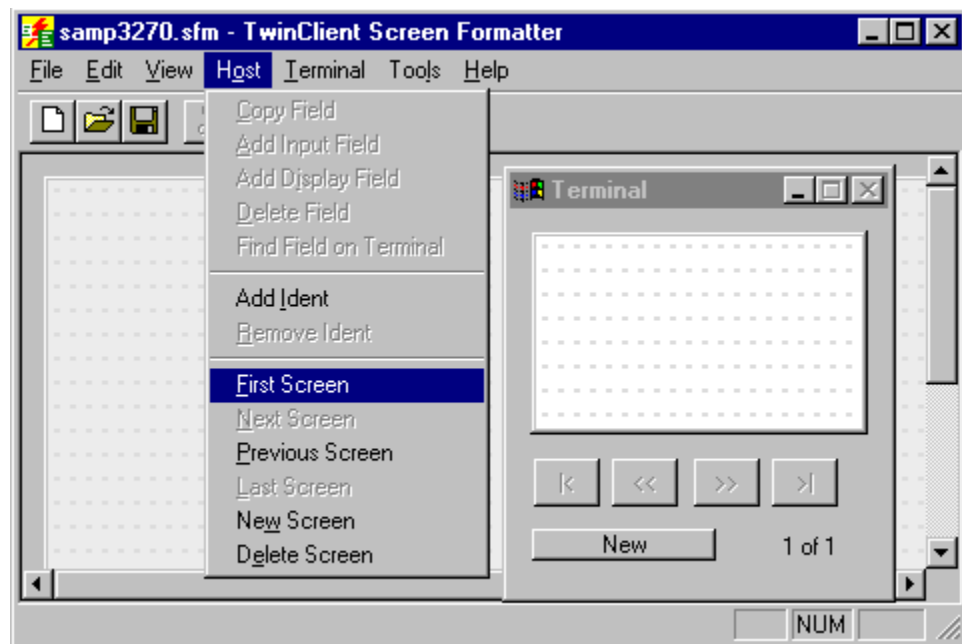
To move to the next screen, select **Next Screen** from the **Host** menu.
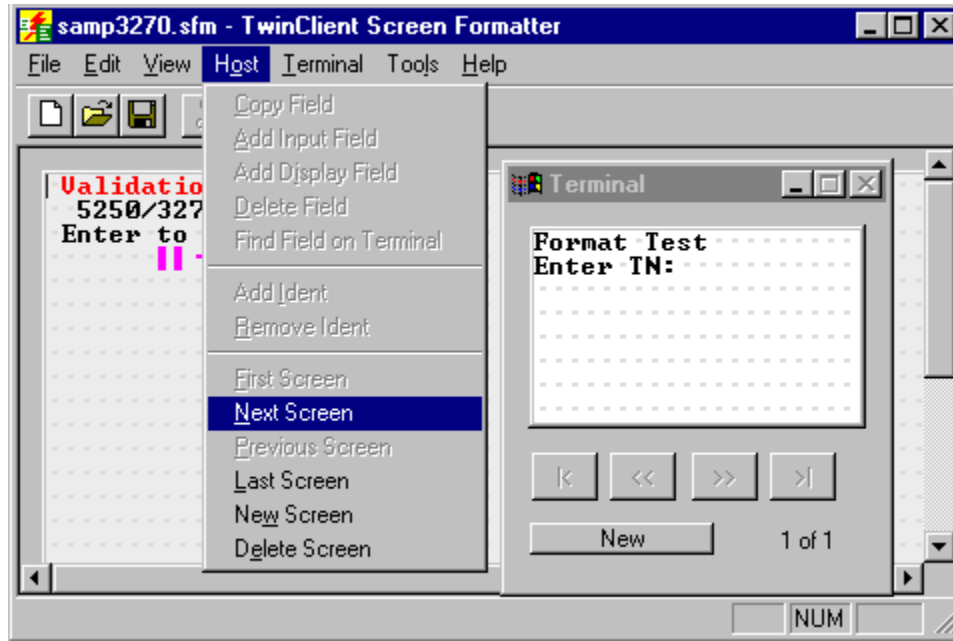
To move to the previous screen, select **Previous Screen** from the **H<u>o</u>st** menu.
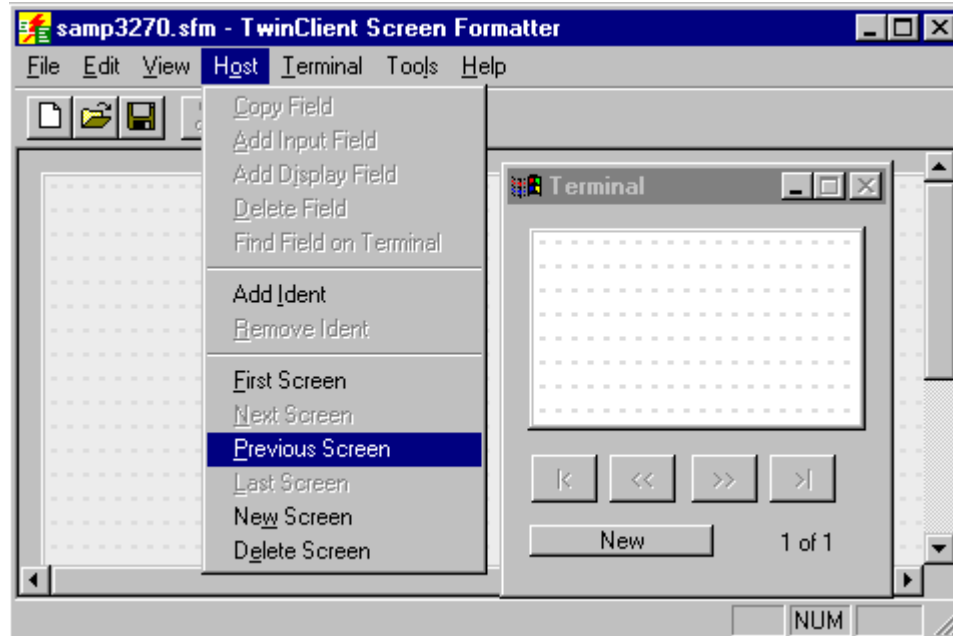
To move to the last screen, select **Last Screen** from the **H<u>o</u>st** menu.
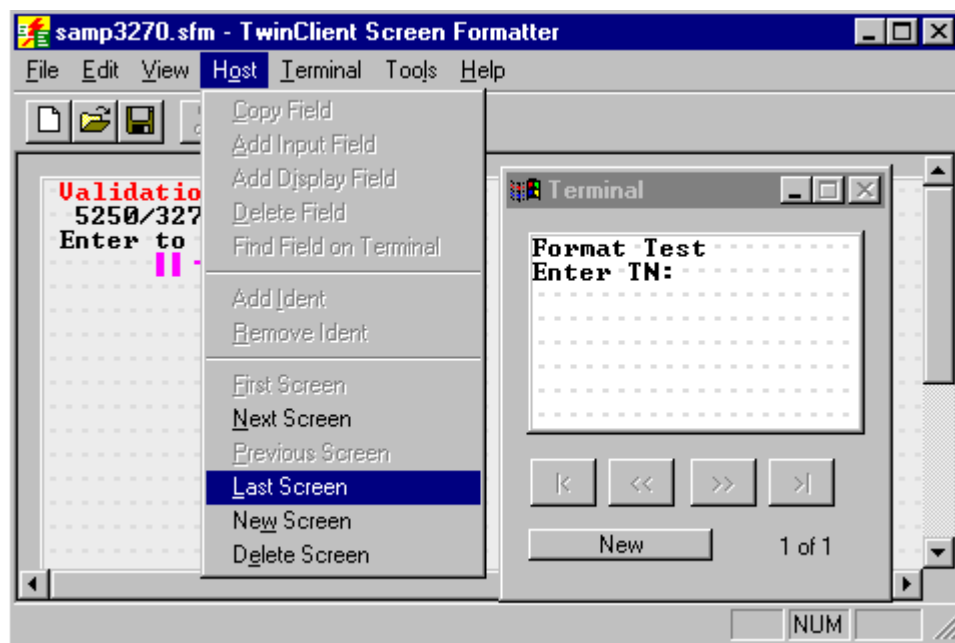
Adding a Terminal Screen

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.

Deleting a Screen

To delete a screen, select **Delete Screen** from the **Host** menu.
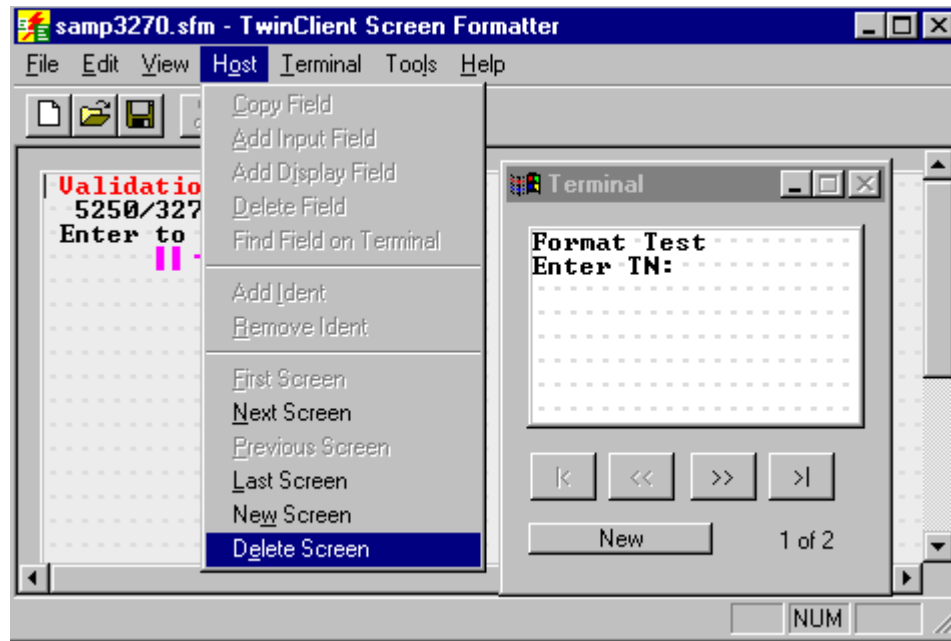
Saving the Formatter Object

The formatter object is saved by clicking on the ![icon] 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.
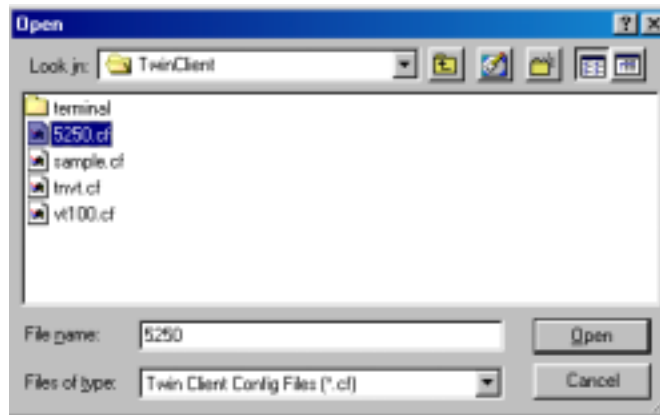
Then click on the advanced view **Display** tab, pull down the Display Formatter Object scrolling list box, and click on the object.
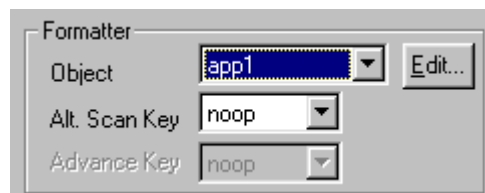
Save the newly modified terminal configuration using the 🖫 toolbar icon, or click on **File** and then **Save**. The new configuration, incorporating the formatter object, is updated on the terminal, automatically, by cold booting the terminal.

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Chapter 7 • TN Plus Features

The following features belong to Release 7.0. These features, like the Formatter feature, are also optional as add-ons.

Under **Tools** in Twin Client Manager are the Screen Watcher, Terminal Messenger, and RF Monitor features.

Note: The terminal may or may not be able to utilize the Screen Watcher or Terminal Messenger features depending on its authorization codes.

Select **Screen Watcher**, enter the terminal's IP address, and click on **OK**.
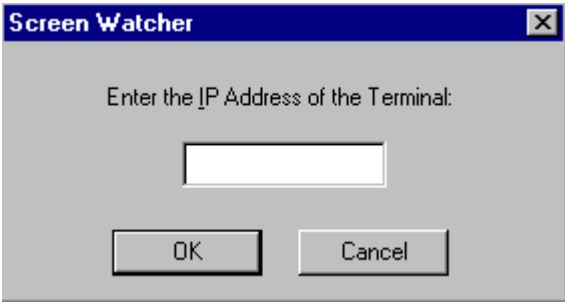
A screen will appear with a display resembling the terminal screen.
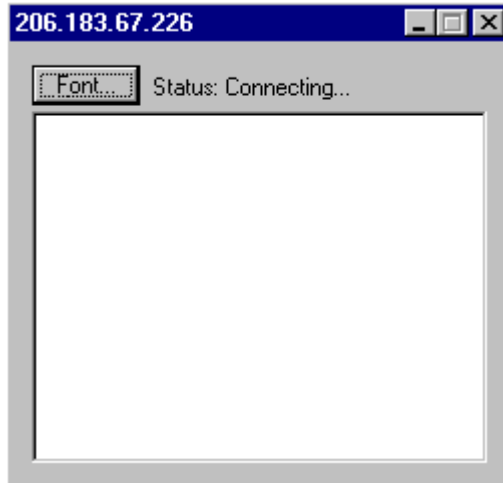
Clicking on the **Font** button on the upper left brings up a screen in which you can modify the font settings, as shown below.
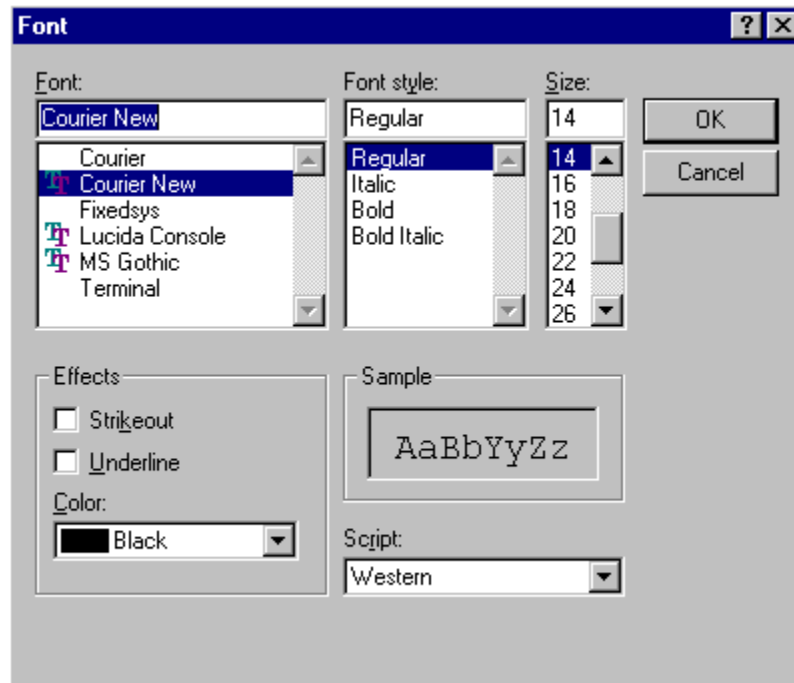
Select **Terminal Messenger** from the **Tools** menu.

You may enter an Address Range in the **From** and **To** boxes on this screen. Click on **Add** when finished.

Enter a message to send in the space provided, select the terminal to receive this message by clicking on it in the **Select Terminal(s)** column, and click on the **Send** button to send the message of your choice to the terminal of your choice.

See the example of the Terminal Messenger screen below.

Terminal Messenger ☒

Enter the message to send:

```
[                                                    ]
```

Select Terminal(s):

```
┌──────────────┐   ┌─Address Range───────────────────┐
│              │   │                                  │
│              │   │ From: [          ]   To: [      ] │
│              │   │                                  │
│              │   │          [   Add   ]             │
│              │   └──────────────────────────────────┘
│              │
│              │      [  Remove  ]      [  Select All  ]
│              │
│              │      [ Remove All ]    [ Unselect All ]
│              │
│              │   Use Ctrl and Shift keys to select multiple terminals
└──────────────┘
```

[Send   ]   [Close   ]

To remove a terminal from the list of terminals receiving your message, click on the
terminal number in the **Select Terminal(s)** column, and click on the **Remove** button.
Click on the appropriate button, **Remove All**, **Select All**, or **Unselect All**, to remove all
terminals, select all terminals, or unselect all terminals from the **Select Terminal(s)** list.

Note: Use the **Ctrl** and **Shift** keys to select multiple terminals.

Click on the **Close** button when finished.

Select **RF Monitor** from the **Tools** menu.

```
┌─────────────────────────────────────────────────────────────────────┐
│ ⚡ Untitled - RFMonitor                                    _ □ ×      │
├─────────────────────────────────────────────────────────────────────┤
│ File  Edit  Actions  Tools  View  Help                                │
├─────────────────────────────────────────────────────────────────────┤
│ |                                                                     │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│ Ready                                               │   NUM │         │
└─────────────────────────────────────────────────────────────────────┘
```
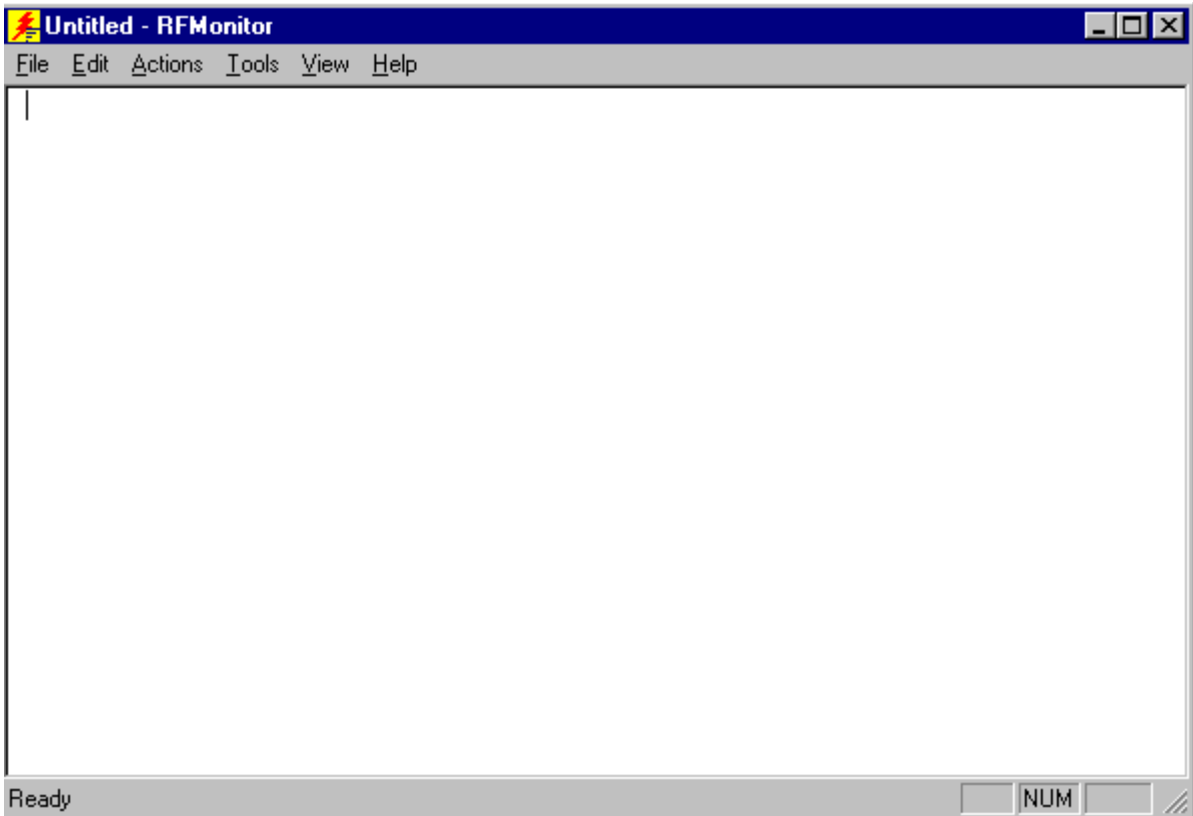
Click on **File** to Select Terminal or to Exit.

```
┌─────────────────────────────────────────────────────────────────────┐
│ ⚡ Untitled - RFMonitor                                    _ □ ×      │
├─────────────────────────────────────────────────────────────────────┤
│ File  Edit  Actions  Tools  View  Help                                │
├──────────────────┬────────────────────────────────────────────────   │
│ Select Terminal...│                                                   │
│ Exit             │                                                    │
└──────────────────┴                                                    │
```
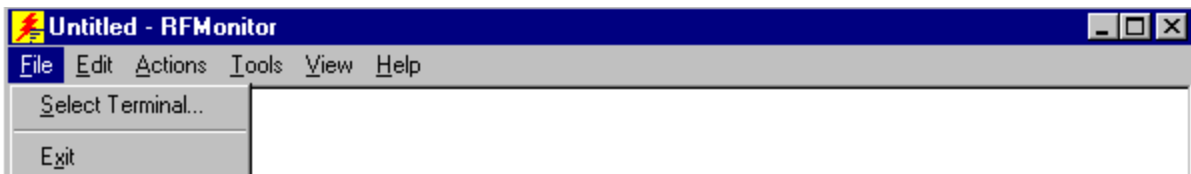
Choosing **Select Terminal** allows you to view a log of the terminal's activity. Enter the Terminal IP address and Terminal IP Port, and click on **OK**.

```
┌────────────────────────────────────────────┐
│ Select Terminal                        ×    │
├────────────────────────────────────────────┤
│                                             │
│  Terminal IP Address:  [207.241.78.130]     │
│                                             │
│  Terminal IP Port:  [1802]                  │
│                                             │
│       [   OK   ]        [  Cancel  ]        │
│                                             │
└────────────────────────────────────────────┘
```
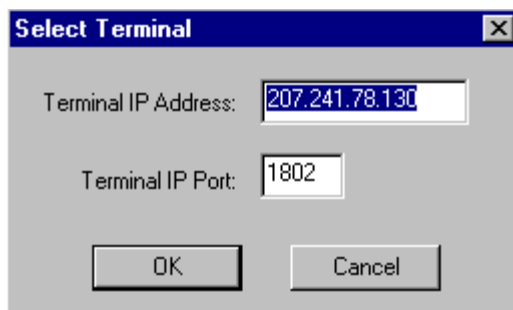
Click on **Edit**. Select Find, and/or Find Next to search for pieces of information in your log, or select Clear to clear the search.
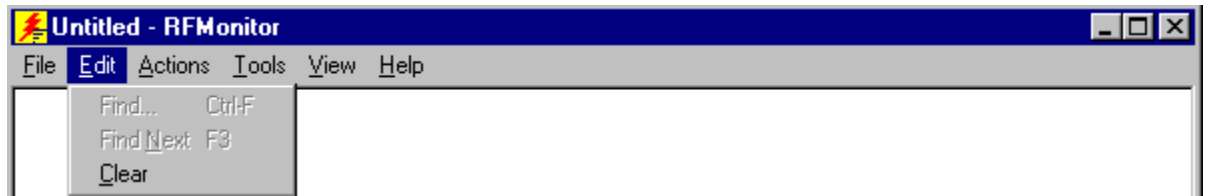
Click on **Actions** to Start the Monitor or Stop the Monitor.
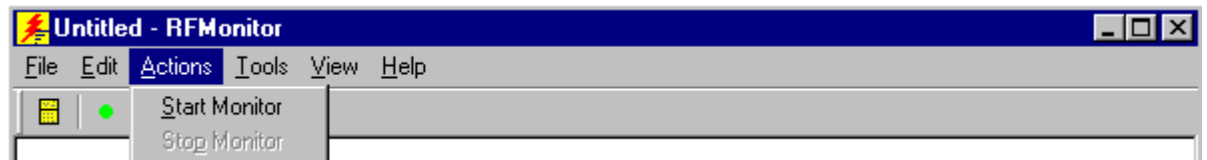
Click on **Tools** to set Debug Levels or Settings.
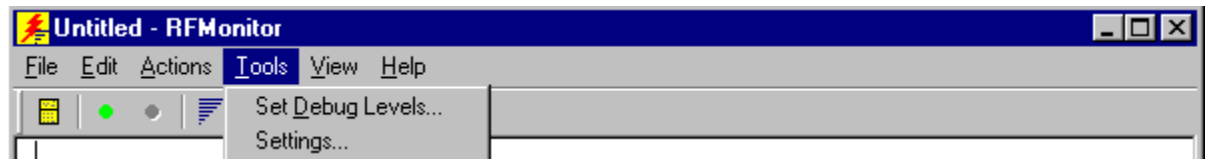
The options in Debug Levels are shown below.
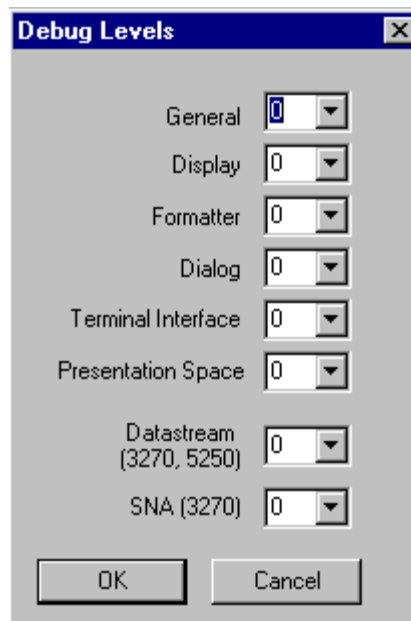
The maximum log file size can be set under Settings.

Settings

Maximum log file size (KB) : 250

OK   Cancel
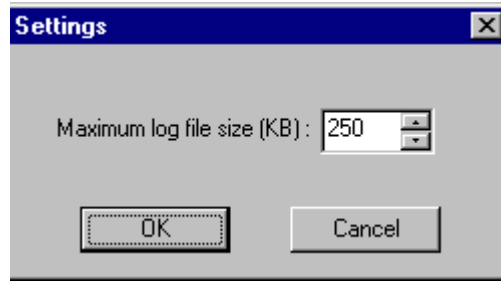
Click on **View** to show or hide the Toolbar and the Status Bar.

Untitled - RFMonitor

File Edit Actions Tools View Help
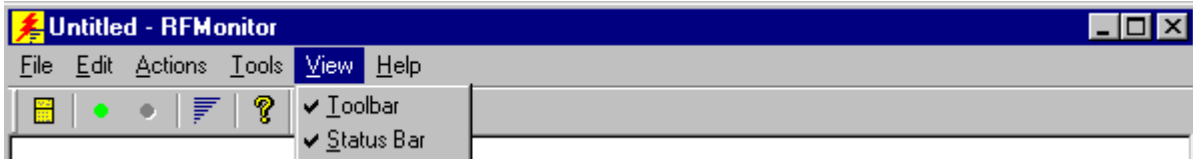
✔ Toolbar
✔ Status Bar

This is the Toolbar. It is found near the top of the screen.

This is the Status Bar. It is found at the bottom of the screen.

Ready   NUM
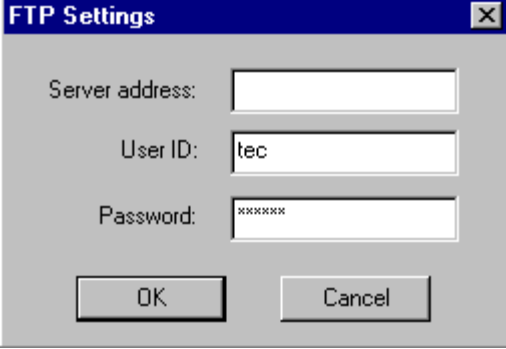
Click on **Help** to bring up the following screen.

About Twin Client Manager

Twin Client Manager
Version 7.0.0
Copyright (C) 2003, Connect, Inc.

OK

From the **Tools** menu, select **Server Transfer**.

Untitled - Twin Client Manager

File Terminal Object Editors Settings Tools View Help

Authorization...

Airloader...
Screen Watcher...
Terminal Messenger...
RF Monitor...

Server Transfer...
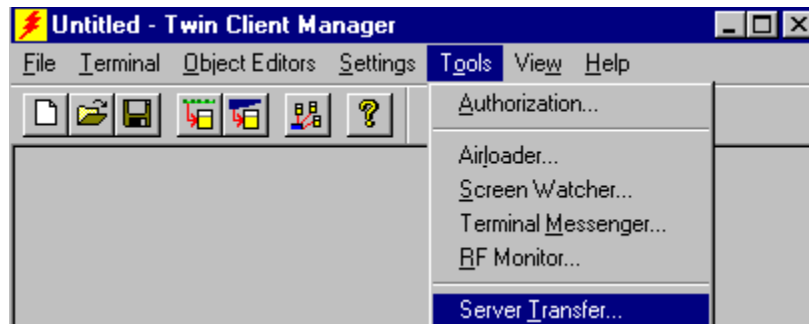
The FTP Settings screen appears.

FTP Settings ☒

Server address: [   ]

User ID: [tec   ]

Password: [******   ]

[OK]   [Cancel]

To send object editor and configuration files from Windows to your Linux box, enter your server address, and click on **OK**.

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Chapter 8 • Printer Support

Introduction

This chapter describes printing in each of the emulation modes, with an example of printing using VTerm in VT-220 emulation mode.

Printing under IBM 3270 & 5250 Emulation

General

The appearance of a Flag Byte at a specific Flag Row and Flag Column position in the screen causes the handler on the NCU to take all characters after the flag byte, up to the next appearance of the flag byte, and send them to the printer on the terminal.

After the printer data has been sent, the handler sends the specified Response Key to the host application. At this point, the host application must clear the printer data from the 3270 screen, or replace it with the next set of printer data.

For the purpose of initializing a printer and for testing print data, an Init File text file can be placed on the NCU in the **/crf** directory. The contents of this file will be transmitted to the terminal when the RF terminal attaches to the IBM handler on the NCU.

IBM Handler Configuration

1. Refer to the "Printer" section on Page 1 of the 3270 and 5250 Handler setup screen.

2. Set the printer type as appropriate.

3. Set the decimal value of the ASCII-converted "Flag Byte" to be used by the host application.

4. Set the zero-based row and column for the Flag Byte. For example, a host 3270 application set for row 1, column 1 is Flag Row 0, Flag Column 0 within the handler setup.

5. Set the Response Key that signals the application to either remove or replace the print data from the screen.

6. In the event the printer requires initialization data and/or the actual print data must be tested for validity, enter the name of the file in the **Init File** field.

Printing under VTERM VT100/220 Emulation

To output data to the RS-232 port on the terminal under VT100/220 emulation, your application must call the Media Copy (MC) feature of the VT-220 device. This uses the following escape sequence:

ESC [5i All data following this escape sequence will be output to the terminal RS232 port until the escape sequence **ESC [4i** is reached.

VTerm Handler Configuration

1. Refer to the "Printer" section on Page 1 of the VTerm Handler setup screen.

2. Set the printer type as appropriate.

3. In the event the printer requires initialization data, and/or the actual print data must be tested for validity, enter the name of the file in the "Init File" field.

Example of printing under VTerm/VT220 Emulation

The following is an example taken from several traces of a print sequence on a VTerm/TIP system.

Here is the rfvt log. Note that the label print operation is started by the command **ESC[5i**.

```
11/13 07:14:37    0ms RCV AP DATA: 240 bytes (240 total)
08 1B 5B 4B 20 20 1B 5B 35 69 0A 4E 0A 44 36 0A    ..[K...
[5i.N.D6.      (Print start cmd is 'ESC[5i')
53 31 0A 5A 54 0A 41 37 35 30 2C 31 31 35 30 2C    S1.ZT.A750,1150,
32 2C 34 2C 31 2C 31 2C 4E 2C 22 45 6C 69 64 61    2,4,1,1,N,"Elida
20 47 69 62 62 73 20 55 6E 69 6C 65 76 65 72 20     Gibbs.Unilever.
49 54 22 0A 41 31 37 30 2C 31 31 35 30 2C 32 2C    IT".A170,1150,2,
32 2C 32 2C 32 2C 4E 2C 22 49 4E 54 45 52 49 22    2,2,2,N,"INTERI"
0A 41 35 32 30 2C 31 31 30 30 2C 32 2C 33 2C 32    .A520,1100,2,3,2
2C 32 2C 4E 2C 22 45 53 50 52 45 53 53 22 0A 41    ,2,N,"ESPRESS".A
35 38 30 2C 31 30 33 30 2C 32 2C 35 2C 36 2C 36    580,1030,2,5,6,6
2C 4E 2C 22 43 5A 22 0A 41 37 35 30 2C 36 35 30    ,N,"CZ".A750,650
2C 32 2C 32 2C 31 2C 31 2C 4E 2C 22 44 61 74 61    ,2,2,1,1,N,"Data
20 46 61 74 74 2E 3A 22 0A 41 36 30 30 2C 36 35     Fatt.:".A600,65
30 2C 32 2C 33 2C 31 2C 31 2C 4E 2C 22 31 30 2D    0,2,3,1,1,N,"10-
30 33 2D 39 35 22 0A 41 34 35 30 2C 36 35 30 2C    03-95".A450,650,
32 2C 32 2C 31 2C 31 2C 4E 2C 22 4E 75 6D 2E 41    2,2,1,1,N,"Num.A
11/13 07:14:38   100ms poll: 1 events PTY=00000001 SMI=00000000
11/13 07:14:38    0ms RCV AP DATA: 572 bytes (812 total)
(Start of second host block)
6C 6C 65 73 74 2E 3A 22 0A 41 33 30 30 2C 36 35    llest.:".A300,65
30 2C 32 2C 33 2C 31 2C 31 2C 4E 2C 22 20 31 30    0,2,3,1,1,N,".10
30 39 35 22 0A 41 31 38 30 2C 36 35 30 2C 32 2C    095".A180,650,2,
32 2C 31 2C 31 2C 4E 2C 22 56 69 61 67 2E 3A 22    2,1,1,N,"Viag.:"
0A 41 38 30 2C 36 35 30 2C 32 2C 33 2C 31 2C 31    .A80,650,2,3,1,1
2C 4E 2C 22 30 31 22 0A 41 37 35 30 2C 36 30 30    ,N,"01".A750,600
2C 32 2C 31 2C 31 2C 4E 2C 22 20 20 41 72          ,2,1,1,1,N,"..Ar
74 69 63 6F 6C 6F 20 20 20 20 20 20 20 20 20 20    ticolo..........
20 43 6F 6C 6C 69 2F 50 7A 20 20 20 20 20 20 20    .Colli/Pz.......
20 20 50 65 73 6F 20 28 4B 67 29 20 22 0A 41 37    ..Peso.(Kg)".A7
34 30 2C 35 37 30 2C 32 2C 33 2C 31 2C 31 2C 4E    40,570,2,3,1,1,N
2C 22 31 31 32 32 38 30 30 34 34 20 20 20 20 20    ,"112280044.....
20 20 20 31 34 34 20 20 20 20 20 20 31 32 30       ...144......120
2C 33 22 0A 41 37 35 30 2C 35 30 30 2C 32 2C 32    ,3".A750,500,2,2
2C 31 2C 31 2C 4E 2C 22 54 69 70 6F 20 50 61 6C    ,1,1,N,"Tipo.Pal
6C 65 74 2E 3A 22 0A 41 35 37 30 2C 35 30 30 2C    let.:".A570,500,
32 2C 33 2C 31 2C 31 2C 4E 2C 22 45 55 52 22 0A    2,3,1,1,N,"EUR".
41 34 35 30 2C 35 30 30 2C 32 2C 32 2C 31 2C 31    A450,500,2,2,1,1
2C 4E 2C 22 50 65 73 6F 28 4B 67 29 3A 22 0A 41    ,N,"Peso(Kg):".A
33 35 30 2C 35 30 30 2C 32 2C 33 2C 31 2C 31 2C    350,500,2,3,1,1,
4E 2C 22 20 20 32 35 2C 30 22 0A 41 34 35 30 2C    N,"..25,0".A450,
```

```
34 35 30 2C 32 2C 32 2C 31 2C 31 2C 4E 2C 22 54    450,2,2,1,1,N,"T
6F 74 2E 20 50 65 73 6F 28 4B 67 29 3A 22 0A 41    ot..Peso(Kg)":".A
32 35 30 2C 34 35 30 2C 32 2C 33 2C 31 2C 31 2C    250,450,2,3,1,1,
4E 2C 22 20 31 34 35 2C 33 22 0A 42 37 35 30 2C    N,".145,3".B750,
33 30 30 2C 32 2C 31 2C 34 2C 31 32 2C 31 35 30    300,2,1,4,12,150
2C 42 2C 22 36 30 30 30 33 34 4E 4F 52 36 35       ,B,"6000034NOR65
34 33 32 31 36 31 22 0A 50 0A 1B 5B 34 69 0A 20    432161".P..[4i..
```
(End Print cmd is 'ESC[4i')
```
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20    ................
20 20 1B 5B 48 1B 5B 4A 20 48 55 49 1B 5B 35 43    ...[H.[J.HUI.[5C
54 45 53 54 20 53 54 41 4D 50 41 20 45 54 49 43    TEST.STAMPA.ETIC
48 45 54 54 20 20 31 33 2F 31 31 2F 39 36 1B 5B    HETT..13/11/96.[
33 3B 39 48 54 45 53 54 20 53 54 41 4D 50 41 20    3;9HTEST.STAMPA.
45 54 49 43 48 45 54 54 45 1B 5B 38 3B 31 31 48    ETICHETTE.[8;11H
46 31 20 41 6E 6E 75 6C 6C 61 20 46 32 20 43 6F    F1.Annulla.F2.Co
6E 66 65 72 6D 61 20 5F 1B 5B 4A 08                nferma._.[J.
11/13 07:14:38    280ms prt_out_unseg: 672 bytes in
11/13 07:14:38      0ms prt_out_unseg: 254 bytes out
11/13 07:14:38      0ms RF SND 256 bytes
44 FE 0A 4E 0A 44 36 0A 53 31 0A 5A 54 0A 41 37    D..N.D6.S1.ZT.A7
```
(1st TIP cmd D with length FE [254 chars])
```
35 30 2C 31 31 35 30 2C 32 2C 34 2C 31 2C 31 2C    50,1150,2,4,1,1,
4E 2C 22 45 6C 69 64 61 20 47 69 62 62 73 20 55    N,"Elida.Gibbs.U
6E 69 6C 65 76 65 72 20 49 54 22 0A 41 31 37 30    nilever.IT".A170
2C 31 31 35 30 2C 32 2C 32 2C 32 2C 32 2C 4E 2C    ,1150,2,2,2,2,N,
22 49 4E 54 45 52 49 22 0A 41 35 32 30 2C 31 31    "INTERI".A520,11
30 30 2C 32 2C 33 2C 32 2C 32 2C 4E 2C 22 45 53    00,2,3,2,2,N,"ES
50 52 45 53 53 22 0A 41 35 38 30 2C 31 30 33 30    PRESS".A580,1030
2C 32 2C 35 2C 36 2C 36 2C 4E 2C 22 43 5A 22 0A    ,2,5,6,6,N,"CZ".
41 37 35 30 2C 36 35 30 2C 32 2C 32 2C 31 2C 31    A750,650,2,2,1,1
2C 4E 2C 22 44 61 74 61 20 46 61 74 74 2E 3A 22    ,N,"Data.Fatt.:"
0A 41 36 30 30 2C 36 35 30 2C 32 2C 33 2C 31 2C    .A600,650,2,3,1,
31 2C 4E 2C 22 31 30 2D 30 33 2D 39 35 22 0A 41    1,N,"10-03-95".A
34 35 30 2C 36 35 30 2C 32 2C 32 2C 31 2C 31 2C    450,650,2,2,1,1,
4E 2C 22 4E 75 6D 2E 41 6C 6C 65 73 74 2E 3A 22    N,"Num.Allest.:"
0A 41 33 30 30 2C 36 35 30 2C 32 2C 33 2C 31 2C    .A300,650,2,3,1,
11/13 07:14:39   1460ms RCV CM_RDY
11/13 07:14:39      0ms prt_out_unseg: 254 bytes out
11/13 07:14:39     10ms RF SND 256 bytes
44 FE 31 2C 4E 2C 22 20 31 30 30 39 35 22 0A 41    D.1,N,".10095".A
```
(2nd TIP cmd D with length FE [254 chars])
```
31 38 30 2C 36 35 30 2C 32 2C 32 2C 31 2C 31 2C    180,650,2,2,1,1,
4E 2C 22 56 69 61 67 2E 3A 22 0A 41 38 30 2C 36    N,"Viag.:".A80,6
35 30 2C 32 2C 33 2C 31 2C 31 2C 4E 2C 22 30 31    50,2,3,1,1,N,"01
22 0A 41 37 35 30 2C 36 30 30 2C 32 2C 31 2C 31    ".A750,600,2,1,1
2C 31 2C 4E 2C 22 20 20 41 72 74 69 63 6F 6C 6F    ,1,N,"..Articolo
20 20 20 20 20 20 20 20 20 20 20 43 6F 6C 6C 69    ...........Colli
2F 50 7A 20 20 20 20 20 20 20 20 20 50 65 73 6F    /Pz.........Peso
20 28 4B 67 29 20 22 0A 41 37 34 30 2C 35 37 30    .(Kg).".A740,570
2C 32 2C 33 2C 31 2C 31 2C 4E 2C 22 31 31 32 32    ,2,3,1,1,N,"1122
38 30 30 34 34 20 20 20 20 20 20 20 20 31 34 34    80044........144
20 20 20 20 20 20 20 31 32 30 2C 33 22 0A 41 37    .......120,3".A7
35 30 2C 35 30 30 2C 32 2C 32 2C 31 2C 31 2C 4E    50,500,2,2,1,1,N
2C 22 54 69 70 6F 20 50 61 6C 6C 65 74 2E 3A 22    ,"Tipo.Pallet.:"
0A 41 35 37 30 2C 35 30 30 2C 32 2C 33 2C 31 2C    .A570,500,2,3,1,
31 2C 4E 2C 22 45 55 52 22 0A 41 34 35 30 2C 35    1,N,"EUR".A450,5
11/13 07:14:41   1370ms RCV CM_RDY
11/13 07:14:41      0ms prt_out_unseg: 164 bytes out
11/13 07:14:41      0ms RF SND 166 bytes
44 A4 30 30 2C 32 2C 32 2C 31 2C 31 2C 4E 2C 22    D.00,2,2,1,1,N,"
```
(3rd TIP cmd D with length A4 [164 chars])
```
50 65 73 6F 28 4B 67 29 3A 22 0A 41 33 35 30 2C    Peso(Kg):".A350,
35 30 30 2C 32 2C 33 2C 31 2C 31 2C 4E 2C 22 20    500,2,3,1,1,N,".
20 32 35 2C 30 22 0A 41 34 35 30 2C 34 35 30 2C    .25,0".A450,450,
32 2C 32 2C 31 2C 31 2C 4E 2C 22 54 6F 74 2E 20    2,2,1,1,N,"Tot..
50 65 73 6F 28 4B 67 29 3A 22 0A 41 32 35 30 2C    Peso(Kg):".A250,
34 35 30 2C 32 2C 33 2C 31 2C 31 2C 4E 2C 22 20    450,2,3,1,1,N,".
31 34 35 2C 33 22 0A 42 37 35 30 2C 33 30 30 2C    145,3".B750,300,
32 2C 31 2C 34 2C 31 32 2C 31 35 30 2C 42 2C 22    2,1,4,12,150,B,"
36 30 30 30 30 33 34 4E 4F 52 36 35 34 33 32 31    6000034NOR654321
36 31 22 0A 50 0A                                  61".P.
11/13 07:14:42   1050ms RCV CM_RDY
11/13 07:14:42      0ms RF SND 2 bytes
44 00                                              D.
```
(TIP cmd to dump data out of serial port)

```
11/13 07:14:42   310ms RCV CM_RDY
11/13 07:14:42     0ms prt_out_unseg: all segments complete
```

All of this processed host data is sent off to the base program to format up and send off to the terminal.

Some excerpts follow of the base log that shows this:

```
11/14 09:49:36   120ms app-105 --> 256 - - Data
11/14 09:49:36     0ms r00-105 *** CHK_UNITDTA: thed=0 tsz=256 fhed=0 fsz=0
11/14 09:49:36     0ms bld_dta: 0-105 S=23 N=7 A=4
11/14 09:49:36     0ms bld_dta: 0-105 S=23 N=0 A=4
11/14 09:49:36     0ms r00-105 *** Building DFP DSZ=2

FRAME: Mode BASE  09:49:36     <-- 33 bytes
 Frame ID: Data-BOC
      S  T U   N A ST    Topology
Hdr:  1B 1 0105 7 4 00    U=0001 Downstream
H: 3B 81 69 9C
D: 44 FE 0A 4E 0A 44 36 0A 53 31 0A 5A 54 0A 41 37   D..N.D6.S1.ZT.A7
(1st TIP cmd D with length FE [254 chars])

D: 35 30 2C 31 31 35 30                                50,1150
C: 20 B2 83 70 (in=7083B220,calc=7083B220)

FRAME: Mode BASE  09:49:36     <-- 33 bytes
 Frame ID: Data-BOC
      S  T U   N A ST    Topology
Hdr:  1B 1 0105 0 4 00    U=0001 Downstream
H: 3B 81 69 80
D: 2C 32 2C 34 2C 31 2C 31 2C 4E 2C 22 45 6C 69 64   ,2,4,1,1,N,"Elid
D: 61 20 47 69 62 62 73                              a.Gibbs
C: BF 48 4B 2C (in=2C4B48BF,calc=2C4B48BF)
```

Each of these messages is ACK'd by the terminal, building up the print string in the terminal's print buffer, and on receipt of the *D0* message the print string is sent out of the RS-232 port.