PRINTRONIX®

Integrated Network Interface Card User's Manual

Thermal, Line Matrix, and Laser Printers

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Thermal, Line Matrix, and Laser Printers

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1 *Introduction*

Overview

This chapter introduces you to the Network Interface Card (NIC) architecture and special features, as well as providing information on installation and configuration tools.

What Is The NIC?

The NIC allows you to attach printers on a local area network (LAN) rather than attaching them directly to a host system. Following simple configuration steps, these peripherals can be simultaneously shared with users on the network whether you are using TCP/IP or NetBIOS over TCP/IP.

The NIC package contains an Ethernet Interface to attach itself and the printer to the network. The NIC is supplied in one of two forms:

- an integrated Ethernet card
- an integrated wireless Ethernet card.

What Special Features Are Available?

The NIC offers an extensive list of features including:

- built-in HTML forms for easy cross-platform configuration
- availability of PrintNet® Enterprise, a remote management software utility
- a detailed and easy-to-use command shell built-in to the firmware
- multi-level configuration security through passwords, permission levels, and access lists
- WAN-wide communication access
- numerous printer logging methods (e.g., automatic email) to record printer errors and usage
- remote management through HTML forms, Telnet sessions, `rsh/rcmd/remsh` commands, SNMP, and pre-defined log methods
- extensive built-in troubleshooting tools
- built-in `telnet` and `ping` clients
- configurable memory usage by disabling protocols and destination services
- multiple destinations/queues for versatile printer manipulation and distinct print setups
- header and trailer strings to instruct printers on font, pitch, printing, etc.
- flexible naming conventions
- automatic network connection and frame type sensing
- simultaneous printing across all I/O ports and all supported protocols
- multiple network protocol support

Logical Printer Architecture

The NIC implements a logical printer architecture which gives the system administrator the possibility to configure the print server to handle and act upon the print data in several ways. When a print job comes through the print server, there is a certain logical print path that it follows before it gets to the printer. Each logical print path consists of a sequence of logical steps where extra processing may be performed on the print data before it is sent to the printer. This ability to preprocess the print data before it is sent to the printer allows elimination of certain printing problems, or implementation of printer enhancements that may be difficult and time consuming to solve or introduce at the system, spool or queue level. The preprocess ability is also simplistic to perform at the print server level.

The logical print path for a print job going through NIC consists of three different phases:

- **Phase 1** - the host sends the job to a destination or queue on NIC (e.g. d1prn).
- **Phase 2** - the print job passes through the associated “model” (e.g. model “m1”) on NIC for any extra processing associated with the model.
- **Phase 3** - the processed print job is directed to the printer for output.

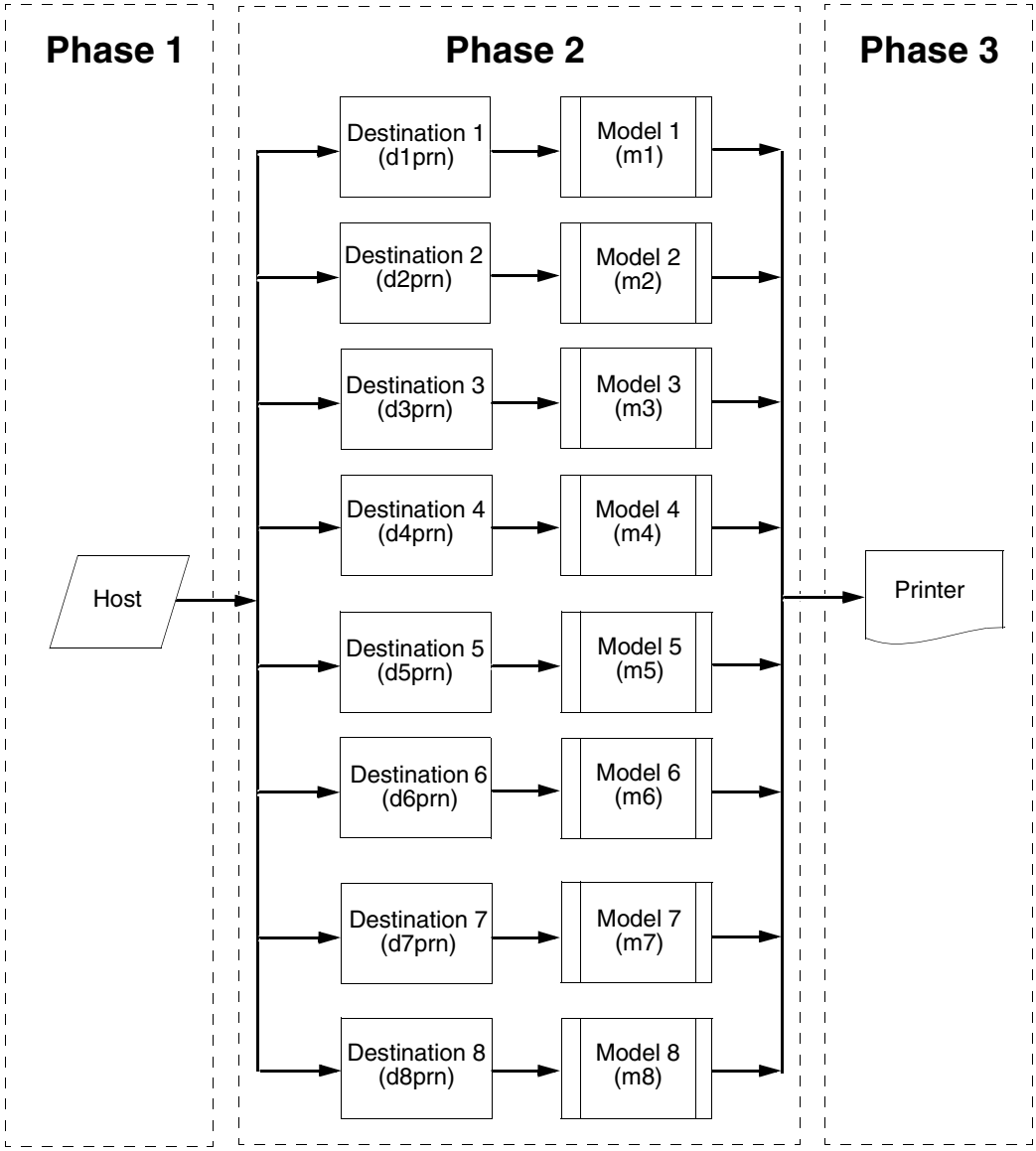

Figure 1. Print Path

Destinations/Queues

For every I/O port on NIC, there is at least one pre-defined logical print queue or destination to accept print jobs destined for it. This includes print jobs that are sent directly to the I/O port, such as port 9100. These queue or destination names are pre-defined but can be changed by the user.

Models

For every destination or queue, there is a pre-defined model associated with it. The model defines how the print job will be processed as it passes through to the printer. Models are a set of mini filters that can be used to modify the print data stream. The functions available for each model are as follows:

1. Insert carriage return after line feed
2. Insert a banner page before or after each print job
3. Insert header strings to
    - Print using upper tray’s paper
    - Printer using lower tray's paper
    - Print in landscape mode
    - Print in portrait mode
4. Insert trailer strings to
    - Reset the printer once the print job completes
    - Force the end of the job
    - Perform a form feed at the end of the data

5. Log one or all of the following information as each print job passes through the model
   - Job ID and username
   - User ID and three messages per job about the start and finish
   - Checksum value of the data transferred
   - Miscellaneous messages from the printer
   - Status of the printer based on the port interface signals
6. Load a specific printer configuration before processing a print job
   - Specify a printer configuration to be associated with a print queue.
   - When a job is set to that print queue, the associated printer configuration will be loaded before the job is processed.
   - Feature allows you to define up to eight unique and independent printer personalities in a single printer.
   - Allows you to effectively have eight different printers in one.

Interfaces

The NIC interfaces with the host printer through an Ethernet 10/100Base-T interface connector.

Two NIC interfaces are available, depending on the type of controller board the printer contains. Some printers use external NICs with dip switches and LEDs that plug into the IEEE 1284 (parallel) interface. Other printers use NICs that plug into the Peripheral Component Interface (PCI) controller boards that have no dip switches or LEDs.

NOTE: If your printer uses both types of NICs, please refer to the External Network Interface Card User's Manual for more information.

Integrated NIC Card LED:

Table 1. Integrated NIC LED Indicator

NET	Indication	Description
ON	flashes	Indicates activity
ON	constant	Indicates that the link is good at 10 Mbps
ON	constant	Indicates that the link is good at 100 Mbps

Speed Setting for 10/100Base-T

When the router is set to auto-negotiation enable, the following is the correct behavior of the NIC with each setting:

1. **10mbps Half Duplex**

   Use parallel detection because the NIC is using force mode and thus has auto-negotiation disabled.

   PORs to 10mbps Half Duplex. Resets to 10mbps Half Duplex. Reconnection at switch maintains 10mbps Half Duplex.

2. **10mbps Full Duplex**

   Use parallel detection because the NIC is using force mode and thus has auto-negotiation disabled.

   PORs to 10mbps Full Duplex. Resets to 10mbps Full Duplex. Reconnection at switch maintains 10mbps Full Duplex.

3. **100mbps Half Duplex**

   Use parallel detection because the NIC is using force mode and thus has auto-negotiation disabled.

   PORs to 100mbps Half Duplex. Resets to 100mbps Half Duplex. Reconnection at switch results in 100mbps Half Duplex.

4. **100mbps Full Duplex**

   Use parallel detection because the NIC is using force mode and thus has auto-negotiation disabled.

   PORs to 100mbps Full Duplex. Resets to 100mbps Full Duplex. Reconnection at switch results in 100mbps Full Duplex.

5. **NIC in Auto mode in 100mbps Full Duplex environment**

   Use auto negotiation to the highest common local and remote capability, i.e. 100 mbps Full Duplex in this case.

   PORs to 100 mbps Full Duplex. Resets to 100 mbps Full Duplex. Reconnection at switch remains 100 mbps Full Duplex.

6. **NIC in Auto mode in 10mbps Half Duplex environment** (determined using 10 mbps Half Duplex hub)

   Use auto-negotiation to the highest common local and remote capability, i.e. 10 mbps Half Duplex in this case.

   PORs to 10 mbps Half Duplex. Resets to 10 mbps Half Duplex. Reconnection at switch maintains 10 mbps Half Duplex.

NOTE: With parallel detection, only speed can be determined. The duplex mode sets to half duplex.

Conventions Used In This Manual

All uppercase print indicates control panel keys.
Example: Press the CLEAR key, then press the ONLINE key.

Quotation marks (“ “) indicate messages on the Liquid Crystal Display (LCD).
Example: Press the ONLINE key. “OFFLINE” appears on the LCD.

Command syntax and examples are formatted as follows:

- The Courier font in **boldface** indicates commands that you type. For example:

  At the prompt, type:

  `ping ftp.CompanyWebsite.com`

- Regular Courier font indicates references to command syntax and output. For example:

  The `ftp.CompanyWebsite.com` site is working properly.

- Variable values are shown in *italics* in command syntax, output, and in text. For example:

  `ping `*`ipname`

  The *`ipname`* is working properly.

Notes And Notices

For your safety and to protect valuable equipment, read and comply with the notes included in this manual. A description follows:

NOTE: A Note gives you helpful information and tips about printer operation and maintenance.

2 Installation And Configuration

Installation

The NIC provides an RJ-45 connector for 10/100Base-T (UTP) networks.

Connecting To The Network

To attach the NIC to a network, plug the network cable into the NIC connector.

Configuration Tools

There are two parts to a NIC setup:

- Configuring the NIC so it can be seen on the network. This involves network-related settings (e.g., an IP address within TCP/IP environments) configured through the built-in command shell, npsh, or from the control panel.
- Configuring a host with a new printer so it knows how to send data to the NIC. Just being able to see the printer on the network does not mean you can automatically print to it. A host has to be told where to send the data.

NOTE: Some network environments do not require any network settings to be configured on the NIC. However, all network setups require configuration on the host end.

The following methods are available for configuring the NIC:

- via the control panel (wired and wireless)
- HTML forms
- Telnet
- Remote Shell
- PTX_Setup
- Printer Setup Wizard, a host based wizard to simplify NIC configuration. This tool can be found on the CD supplied with the printer.

Printing A NIC Test Page

Always print an E-NET test page before performing any updates or network configuration using the following steps:

- For P5000/P7000 printers:
  a. Take the printer offline. When the printer LCD reads “OFFLINE /QUICK SETUP,” press the up and down arrow keys simultaneously to unlock the control panel.
  b. Press the left arrow until “Diagnostics” appears.
  c. Press the down arrow until “Printer Tests” appears.
  d. Press the down arrow until “Shift Recycle” appears.
  e. Press the left arrow until Ethernet Test appears.
  f. Press Enter.
- For SL5000e/T5000e/SL5000r/T5000r and SL/T5R Energy Star printers:
  a. Take the printer offline. When the printer LCD reads “OFFLINE,” press the down arrow and ENTER keys simultaneously to unlock the control panel.
  b. Press the “+” key until “Printer Tests” appears. Continue pressing the “+” key until “Printer Tests/E-Net Test Page” or “Ethernet Test” appears. Press ENTER.

- For T4204 printers:
  a. Take the printer offline. When the printer LCD reads “OFFLINE,” press the down arrow and ENTER keys simultaneously to unlock the control panel.
  b. Press the NEXT key until “DIAGNOSTICS” appears. Continue pressing the NEXT key until “Printer Tests/ E-Net Test Page” appears. Press ENTER.
- For Laser printers:
  a. Take the printer offline. When the printer LCD reads “OFFLINE/CONFIG. CONTROL,” press the up and down arrow keys simultaneously to unlock the control panel.
  b. For L5520 and L5535 printers, press the right arrow until “TEST PRINT” appears.
  For the L1524 printer model, press the right arrow until “DIAGNOSTICS” appears.
  c. Press the down arrow until “Test Patterns” appears.
  d. Press PREV to display “E-Net Test Page.” Press ENTER.

Configuration Using The Control Panel

You can set NIC settings from the printer control panel.

CAUTION **When the printer is first powered on, E-NET INIT. displays on the control panel. To prevent a loss of NIC configuration information, do not change the NIC settings while this message displays. When the initialization is complete, E-NET READY displays and now you can safely change the NIC settings from the control panel.**

1. After the printer displays “E-NET READY,” take the printer offline.
2. Scroll through menu selections until “ETHERNET ADDRESS” OR “WLAN ADDRESS” displays.

3. From the control panel, navigate to the IP Address, Netmask, and Gateway Address (Subnet Mask) menu options and enter the appropriate values. You must press the ↵ (Enter) key after inputting each segment of the IP Address, Subnet Mask, and Gateway Address.
4. Place the printer online to start the NIC IP Address, Subnet Mask, and Gateway Address update process. This process will reboot the printer and may take several minutes. Wait until E-NET READY displays on the control panel.

NOTE: If you do not put the printer online, the settings you just entered will not take effect. Do not turn the printer off until E-NET READY displays. If you turn the printer off before the new values are written to memory in the NIC adapter, you will need to repower the printer and repeat step 3 and step 4.

NOTE: When the printer is moved from one network to another, the software cannot find the printer. Verify the IP address, Gateway Mask, and Subnet Mask to make sure the settings are correct and routable.

Your NIC is now configured and connected to your network.

NIC Verification

Before performing the verification, you must connect the NIC card to the network.

1. Print an E-NET test page (see steps on page 26) to verify the settings you made.
2. Verify the Netmask is correct in two locations on the E-NET test page:
   - NETWORK INTERFACES
   - TCP/IP ROUTING TABLE

   The Netmask must be the same in both locations. For example, if the Netmask is listed as 255.255.255.0 in NETWORK INTERFACES and is listed as 255.255.255.255 in the TCP/IP ROUTING TABLE, they do not match and you must correct it for the Gateway.

Also, if a Gateway Address was entered, verify that "*xxx.xxx.xxx.xxx* is alive" is printed under the Default Gateway Ping Test, where *xxx.xxx.xxx.xxx* is the Gateway Address. If a Gateway Address was not entered, the Default Gateway Ping test is not required and will not display on the page.

If the Netmask does not match, complete the following steps:

a. Take the printer offline.

b. Using the control panel, modify the Gateway value to 0.0.0.0. (non-configured).

c. Place the printer online and wait until E-NET IS READY displays.

d. Take the printer offline and enter the Gateway Address you desire.

e. Place the printer online and wait until E-NET IS READY displays. This saves the new Gateway Address.

Your NIC is now configured and connected to your network.

Wireless NIC Configuration Using The Control Panel

NOTE: The Access Point must be configured according to the manufacturer's installation guide.

To configure Wireless NIC card, configure the ethernet and wireless IP addresses so they can be seen on the network. This includes several network-related settings (e.g., an IP address within TCP/IP environments) configured through the built-in command shell, npsh, or from the control panel.

NOTE: It is not necessary to configure the Ethernet IP address if only WLAN NIC is installed.

IP Address Configuration

You can set the wireless NIC IP and other parameters from the front panel. Refer to the NETWORK SETUP menu in the User's Manual for more information.

CAUTION **When the printer is first powered on, the message "E-NET INIT" displays on the control panel. To prevent a loss of NIC configuration information, do not change the NIC settings while this message displays. When the initialization is complete, "E-NET READY" displays, and you can safely change the NIC settings from the control panel.**

You need to set both the ethernet and wireless network IP addresses according to the TCP/IP environment that the printer is connected to. There are four parameters accessed from the printer control panel that are IP address related. These parameters are located in the "Ethernet Address" menu and the "Wireless Address" menu.

NOTE: It is not necessary to configure the Ethernet IP address if the WLAN NIC is not installed.

- **IP Address**

This is the host for IP addresses that have four segments. They are displayed as SEG1, SEG2, SEG3, and SEG4 which can be set to any value in the range of 0 to 255.

- **Subnet Mask**

This is the subnet mask for the host IP that has four segments. They are displayed as SEG1, SEG2, SEG3, and SEG4 which can be set to any value in the range of of 0 to 255.

- **Gateway Address**

This is the gateway IP addresses that have four segments. They are displayed as SEG1, SEG2, SEG3, and SEG4 which can be set to any value in the range of 0 to 255.

- **DHCP**

The DHCP option allows you to obtain host server IP addresses when powering onto the network. The DHCP can be configured to:

- Enable – each time you power on, the host server automatically assigns you a different address (if the IP address has not been previously assigned).
- Disable – You choose the host server IP address. After the selection, the IP Address remains fixed even after you reboot.

Wireless Parameter Configuration

Certain "WIRELESS PARAMS" must be configured to match the Access Point settings:

- **Signal Strength**

This menu displays the strength of the wireless signal.

NOTE: This is a display value only and cannot be changed.

- **Operation Mode**

This is the operation mode of the wireless network. The options include “Infrastructure” and “Ad Hoc” modes. This must match the Access Point's configuration.

NOTE: Operation Mode is not available if the Symbol LA5127 802.11g/b radio card is installed.

- **SSID Name**

This is the Service Set Identifier which must be identical to the Access Point's SSID name. The SSID name can be configured to a maximum of 32 alphanumeric characters. The SSID name and alphanumeric characters are divided into three parts in the control panel menu as "SSID Name (01-15)", "SSID Name (16-30)" and "SSID Name (31-32)".

NOTE: When two or more consecutive space characters are used in the SSID, enclose it in a double quoted string;otherwise upon resetting the NIC, the SSID Name wil be saved in the Wireless NIC with only one space.

- **Min Xfer Rate**

Allows you to set the minimum speed at which the Wireless Option will accept a connection (in million bits per second).

This is the wireless transfer rate, and can be set to either “enable” or “disable.” It is set to “enable” when the operation mode is "Infrastructure" so that the NIC can automatically detect the optimal transfer rate. If the operation mode is "Ad Hoc" and the transfer rate is known, the user can enable or disable the corresponding transfer rate in the menus "Xfer Rate 1Mb", "Xfer Rate 2Mb", "Xfer Rate 5.5Mb" or "Xfer Rate 11Mb".

- **Channel**

This is the frequency used for wireless communication. The 2.4GHz band spectrum is divided into different channels (1-15). It is set to "Default" so that the NIC can detect the correct channel to communicate with the Access Point in infrastructure mode. If the operation mode is "Ad Hoc" and the channel is known, the user can set the corresponding channel in this menu.

NOTE: This parameter is not applicable for 802.11g/b.

- **Ant. Diversity**

This is used to select the antenna for communication. It is recommended to set to "Primary" for the NIC to detect for optimal communication. It can also be set to "Diverse" or "Auxiliary".

- **Preamble**

This is the preamble used in the wireless packets. It is recommended to set to "Default" so that the NIC can detect the correct preamble. The preamble is approximately 8 bytes of the packet header generated by the AP is and attached to the packet prior to transmission. The preamble length is transmission data rate dependent. The "short" preamble is 50% shorter than the "long" preamble. Transmit power is 0–100%. It must match the Access Point's preamble configuration.

NOTE: This parameter is not applicable for 802.11g/b.

- **Power Mgmt**

This option allows you to set power-save mode and sleep time. A value specifying the sleep time in milliseconds will be provided. If set to zero, power-save mode will be disabled. It is recommended not to change this setting.

- **Transmit Power**

This option allows you to specify the power level used by the wireless card to send network packets to the access point. Transmit power is specified as a percentage of full pwer (0 – 100%).

- **Internat. Mode**

When enabled, the Wireless option adapts to international frequency requirements in Europe.

- **Auth Method**

This feature allows the user to select the authentication method used for the wireless network interface. Depending on the radio card installed, the options include Open, Shared, Kerberos, and LEAP.

- **Default WEP Key**

The default key must match the Access Point's configuration. If the Access Point is configured to use "Open System", the default key should be set to 0. If the Access Point is configured to use 40-bit or 128-bit WEP encryption key, the encryption key must be set to the same setting as the Access Point's setting. See the following section on how to set up the encryption key.

Encryption Key Configuration

As previously mentioned, there are four encryption keys that can be configured through the control panel. For each encryption key x (where x can be 1 to 4), the following control menu can be used to configure the key:

- **WEP Key x Format**

This is the format of the key. It can be set to either ASCII or Hexadecimal.

- **WEP Key x Width**

This is the number of bits used for encryption. This can be set to either 40 Bits or 128 Bits and must match the Access Point's configuration.

- **WEP Key x**

This is the key value. If the "WEP Key x Width" is set to 40 Bits, the key values can be entered in the following 5 sub menus (BYTE 1, …, BYTE 5). If the "WEP Key x Width" is set to 128 Bits, the key values can be entered in the following 13 sub menus (BYTE 1, …, BYTE 13). The key values must configure to match the corresponding key in the Access Point's key configuration.

WPA Parameters

- **WPA Mode**. Selects the WPA wireless security mode. By default the mode is set to Disable thus disabling WPA security. If set to Personal, this selects a personal or pre-shared key mode for WPA security.
- **WPA Cipher**. Selects the WPA wireless security cipher setting.
- **WPA P-Phs**. Sets the individual bytes of the WPA passphrase.
- **Reset WPA P-Phs**. Resets all 32 bytes of the WPA passphrase at once.

WLAN EAP Parameters

EAP wireless security scheme is available when either the Cisco Aironet 350 or the Symbol LA-5127 radio card is installed. The Cisco LEAP allows for a WEP key timeout that forces re-authentication, resulting in the derivation of a new WEP key for the session.

- **Auth Method**. This feature allows the user to select the authentication method used for the wireless network interface.
  - **Open** (the default). Selects open authentication.
  - **Shared**. Selects shared key authentication.
  - **LEAP**. Selects LEAP authentication (for use with a Cisco 350 radio card is installed).
- **EAP Mode**. This feature allows the user to select the EAP authentication mode. None, LEAP, PEAP, and TTLS are the available settings.

NOTE: For 802.11b/g radio only.

- **EAP Username**
  - **EAP Username (01-15)**. The first 15 characters of the EAP user name (maximum number of characters is 32).
  - **EAP Username (16-30)**. Characters 16 to 30 of the EAP user name (maximum number of characters is 32).
  - **EAP User (31-32)**. Characters 31 to 32 of the EAP user name (maximum number of characters is 32).
- **Reset EAP User**. Resets the EAP user name to an empty string.

- **EAP Password**
  - **EAP Password (01-15)**. The first 15 characters of the EAP password (maximum number of characters is 32).
  - **EAP Password (16-30)**. Characters 16 to 30 of the EAP password (maximum number of characters is 32).
  - **EAP Password (31-32)**. Characters 31 to 32 of the EAP password (maximum number of characters is 32).
- **Reset EAP Pswd**. Resets the EAP password to an empty string.

Kerberos Parameters

Kerberos is a wireless security scheme available when a symbol LA 4121 radio card is installed.

Kerberos Enable

- **Enable**. Enable Kerberos authentication in the wireless network interface.
- **Disable** (default). Disable Kerberos authentication in the wireless network interface.

Kerb. Pwd (01–15)

First 15 characters of the Kerberos password (maximum number of characters is 40).

Kerb. Pwd (16–30)

Characters 31 to 40 of the Kerberos password (maximum numer of characters is 40).

Kerb. Pwd (31–40)

Characters 31 to 40 of the Kerberos password (maximum number of characters is 40).

Reset Kerb. Pwd.

Reset Kerberos password to an empty string.

KDC Port Number

KDC (Key Distribution Center) port number is the 2-byte UDP/TCP port used for Kerberos Communication.

- 88 (default)
- 0–65535

Clock Skew Units

- Seconds (default)
- Minutes

Clock Skew (SEC)

Sets the maximum allowable amount of time in seconds (SEC) or minutes (MIN), as specified by the Clock Skew Units, that Kerberos authentication will tolerate before assuming that a Kerberos message is invalid.

- **Seconds:** The range is 60-900, and the default is 300.
- **Minutes:** The range is 1-15, and the default is 5.

NOTE: Whatever submenu is selected in Clock Skew Units will display on the Clock Skew (SEC) menu. For example, if you select Minutes, the Clock Skew (SEC) menu name will change to Clock Skew (MIN).

Tckt Life Units

Ticket lifetime unit in either seconds, minutes, hours, or days.

- Seconds (default)
- Minutes
- Hours
- Days

Tckt Life (SEC)

Sets the maximum allowable amount of time in seconds (SEC), minutes (MIN), hours (HR), or days (DAY), as specified by the Tckt Life Units, that a ticket obtained from the Kerberos server is valid before getting a new one.

- **Seconds:** The range is 300-259200, and the default is 43200.
- **Minutes:** The range is 5-4320, and the default is 720.
- **Hours:** The range is 1-72, and the default is 12.
- **Days:** The range is 1-3, and the default is 1.

NOTE: Whatever submenu is selected in Tckt Life Units will display on the Tckt Life (SEC) menu. For example, if you select Hours, the Tckt Life (SEC) menu name will change to Tckt Life (HR).

Renew Life Units

Renew lifetime unit in either seconds, minutes, hours, or days.

- Seconds (default)
- Minutes
- Hours
- Days

Renew Life (SEC)

Sets the maximum allowable amount of time in seconds (SEC), minutes (MIN), hours (HR) or days (DAY), as specified by the Renew Life Units, before warning for a new Kerberos password.

- **Seconds:** The range is 0-604800, and the default is 0.
- **Minutes:** The range is 0-10080, and the default is 0.
- **Hours:** The range is 0-168, and the default is 0.
- **Days:** The range is 0-7, and the default is 0.

The selected submenu is in Renew Life Units will display on the Renew Life (SEC) menu. For example, if you select Days, the Renew Life (SEC) menu name will change to Renew Life (DAY).

Equivalent Wireless NIC Configuration Using The Telnet Command

store ifc 2 wlan ssid <network-name>

store ifc 2 wlan mode adhoc|pseudo|managed

store ifc 2 wlan speed auto|(1 2 5 11)

store ifc 2 wlan channel default|(1-15)

store ifc 2 wlan antenna diverse|primary|aux

store ifc 2 wlan preamble default|long|short

store ifc 2 wlan pmm on|off

store ifc 2 wlan txpwr (0-100)

store ifc 2 wlan opts [[-]intnl]

store ifc 2 wlan defkey disable|(1-4)

store ifc 2 wlan key <key-num> <key-sequence>

store ifc 2 wlan auth <AUTH-METHOD>

store ifc 2 wlan user <AUTH-USER-NAME>

store ifc 2 wlan pass <AUTH-PASSWORD>

store ifc 2 wlan profile <WIFI-PROFILE> <0...6>

The values that can be set are as follows:

0: 802.11b operation only
1: mixed 802.11b and 802.11g operation
2: mixed 802.11b and 802.11g operation without support for 5.5 and 11 Mbps basic rates
3: 802.11g only operation
4: test 802.11g operation
5: 802.11b only operation without support for 5.5 and 11 Mbps basic rates
6: mixed 802.11b and 802.11g operation with support for 5.5 and 11 Mbps basic rates

store ifc <2> wlan wpa disable | personal | enterprise

store ifc <2> wlan eap none | leap | peap | ttls

store ifc <2> wlan cipher disable | tkip | aes | tkip+aes

store ifc <2> wlan passphrase <WPA Pre-shared Key>

store ifc <2> wlan country <COUNTRY-CODE>

Refer to page 213 for the complete command list.

HTML Forms

The NIC settings can be configured over TCP/IP through a standard Web browser. The NIC Web pages provide a way to access some of the commands built into the print server.

NOTE: If a router is used, make sure a Gateway value is configured.

To access the NIC home page:

1. Make sure the print server has an IP address and Subnet Mask so it is recognizable on your TCP/IP network.
2. Make sure your network station can successfully `ping` the NIC over the network.

3. Direct your Web browser to the URL:
   `http://IPaddress`
   (e.g., `http://192.75.11.9`)
   where ***`IPaddress`*** is the IP address of your NIC.

The NIC HTML structure is divided into several menus as shown in Figure 2.

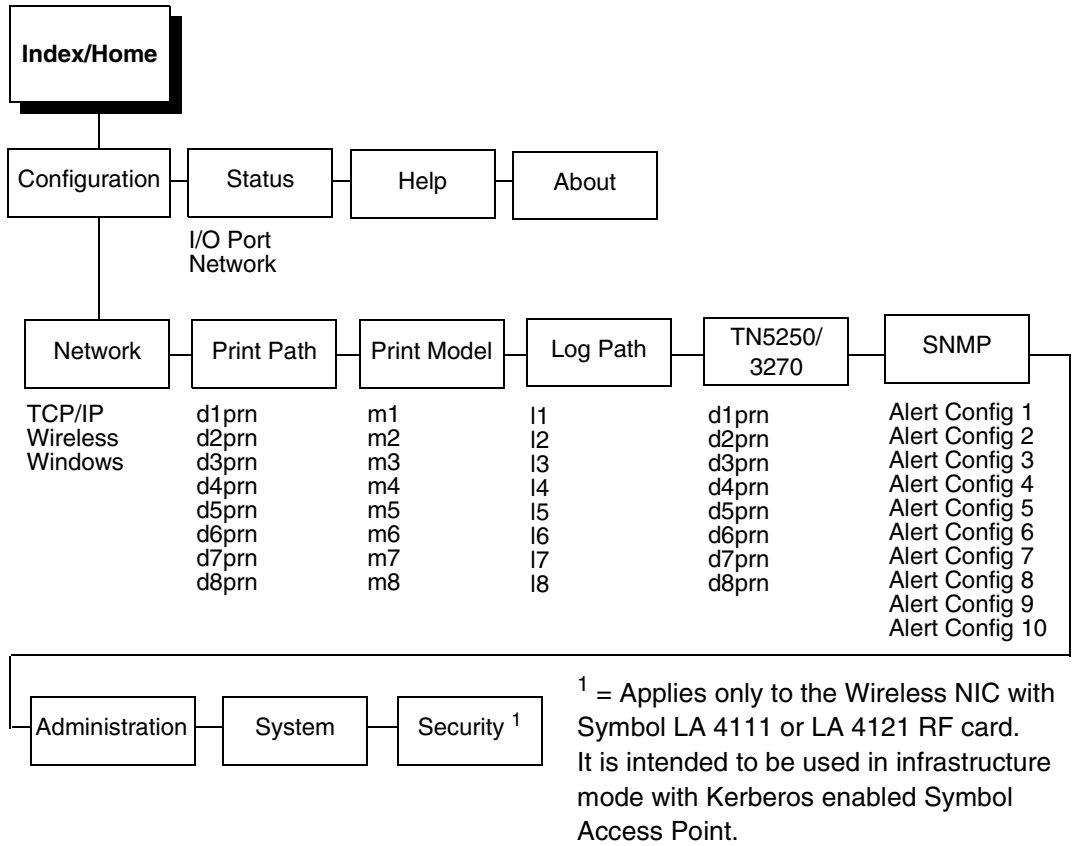

Figure 2. NIC HTML Structure

NOTE: Online help is available for all HTML pages.

Printer Status Screen

Using the printer IP Address and any standard Web browser, you can check the status of the printer. Figure 3 shows the exact state of the printer by showing the printer LCD message. (This screen automatically refreshes every minute.)

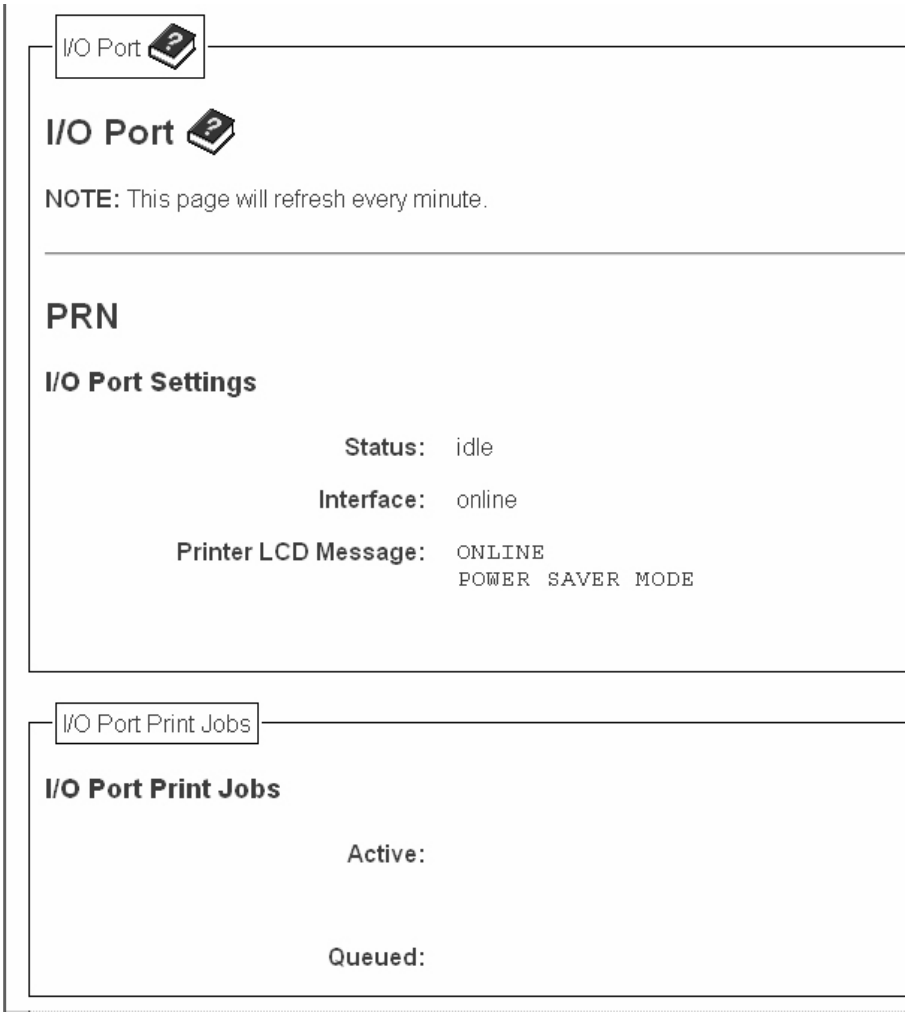

Figure 3. Printer Status Screen

Besides the HTML forms and software provided, the NIC internal command shell, npsh, can also be reached using Telnet, Remote Shell, FTP, and Data Stream:

Telnet

A TCP/IP command that helps configure NIC settings remotely. A TCP/IP host starts a Telnet session with the print server and logs into the device command shell to alter and view settings.

Example:

```
telnet 192.75.11.9
```

NOTE: The default User ID is root. There is no password by default, just press **ENTER**. If you have changed the default User ID and password, use the current User ID and the associated password instead of the defaults. For more information on setting passwords, see “NIC Security” on page 251.

Remote Shell

A TCP/IP command that helps configure print server settings remotely. A TCP/IP host uses this command to remotely execute a single command on the NIC.

Example:

```
rsh spike list prn
```

This command remotely executes the npsh command `list prn` on the NIC named `spike`.

FTP

FTP can also be used to configure print server settings remotely. A TCP/IP host uses FTP to store a file containing 1 or more NPSH commands on the FTP file system. The configuration file must be FTP ‘put’ to the /config/default/defaultCfg file. The configuration file can later be executed on demand using the ‘load oem’ command during a telnet (NPSH) session. The configuration file is also executed automatically during the power-up sequence when NIC configuration is reset to default.

Setup Through Data Stream

The PTX_SETUP command can also be used to configure NIC settings through a printer data port (serial, parallel, etc.). This is done by creating a text file containing the PTX_SETUP command and NIC internal command shell (npsh) commands. The text file is then sent to the printer through a data port to perform the NIC configuration. The following is an example of a PTX_SETUP file that can be used to configure the NIC:

```
!PTX_SETUP
NIC_SETUP
store net 1 addr 190.168.2.11
store ifc 2 wlan ssid “SomeLongString”
store ifc 2 wlan defkey 2
END_NIC_SETUP
PTX_END
```

Printer Setup Wizard

This tool can be found on the CD that is included with the printer. Follow the instructions on the CD to install the wizard.

The wizard allows you to configure all wired and wireless NIC parameters via an easy-to-use graphical user interface.

After the NIC is configured, the wizard also allows you to configure other printer parameters as well.

3 NIC Web Server

Overview

The NIC comes with a printer management tool that allows you to monitor, configure, and manage both the printer and its print job. The NIC comes with a web server that allows System Administrators and users access to its printer management capabilities from a standard web browser.

The NIC printer's IP address is used as a URL, similar to the URL of an Internet web page. When a web browser is activated and the printer's IP address is entered, the printer's embedded web server displays its home page, with links to the printer's status and configuration settings.

All of NIC's configuration settings are protected by a password so unauthorized users cannot make changes. When you try to open any of the NIC 's configuration pages, you are asked for your user name and password. At the prompt, you need to enter **root** (unless you have another user configured with root privileges) followed by the associated password. If there is no password, just press **ENTER**. For more information on setting passwords, refer to "NIC Security" on page 251.

After you configure the NIC settings, and click the SUBMIT button on the related form, re-power the NIC to ensure the latest settings are in use. To reset the NIC, go to the System form under the Configuration Menu and click the REBOOT button.

The embedded NIC Web server gives you the ability to configure the network adapter, monitor printer status, and to manage print jobs. The NIC Web page structure is divided into several menus, as shown in Figure 2 on page 41

Configuration

The Configuration menu items allow you to configure the settings for the following items:

- Network - this menu item allows you to change the network setting for each protocol: TCP/IP, Wireless, and NetBIOS over TCP/IP.
- Print Path - this menu item allows you to change the name of the destination queues, and define how the print job will be preprocessed before printing. It allows you to select what information to log, and to specify the SMTP server's IP address.
- Print Model - this menu item allows you to specify the printer name and model. It also allows you to select banner page types, filters, header and trailer strings, and printer configurations.
- Log Path - this menu item allows you to specify the logpath name, type, and port.
- TN5250/3270 - this menu item allows you to configure the TN5250/3270 settings.
- SNMP - this menu item allows you to configure the SNMP trap manager settings. It also allows you to define the printer event types to monitor, and the e-mail address that should receive alert notifications.
- Administration - this menu item allows you to define or change the printer name, location, description, etc.. It also allows you to change the root and guest user passwords.
- System - this menu item allows you to reboot the NIC, or restore its settings to the factory default.

Network Configuration

The network configuration allows you to specify the setting for each network protocol. Beside each protocol name is a checkbox which allows you to enable or disable each protocol depending on your network printing needs.

NOTE: TCP/IP is the only supported protocol which is always enabled.

TCP/IP Network

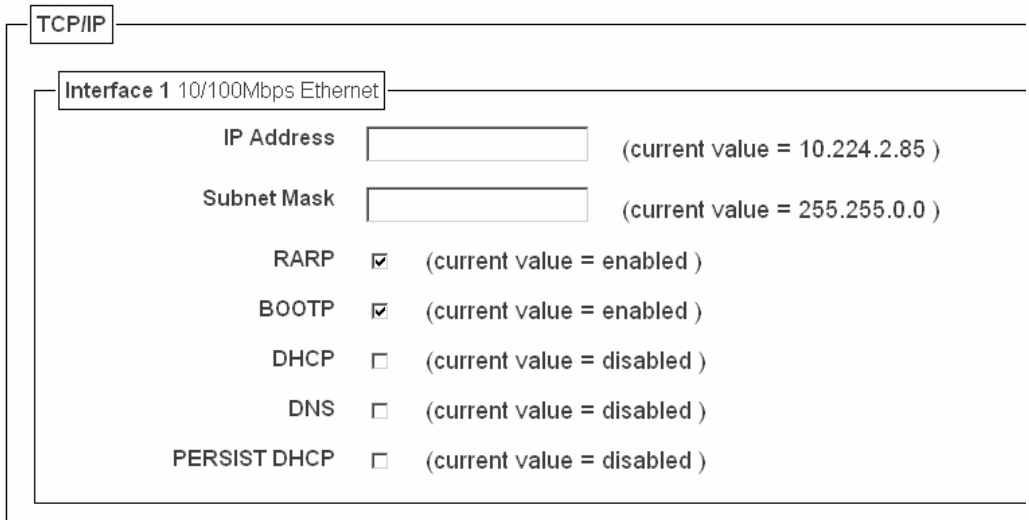

Figure 4. TCP/IP Network Configuration for Wired Ethernet

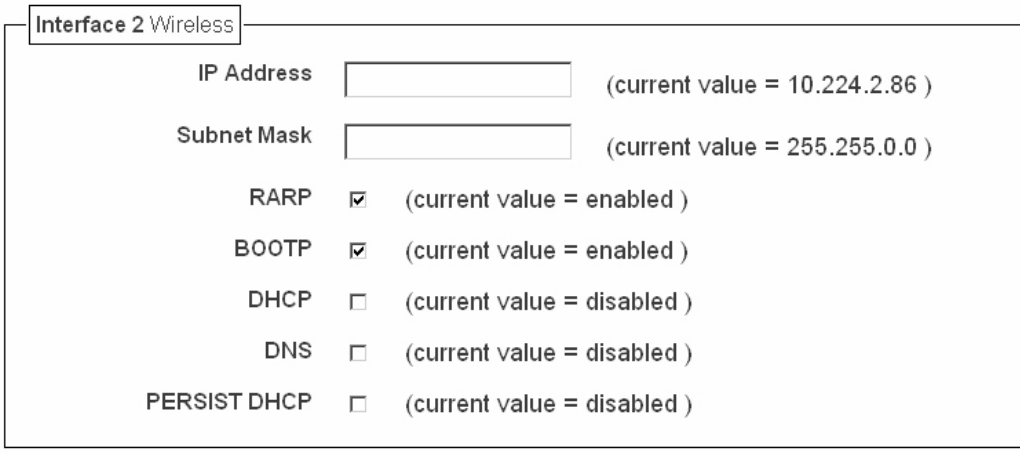

Figure 5. TCP/IP Network Configuration for Wireless Ethernet

Interface

The two edit fields contain the NIC's IP address and subnet mask. The check boxes enable the RARP, BOOTP, DHCP, DNS, and Persistent DHCP protocols, which are alternate methods of assigning IP addresses. On most networks, you want to enter a permanent IP address and subnet mask and disable RARP, BOOTP, and DHCP. However, if your network requires one of these, you should clear the IP address (and possibly the subnet mask) fields and ensure that the appropriate check box is selected.

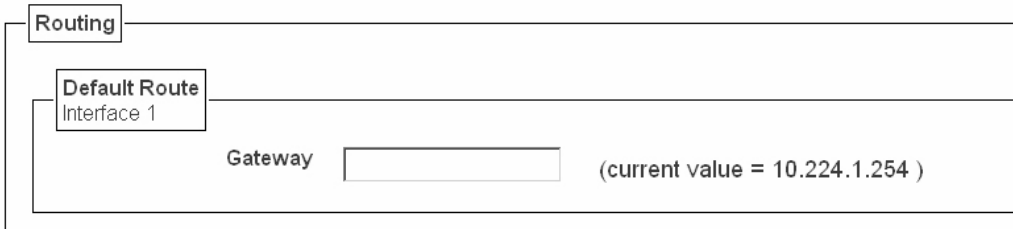

Figure 6. Defining a Gateway Address for Wired Ethernet Routing

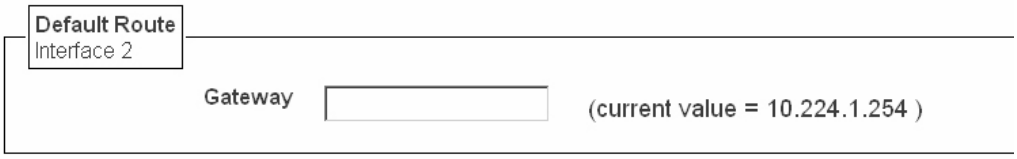

Figure 7. Defining a Gateway Address for Wireless Ethernet Routing

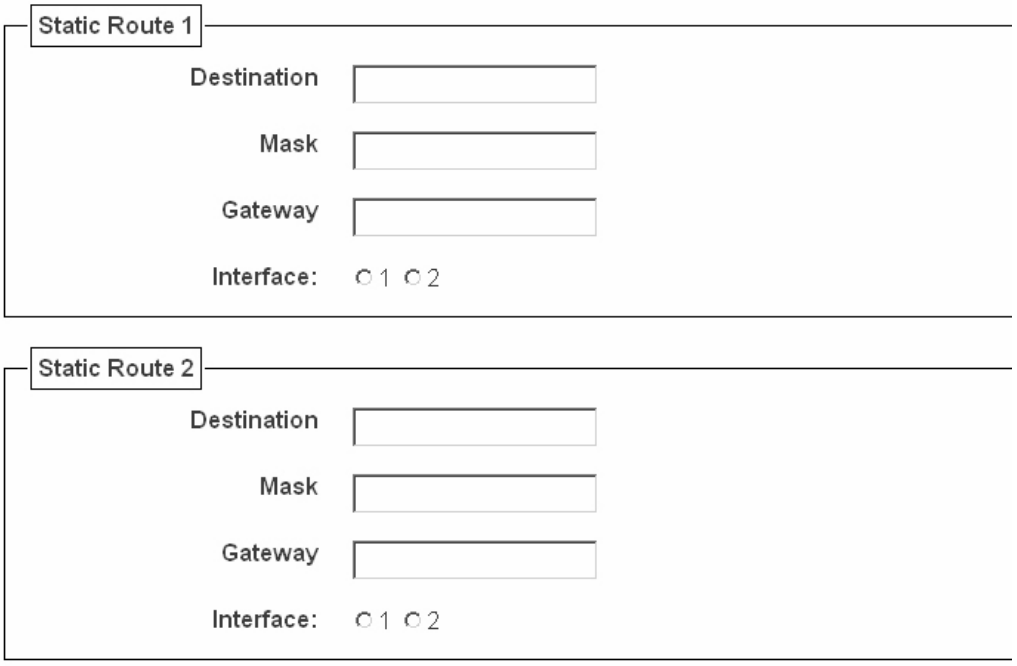

Figure 8. TCP/IP Static Routes

Routing

The routing table tells the NIC which router or gateway to use to access other subnets or hosts. In most situations, you can simply add your router's IP address as the default router. All packets destined for other subnets will be forwarded to the default router for delivery to the destination host. If you have more complex routing requirements, add static routing entries for specific hosts or networks in the remaining Routing rows. Packets with IP addresses that match a given Destination and Mask (from the first two fields in a Routing row) will be routed to the router/gateway named in the third field. Packets which do not match any of the listed Destinations and Masks will be routed to the default router if one is set.

Wireless

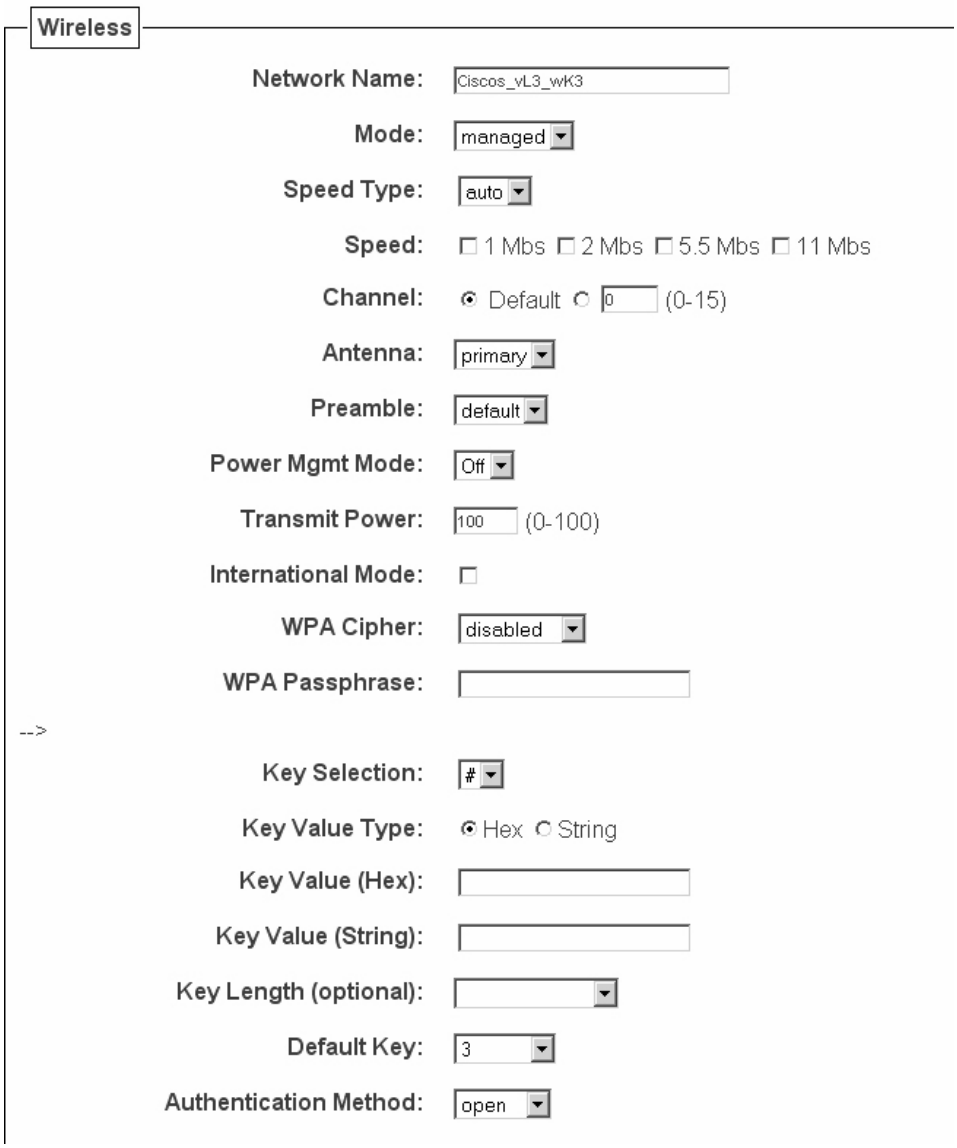

Figure 9. Wireless Network Configuration, 802.11b

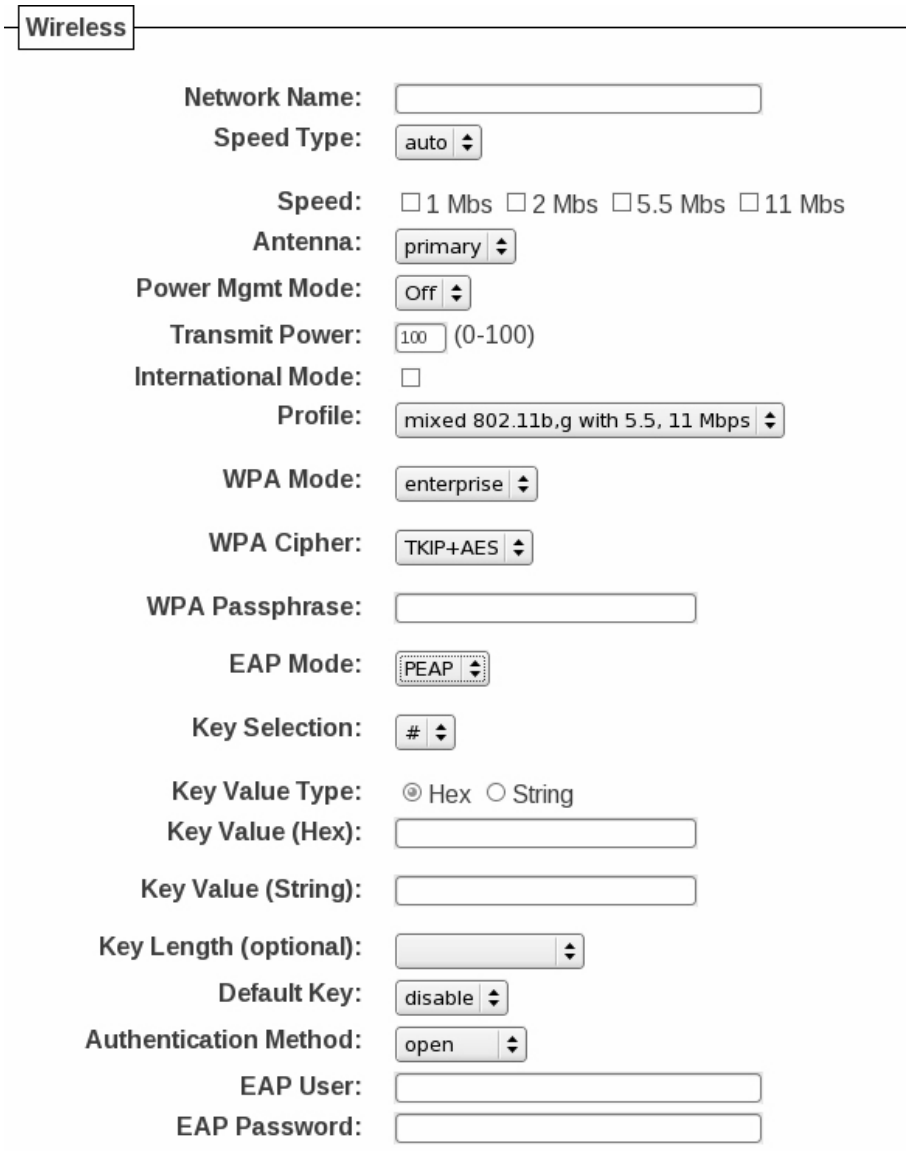

Figure 10. Wireless Network Configuration, 802.11b/g

Network Name

Enter the wireless network name. Maximum length of 32 characters.

Mode

NOTE: For 802.11b radio only, not 802.11g/b.

Set the mode of operation for the wireless device. Pseudo, Adhoc, and Managed are the available settings.

Speed Type

Change the selected bit-rates. Choosing "auto" will select auto settings even if some or all of the checkboxes are selected. To manually choose bit-rates, change speed option to "user" and check the appropriate checkboxes. If "user" is selected, and no checkboxes are checked, then the automatic setting is used.

Speed

Checkmark the appropriate checkboxes to manually choose the bit-rates.

NOTE: The Speed Type must be set to “user”. If "user" is selected, and no checkboxes are checked, then the automatic setting is used.

Channel

NOTE: For 802.11b radio only, not 802.11g/b.

This is the frequency used for wireless communication. The 2.4GHz band spectrum is divided into different channels (1-15). It is set to "Default" so that the NIC can detect the correct channel to communicate with the Access Point in infrastructure mode. If the operation mode is "Ad Hoc" and the channel is known, the user can set the corresponding channel in this menu.

Antenna

Choose the antenna type. Diverse, Primary, and Aux are the available settings.

Preamble

NOTE: For 802.11b radio only, not 802.11g/b.

This is the preamble used in the wireless packets. It is recommended to set to "Default" so that the NIC can detect the correct preamble. The preamble is approximately 8 bytes of the packet header generated by the AP is and attached to the packet prior to transmission. The preamble length is transmission data rate dependent. The "short" preamble is 50% shorter than the "long" preamble. Transmit power is 0–100%. It must match the Access Point's preamble configuration.

Power Mgmt Mode

Change the power management mode and adjust the power-save sleep time (milliseconds). Selecting "Off" will turn the Power Management Mode off and set the power-save sleep time to zero.

Transmit Power

Adjust RF transmit power in percent of full power.

International Mode

Set the International Mode option

Profile

NOTE: For 802.11b/g radio only.

Select the 802.11g Wireless (Wi-Fi) mode in which to operate. Available options include:

- 802.11b operation only
- mixed 802.11b and 802.11g operation
- mixed 802.11b and 802.11g operation without support for 5.5 and 11 Mbps basic rates
- 802.11g only operation
- test 802.11g operation
- 802.11b only operation without support for 5.5 and 11 Mbps basic rates
- mixed 802.11b and 802.11g operation with support for 5.5 and 11 Mbps basic rates (default)

WPA Mode

NOTE: For 802.11b/g radio only.

Select the WPA wireless security mode. Disabled (default), Personal, and Enterprise are the available settings.

WPA Cipher

NOTE: For 802.11b/g radio only.

Select the WPA Cipher setting. Disabled (default), TKIP, AES, and TKIP + AES are the available settings.

WPA Passphrase

NOTE: For 802.11b/g radio only.

Enter the WPA wireless security passphrase used to communicate with an access point. The passphrase entered must be between 8 and 63 characters long.

EAP Mode

NOTE: For 802.11b/g radio only.

Select the EAP authentication method. LEAP, PEAP, TTLS, and None are the available settings.

Key Selection

Change the key used for WEP encryption. Ascii-Hex Format. Ex: 01234-56789-abcd-ef01-2345-6789

Key Value Type

Select the type of WEP encryption key, either Hex or String.

Key Value (Hex)

Enter the key value in Hex format.

Key Value (String)

Enter the key value in string format.

Key Length (Optional)

Select the key length, 5 or 13.

Default Key

Change the default key number used for WEP encryption.

Authentication Method

Select the desired authentication method to be used when communicating with an access point.

EAP User

NOTE: For 802.11 b/g radio only.

Enter the EAP user name to be used when authenticating with an access point. Currently only used for EAP authentication.

EAP Password

NOTE: For 802.11b/g radio only.

Enter the EAP password to be used when authenticating with an access point. Currently only used for EAP authentication.

Windows Network (NetBIOS TCP/IP)

TCP/IP is used for Windows (i.e. Windows NT, Windows 95, and Windows for Workgroups) printing unless another protocol like IPX is available. Therefore, mandatory TCP/IP settings (i.e. IP address and subnet mask) are necessary on the NIC. Go to "TCP/IP Network" on this form to fill in these settings if you haven't done so already.

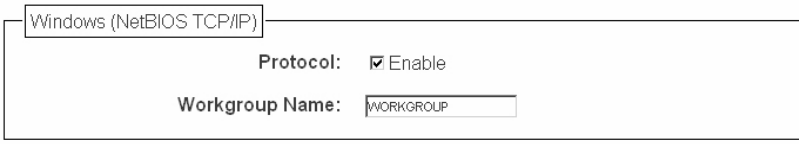

Figure 11. Setting Windows Protocol

Workgroup Name

This name specifies which Windows workgroup the NIC will reside in.

Print Path Configuration

The NIC print path is the path a print job takes when it reaches the network adapter. First the job goes to a destination/queue (e.g. d1prn) where it then passes through an associated model (e.g. m1) for extra processing and logpath (e.g. l1) for job and printer logging. Finally the job reaches the NIC's I/O port (e.g. PRN) where it passes through to the attached printer. The "Print Path" form displays one destination's settings at a time. From here, you can then select another destination or you can go directly to an I/O port to configure port settings.

Destination Settings

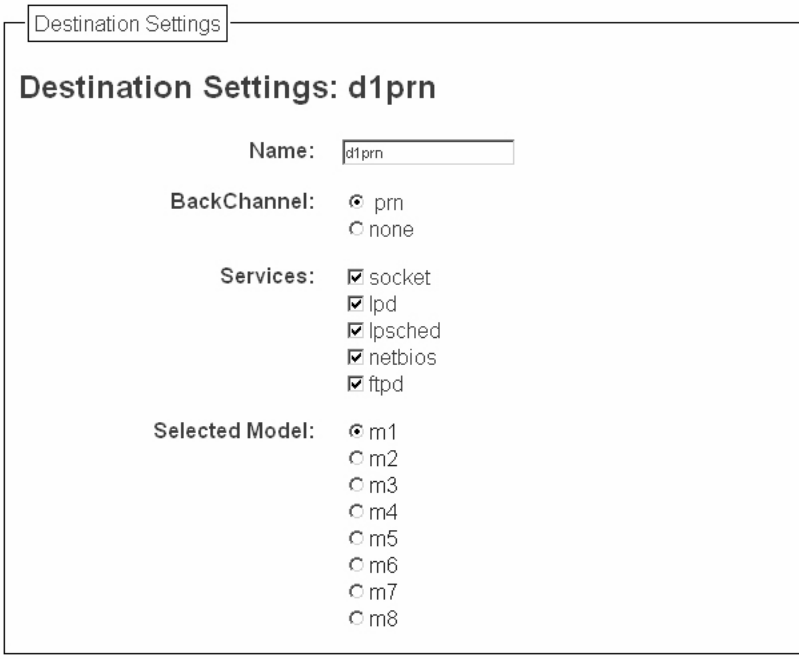

Figure 12. Print Path Configuration, Destination Settings

Name

Name of the destination. The default destination queue names are d1prn, d2prn, d3prn, d4prn, d5prn, d6prn, d7prn, and d8prn.

Back Channel

I/O port to receive printer feedback when a print job passes through this destination. By default, the backchannel for all print queues is enabled for ETHERNET and WLAN.

Services

Define what type(s) of print services the destination will support. By default all services enabled.

Parameter	
socket	Printing to a TCP port number (e.g. 9100) on the NIC
lpd	Remote printing using the Line Printer Daemon
lpsched	System V printing using the "lp" command
netbios	Printing from Windows stations relying on NetBIOS over TCP/IP
ftpd	printing using the File Transfer Protocol (FTP)
tn5250/3270	configuration print path using tn5250/3270 sessions

Selected Model

Defines the model configuration that is to be associated with the current destination. The default model names are m1, m2, m3, m4, m5, m6, m7, and m8.

Current Model Settings

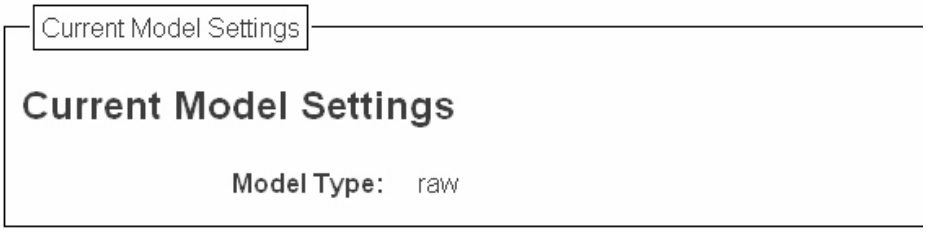

Figure 13. Print Path Configuration, Current Model Settings, Model Type

Model Type

The option is available on the Print Model web page. For a description, see page 63.

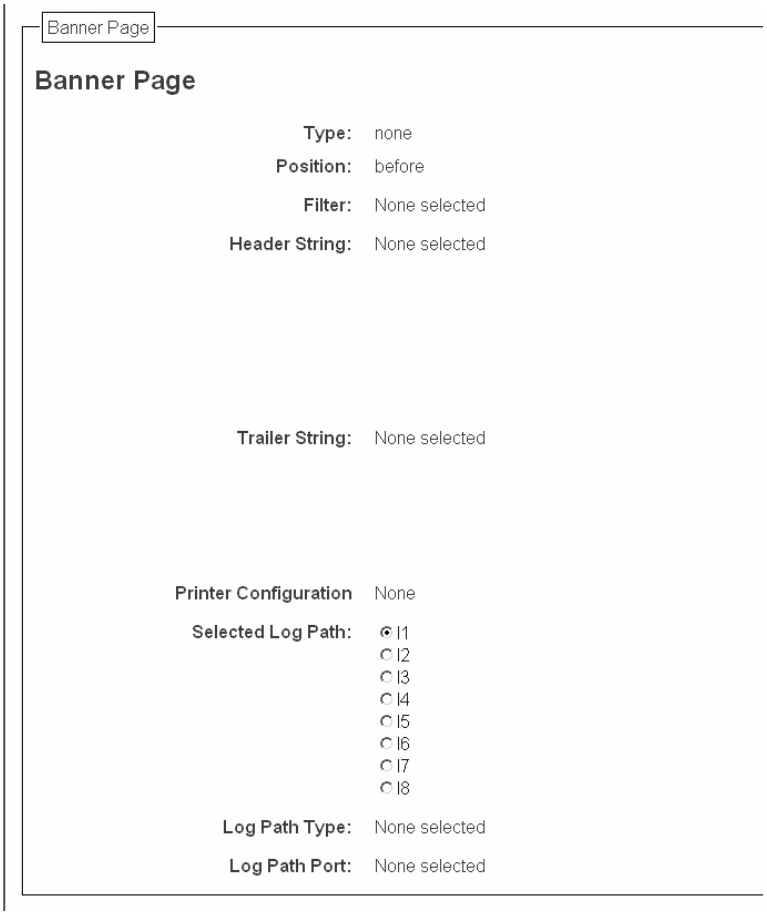

Figure 14. Print Path Configuration, Current Model Settings, Banner Page

Banner Page

The option is available on the Print Model web page. For a description, see page 64.

Filter

The option is available on the Print Model web page. For a description, see page 64.

Header String

The option is available on the Print Model web page. For a description, see page 64.

Trailer String

The option is available on the on the Print Model web page. For a description, see page 65.

Printer Configuration

The option is available on the Print Model web page. For a description, see page 65.

Selected Log Path

This option defines the log path configuration that is to be associated with the current destination.

Log Path Type

The option is available on the Log Path web page. For a description, see page 66.

Log Path Port

The option is available on the Log Path web page. For a description, see page 67.

Print Model Configuration

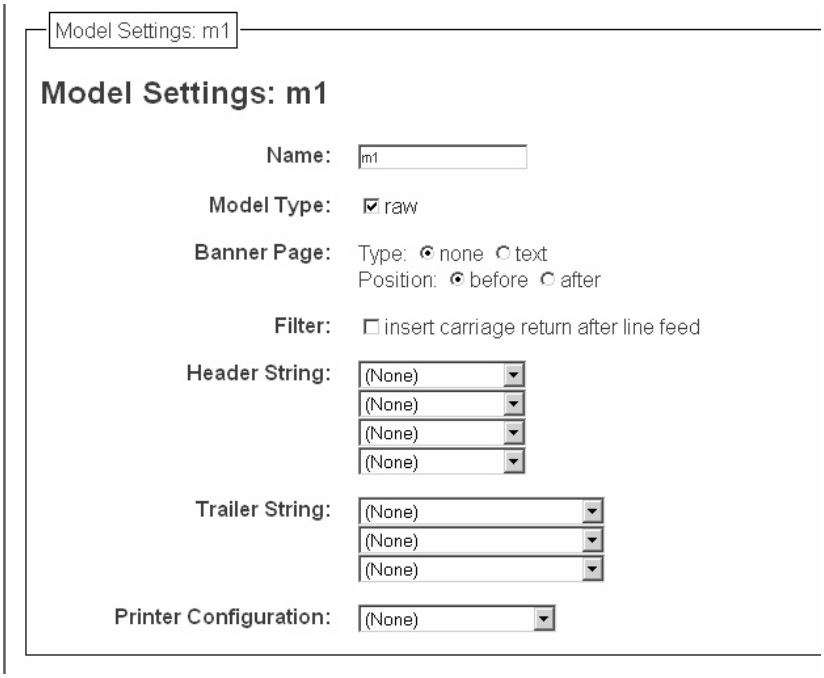

Figure 15. Print Model Configuration, Model Settings

Name

Name of the model. The default model names are m1, m2, m3, m4, m5, m6, m7, and m8.

Model Type

Define what processing (if any) will be performed on print jobs passing through the associated destination. If set to "raw", the job will not be touched by the network adapter.

Banner Page

Tells the Ethernet Interface to produce a banner page with each print job. The type of banner page data can be text. You can also specify whether the banner page should come at the front or the end of a print job.

NOTE: PPI emulations will not print a banner page unless “Auto Pass Thru” is selected under the PPI menu.

Filter

Specify whether the Ethernet Interface is to add carriage returns to print jobs passing through that contain solitary linefeeds. This is common with Unix text jobs resulting in stair-stepped output.

Header String

Define an escape sequence to be sent to the printer before each print job. For example, you may want to send a sequence to print the job in landscape mode or to a certain tray on the printer. You can specify up to four separate sequences per header string. The Ethernet Interface will execute them in order from top to bottom. If specifying fewer than four sequences, be sure to start at the top leaving undefined fields at the bottom.

NOTE: You can specify up to four separate sequences per header string. The Integrated PrintNet Enterprise will execute them in order from top to bottom. If specifying fewer than four sequences, be sure to start at the top leaving undefined fields at the bottom.

The most common sequences are listed on the form:

- **Print landscape** - tell the printer to print in landscape mode.
- **Print portrait** - tell the printer to print in portrait mode.

Trailer String

Define an escape sequence to be sent to the printer after each print job. For example, you may want to send a sequence to add a formfeed so you don't have to manually press the formfeed button on the printer. You may also want to tell the printer to reset itself in case you have set a header string which tells the printer to do something special with the job. You can specify up to three separate sequences per trailer string. The Ethernet Interface executes them in order from top to bottom. If specifying fewer than four sequences, be sure to start at the top leaving undefined fields at the bottom.

The most common sequence is listed on the form:

- **Formfeed** - tells the printer to do a formfeed at the end of the data.

Printer Configuration

Specify a printer configuration number to be loaded before processing the print job. This ability to associate a printer configurations to a logical printer model allows you to define up to eight unique and independent printer personalities in a single printer. Using this feature, you effectively have eight different printers in one.

To associate a printer configuration to the currently selected destination queue, just select the desired printer configuration number from the drop down list. Once a printer configuration has been associated with a destination queue, any print job sent to that destination queue name will cause the printer to load the associated printer configuration before processing the print job.

Log Path Configuration

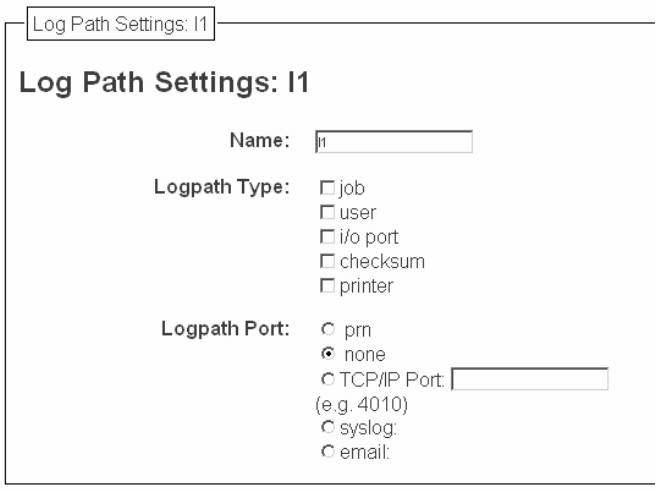

Figure 16. Log Path Settings

Name

Name of the log path. The default names are l1, l2, l3, l4, l5, l6, l7, and l8.

Logpath Type

Define what type of log information will be tracked for each print job passing through the associated destination. The types are:

- **job** - job ID, username, etc.
- **user** - user ID and three messages per job about the start and finish
- **checksum** - value used when troubleshooting integrity of data transferred
- **printer** - miscellaneous messages from the printer
- **i/o port** - status of the printer based on the port interface signals.

Logpath Port

Define where logging information for print jobs passing through the associated destination will be reported. The choices are:

- **prn** - reported to the PRN port
- **none** - don't report any logging information
- **TCP/IP port** - to a TCP port number (specified in the edit field)
- **syslog** - to a host (specified by the IP address in the edit field) running a SYSLOG daemon
- **email** - to an e-mail address (specified by the e-mail address and the SMTP server IP address edit fields). You can set the option on the Administration web page.

Default: no logging turned on.

TN5250/3270 Configuration

The TN5250/3270 configuration form allows you to specify settings for up to eight different TN5250/3270 sessions.

NOTE: The standard Printronix NIC module does not support TN5250/3270 protocol. However, the TN5250/3270 software is available as an option you can order or as factory installed.

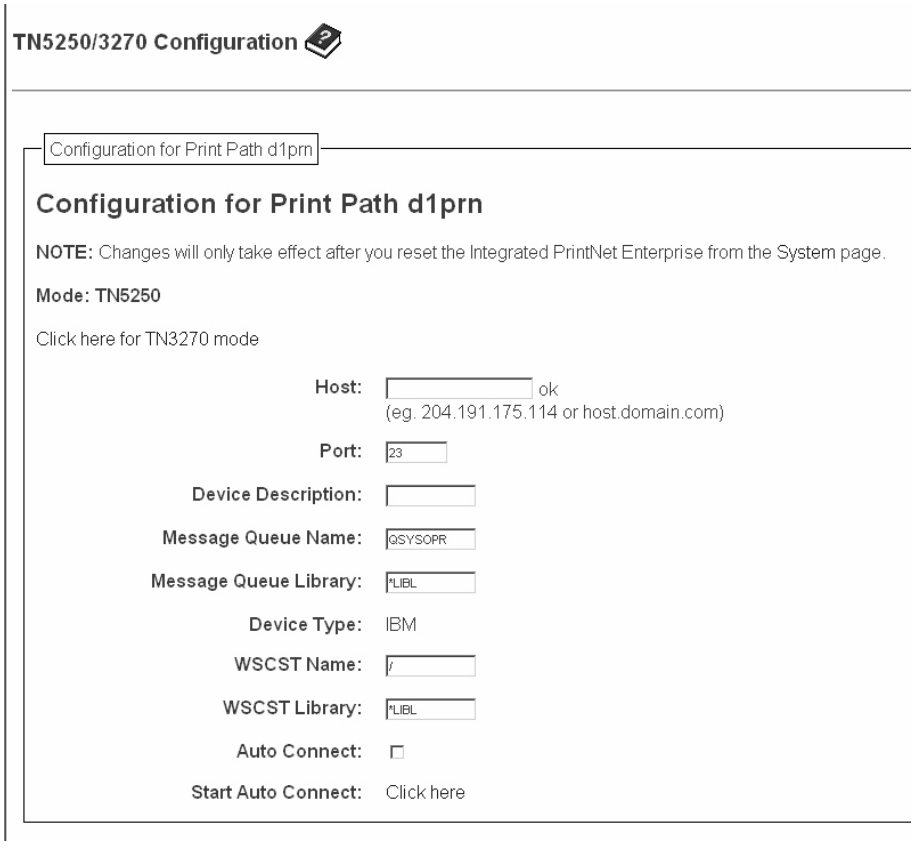

Figure 17. TN5250/3270 Configuration, TN5250 Mode

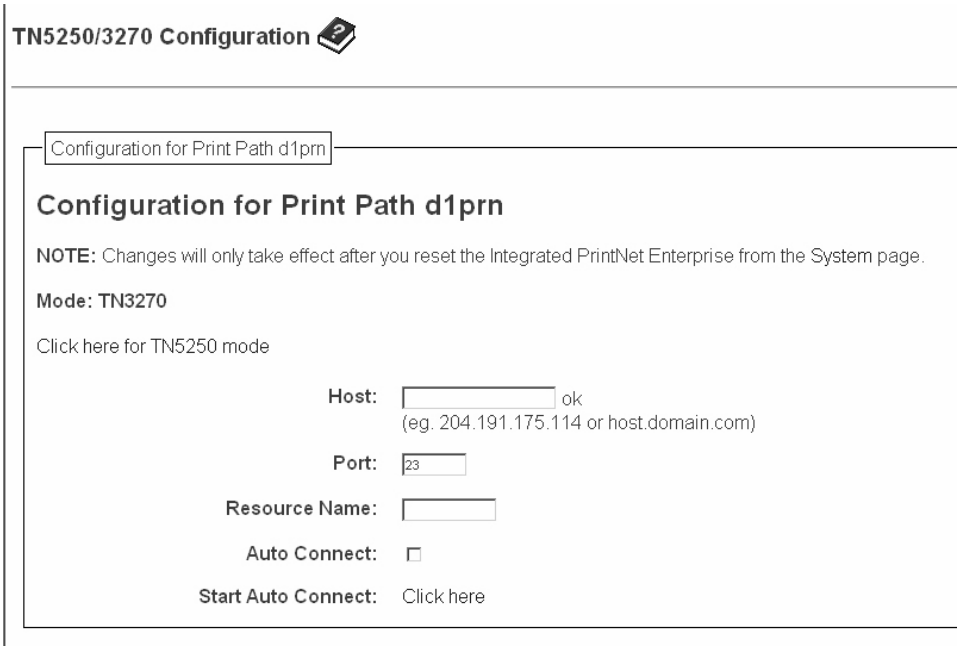

Figure 18. TN5250/3270 Configuration, TN3270 Mode

Mode

Specifies the TN protocol mode for the current configuration.

Default: TN5250

Host IP

Specifies the IP address or domain name of the host (AS/400 for TN5250) for the current configuration.

Default: Unconfigured (empty) host.

Port

Specifies the UDP port number of the TN5250 or TN3270 server for the current configuration.

Default: 23

Resource Name

(TN3270 mode) Specifies the name of the AS/400 LU session for the current configuration. The resource name entered will be the name of the printer device created on the AS/400 host for the current session. The name is limited to 10 characters in length, must start with an alpha character (a-z, A-Z), and contain only alphanumeric characters and underscores.

Default: Unconfigured (empty) resource name

Device Description

(TN5250 mode) Specifies the name of the printer device for the current configuration. The description entered will be the name of the printer device created on the AS/400 host for the current session. The name is limited to 10 characters in length, must start with an alpha character (a-z, A-Z), and contain only alphanumeric characters and underscores.

Default: Unconfigured (empty) description

Message Queue Name

(TN5250 mode) Specifies the queue name to which system messages will be logged.

Default: QSYSOPR

Message Queue Library

(TN5250 mode) Specifies the queue library to which system messages will be logged.

Default: *LIBL

Device Type

By default, the device type is always set to IBM.

WSCST Name

(TN5250 mode) As declared on the AS/400 host for the created printer device.

Default: *NONE

WSCST Library

(TN5250 mode) As declared on the AS/400 host for the created printer device.

Auto Connect

Specifies whether the NIC will automatically connect to the host.

Default: Disabled

Start/Stop Auto Connect

Specifies whether the NIC should retry automatic connection to the host.

Default: 'Start' if Auto Connect is currently stopped, 'Stop' if Auto Connect is currently started.

SNMP Configuration

The SNMP Configuration form allows you to configure SNMP trap managers and the e-mail alert features of NIC. It allows you to configure how SNMP alerts are processed by a SNMP trap manager, a Unix syslog logging daemon, and/or have e-mail notifications sent. Up to 10 SNMP trap managers and e-mail recipients may be specified. Individual alerts fall into one of 14 alert group categories, providing the ability to filter alert notices as desired.

SNMP Manager Alert Posting Settings

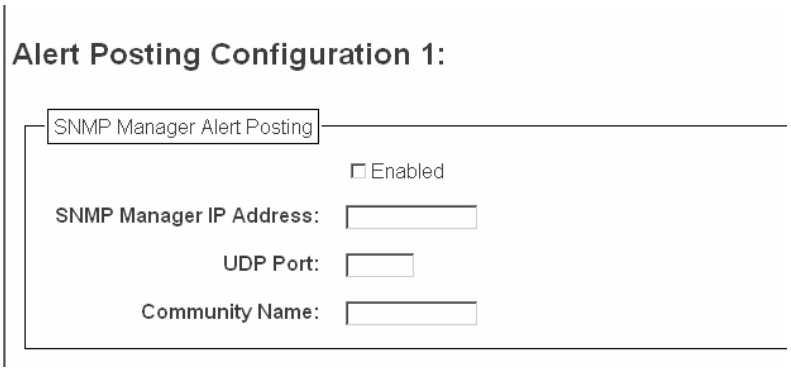

Figure 19. SNMP Manager Alert Posting Configuration

Specifies whether alerts from the enabled alert group categories for this configuration will be sent to the SNMP manager. If this option is enabled, the following information must be entered:

- **SNMP Manager IP Address** - specifies the IP address of the SNMP trap manager
- **UDP Port** - specifies the UDP port number used by the SNMP trap manager for receiving trap messages. Acceptable values are 162, and 49152 through 65535
- **Community Name** - up to 15 character string specifying the trap community name.

Syslog Alert Posting Settings

Figure 20. SNMP Syslog Alert Posting Configuration

Specifies whether alerts from the enabled alert group categories for this configuration will be sent to the Unix syslog daemon. If this option is enabled, the syslog daemon IP address must be entered in the syslog field in the System Information section of the Administration Configuration form.

Default: Disabled

E-mail Alert Posting Settings

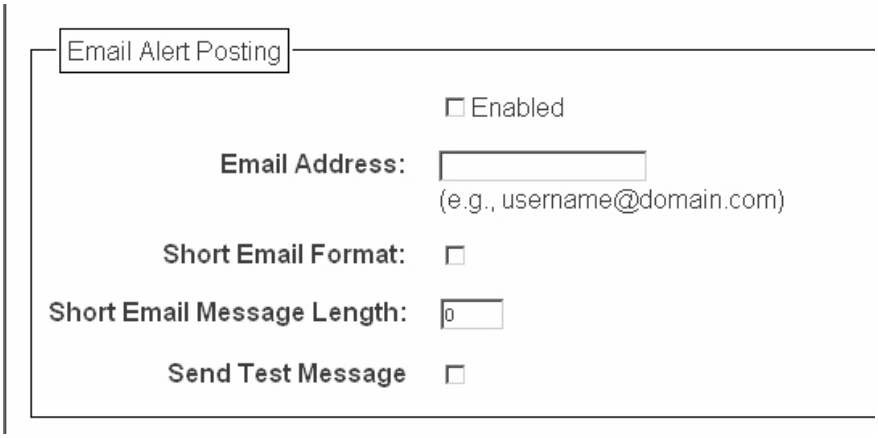

Figure 21. SNMP Email Alert Posting Configuration

Specifies whether alerts from the enabled alert group categories for this configuration will be sent to the specified e-mail address. If this option is enabled, the following information must be entered:

- **E-mail Address** - specifies an e-mail address to which alert information will be sent
- **Short E-mail Format** - specifies whether a short (15-80 character) alert e-mail message should be sent.

  If enabled, the message will contain the alert description, the severity level, device description, and device name (unless the length of the message exceeds the Short E-mail Message Length, in which case the message will be truncated).

  If disabled, the message will contain additional information including the device description, device name and location, alert description, alert group, alert severity level, and printer status.

  Default: Disabled
- **Short E-mail Message Length** - Specifies the maximum size of the short e-mail message. Acceptable values are 15 to 80 characters.

  Default: 80 characters
- **Send Test Message** - Provides a way to test the validity of the e-mail address/SMTP server address. If checked, a test message will be sent to the specified e-mail address when the submit button is pressed.

  Default: All alert groups are disabled by default.

If the alert message is to be sent to a cellular phone or pager, the Short E-mail Format option should be enabled. Once this option is enabled, you may specify the maximum e-mail message length (15-80 characters). When enabled, the message will contain the alert description, the severity level, device description, and device name (unless the length of the message exceeds the Short E-mail Message Length, in which case the message will be truncated).

If the Short E-mail format is disabled, the message will contain additional information including the device name and location, alert description, alert group, alert severity level, and printer status.

To test the validity of the e-mail address and the SMTP server address, enable the Send Test Message option. If the Send Test Message box is checked, a test message will be sent to the specified e-mail address when the submit button is pressed.

Alert Groups

Figure 22. SNMP Alert Groups Configuration

Specifies which alert groups are enabled for reporting for this configuration. When an alert occurs that is contained in one of the enabled alert groups, it will be posted to the specified SNMP manager, Unix syslog daemon, and/or e-mail address. The following table describes which printer events belongs to which Alert Group.

Default: All alert groups are enabled by default.

Table 2. Alert Groups and Printer Events

Alert Group	Printer Events
Warning	COMM Check Invalid Address CU Time Out CU Not Enabled File System Full File Exist Hex Dump Mode Half Speed Mode Printer Warm Print Head Warm 2B-Toner Density Too High 2C-Toner Density Too Low
Offline	Printer is Offline Hold Print Time Out
Media Input	Load Paper Paper Out Time Out Fanfold Paper Empty No Fanfold Paper 63-CutSheet Feeder Fail Cutsheet Pick Miss No Paper Tray Paper Jam at Entrance Cutsheet Cover Open Cutsheet Paper Empty Tray Mismatch

Table 2. Alert Groups and Printer Events

Alert Group	Printer Events
Media Output	Stacker Full Stacker Jam Time Out Stacker Full Time Out Stacker Fault Time Out Stacker Jam Stacker Fault Stack Over Flow Stack Under Flow Stacker Fail Stacker Interlock Fail Stacker Not Ready
Media Path	Clear Paper Jam Paper Jam Time Out Paper Jam Fuser Paper Jam Exit Cutsheet Path Open Paper Jam at Drum Paper Jam at Fuser Paper Jam at Exit Tractor MTR FWD Speed Error Tracker MTR BKWD Speed Error Paper Jam at Entrance Cutsheet Motor Fail Cutsheet Feeder Fail Clear Jam at Fuser Input Clear Jam at Fuser Exit Clear Jam Near TOF Lever

Table 2. Alert Groups and Printer Events

Alert Group	Printer Events
Marker	Ribbon Stall Time Out Ribbon Ink Out Ribbon Stall Ribbon Drive Shuttle Over Speed Ribbon Fault Ribbon Detected Print Head Up Ribbon Broken Ribbon Load Bad Ribbon Take-up Full 2A-Toner Empty Add Toner Install Toner Cup
Cutter	Cutter Fault Cutter Fail
Barcode	Barcode Fail Specification Barcode Quiet Zone Too Small Barcode Improper Data Format
Scanner	Unscannable Check Media Poor Scanning Check Head and Heat Poor Scanning Inspect Head Poor Scanning Check Media Contrast Too Low Check Media
Intervention	These are error messages that need some kind of user intervention to solve them.
Consumable	Ribbon Low Toner Low
Label	Label Present Gap Not Detected

Table 2. Alert Groups and Printer Events

Alert Group	Printer Events
Power Cart	Recharge Battery Batt High Volt Batt Low Volt
RFID	RFID Tag Failed RFID Max Retry RFID Comm Error RFID Read-Only Tag

NOTE: Not all of the alerts are available on all of the printers. The alerts available for monitoring will depend on the printer type and the options installed on the printer.

Administration Configuration

The Administration Configuration form is broken down into general print server-related settings and password security.

System Information

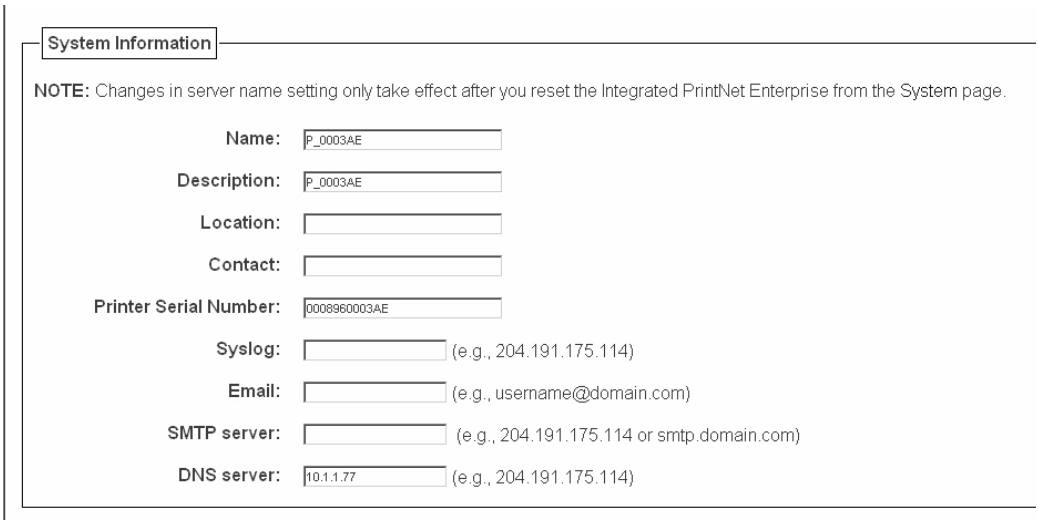

Figure 23. Administration Configuration, System Information

The System Information form allows you to specify the following information about the printer:

Name

Name given to the print server in Windows environment. The defaul name is “P_xxxxxx” where "xxxxxx" equals the last six digits of the NIC’s Ethernet address. (e.g. P_01001C).

Description

Optional field to help identify the printer’s features and capabilities.

Location

Optional field to help identify the printer’s physical location.

Contact

Optional field to help identify the individual or group responsible for the printer.

Printer Serial Number

Allows the user to enter the printer serial number. The field is blank by default.

NOTE: If the user has not entered a serial number through one of the NICs, depending on the printer type, the printer may use its internal serial number from EEPROM. If EEPROM is blank, i.e. no serial number on the board, it will use the MAC address of the embedded NIC, embedded wireless NIC, or external NIC, respectively, as the printer’s serial number.

Syslog

Specifies the IP address of a host running the SYSLOG daemon. NIC debugging or printer logging information can be sent to the IP address.

Email

Defines the user email address to receive printer and job logging information from log paths on the NIC.

Default: Unconfigured (empty).

SMTP Server

Specifies the IP address or domain name of the SMTP server to be used for processing email messages generated by the NIC.

Default: Unconfigured (empty).

DNS Server

Specifies the IP address of the domain name server to be used for resolving host names (e.g. host.domain.com) to IP addresses (e.g. 192.168.0.42).

Default: Unconfigured (empty).

NOTE: If the DNS server field is initially blank, the NIC will automatically use the IP address of the DNS server and enter it in the DNS server field when DHCP is enabled.

Passwords

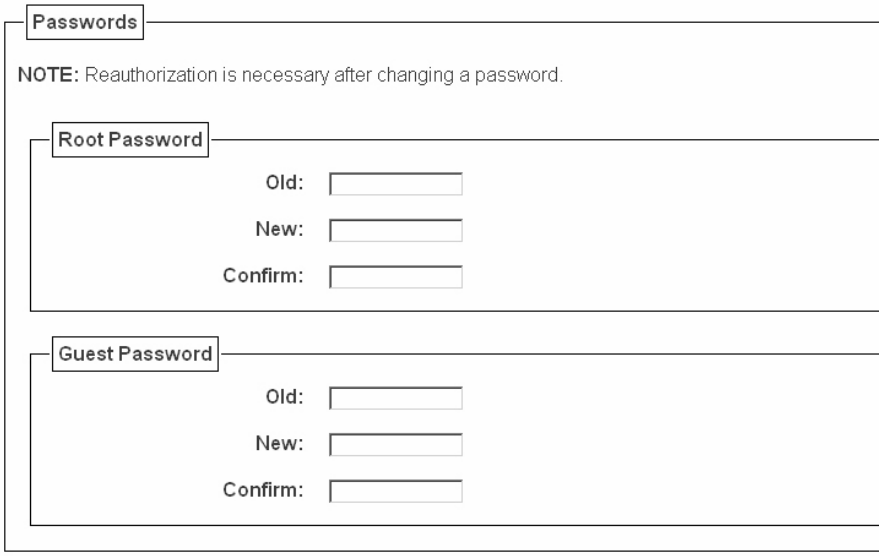

Figure 24. Administration Configuration, Passwords

Only a user with root privileges can alter the NIC's settings. Guest users can only view settings but cannot alter them. Both types of users can be assigned passwords. To change a password, type in the old password in the "Old" field. Then type the new password twice: once in the "New" field, and once in the "Confirm" field.

Default: No passwords for root or guest users.

System Configuration

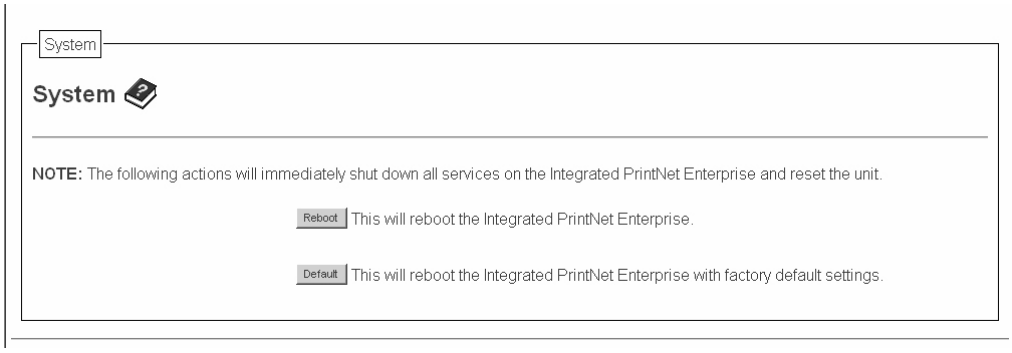

Figure 25. System Configuration

The System Configuration form allows you to change the NIC 's operation mode. Select "Reboot" to re-power the print server. Select "Default" to reset the print server and have it come up with factory default settings.

Security Configuration

The Security Configuration form allows you to configure the NIC's Kerberos authentication settings and to obtain the authenticated information. Kerberos is available only when a Symbol LA41X1 radio card is installed.

Kerberos Configuration

This section covers the configuration of Kerberos related settings. The two configuration settings include:

- **Print Server Settings** – Used to configure Kerberos settings related to the Print Server.
- **Key Distribution Center (KDC) Settings** – Used to configure the Kerberos settings related to the Kerberos server.

Print Server Settings

- **Print Server Name** – The Print Server name is used in the KDC database and can be configured in the Administration page. If this name is changed, the corresponding name in the KDC database must be changed accordingly to match it.

  Default: “p_xxxxxx” where “xxxxxx” is the serial number or the last six digits of the network adapter’s Ethernet address.

- **Renew Lifetime** – The maximum time allowed before a new Kerberos password is needed. If the password has not been changed within the renew lifetime, a warning message displays in the next logon. If the renew lifetime is zero, there is no time limit imposed on the password.

  Default: 0 seconds (no limit).

- **Enable Kerberos Authentication** – This check box is used to enable/disable the Kerberos authentication within the Print Server. If it is selected, the Print Server uses Kerberos to authenticate with the Access Point during its boot up process.

  Default: disabled (i.e. the check box is not selected).

Key Distribution Center (KDC) Settings

- **KDC Port** – The TCP port of the Kerberos server.

  Default: 88.

- **KDC Name** – The Kerberos server name.

  Default: krbtgt

- **KDC Realm** – The Kerberos realm in which the Kerberos server, the Access Point, and the Print Server are operating.

  Default: LOCALREALM

- **Clock Skew** – The maximum time difference allowed between the Kerberos server and the Print Server. This has to be the same setting in the Access Point.

  Default: 300 seconds.

- **Ticket Lifetime** – The maximum time allowed before the Print Server is required to get a new ticket.

  Default: 43200 seconds

Credentials Information

This section displays the Print Server's principal and its Kerberos ticket credentials after the Print Server has authenticated with the Access Point.

Status

The Status menu items allow you to view the current status of both the printer and the network. The submenu items available are as follows:

- **I/O Port** - this menu item allows you to view the current status of the printer, including the print jobs that are queued or are currently active.
- **Network** - this menu item allows you to view the current status of the network connection.

Status - I/O Port

The I/O Port Status form allows you to remotely see what is happening on the NIC I/O port. The port's status and a list of active and queued jobs will be displayed. You can cancel a job (as long as you have permission) by clicking the Cancel icon beside the desired job. If you see "waiting" in the "Status" line, this indicates the network adapter is either waiting for data from the host or for feedback from the printer. If you see "blocked" in this line, this indicates the printer is not allowing the NIC to send any more data. The printer could be busy processing data it has already received or it could be in an error state.

The printer status display is automatically refreshed every minute.

NOTE: You cannot cancel a print job with an IPDS Emulation. Do not click the Cancel icon.

The printer's buffer size may not allow you to monitor the real time status of the printer and the print job at the same time. The status feedback to the host usually reads "printer idle" unless the print job is significantly large.

Status - Network

This form allows you to view the current status of the network. The statistical data provided is broken down by network protocol. You can use this form to troubleshoot network-related problems.

Help

General help information is available online. It provides assistance with the configuration and status reference for the Integrated PrintNet Enterprise network adapter. Through the provided HTML forms, you can configure settings on the Integrated PrintNet Enterprise and view printer status.

Chapter 3 Help

4 *Windows Configuration*

Overview

This chapter details a complete Windows configuration setup including:

- Identifying the NIC on the network using TCP/IP as the underlying protocol
- Configuring the NIC with its mandatory TCP/IP settings (IP address and subnet mask)
- Configuring a new printer on the Windows station

Windows Environment Description

The NIC supports network printing under Windows environments by using TCP/IP. In a Windows NT®/Vista® setup, pure TCP/IP is used as the network protocol whereas with Windows 95/98®, Windows Me®, NetBIOS is used over TCP/IP.

Windows NIC Configuration

The IP address and subnet mask are mandatory TCP/IP settings and are needed before the print server can be detected on the network. There are also additional optional settings. This section offers alternative methods for configuring your NIC in a Windows environment and describes some of the more common optional settings available.

Mandatory

Since TCP/IP is used for Windows printing, the NIC must be configured with a minimum of an IP address and subnet mask before it can be seen on the network.

Optional

Additional settings, like routing entries, can be configured. This allows communication across subnets when no other router exists.

You can configure the NIC done from the printer control panel, Web browser, host commands, or other Printronix utility software. To configure these options, see “Configuration Tools” on page 25.

Configuration Using ARP

To configure the NIC with its IP settings using a manual `arp` command:

1. Log on to a Windows station with TCP/IP loaded and located on the same subnet as the NIC.
2. Find the Ethernet address for the NIC on the configuration printout. It must be entered as part of this procedure.

3. Use the `arp` command to add an entry into the Windows station ARP table for the NIC. This is the most common syntax for this command:

   Syntax:

   `arp -s` *`ipaddress ethernetaddress`*

   Example for Microsoft® TCP stacks:

   `arp -s 192.75.11.9 00-08-96-07-00-60`

   This example specifies a NIC using IP address `192.75.11.9` and Ethernet address `00-08-96-07-00-60`.

4. Check if the ARP entry was accepted.

   `arp -a`

   You should see an entry in the listed ARP table with the IP address and Ethernet address specified in Step 3.

5. **`Ping`** this IP address to see if the NIC can be seen on your network.

   At this point, you should be able to communicate with the NIC from your local Windows station. This means the print server knows about an IP address and subnet mask and has these settings in its current memory. However, if the NIC is power cycled, these settings will disappear unless you store them into flash memory. To do this:

   a. Load a Web browser on your Windows station and direct it to the URL:
      `http://`*`NICIPaddress`*`/networkConf.html`
      (e.g., `http://192.75.11.9/networkConf.html`).

   NOTE: If prompted for a "User ID" and password first, type **`root`** for the ID and press ENTER at the password prompt (since there is no password by default).

   b. At the "Network Configuration" HTML form that displays, click in the field below the "IP Address" heading and type in the IP address for the NIC.

c. Under the “Subnet Mask” heading, enter the NIC subnet mask.

NOTE: If you would like to communicate with the NIC from across routers, you will need to fill in an entry within the “Routing” section. Please see “Communicating Across Routers” on page 92 for more details.

6. Click on the SUBMIT button when done and physically repower the printer to make the new settings take effect.

Communicating Across Routers

Since Windows environments rely on TCP/IP to communicate with the NIC, crossing routers becomes an issue.

After you have followed one of the NIC configuration methods mentioned, most likely you will only be able to communicate with the print server from the same subnet. This means any hosts across a router will not be able to see your NIC. In order for hosts across a router to see your NIC, store a default router/gateway within the print server so that any packets destined for another subnet get forwarded to this router automatically. The router (or series of routers) can then take over, ensuring the packets get to their final destination on another subnet on your network.

To configure a default router/gateway within the NIC:

1. Load a Web browser on your Windows station and direct it to the URL:
   `http://`*`NICIPaddress`*`/networkConf.html`
   (e.g., `http://192.75.11.9/networkConf.html`).

NOTE: If prompted for a “User ID” and password first, type in **`root`** for the ID and press ENTER at the password prompt (since there is no password by default).

2. At the “Network Configuration” HTML form that displays, click in the first field below the “Gateway” heading and type in the IP address of the default router/gateway for the NIC subnet.

3. Click on the SUBMIT button when done and physically repower the print server to make the new settings take effect.

Changing Workgroup Names

Windows environments define groups of related computers as "workgroups." By default, "WORKGROUP" is the name that is assigned to the NIC workgroup. However, you may want to change this to suit your network better. To do this:

1. Load a Web browser on your Windows station and direct it to the URL:
   `http://`*`NICIPaddress`*`/networkConf.html`
   (e.g., `http://192.75.11.9/networkConf.html`).

NOTE: If prompted for a "User ID" and password first, type in **`root`** for the ID and press ENTER at the password prompt (since there is no password by default).

2. At the "Network Configuration" HTML form that displays, search for the "Windows (NetBIOS TCP/IP)" section and highlight the "Workgroup Name" field.
3. Type in the new workgroup name for the NIC.
4. Click on the SUBMIT button when done and physically repower the print server to make the new settings take effect.

Changing Destination Names

When defining some printers within Windows environments, the NIC requires that you specify a predefined destination rather than any name you would like. For example, when creating a new printer under Windows NT, a screen similar to Figure 26 displays.

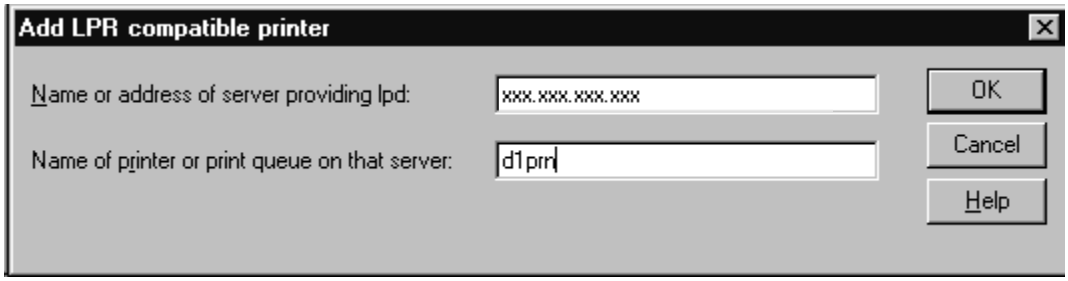

Figure 26. Windows NT Print Setup Dialogue Box

The first field requires the IP address for the NIC, and the second field must be filled in with a valid destination from the print server (e.g., d1prn). Otherwise, LPR will not be able to access the printer. Table 3 outlines the default destinations to choose from.

Table 3. NIC Default Destinations

Destination	Mapped I/O Port
d1prn	PRN
d2prn	PRN
d3prn	PRN
d4prn	PRN
d5prn	PRN
d6prn	PRN
d7prn	PRN
d8prn	PRN

This name can be changed to something more meaningful using the built-in HTML forms. To do this:

1. Load a Web browser on your Windows station and direct it to the URL:
   `http://`*`NICIPaddress`*`/destConf.html`
   (e.g., `http://192.75.11.9/networkConf.html`).

NOTE: If prompted for a "User ID" and password first, type in **`root`** for the ID and press ENTER at the password prompt (since there is no password by default).

2. At the "Print Path Configuration" HTML form that displays, select a destination link from the top of the page to bring up the appropriate destination form. By default, you should see a line near the top of the form showing the destinations listed in Table 3.
3. Once the desired destination HTML form displays, highlight the "Name" field and type in the new name for this destination.
4. Click on the SUBMIT button when done and physically repower the print server to make the new setting take effect.

Windows Host Configuration

This section covers Windows Vista, XP, 2000, and 2003 Server printer setup.

Printer Driver Setup Wizard

1. Select Windows Drivers from the CD. The Printer Driver Setup Wizard window displays.

Figure 27. Setting Up the Printronix Printer Driver

2. Click **Next**. The Welcome to the Add Printer Wizard window displays.
3. Click **Next**.
4. Select the type of printer to set up and click **Next**. For this example, select **Local printer attached to this computer**.

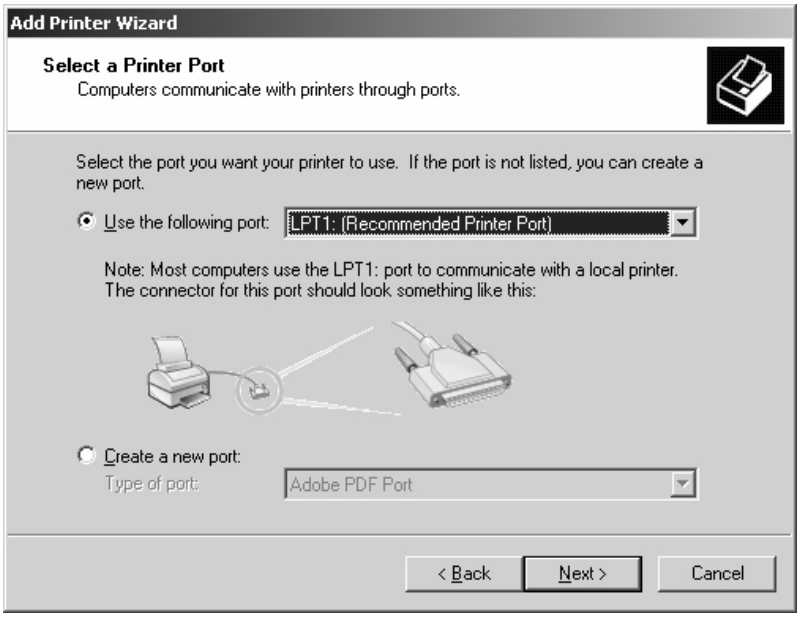

Figure 28. Selecting a Printer Port

5. Select a port for the printer to use and click **Next**. For this example, select **LPT1:(Recommended printer Port)**.

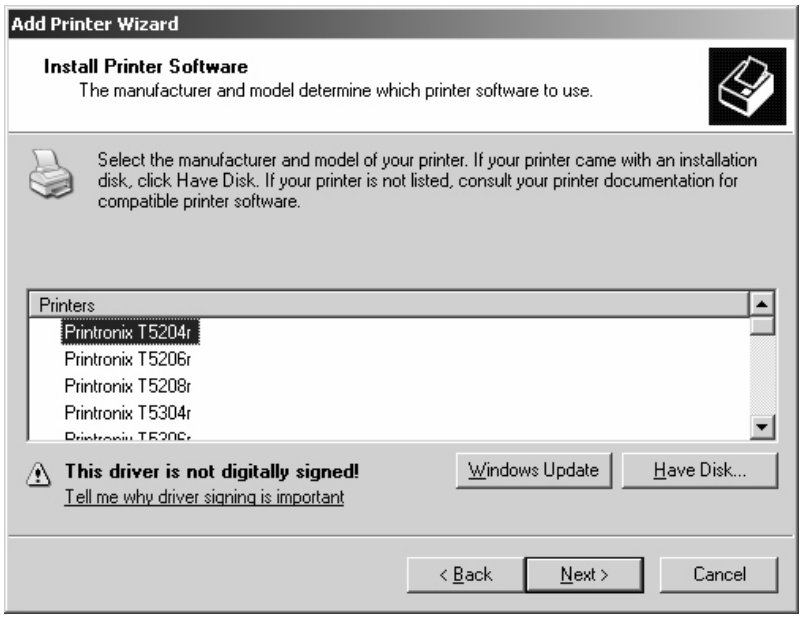

Figure 29. Selecting a Printer Driver

6. Select the Printronix printer driver and click **Next**.
7. Enter a printer name and specify whether to have this printer set up as the default printer, then click **Next**. For this example, select **No**. By default the printer you selected in the previous step is entered.
8. Select **Do not share this printer** and click **Next**. You are prompted to print a test page.
9. Select **No** and click **Next**.

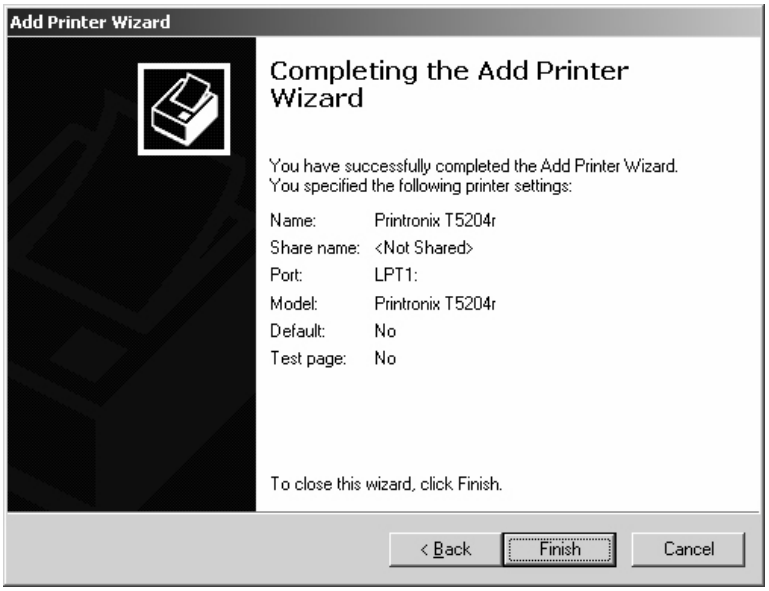

Figure 30. Printer Driver Installation Completion

10. Click **Finish** to complete the add printer wizard.
11. Click **Finish**. You have successfully installed your printer driver. Next the printer setup wizard will guide you through basic printer setup.

Windows Driver Usage Information

Refer to the online help file for important Windows driver usage information, restrictions, and limitations. Online help information is available in the driver properties dialog box.

Network Setup Wizard

The network and Printer Setup Wizard helps you configure both your printer and your printer's network adapter. To use the setup wizard, install the application similarly to the way you installed the printer driver. Once installed, launch the application and follow the prompt on the screen.

When the setup wizard is launched, specify the operation you want to perform. It can be either setting up the network adapter or the printer. If network settings is selected, the wizard will guide you through the process of setting up either your wired network and/or your wireless network.

NOTE: You do not need to install a Windows driver before you can use the setup wizard to configure your network adapter.

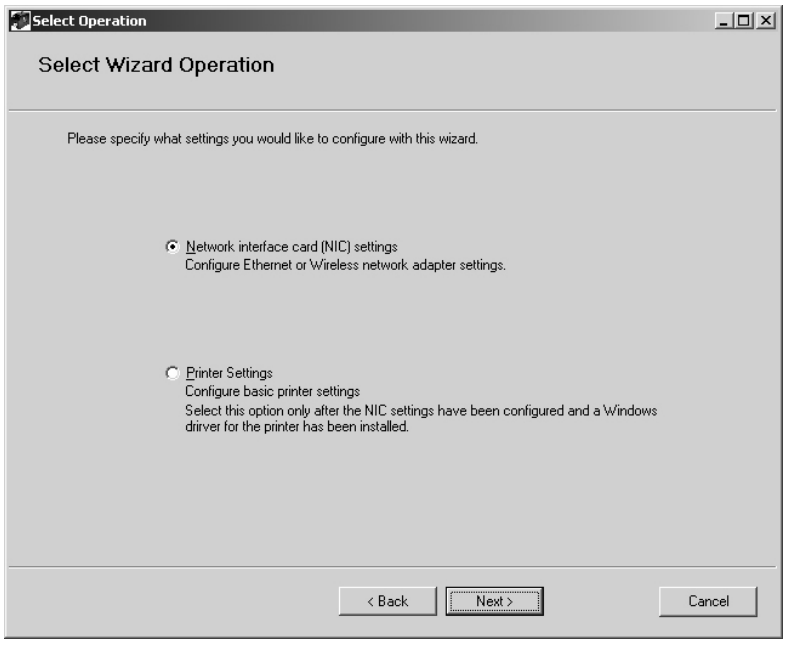

Figure 31. Selecting Configuration Settings

If you wish to use the setup wizard to configure your printer, first install a Windows driver. If a Windows driver has not been installed, the setup wizard will ask whether you want to install a Windows driver now. If yes, the setup wizard will guide you through the installation process.

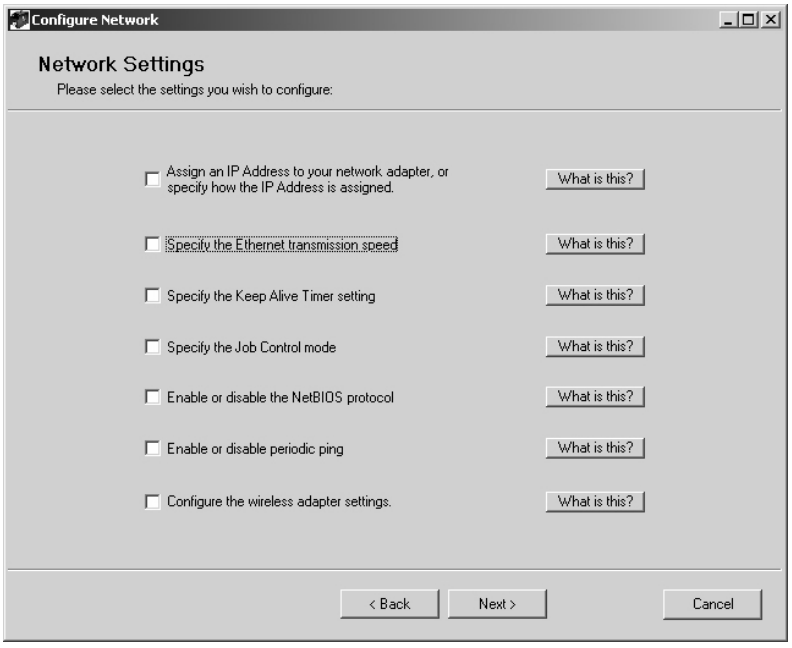

Figure 32. Configuring Network Settings

Once a Windows driver has been installed, you are prompted to select a printer driver. The printer associated with that driver will be configured based on your input. You can use the Printer Setup Wizard to configure your media handling and emulation settings.

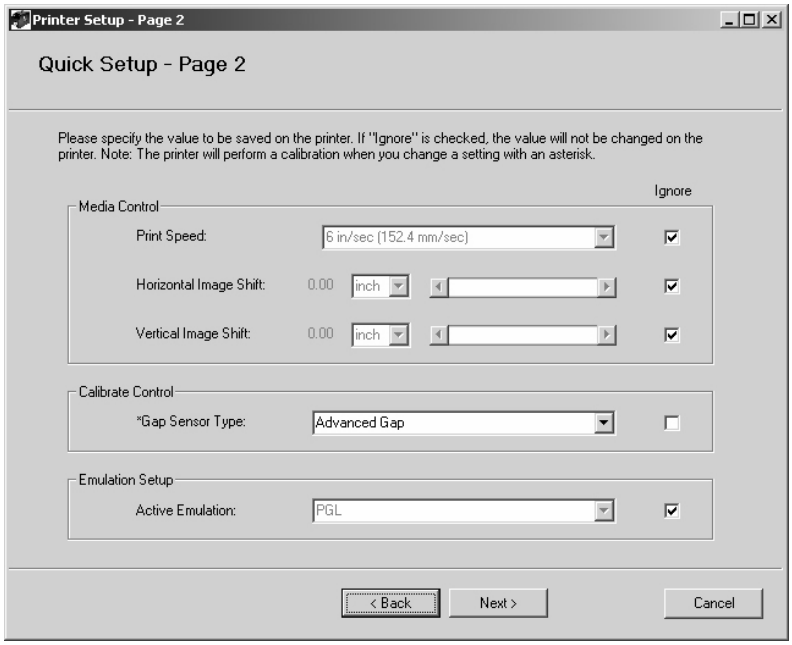

Figure 33. Configuring Printer Settings

Since you can save the setting for both your network and printer configuration, the setup wizard is ideal for bulk printer configurations. Set up the network and printer once, and then download those settings to other printers as required.

5 *Unix Configuration*

Overview

This chapter details a complete Unix setup including:

- Configuring the NIC with its mandatory TCP/IP settings (e.g., IP address and subnet mask).
- Configuring the Unix host station with a new printer.

Unix Environment Description

The NIC supports network printing under various TCP/IP environments including all variations of Unix. Printing can come from multiple hosts directly or through central spooling machines.

Unix NIC Configuration

There are mandatory settings needed before the print server can be detected on the network, as well as some additional optional settings. This section offers alternative methods for configuring your NIC and mentions some of the more common optional settings available.

Mandatory

Since TCP/IP is used, the NIC must be configured with a minimum of an IP address and subnet mask before it can be seen on the network. To configure these options, see “Configuration Tools” on page 25.

Optional

Additional settings, like routing entries, can be configured allowing for communication across subnets.

Configuration of the NIC can be done from the control panel or through host commands. To configure these options, see “Configuration Tools” on page 25.

Using ARP

To configure the Ethernet Interface with its TCP/IP settings using a manual `arp` command, the syntax is:

`arp -s` *`ipaddress ethernetaddress`*

For the `aix` command, the syntax is:

`aix -s` *`ether ipaddress Mac_address`*

To use either of these commands:

1. Log on to a Unix station as **`superuser`** or **`root`**. This station must be located on the same subnet as the NIC since ARP is limited to subnets.

2. Find the Ethernet address for the NIC by printing a configuration or reading it from the control panel. It must be entered as part of this procedure.
3. Use the `arp` command to add an entry into the Unix station ARP table for this NIC. Here is the most common syntax for this command:

   `arp -s` *`ipaddress ethernetaddress`*

   Example for Microsoft TCP stacks:

   `arp -s 192.75.11.9 00:08:96:07:00:60`

   This example specifies a NIC using IP address `192.75.11.9` and Ethernet address `00:08:96:07:00:60`.
4. Verify that the ARP entry was properly applied.

   `arp -a`

   You should see an entry in the listed ARP table with the IP address and Ethernet address specified in step 3.
5. Try to **`ping`** this IP address to see if the NIC can be seen on your network.

At this point, you should be able to communicate with the NIC from your local Unix station. This means the printer knows about an IP address and subnet mask and has these settings in its current memory. However, if the NIC is shut off, these settings will be lost unless you store them in flash memory, as follows:

1. Load a Web browser on your Windows station and direct it to the URL:
   `http://`*`NICIPaddress`*`/networkConf.html`
   (e.g., `http://192.75.11.9/networkConf.html`).

NOTE: If prompted for a “User ID” and password first, type in **`root`** for the ID and press ENTER at the password prompt (since there is no default password).

2. At the “Network Configuration” HTML form that displays, click in the field below the “IP Address” heading and type in the IP address for the NIC.

3. Under the **Subnet Mask** heading, enter the NIC subnet mask.

NOTE: If you would like to communicate with the NIC from across routers, you will need to fill in an entry within the “Routing” section. Please see “Communicating Across Routers” on page 108 for further details.

4. Click the **Submit** button when done and physically repower the print server to make sure the new settings are in effect.

Using RARP

RARP allows you to dynamically assign an IP address to the NIC upon bootup. To configure the NIC with its TCP/IP settings using RARP:

1. On your RARP server, make an entry in the /etc/ethers file for the NIC.

   Syntax:

   ethernetaddress NICIPaddress

   Example:

   `00:08:96:07:00:60 192.75.11.9`

2. Start the RARP daemon on the RARP server if not already running. If it is running, send an HUP signal to it with the `kill` command:

   Syntax:

   `kill -HUP` *pid*

   where *pid* is the process ID of the RARP daemon.

3. Power on the NIC so that it immediately sends out an RARP request. Wait one minute to allow the address assignment process to complete. You should see the STAT LED on the NIC interface slow down, indicating it knows about an IP address to use.

4. Try to **ping** the NIC IP address from a local Unix station to see if it can be seen on your network.

NOTE: You will only be able to communicate with the NIC from a network station on the same subnet as the print server. The NIC needs to be told about a default router/gateway so any packets that come in from a different subnet can be returned via this gateway. Please see “Communicating Across Routers” on page 108 to set this up.

Using BOOTP

BOOTP allows you to dynamically assign an IP address to the NIC upon bootup. In addition, the BOOTP server can provide additional details like a default router/gateway address. To configure the NIC with its TCP/IP settings using BOOTP:

1. On your BOOTP server, make an entry in the /etc/bootptab file for the NIC.

   Syntax:

   ***NICIPname*:**
   :sm=*netmask*:
   :hd=*homedirectory*:
   :bf=*null*:
   :gw=*defaultgateway*:
   :ht=*ethernet*:
   :ha=*ethernetaddress*:
   :ip=ipaddress:
   :ts=*timeserver*:
   :to=*timezone*:

   Example:

   ```
   spike:\
   :sm=255.255.255.0:\
   :hd=/usr/null:\
   :bf=null:\
   :gw=192.75.11.1:\
   :ht=ethernet:\
   :ha=000896070060:\
   :ip=192.75.11.9:\
   :ts=192.75.11.7:\
   :to=25200:
   ```

2. Turn the NIC on so that it immediately sends out a BOOTP request. Wait one minute to allow the IP address assignment process to complete. You should see the STAT LED (on the NIC interface) slow down, indicating it knows about an IP address to use.
3. Try to **`ping`** the NIC IP address from a network station to see if it can be seen on your network.

NOTE: You will be able to communicate with the NIC from network stations on different subnets if the print server has been told about its default router/gateway in the BOOTP response from the BOOTP server.

Communicating Across Routers

Since Unix environments rely on TCP/IP to communicate with the NIC, crossing routers becomes an issue.

After you have followed one of the NIC configuration methods mentioned (other than the BOOTP method), most likely, you will only be able to communicate with the print server from the same subnet. This means any host across a router will not be able to see your NIC. In order to communicate across a router, store a default router/gateway within the print server so that any packets destined for another subnet get forwarded to this router automatically. The router (or series of routers) can then take over the process of ensuring the packets get to their final destination on another subnet on your network.

To configure a default router/gateway within the NIC:

1. Load a Web browser on your Windows station and direct it to the URL:
   `http://`*`NICIPaddress`*`/networkConf.html`
   (e.g., `http://192.75.11.9/networkConf.html`).

NOTE: If prompted for a User ID and password first, type in **`root`** for the ID and press ENTER at the password prompt (since there is no default password).

2. At the **Network Configuration** HTML form that displays, click the first field below **Gateway** and type in the IP address of the default router/gateway for the NIC subnet.
3. Click **Submit** when done and physically repower the print server to make sure the new setting is in effect.

Unix Host Configuration

There may be times when you would prefer or have to perform the manual setup steps for a new printer definition. There may also be times when you require a less common print solution such as direct socket capabilities. This section covers these additional setups.

Manual System V Host Setup

This setup involves any Unix operating system using System V print spooling (e.g., SCO, Solaris®, HP-UX®, DG/UX®, etc.). This means an interface file is used for each defined printer and, in the case of any System V print setup involving a NIC, the RSHD protocol is used to transfer data from the host to the print server.

To manually configure a new System V printer on a Unix station, create a dummy device file that acts as a locking mechanism between contending print jobs.

Syntax:

`touch /dev/`*`NICname.portname`*

where *NICname* is the host or IP name of the print server and *portname* is one of its four I/O ports.

Example:

```
touch /dev/spike.prn
```

NIC Installation on HP-UX

LPR is supported in HP/UX Version 9.0 and greater. To configure a print queue using LPR, issue the following commands.

NOTE: Requires root privilege. The default BSD interface file "rmodel" will be used.

Syntax:

```
lpshut
lpadmin -pqueue_name -mrmodel -v/dev/null
-orm[printer_ip] -orpd1prn -ob3
lpsched
accept queue_name
enable queue_name
```

queue_name = any unique printer name

[printer_ip] = IP address of the printer or the DNS name (without brackets)

d1prn = NIC remote printer name*

Explanation of command line:

-m indicates the model rmodel

-v indicates the use of /dev/null as a file interlock to avoid contention

-orm is the name of remote Print Server

-orp is the name of the remote printer on the remote Print Server

-ob3 declares that the remote Print Server is a BSD type

NOTE: The "lpshut" command stops the HP spooling system; do not perform when print jobs are active.

The default NIC destination name is d1prn, however, this name can be changed. To verify the queue name, print an Ethernet Test Page or telnet to the adapter and run a "list dest" command.

To print to this queue, use normal lp syntax:

```
# lp -dqueue_name filename
```

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NOTE: Requires Superuser privilege in the borne shell. Assume that you can ping and Telnet to the adapter.

The IP address of the NIC adapter must be placed in the /etc/hosts file.

Syntax:

```
lpadmin -p [queue_name] -v /dev/null
lpadmin -p [queue_name] -i /usr/lib/lp/model/
netstandard
lpadmin -p [queue_name] -o dest=[host_name] -o
protocol=bsd -o timeout=60
lpadmin -p [queue_name] -s [host_name]!d1prn -I any
enable {queue_name]
accept [queue_name]
```

where

[queue _name] = any name, but not the name in the etc/hosts file or d1prn

[host_name] = name in etc/hosts file

Troubleshooting

This installation procedure assumes that the NIC adapter is configured with the correct IP address, subnet mask, and gateway (if required). You can also ping and telnet to the NIC adapter.

Print an E-Net Test Page to verify the Ethernet settings.
See “Printing A NIC Test Page” on page 26.

The default NIC queue name is d1prn, however, the name can be changed. To verify the queue name, print an E-Net Test Page or telnet to the adapter and run a “list dest” command.

NOTE: Depending on the shell, preceed the ! character with a \ to avoid shell script errors.

Manual LPR/LPD Host Setup

The NIC also supports Unix operating systems which follow a BSD print system (e.g., SunOS 4.1.x). This means a printcap file is used to define all printers available on the host, and interface scripts are not commonly used. Instead, LPR/LPD printers are defined.

To manually configure an LPR/LPD printer on a BSD Unix system:

1. Define an entry for this new printer within the printcap file, /etc/printcap.

   Syntax:

   printername:
   :sh:pw#80:mx#0:
   :rm=*NICname*:
   :rp=*NICdestination*:
   :lp=:
   :sd=/usr/spool/lpd/*printername*:
   :lf=/usr/spool/lpd/*printername*/log:
   :af=/usr/spool/lpd/*printername*/acct:

   where *printername* is any name you would like to give to this new printer, *NICname* is the host or IP name of the print server, and *NICdestination* is one of the pre-defined destinations/queues on the device.

   Example:

   ```
   P5000:
   :sh:pw#80:mx#0:\
   :rm=spike:\
   :rp=d1prn:\
   :lp=:\
   :sd=/usr/spool/lpd/ P5000:\
   :lf=/usr/spool/lpd/ P5000/log:\
   :af=/usr/spool/lpd/ P5000/acct:
   ```

2. Create the spool directory specified by the `sd=` entry in the printcap entry for this printer.

   Example:

   ```
   touch /usr/spool/lpd/ P5000
   ```

3. Create the log and account files specified by the `lf=` and `af=` entries in the printcap entry for this printer.

   Example:

   ```
   touch /usr/spool/lpd/P5000/log
   touch /usr/spool/lpd/P5000/acct
   ```

4. Change permissions and ownership on the spool directory and everything within it.

   Example:

   ```
   chmod -R g+rwX,o+rX /usr/spool/lpd/ P5000
   chmod -R daemon.daemon /usr/spool/lpd/ P5000
   ```

5. Start the printer daemon for this new printer.

   Example:

   ```
   lpc start P5000
   ```

You now have a new printer which relies on LPR/LPD to print to a NIC printer. Use the following command to test printing:

Syntax:

`lpr -P` *`printername filename`*

Example:

```
lpr -P P5000 /etc/hosts
```

NIC Configuration for AIX 4

Before you set up the printer, it is good to know the ways a print job can be filtered.

1. **Standard processing.** Filtering is done on the printer with no processing on the host.
2. **Local Filtering.** Filtering is done on the host. Be sure to specify the printer model during install.

Standard Processing

1. Enter SMIT select devices.
2. Select **Printer/Plotter**.
3. Select **Print Spooling**.
4. Add a **Remote** Print Queue.
5. Set the type of Remote Printing to **Standard processing**.
6. Enter the following Remote printer settings:

Name of queue	any_name, user selectable
Host Name of Remote Server	name in /etc/hosts file or the NIC IP address
Name of Queue on Remote Server	d1prn
Type of Print Spooler	BSD (Press the list button and choose BSD)

Local Filtering

1. Enter **smitty mkvirprt**.
2. Add a **Remote** Print Queue.
3. Set the type of Remote Printing to **Local Filtering...**
4. Set the Printer Manufacturer to **IBM**.
5. Set the Printer Type to **IBM4202**.

IMPORTANT **You must change the printer emulation to Proprinter.**

6. Enter the following Remote Print Queue with Local Filtering settings:

Name of queue	any_name, user selectable
Host Name of Remote Server	name in /etc/hosts file or the NIC IP address
Name of Queue on Remote Server	d1prn
Type of Print Spooler	BSD (Press the list button and choose BSD)
Leave Pass-Through Flag	Yes

Troubleshooting

This installation procedure assumes that the NIC adapter is configured with the correct IP address, subnet mask, and gateway (if required). In addition you can also ping and telnet to the NIC adapter.

To verify the NIC settings, print an E-net Test Page.
See “Printing A NIC Test Page” on page 26.

The default NIC queue name is d1prn (in lower case), however the name can be changed. To verify the queue name, print an E-Net Test Page or telnet to the adapter and do a “list dest” command.

AIX Remote Queue Time–Out Setting

Symptoms: Print jobs restart or queue goes down.

If the queue is set up for standard processing (not local filtering), add -T50 flag to rembak to the queue device stanza for the queue in /etc/qconfig

backend = /usr/lib/lpd/rembak -T50

If the queue was set up for local filtering edit the file /usr/lib/lpd/pio/etc/piorlfb and change the line;

typeset piorlfb_rbflags=””

to

typeset priorlfb_rbflags=”-T50”

Printing From AIX

Version 4.0 and higher of AIX® offers LPR/LPD support for network printing. This means, to set up a new printer under this operating system, you only need to define these two parameters:

1. **NIC IP address.** The IP address or host name of the print server to which you want to print.
2. **NIC destination/queue.** A pre-defined name on the print server telling the device to which I/O port to send the jobs. Most likely, you will use `d1prn` for the PRN.

Printing With FTP

Print jobs can also be sent to the NIC using the File Transfer Protocol (FTP). To do this:

1. On your network station, change to the directory containing the file you want to print.
2. Open an FTP session with the NIC.

   Syntax:

   `ftp` *`NICIPaddress`*
3. Log in as **`root`**.
4. At the password prompt, press ENTER (since there is no default password).
5. Change to the `dest` directory.

   Syntax:

   `cd dest`
6. List the contents of this directory using the `dir` command and determine which destination/queue you would like to send the print job through. Most likely, you will select `d1prn` for the PRN port.
7. Change to this destination directory.

   Example:

   `cd d1prn`
8. Change the mode to correspond with the type of file you are going to print. By default, ASCII is set for text-only files, but if you need to print both text and graphics, select binary using the `bin` command.
9. Place the file to be printed within this directory on the NIC, so it can be spooled and printed.

   Syntax:

   `put` *`filename`*

10. Close the FTP session, unless you have more jobs to print.

    Syntax:

    ```
    quit
    ```

Direct Socket Printing

Within TCP/IP environments, there are some setups which require the host to print directly to a TCP port number on the NIC, bypassing all of the higher level destination/queue names. If you run into a setup which requires this, you will need to define two parameters for a new print setup:

1. **NIC IP address**. The IP address or host name of the print server to which you want to print.
2. **NIC TCP port number**. A pre-defined number for the I/O port on the print server. 9100 is the default port number.

Though the host will be sending directly to a TCP port number on the NIC, the port numbers are still mapped to destinations/queues in case there is some type of special processing or logging to be done to the job. However, the destination name is of no concern in this type of printer definition. Only the two parameters mentioned above need to be defined for printing to work.

6 z/OS Configuration, IPDS Printer

Overview

Use this chapter to configure z/OS to print IPDS files on your line matrix network printer.

To print IPDS files, you must have the IPDS option on the printer.

Requirements

Verify that you have the following required software:

- PSF Version 2.2.0 with APAR OW15599 (for TCP/IP support)
- z/OS Scheduler with APAR OW12236 to support two new PRINTDEV keywords: IPADDR and PORTNO
- TCP/IP Version 3 Release 1, or higher, installed and configured on z/OS

To obtain the PTFs associated with these APARs, contact the support center.

Configuration Checklist

All of the following configuration steps carried out on z/OS require appropriate RACF authority.

1. Using the printer operator panel, set up the IPDS printer emulation to 6408/6412.
2. Set TCP/IP addresses for the printer, such as IP address, gateway address, or subnet mask. See “Configuration Tools” on page 25.
3. Configure the host environment.
   See “Configuring PSF for z/OS to Print IPDS Files” on page 121.
4. Verify the configuration. See “Verifying a TCP/IP-Attached Printer on z/OS” on page 131.
5. If you want to share the printer, do the procedure in “Sharing Line Matrix Printers on z/OS” on page 132.
6. If you have problems, refer to “Handling z/OS Connectivity Problems” on page 134.

Configuring PSF for z/OS to Print IPDS Files

To perform this procedure, you need the IP address of the Ethernet.

Configuration Procedure

Configuring PSF to print IPDS files includes the following steps:

1. Define the z/OS communications control unit to z/OS. See “Define the Communications Control Unit to z/OS” on page 122.
2. Modify the TCP/IP profile on your z/OS system, if necessary. See “Modify the TCP/IP Profile in z/OS” on page 122.
3. “`Ping`” the printer. See “Verify the Printer Connection” on page 125.
4. Define the printer as a writer-controlled printer to JES. See “Define the Printer to JES” on page 126.
5. Define the printer to PSF with a PRINTDEV statement, including the IP address. See “Define the Printer to PSF” on page 127.

This section does not provide all the information you need to install and configure TCP/IP on your z/OS system. For more information on installing TCP/IP, refer to *TCP/IP for z/OS: Customization and Administration Guide*.

The routing of information is determined on the basis of the IP address, and is performed by IP gateways. After the network is configured correctly, the z/OS host appears to be communicating directly with the TCP/IP-attached printer.

Define the Communications Control Unit to z/OS

If you have not already done so, define the communications control unit for the z/OS host, such as the 3172 or the 3745 control unit, to z/OS. Use either an z/OS configuration program (MVSCP) or a hardware configuration definition (HCD), depending on the version of your z/OS system:

- When using a version earlier than z/OS 4.1.0, use an MVSCP.
- When using a version of z/OS 4.1.0 or later, use an HCD or an MVSCP.

For more information about using these methods, refer to:

- MVS/ESA* Migration Planning: Dynamic I/O Configuration
- MVS/ESA Hardware Configuration: Using the Dialog

Modify the TCP/IP Profile in z/OS

The TCP/IP profile contains system configuration statements used to initialize the TCP/IP address space. Of those statements, the following are subject to special considerations when you are printing from PSF on TCP/IP-attached printers. Samples of these statements are printed in bold in the example shown in Figure 34.

```
ACBPOOLSIZE                          1000
ADDRESSTRANSLATIONPOOLSIZE           1500
CCBPOOLSIZE                          150
DATABUFFERPOOLSIZE                   160    32768
ENVELOPEPOOLSIZE                     750
IPROUTEPOOLSIZE                      300
LARGEENVELOPEPOOLSIZE                50
RCBPOOLSIZE                          50
SCBPOOLSIZE                          256
SKCBPOOLSIZE                         256
SMALLDATABUFFERPOOLSIZE              256
TCBPOOLSIZE                          512
TINYDATABUFFERPOOLSIZE               256
UCBPOOLSIZE                          100
KEEPALIVEOPTIONS INTERVAL 10 SENDGARBAGE FALSE ENDKEEPALIVEOPTIONS
GATEWAY
;    * Network      First hop     Linkname   Packet Size   Subnet mask     Subnet value
     9              =             BPCLAN     2000          0.255.255.0     0.99.12.0
     DEFAULTNET     9.99.12.254   BPCLAN     2000          0.255.255.0     0
```

Figure 34. Modifying TCP/IP Profile

This section contains information about the statements, the special considerations that apply to them, and the changes they may make necessary. If you change any of the values in the TCP/IP profile, restart TCP/IP to pick up the changes.

DATABUFFERPOOLSIZE

The DATABUFFERPOOLSIZE statement defines the number and size of the data buffers. For printing on TCP/IP-attached printers, it is recommended that you specify at least **160** data buffers, **32768** buffer size.

SMALLDATABUFFERPOOLSIZE

The SMALLDATABUFFERPOOLSIZE statement defines the number of small data buffers. For printing on TCP/IP-attached printers, it is recommended that you specify at least **256** small data buffers.

TINYDATABUFFERPOOLSIZE

The TINYDATABUFFERPOOLSIZE statement defines the number of tiny data buffers. For printing on TCP/IP-attached printers, it is recommended that you specify at least **256** tiny data buffers.

KEEPALIVEOPTIONS

PSF relies on TCP to detect when a connection with a TCP/IP-attached printer is no longer usable. When no data has been exchanged between PSF and its connection partner, TCP sends keep-alive probes to the connection partner periodically. These periodic probes, called keep-alive transmissions, enable TCP to discover when a connection is no longer usable even if the connection partner is abruptly powered off or is no longer accessible through the network.

The frequency of keep-alive transmissions is controlled by the INTERVAL parameter on the KEEPALIVEOPTIONS statement. The frequency applies to all TCP applications that direct TCP to send keep-alive transmissions. The default frequency is after about two hours of inactivity.

For printing on TCP/IP-attached printers, it is recommended that you specify a shorter interval than the default, such as 10 minutes, for the interval between keep-alive transmissions.

Also, if any target host requires that the keep-alive packet contain data, specify **SENDGARBAGE TRUE**. For example:

```
KEEPALIVEOPTIONS INTERVAL 5 SENDGARBAGE TRUE
ENDKEEPALIVEOPTIONS
```

GATEWAY

The Packet Size parameter of the GATEWAY statement defines the maximum transmission unit (MTU) for the z/OS host. For 10/100Base-T Ethernet Interface printers, the MTU size is fixed at 1024 bytes. The value cannot be adjusted.

Verify the Printer Connection

To verify that the z/OS system can establish a connection with the TCP/IP-attached printer, "**ping**" the printer from the MVS system.

From a TSO session, enter the following command:

```
TSO PING ip_address
```

In JES2, enter the following command from the System Display and Search Facility (SDSF) menu 6:

```
ping ip_address
```

ip_address specifies the IP address of the Ethernet.

Here is an example of a successful "**ping**" command:

```
EZA0458I Ping V3R1: Pinging host 9.99.12.33
(Use ATTN to interrupt.)
EZA0463I PING: Ping #1 response took 0.084 seconds.
Successes so far = 1.
```

Here is an example of an unsuccessful "**ping**" command:

```
EZA0458I Ping V3R1: Pinging host 9.99.12.33
(Use ATTN to interrupt.)
EZA0464I PING: Ping #1 timed out
```

NOTE: If you have problems "**ping**"-ing a printer, refer to "Handling z/OS Connectivity Problems" on page 134.

Define the Printer to JES

When a TCP/IP-attached printer is to be used with JES, it must be defined for deferred printing mode with JES.

JES2 Printer Definitions

Below is an example of the JES2 printer definition initialization member, located in the system PARMLIB:

```
FSS(FSS1),PROC=PSFPROC,HASPFSSM=HASPFSSM
PRT1     FSS=FSS1,MODE=FSS,PRMODE=(LINE,PAGE,SOSI1),
            CLASS=C,UCS=0,SEP,NOSEPDS,CKPTPAGE=100,
            DRAIN,MARK,TRKCELL=YES
```

The above example is correct for JES2 3.11 and above. For earlier versions of JES2, the statement is named **FSSDEF** and would be stated as **FSSDEF FSSNAME=FSS1**.

The value you specify for the PROC parameter must match the name on the PSF Startup procedure.

JES3 Printer Definitions

Below is an example JES3 printer definition. This example is not executable, but it is intended to help the JES3 systems programmer define the printer to the z/OS host.

```
FSSDEF,TYPE=WTR,FSSNAME=FSS1,PNAME=PSFPROC,SYSTEM=SYS1,
TERM=NO DEVICE,JNAME=PRT1,JUNIT=(,SYS1,,OFF),
FSSNAME=FSS1, MODE=FSS,PM=(LINE,PAGE,SOSI1),
CHARS=(YES,GT12),
```

The value you specify for the JNAME parameter must match the name of the printer in the PSF Startup procedure.

The value you specify for the PNAME parameter must match the name on the PSF Startup procedure.

Define the Printer to PSF

Each TCP/IP-attached printer must be defined to PSF with a PRINTDEV statement in the PSF startup procedure.

Figure 35 shows a sample PSFPROC procedure that you can modify to suit your installation. The PRINTDEV statement shows the required IPADDR keyword.

No line matrix printer-specific writer procedure is currently supplied. You can, however, copy the APSWPROT sample from the APAR medium and modify it for the line matrix printer.

NOTE: The line matrix printer supports only resident symbol sets.

```
//PSFPROC PROC
//*************** NETWORK PRINTERS WRITER PROCEDURE ***************
//*
//*01* MODULE-NAME = PSFPROC
//*
//*01* DESCRIPTIVE-NAME = START PROCEDURE FOR PSF:
//*TCP/IP ATTACHED NETWORK PRINTERS
//*
//*01* NOTES = THE FULL NAME OF THE DEFAULT PAGEDEF IS
//*P1A06462.
//*THE FULL NAME OF THE DEFAULT FORMDEF IS
//*F1A10110.
//*THE FULL NAMES OF THE DEFAULT FONTS ARE
//*X0GF10, X0GS10, X0TU10, AND X0GU10.
//*THE FULL NAME OF THE SEPARATOR PAGE PAGEDEF IS
//*P1V06483.
//*THE FULL NAME OF THE SEPARATOR PAGE FONT IS
```

```
//*X0GT15.
//*
//*
//*01* CHANGE-ACTIVITY:
//*
//**** END OF SPECIFICATIONS ***/
//STEP01EXEC PGM=APSPPIEP,REGION=4096K
//JOBHDR OUTPUT PAGEDEF=V06483,/* JOB SEPARATOR PAGEDEF*/
//FORMDEF=A10110,CHARS=GT15/* JOB SEPARATOR FORMDEF*/
//JOBLTR OUTPUT PAGEDEF=V06483,/* JOB SEPARATOR PAGEDEF*/
//FORMDEF=A10110,CHARS=GT15/* JOB SEPARATOR FORMDEF*/
//DSHDR OUTPUT PAGEDEF=V06483,/* DS SEPARATOR PAGEDEF*/
//FORMDEF=A10110,CHARS=GT15/* DS SEPARATOR FORMDEF*/
//MSGDS OUTPUT PAGEDEF=A06462,/* MESSAGE DATASET PAGEDEF*/
//FORMDEF=A10110/* MESSAGE DATASET FORMDEF*/
//FONT300DDDSN=SYS1.FONT300,/* SYSTEM FONTS - 300 PEL*/
//DISP=SHR
//PSEG01DDDSN=SYS1.PSEGLIB,/* SYSTEM PAGE SEGMENTS*/
//DISP=SHR
//OLAY01DDDSN=SYS1.OVERLIB,/* SYSTEM MEDIUM OVERLAYS*/
//DISP=SHR/*
//PDEF01DDDSN=SYS1.PDEFLIB,/* SYSTEM PAGEDEFS*/
//DISP=SHR
//FDEF01DDDSN=SYS1.FDEFLIB,/* SYSTEM FORMDEFS*/
//DISP=SHR
//* ********************************************************************************/
```

```
//*PRINTDEV
//* ****************************************************************************************/
//PRT1CNTL
//PRT1PRINTDEV FONTDD=*.FONT300,/* 300 PEL FONT LIBRARY DD*/
//OVLYDD=*.OLAY01,/* OVERLAY LIBRARY DD*/
//PSEGDD=*.PSEG01,/* SEGMENT LIBRARY DD*/
//PDEFDD=*.PDEF01,/* PAGEDEF LIBRARY DD*/
//FDEFDD=*.FDEF01,/* FORMDEF LIBRARY DD*/
//JOBHDR=*.JOBHDR,/* JOB HEADER SEPARATOR*/
//*/* OUTPUT*/
//JOBTRLR=*.JOBTLR,/* JOB TRAILER SEPARATOR*/
//*/* OUTPUT*/
//DSHDR=*.DSHDR,/* DATA SET HEADER*/
//*/* SEPARATOR*/
//MESSAGE=*.MSGDS,/* MESSAGE DATA SET OUTPUT*/
//BUFNO=5,/* NUMBER OF WRITE DATA BUFFERS*/
//PAGEDEF=A06462,/* DEVICE PAGEDEF DEFAULT*/
//FORMDEF=A10110,/* DEVICE FORMDEF DEFAULT*/
//CHARS=(GF10,/* DEVICE*/
//GS10,TU10,GU10),/* DEFAULT FONT SET*/
//PIMSG=YES,/* ACCUMULATE DATA SET*/
//*/* MESSAGES*/
//DATACK=BLOCK,/* REPORT ALL DATA-CHECK*/
//*/* ERRORS*/
//TRACE=NO,/* CREATE INTERNAL TRACE*/
//FAILURE=WCONNECT,/* PSF ACTION ON PRINTER*/
```

```
//*/* FAILURE*/
//TIMEOUT=REDRIVE/* PSF ACTION ON TIMEOUT*/
//MGMTMODE=OUTAVAIL,/* PRINTER MANAGEMENT MODE*/
//DISCINTV=15,/* DISCONNECT INTERVAL IN*/
//*/* SECONDS*/
//IPADDR='xxx.xxx.xxx.xxx'/* IP ADDRESS FOR TCP/IP*/
//PRT1ENDCNTL
```

Figure 35. Sample PSFPROC procedure

NOTE: To specify a TCP/IP address space name other than the default, TCPIP, code the following exec statement in the writer procedure:
`//STEP01EXEC PGM=ASPPIEP,REGION=4096K,`
`PARM=(,,,,`*`tcpip_name`*`)`
where ***`tcpip_name`*** is the name of the TCP/IP address space. If this parameter is not coded, PSF uses the default name, TCPIP.

The IP address is the only required parameter. Other parameters may be set to facilitate printer sharing as described in "Sharing Line Matrix Printers on z/OS" on page 132. For a description of the PRINTDEV statement, which is not given here, see the PSF *System Programming Guide*.

IPADDR

Specifies the IP address for the printer or attachment, in dotted-decimal notation. Do not specify a hostname in place of the dotted-decimal address.

Verifying a TCP/IP-Attached Printer on z/OS

To operate a TCP/IP-attached printer, use JES operator commands.

Starting a TCP/IP-attached Printer

To start a TCP/IP-attached printer, do the following:

1. Start TCP/IP.
2. Power on the printer.
3. Start the printer FSA.
   - On **JES2**, the command is:
     $S*printer_name*
   - On **JES3**, the command is:
     ***VARY *printer_name*,ON**

Stopping a TCP/IP-attached Printer

You can stop a TCP/IP-attached printer in several ways:

- The preferred method is to first stop the PSF FSA for the printer by entering the following command from the z/OS console:

  JES2:
  $P*printer_name*

  JES3:
  ***VARY *printer_name*,OFF**
  CANCEL *printer_name

  where ***printer_name*** specifies the name of the printer FSA.

  Then you can turn off power to the printer.

- To end the PSF FSA for the printer, use the JES commands. If you are unable to purge or cancel the printer by use of the JES commands, enter the following command:
  MODIFY FSSname,FORCE,*printer_name*

Resolving IPDS Printing Problems

If you have problems printing, do the following:

- Print an Ethernet Test Page. Refer to your *User's Manual*.
- Verify that the IPDS service is enabled.
- Verify the service name.
- Verify that port number 5001 is being used.

If you are still unable to print IPDS files, contact the support center.

Sharing Line Matrix Printers on z/OS

Line matrix printers can be shared on PSF in one of two ways:

- By using the MGMTMODE and DISCINTV parameters via the JES spool.
- By port switching on the printer.

JES Spool Printer Sharing

JES spool printer sharing is valid for TCP/IP attached network printers. A session with the printer is maintained while there is output on the JES spool and the printer is available. When there is no more output on the spool and the disconnect interval expires, PSF ends the session with the printer. PSF attempts to restart the session when there is more work on the spool for the printer. After the session is restarted, PSF must reload the resources required for the print jobs. When using this method of network printer sharing, PSF cannot determine if another print driver is active.

You can request this method of network printer sharing by specifying the following parameters in the PSF Startup Proc.

```
MGMTMODE=OUTAVAIL
FAILURE=WCONNECT
TIMEOUT=REDRIVE
DISCINTV=n
```

MGMTMODE

Set to OUTAVAIL. OUTAVAIL requests that PSF start a communications session with the printer only when output is available on the JES spool.

FAILURE

Specifies the action PSF is to take after a printer failure or a TCP/IP network failure. If FAILURE=WCONNECT and the printer is connected to another host when PSF attempts to establish a connection on TCP/IP, PSF continuously retries (up to the limit specified by CONNINTV) until the printer becomes available. FAILURE=STOP stops the attempt to connect to the printer.

TIMEOUT

Specifies the action that PSF is to take after a timeout when no output is available on JES. The DISCINTV parameter specifies the timeout interval. TIMEOUT=REDRIVE requests that PSF redrive the printer FSA using the value of the MGMTMODE parameter. TIMEOUT=STOP requests that PSF stop the printer FSA, which can then be restarted only by an operator command.

DISCINTV

Specifies the disconnect interval in seconds. The value can range from zero through 86400. It is recommended that you set the value to **15**. When no output is available from JES for this time period, PSF ends the session with the network printer. If the value is set to zero, PSF does not end the session because of lack of output.

NOTE: PSF supports two other methods of printer sharing, which are not applicable to 10/100Base-T Ethernet Interface printers. VTAM RELREQ is available for printer sharing under SNA. Port switching is available for SNA- and TCP/IP-attached printers when a printer can support multiple active ports.

Port Switching Printer Sharing

To support printer sharing, 10/100Base-T Ethernet Interface printers automatically switch among all attached ports (serial port, the twinax or coax port, or the Ethernet network port). Basically, the printer prints jobs for one port until no new jobs appear and the port "times out". The printer then switches to the next port and does the same thing.

To change the default "time out" value for a port, update the TIMEOUT value for the port on the appropriate menu (Serial Interface, Ethernet, Twinax Interface, or Coax Interface).

Handling z/OS Connectivity Problems

If you encounter problems when "**`ping`**"-ing a network printer from z/OS, here is how to resolve them.

Ping is Not Successful

If the "**`ping`**" is not successful, verify the following:

- The printer is powered on.
- The IP address is unique in the TCP/IP network.
  If the IP address of the z/OS system is not unique, see your network administrator to resolve the IP address problem.
- The Maximum Transmission Unit (MTU) size of the IP packet for the z/OS system is equal to the MTU size of the printer. For information about the values recommended for the z/OS system, see "Modify the TCP/IP Profile in z/OS" on page 122.

  To change the MTU size for the z/OS system, change the GATEWAY statement in the z/OS TCP/IP profile, and restart TCP/IP to pick up the changes.

  You cannot change the MTU size on a 10/100Base-T Ethernet Interface printer. The MTU size is fixed at 1024 bytes.

If these items are all in order, consult your TCP/IP network administrator about a possible network problem.

Ping is Successful

A successful "**ping**" usually indicates that the z/OS system can communicate with the printer; however, you might receive a successful "**ping**" even though the IP address of the TCP/IP-attached printer is a duplicate of another IP address.

If PSF is unable to establish a network connection with the TCP/IP-attached printer or if PSF output for this printer prints elsewhere, follow these steps to determine whether the IP address of the printer is unique:

1. Turn the printer off.
2. Wait at least 5 minutes for TCP/IP to clear the Address Resolution Protocol (ARP) tables. (If your installation specified a longer interval on the ARPAGE configuration statement in the TCP/IP profile, you may need to wait longer. For information about the ARPAGE statement, refer to the *TCP/IP z/OS Customization and Administration Guide*.)
3. Enter the "**ping**" command again from the z/OS system.

NOTE: If you receive a successful response to the "**ping**" command, there is a duplicate IP address. Consult your TCP/IP network administrator.

Chapter 6 Handling z/OS Connectivity Problems

7 AS/400 Configuration, ASCII Printer

Overview

This chapter details a complete AS/400 configuration setup including:

- Developing Line Descriptions with CRTLINETH
- Configuring the AS/400 for TCP/IP
- Configuring the AS/400 for Printing
- Verifying Printing from the AS/400

This document assumes no AS/400 printer configuration has been done. If any configuration has been done, please follow the procedure to the point at which continued configuration is required.

Developing Line Descriptions With CRTLINETH

For each LAN adapter on the AS/400, a line description needs to be created for the NIC. This is required for Release V3R2 and V3R7.

If a line description already exists, make sure the SSAP list includes default options “AA” and “12.” You must also know the LAN speed for the AS/400 LAN adapter.

NOTE: To change a line description, you need to vary the line off before making the change. After making the change, you need to vary the line back on.

To change an existing line description, use the CHGLINETH command. To create a line description, use CRTLINETH.

NOTE: SSAPS of “AA” and “12” are automatically set as default values in the line description when “*CALC” is used in creating new line descriptions. You do not need to set these values unless they have been changed.

To create a line description, enter the following command:

```
CRTLINETH LIND(ETHLAN) RSRCNAME(LIN041)
```

Your completed screen should look like Figure 36.

```
5763SS1 V3R2M0  960517                                BLDD60    09/11/96  12:25:46
Line description . . . . . :   LIND        ETHLAN
Option . . . . . :   OPTION      *ALL
Category of line . . . . . :                 *ELAN
Resource name  . . . . . :   RSRCNAME    LIN041
Online at IPL  . . . . . :   ONLINE      *YES
Vary on wait . . . . . :   VRYWAIT     *NOWAIT
Local adapter address  . . . . . :   ADPTADR     *ADPT
Exchange identifier  . . . . . :   EXCHID      056A1005
Ethernet standard  . . . . . :   ETHSTD      *ALL
Maximum controllers  . . . . . :   MAXCTL      40
Error threshold level  . . . . . :   THRESHOLD   *OFF
Text . . . . . :   TEXT        *BLANK
--------------Active Switched Controllers--------------
  (No active switched controllers attached)
SSAP list  . . . . . :   SSAP
----Source Service Access Points-----    ----Source Service Access Points-----
   SSAP      Maximum Frame    Type          SSAP      Maximum Frame    Type
    04            1496        *SNA           AA            1496        *NONSNA
     12            1496        *NONSNA        C8            1496        *HPR
Group address  . . . . . :   GRPADR
---------------Group Addresses----------------
  (No group addresses found)
Link speed . . . . . :   LINKSPEED   10M
Cost/connect time  . . . . . :   COSTCNN     0
Cost/byte  . . . . . :   COSTBYTE    0
Security for line  . . . . . :   SECURITY    *NONSECURE
Propagation delay  . . . . . :   PRPDLY      *LAN
User-defined 1 . . . . . :   USRDFN1     128
User-defined 2 . . . . . :   USRDFN2     128
User-defined 3 . . . . . :   USRDFN3     128
Autocreate controller  . . . . . :   AUTOCRTCTL  *NO
Recovery limits  . . . . . :   CMNRCYLMT
  Count limit  . . . . . :               2
  Time interval  . . . . . :             5
```

Figure 36. Example NIC Line Description

The following three parameters must be specified:

Line Description (LIND)

The line description name is the user's name for the AS/400 adapter. This name must be identical to the name entered when the TCP/IP is configured on the AS/400.

Resource Name (RSRCNAME)

The system-assigned name for the interface (for example, LIN041).

SSAP

When *CALC is used, the values of “12” and “AA” are entered automatically as defaults. Verify that those SSAP values have not been changed.

Configuring AS/400 For ASCII Using TCP/IP

The next step is to configure the interface on the AS/400 for TCP/IP.

NOTE: The AS/400 interface is not the NIC. Do not set the AS/400 interface address to the same address as the NIC IP address. Also, do not add the NIC to the AS/400 TCP/IP interface list.

Configuring With ADDTCPIFC

ADDTCPIFC is used to add a TCP/IP interface to the AS/400. This step configures the AS/400 for attachments to a TCP/IP network.

At the AS/400 command line, enter the following command:

```
ADDTCPIFC INTNETADR ('9.99.15.188') LIND(ETHLAN)
SUBNETMASK('255.255.255.0')
```

Your completed screen should look like Figure 37.

System: BLDD6	
Internet address:	**9.99.15.188**
Subnet mask:	**255.255.255.0**
Line description:	**ETHLAN**
Line type:	*Elan
Interface status:	Inactive
Type of service:	*Normal
Maximum transmission unit:	*Lind
Automatic start:	*Yes

Figure 37. Example of ADDTCPIFC Interface

The following parameters must be specified:

Internet Address

Internet address of the AS/400 LAN adapter.

NOTE: Do not use the IP address of the NIC.

Subnet Mask

The Subnet Mask for this AS/400 TCP/IP interface (for example, 255.255.255.0).

Line Description

The name assigned to the AS/400 line description as described in “Developing Line Descriptions With CRTLINETH” on page 137.

NOTE: Each AS/400 LAN adapter will have its own line description.

Configuring A Router Definition With ADDTCPRTE

If necessary, use the ADDTCPRTE command to create a route definition. This is required if the printer is somewhere other than on a local segment and must cross bridges.

Configuring A Local Domain And Hostname

The AS/400 print commands, described in “Setting Up Printing For ASCII Files” on page 142, require a local name and hostname. If you have already configured LAN attached TCP/IP printers on the AS/400 system, you will have a local domain name and hostname configured on the system.

NOTE: If you already have a local domain name and hostname configured on the system, do not change your setup.

If the local domain name and hostname file is empty, the file must be set up. This control file information is used to determine if a print request comes from an authorized host.

To configure the local domain and hostname, you will run the CFGTCP command and select Option “12” from the menu. Enter a local domain name, such as *city.company.com*. Enter a local hostname, such as `as400-01`. This is the name of your AS/400 system and must match the hostname for your system in the host entry table. Refer to “Configuring A TCP/IP Host Table Entry” for more information.

NOTE: If the printer and AS/400 are not on the same local LAN segment, use CFGTCP Option 2 to verify that there is a route defined in the TCP/IP route list.

Configuring A TCP/IP Host Table Entry

Although creating a TCP/IP host table entry is optional, it is a good idea to take this step. Add the AS/400 name and the IP address of the LAN adapter to the “Host Table Entries.”

Configuring The AS/400 For Printing

To configure an AS/400 for printing, you must:

- set up the printing capability, and
- verify the setup with a print job.

You will need the following information:

Remote Printer Queue name

Set to `'d1prn'` through `'d8prn'`.

NOTE: The Remote Printer Queue name must be in lowercase letters. Do not use “PASS.”

NOTE: When the IPDS feature is installed, the queue name `'d4prn'` is not available.

IP Address

The IP address for the NIC.

Setting Up Printing For ASCII Files

The next step is to set up the remote printing capability. There are two ways to do this: you can either specify the LPR parameters manually each time you send a file to the printer, or use Remote Writer and a remote output queue for automatic printing to the printer.

To Use LPR Manually

1. Start TCP/IP, if it is not already running, by entering the command **`STRTCP`**.
2. At the AS/400 command line, enter **`LPR`**.
3. Figure 38 displays in **bold** the parameters you need to specify.

Send TCP/IP Spooled File (LPR)			
Type choices, press Enter.			
Remote system	**RMTSYS**	**>**	***INTNETADR**
Printer queue	**PRTQ**	**>**	**'d1prn'**
Job name	JOB		*
User			
Number			
Spooled file number	SPLNMBR		*ONLY
Destination type	**DESTTYP**		***OTHER**
Transform SCS to ASCII	**TRANSFORM**		***YES**
Manufacturer type and model	**MFRTYPMDL**	**>**	***IBM6400EP**
Internet address	**INTNETADR**	**>**	**'9.99.2.3'**

Figure 38. ASCII LPR Parameters

The following parameter values are required:

Remote System

Enter the hostname of your printer or ***INTNETADR**, which then prompts you to specify the IP address of your printer.

Printer Queue (PRTQ)

Set to `'d1prn'` through `'d8prn'`. The remote printer queue name must be in lowercase letters, entered in single quotes.

NOTE: When the IPDS feature is installed, queue name `'d4prn'` is not available.

Destination Type (DESTTYP)

Specify ***OTHER** for the DESTTYP parameter.

Transform (TRANSFORM)

Specify ***YES**.

Manufacturer Type and Model (MFRTYPMDL)

Select a manufacturer type and model. This is the name of the WSCO. Select `*IBM6400EP` for Epson emulation or `*IBM6400` or `*IBM42023` for Proprinter Emulation if you have AS/400 V3R2 and above or V3R7 and above.

NOTE: Select the Manufacturer Type Model based on the data type.

a. Report printing, text only, no IGP or barcodes.

   Manufacturer Type Model = *IBM42023
   Workstation customizing object = *NONE

   Since IBM42023 is a Printronix XL emulation, the printer emulation must also be switched to Proprinter emulation. Be sure to save the printer emulation as the power-up configuration.

   Alternate selection:

   Manufacturer Type Model = *IBM6400EP
   Workstation Customizing Object = *NONE

   Since IBM6400EP is an Epson emulation, the printer emulation must be also switched to Epson emulation. Be sure to save the printer emulation as the power-up configuration.

b. PGL or VGL or PPI program.

   Manufacturer Type Model = *WSCSTCONT132
   Workstation Customizing Object = QWPDEFAULT
   Library = QSYS

This selects a generic object that passes the data unchanged without any escape codes to the printer. Text files will print in the currently selected printer configuration, cpi, lpi, and form length. OS/400 versions below V3R7 may not have this selection and may require manual creation of a generic WSCST. Please contact Printronix Technical Support for assistance.

NOTE: For occasional text reports, create a printer configuration for each report and use the [Job Select] key to select a report configuration.

Internet Address (INTNETADR)

The IP address of the NIC.

NOTE: You may specify either ***INTNETADR** (and the NIC IP address) or the hostname for the NIC (if you added the printer to the host table entry as directed in “Configuring A TCP/IP Host Table Entry” on page 141).

To Create An Automatic Remote Output Queue

1. From the AS/400 command line, enter `CRTOUTQ`.
2. Figure 39 displays in **bold** the parameters you need to specify.

Send TCP/IP Spooled File (LPR)			
Type choices, press Enter.			
Output queue	**OUTQ**	**>**	**USERNAME**
Library			*CURLIB
Maximum spooled file size:	MAXPAGES		
Number of pages			*NONE
Staring time			
Ending time			
+ for more values			
Order of files on queue	SEQ		*FIFO
Remote system	**RMTSYS**	**>**	***INTNETADR**
Remote printer queue	**RMTPRTQ**	**>**	**'d1prn'**
Writer to autostart	**AUTOSTRWTR**		**1**
Queue for writer messages	MSGQ		QSYSOPR
Library			*LIBL
Connection type	**CNNTYPE**	**>**	***IP**
Destination type	**DESTTYP**		***OTHER**
Host print transform	**TRANSFORM**		***YES**
Manufacturer type and model	**MFRTYPMDL**	**>**	**(See Note on page 144)**

Workstation Customizing Object	WSCST	**> (See Note on page 144)**
Library		
Internet address	**INTNETADR**	**> '9.99.57.173'**
Destination options	DESTOPT	*NONE
Print separator page	SEPPAGE	*YES
User defined option	USRDFNOPT	*NONE

Figure 39. Automatic Remote Output Queue Configuration

3. Enter values for the following parameters:

   Output Queue (OUTQ)

   The name of the AS/400 output queue. The name can be anything you would like. This name is not the same as the printer internal queue name, `'d1prn'`.

   Remote System (RMTSYS)

   Internet address of the NIC on the printer (`*INTNETADR` prompts you for this) or the hostname of the NIC.

   Remote Printer Queue (RMTPRTQ)

   Default name of the network printer. Set for any of `'d1prn'` through `'d8prn'`. The remote printer queue name must be lowercase, entered in single quotes.

   NOTE: When the IPDS feature is installed, queue name `'d4prn'` is not available.

   Writer to Autostart (AUTOSRTWTR)

   Set the value to `1`. This will start the Remote Writer when the queue is created, and it automatically starts the Remote Writer after each IPL of the AS/400 and whenever STRTCP is started.

Connection Type (CNNTYPE)

Specify this value as ***IP**.

Destination Type (DESTTYP)

Specify ***OTHER**. ***OTHER** is a performance enhancement, in which data is not required to be transformed again if the connection is interrupted and allows printing of multiple copies.

Transform (TRANSFORM)

Specify this value as ***YES**.

Manufacturer Type (MFRTYPMDL)

Select a manufacturer type and model. This is the name of the WSCO. Select `*IBM6400EP` for Epson emulation or `*IBM6400PR` or `*IBM42023` for Proprinter Emulation.

Troubleshooting

This installation procedure assumes that the NIC adapter is configured with the correct IP address, subnet mask, and gateway (if required). In addition you can also ping and telnet to the NIC adapter.

Print an E-net Test Page to verify the Ethernet settings.
See “Printing A NIC Test Page” on page 26.

The default NIC queue name is d1prn, however, the name can be changed. Substitute the changed name for the RMTPRTQ parameter. To verify the queue name, print an E-Net Test Page or telnet to the NIC and perform a “list dest” command.

Internet address (INTNETADR)

Specify the IP address of the printer.

Verify Printing On AS/400

This section verifies that the printer is capable of printing ASCII files and that the printer can be pinged on the network.

To test ASCII printing:

1. Start TCP/IP, if it is not already running, by entering the command **STRTCP**.
2. Verify that the AS/400 TCP/IP interface is active.
3. **Ping** the printer from an AS/400 workstation with the command:
   ping *ip_address.*

   Where *ip_address* is the Internet address of the remote system printer (the NIC) or the hostname of the printer (if you put the hostname in the host entry table as directed in “Configuring A TCP/IP Host Table Entry” on page 141).
4. If the printer cannot be pinged, proceed to “AS/400 ASCII Troubleshooting” on page 150.
5. Use one of the following methods to send a spooled file to the printer:
   - Enter the LPR command on the AS/400 command line with the appropriate parameters. See “To Use LPR Manually” on page -142.
   - Enter **STRRMTWTR *name*** on the AS/400 command line, where *name* is the name of the AS/400 remote output queue (not the printer Internet queue, as described on “To Create An Automatic Remote Output Queue” on page 146).
   - Use the WRKOUTQ command to send jobs.

AS/400 ASCII Troubleshooting

During power up, the printer performs an interface hardware test. The presence of the ETHERNET PARAMS menu selection at the printer control panel indicates that the NIC hardware is functioning properly. See the *User's Manual* for configuration menu information.

If you have trouble pinging the printer:

1. Verify the configuration of the AS/400, including the printer and any intervening devices such as routers and bridges.
2. Verify that the AS/400 line description is varied on and the printer is turned on and displays an ONLINE status.
3. Verify that the AS/400 TCP/IP is active.

8 AS/400 Configuration, IPDS Printer

Configuring On AS/400 As An IPDS Printer

NOTE: The IPDS emulation is not supported on the T4204 printer.

Use this chapter to configure your printer on AS/400 as an IPDS printer. To print IPDS, you must install the IPDS option on your printer. Once configured as an IPDS printer, the printer can also print AFP™ and SCS, but these datastreams must be converted to IPDS first.

NOTE: Do not cancel IPDS print jobs by using WebPage cancel. To cancel IPDS print jobs hold the job on the AS/400 writer or press the printer Cancel key.

Printing AFP, IPDS, And SCS Files

Printers configured as IPDS only print IPDS files. AFP and SCS files can be printed, but they must be transformed to IPDS before printing.

- APF files are transformed directly by Print Services Facility™ (PSF/400, an integrated feature of OS/400), which then sends the transformed file to the printer.
- SCS files are transformed into IPDS by setting the IPDSPASTHR parameter to YES (see Figure 42 on page 160 or Figure 43 on page 163). This path yields the best performance by sending IPDS files directly to the printer with no transform.

Requirements

Contact technical support to obtain the latest PTFs for PSF/400.

For IPDS printing, you also need to install the IPDS option for the printer.

Configuration Checklist

NOTE: All of the following configuration steps carried out on the AS/400 may require “create” or “change” authority.

1. If you have not already done so, set up the printer and install the NIC. See “Configuration Using The Control Panel” on page 27.
2. Using the printer control panel, set up the printer for IPDS by setting the parameters and values shown in Table 4.

Table 4. Control Panel Settings

Menu	Item	Setting
C/T PORT	Port Type	Twinax
TWINAX SETUP	Twinax Type	IPDS 256 or IPDS 1024

3. Set TCP/IP addresses for the printer, such as an IP Address, Gateway Address, or Subnet Mask. See “Configuration Tools” on page 25.
4. If the printer and AS/400 are not on the same LAN segment, verify there is a route defined in the TCP/IP route list. If necessary, use the `ADDTCPRTE` command to create a route definition. You need this if your printer is somewhere other than on a local segment.
5. You need the IP address of the NIC to configure the NIC.
6. If you have not done so yet, create a line description for your NIC. See “Developing Line Descriptions With CRTLINETH” on page 137.

7. Create or verify the existence of an AS/400 TCP/IP interface for NIC. See “Configuring An AS/400 TCP/IP Interface With ADDTCPIFC” on page 154.
8. The next step depends on your AS/400 release. Configure your printer with one of these procedures:
   - “Configuring PSF/400 For IPDS On V3R2” on page 156.
   - “Configuring PSF/400 For IPDS On V3R7 And Above” on page 162.
9. Notice that when the IPDS feature is installed, the queue name ‘d4prn’ is not available.
10. Verify the printer is ON using the `VFYCFG` command.
11. Verify that TCP/IP has been started using the `STRTCP` command.
12. Test your configuration. See “Verifying The IPDS Configuration On AS/400” on page 174.
13. To share the printer on the network, verify that the necessary parameters have been set correctly. See “Sharing The AS/400 Printer On The Network” on page 175.
14. If you have problems, refer to “AS/400 Troubleshooting” on page 179.

Configuring An AS/400 TCP/IP Interface With ADDTCPIFC

NOTE: Do not enter the IP address of the NIC. Do not set the AS/400 interface address to the same address as the NIC IP address. Also, do not add the NIC to the AS/400 TCP/IP interface list.

Configuring An Interface For Ethernet

ADDTCPIFC is used to add a TCP/IP interface to AS/400. This step configures the AS/400 for attachments to a TCP/IP network.

1. At the AS/400 command line, enter the following command:

```
ADDTCPIFC INTNETADR ('9.99.15.188') LIND(ETHLAN)
SUBNETMASK('255.255.255.0')
```

2. Your completed screen should look like Figure 40.

System: BLDD60	
Internet address:	**9.99.15.188**
Subnet mask:	**255.255.255.0**
Line description:	**ETHLAN**
Line type:	*ELAN
Interface status:	Inactive
Type of service:	*NORMAL
Maximum transmission unit:	*LIND
Automatic start:	*YES

Figure 40. Example ADDTCPIFC Interface

3. The following parameters must be specified:
   a. **Internet Address**

      Internet address of the AS/400 Ethernet LAN adapter.

   NOTE: Do not use the IP address of the NIC.

b. **Subnet Mask**

   The Subnet Mask for this AS/400 TCP/IP interface (for example, **255.255.255.0**).

c. **Line Description**

   The name assigned to the AS/400 line description as described in “Developing Line Descriptions With CRTLINETH” on page 137. Each AS/400 LAN adapter will have its own line description.

Configuring A TCP/IP Host Table Entry

Although optional, it is recommended that you create a TCP/IP host table entry. Add the AS/400 name and the IP address of the LAN adapter to the “Host Table Entries.” Also, add the hostname and IP address of the printer to the list. You can access the host table entries function by using the `CFGTCP` command, then selecting option 10 from the menu.

You can also add entries to your host table for both the hostname and the fully qualified network name for your system. The entry name should match the name you configured for host and domain. For example, if your hostname is “RCHASM03” and your domain name is “RCHLAND.PTX.COM”, your fully qualified network name is “RCHASM03.RCHLAND.PTX.COM”. In your host entry table, enter both RCHASM03 and RCHASM03.RCHLAND.PTX.COM.

Configuring PSF/400 For IPDS On V3R2

To configure IPDS on AS/400 V3R2, use the following commands:

- CRTDEVPRT
- CRTPSFCFG

Configuring PSF With CRTDEVPRT On V3R2

This section describes how to create a printer device description.

1. At the AS/400 command line, enter a command in the form:

```
CRTDEVPRT   DEVD(printer_type) DEVCLS(*RMT) TYPE(*IPDS)
            MODEL(0) AFP(*YES) AFPATTACH(*APPC)
            FONT(11) RMTLOCNAME(TCPIP) FORMFEED(*CONT)
            TEXT('printer_type NETWORK PRINTER')
```

   Where ***printer_type*** (e.g., T5000, P5000, L5520) is the model of your printer.

2. A completed screen looks like the example shown in Figure 41, which starts on the next page.

Display Device Description

Device Description:	**DEVD**	*printer_type*
Option:	OPTION	*ALL
Category of device:		*PRT
Automatically created:		NO
Device class:	**DEVCLS**	***RMT**
Device type:	**TYPE**	***IPDS**
Device model:	**MODEL**	**0**
Advanced function printing:	**AFP**	***YES**
AFP attachment:	**AFPATTACH**	***APPC**
Online at IPL:	ONLINE	*YES
Font:	**FONT**	
Identifier:		**011**
Point size:		***NONE**
Form feed:	**FORMFEED**	***CONT**
Separator drawer:	SEPDRAWER	*FILE
Separator program:	SEPPGM	*NONE
Library:		
Printer error message:	PRTERRMSG	*INQ
Message queue:	MSGQ	QSYSOPR
Library:		*LIBL
Maximum pending requests:	MAXPNDRQS	6
Print while converting:	PRTCVT	*YES

Print request timer:	PRTRQSTMR	*NOMAX
Form definition:	FORMDF	F1C10110
Library:		*LIBL
Character identifier:	CHRID	*SYSVAL
Remote location:	**RMTLOCNAME**	**TCPIP**
Local location:	LCLLOCNAME	*NETATR
Remote network identifier:	RMTNETID	*NETATR
Mode:	MODE	QSPWTR
Dependent location name:	DEPLOCNAME	*NONE
Text:	TEXT	'*printer_type* Network Printer'

Figure 41. Example of CRTDEVPRT Command (V3R2)

3. Values must be entered for the following parameters:
   a. **Device Description (DEVD)**

      The device description or name. This value must match the value entered for the `PSFCFG` parameter in "Configuring AFP With CRTPSFCFG On V3R2" on page 159.

   b. **Device Class (DEVCLS)**

      Specify **`*RMT`**.

   c. **Device Type (TYPE)**

      Specify **`*IPDS`**.

   d. **Device Model (MODEL)**

      Specify `0`.

   e. **Advanced Function Printing (AFP)**

      Specify **`*YES`**.

   f. **AFP Attachment (AFPATTACH)**

      Specify **`*APPC`**. `CRTPSFCFG` overrides this value.

g. **Font (FONT)**

Enter an appropriate value.

h. **Form Feed (FORMFEED)**

Specify ***CONT**.

i. **Remote Location (RMTLOCNAME)**

Enter the remote location name.

Configuring AFP With CRTPSFCFG On V3R2

The PSF™ configuration object created with this command is used by PSF/400 when printing IPDS files. The object is used by AS/400 V3R2 only if the object is in the QGPL library and has the same name as the printer device description. This information overrides the APPC configuration information specified in the printer device description.

To configure AS/400 for IPDS printing on V3R2:

1. At the AS/400 command line, enter a command in the form:

```
CRTPSFCFG   PSFCFG(printer_type IPDSPASTHR(*YES)
            RLSTMR(*SEC15) TEXT('printer_type NETWORK
            PRINTER') RMTLOCNAME('128.99.12.134')
            PORT(5001)
```

   where ***printer_type*** (e.g., T5000, P5000, L5520) is the model of your printer.

2. A completed screen looks like Figure 42.

PSF configuration: *printer_type*	**Library: QGPL**
User resource library:	*JOBLIBL
IPDS pass through:	***YES**
Activate release timer:	***NORDYF**
Release timer:	***SEC15**
Restart timer:	*IMMED
SNA retry count:	2

Delay time between retries:	0
Blank page:	*YES
Page size control:	*NO
Resident fonts:	*YES
Resource retention:	*YES
Edge orient:	*NO
Remote location:	
Name or address:	**128.99.12.134**
TCP/IP port:	**5001**
TCP/IP activation timer:	**170**
PSF defined options:	
Text description:	*printer_type* **Network Printer**
Device resource library list:	*DFT

Figure 42. Example CRTPSFCFG Command (V3R2)

3. The following parameters are required:
   a. **PSF Configuration (PSFCFG)**

      The name of the printer device you are configuring.

   b. **Library**

      Specify **QGPL**.

   c. **IPDS pass through (IPDSPASTHR)**

      To print SCS files, specify ***YES**. PSF/400 transforms SCS into IPDS before printing.

d. **Activate release timer (ACTRLSTMR)**

   Specifies the point at which the release timer (RLSTMR) is activated. Set to ***NORDYF**. This means that the release timer is activated when there are no spooled files in the printer's output queue with a status of RDY and the last page of the last spooled file processed has printed. *NORDYF is used so that all files with a status of RDY are printed before releasing the session (which does not terminate the writer, however).

e. **Release timer (RLSTMR)**

   Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. The recommended value is ***SEC15**.

f. **Remote Location name or address (RMTLOCNAME)**

   Enter the IP address or hostname of the printer.

g. **TCP/IP port (PORT)**

   Specify **5001**.

h. **TCP/IP activation time (ACTTMR)**

   This value specifies the number of seconds that PSF/400 waits for a printer to respond to an activation request. If only one system is using the printer, use the default value (170 seconds). If more than one system is using the printer, specify ***NOMAX**, which causes PSF/400 to wait indefinitely for a response to an activation request.

Configuring PSF/400 For IPDS On V3R7 And Above

To configure IPDS on AS/400 V3R7 and above, use the following commands:

- CRTPSFCFG (Optional)
- CRTDEVPRT

Configuring AFP With CRTPSFCFG On V3R7 Or V4R1 (Optional)

New for V3R7 is the ability to specify three TCP/IP-related parameters for PSF in a printer device description: RMTLOCNAME, PORT, and ACTTMR. In V3R2, CRTPSFCFG, which replaced WRKAFP2, was used to specify these same parameters, along with other parameters. In V3R7 and higher, these three parameters are ignored when specified in a PSF configuration object, since they are specified in a printer device description. However, you may wish to use a PSF configuration object to specify other parameters, such as IPDS passthrough and so on.

The PSF configuration object created with this command is used by PSF/400 when printing IPDS files only if the object is specified with the USRDFNOBJ parameter in the printer device description.

To configure AS/400 for IPDS printing on V3R7 or V4R1:

1. At the AS/400 command line, enter a command in the form:

```
CRTPSFCFG   PSFCFG(AFP/printer_typeNETPRT)
            IPDSPASTHR(*YES) RLSTMR(*SEC15)
            TEXT('printer_type NETWORK PRINTER')
```

   where ***printer_type*** (e.g., T5000, P5000, L5520) is the model of your printer.

2. A completed screen looks like Figure 43.

PSF Configuration Information	
PSF configuration: *printer_type*NETPRT	Library: AFP
User resource library:	*JOBLIBL
IPDS pass through:	*YES
Activate release timer:	*NORDYF
Release timer:	*SEC15
Restart timer:	*IMMED
SNA retry count:	2
Delay time between retries:	0
Blank page:	*YES
Page size control:	*NO
Resident fonts:	*YES
Resource retention:	*YES
Edge orient:	*NO
Remote location:	
Name or address:	***NONE**
TCP/IP port:	***NONE**
TCP/IP activation timer:	**170**
PSF defined options:	
*NONE	
Text description:	*printer_type* Network Printer
Device resource library list:	*DFT

Figure 43. Example CRTPSFCFG Command (V3R7 or V4R1)

NOTE: The lines in **bold** in Figure 43 are not used by PSF/400. Instead, PSF/400 uses the information entered in the device description screen.

3. The following parameters are recommended:

   a. **PSF configuration (PSFCFG)**

      The name used for this PSF configuration object. The name must match the user-defined object name (USRDFNOBJ) in the printer DEVD.

   b. **IPDS pass through (IPDSPASTHR)**

      To print SCS files, specify ***YES**, PSF/400 transforms SCS into IPDS before printing.

   c. **Activate release timer (ACTRLSTMR)**

      Specifies the point at which the release timer (RLSTMR) is activated. Set to ***NORDYF**.

   d. **Release timer (RLSTMR)**

      Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. The recommended value is ***SEC15**.

Configuring PSF With CRTDEVPRT On V3R7 And Above

This section describes how to create a printer device description.

1. At the AS/400 command line, enter a command in the form:

```
CRTDEVPRT DEVD(printer_type) DEVCLS(*LAN) TYPE(*IPDS)
          MODEL(0) LANATTACH(*IP) AFP(*YES) PORT(5001)
          FONT(11) FORMFEED(*CONT)
          RMTLOCNAME('128.9.12.134')
          USRDFNOBJ(AFP/5000NETPRT *PSFCFG)
          TEXT('printer_type NETWORK PRINTER')
```

   Where *printer_type* (e.g., T5000, P5000, L5520)is the model of your printer.

NOTE: Only use the USRDFNOBJ parameter if it was defined in the previous procedure. See “Configuring AFP With CRTPSFCFG On V3R7 Or V4R1 (Optional)” on page 162.

2. A completed screen looks like the example shown in Figure 44.

Display Device Description		
5716SS1 V3R7M0 961108	BLDRB1	
Device Description:	**DEVD**	*printer_type*
Option:	OPTION	*ALL
Category of device:		*PRT
Device class:	**DEVCLS**	***LAN**
Device type:	**TYPE**	***IPDS**
Device model:	**MODEL**	**0**
LAN attachment:	**LANATTACH**	***IP**
User-defined object:	**USRDFNOBJ**	*printer_type* **NETPRT**
Library:		AFP
Object type:		*PSFCFG
Data transform program:	USRDTATFM	*NONE
User-defined driver program:	USRDRVPGM	*NONE
Advanced function printing:	AFP	*YES
Port number:	**PORT**	**5001**
Online at IPL:	ONLINE	*YES
Font:	**FONT**	
Identifier:		**011**
Point size:		***NONE**
Form feed:	**FORMFEED**	***CONT**

Separator drawer:	SEPDRAWER	*FILE
Separator program:	SEPPGM	*NONE
Library:		
Printer error message:	PRTERRMSG	*INQ
Message queue:	MSGQ	QSYSOPR
Library:		*LIBL
Activation timer:	**ACTTMR**	**170**
Maximum pending requests:	MAXPNDRQS	6
Print while converting:	PRTCVT	*YES
Print request timer:	PRTRQSTMR	*NOMAX
Form definition:	FORMDF	F1C10110
Library:		*LIBL
Remote location:	**RMTLOCNAME**	
Name or address:		128.9.12.134
Dependent location name:	DEPLOCNAME	*NONE
Text:	TEXT	*printer_type* Network Printer
User-defined options:	USRDFNOPT	

Figure 44. Example CRTDEVPRT Command (V3R7 and above)

3. Values must be entered for the following parameters:
   a. **Device Description (DEVD)**

      The device description or name.
   b. **Device Class (DEVCLS)**

      Specify **`*LAN`**
   c. **Device Type (TYPE)**

      Specify **`*IPDS`**

d. **Device Model (MODEL)**

   Specify `0`

e. **LAN Attachment (LANATTACH)**

   Specify `*IP`

f. **Port Number (PORT)**

   Specify `5001`

g. **Font (FONT)**

   Enter an appropriate value.

h. **Form Feed (FORMFEED)**

   Specify `*CONT`

i. **Activation Timer (ACTTMR)**

   This value specifies the number of seconds that PSF/400 waits for a printer to respond to an activation request. If only one system is using the printer, use the default value (170 seconds). If more than one system is using the printer, specify **`*NOMAX`**, which causes PSF/400 to wait indefinitely for a response to an activation request.

j. **Remote Location (RMTLOCNAME)**

   Enter the IP address or hostname of the printer.

k. **User-Defined Object (USRDFNOBJ)**

   To use a PSF configuration object, specify its name and library here. This object type must be **`*PSFCFG`**. For V3R7 and higher, a single PSF configuration object may be referenced by multiple device descriptions, if required.

Configuring PSF for IPDS On V4R2 And Above

To configure IPDS on the iSeries V4R3, use the following commands:

- CRTDEVPRT
- CRTPSFCFG (Optional)

Configuring AFP with CRTPSFCFG on V4R3 and Above (Optional)

To configure the iSeries for IPDS printing on V4R3:

1. At the iSeries command line, enter a command in the form:

```
CRTPSFCFG PSFCFG(AFP/NETPRTP7000) IPDSPASTHR(*YES)
RLSTMR(*SEC15) TEXT('PRINTRONIX P7000 NETWORK ATTACHED
PRINTER') PAGSIZCTL(*YES) ACTRLSTMR(*NORDYF)
```

2. A completed screen looks like Figure 45.

Create PSF Configuration (CRTPSFCFG)		
PSF configuration		**Name**
Library	**>*CURLIB**	**Name, *CURLIB**
User resource library list	*JOBLIBL	*JOBLIBL, *CURLIB, *NONE
Device resource library list	*DFT	Name, *DFT
+ for more values		
IPDS pass through	**>*NO**	***NO, *YES**
Activate release timer.....	*NORDYF	*NORDYF, *IMMED...
Release timer.....	**>*NOMAX**	**1-1440, *NOMAX, *SEC15...**
Restart timer.....	*IMMED	1-1440, *IMMED
APPC and TCP/IP retry count....	15	1-99, *NOMAX
Delay between APPC retries.....	90	0-999
Acknowledgment frequency	100	1-32767
Printer response timer	*NOMAX	5-3600, *NOMAX
Generate PDF output	*NONE	*NONE, SPLF, *STMF, *MAIL
Text 'description'	**>*BLANK**	
Additional Parameters		
Automatic session recovery:		
Enabled	*NO	*NO, *YES
Message option		*INFO, *INQ
Blank page	*YES	*YES, *NO
Page size control.....	**>*YES**	***NO, *YES**
Resident fonts	*YES	*YES, *NO
Resource retention.....	*YES	*YES, *NO

Edge orient.....	*NO	*YES, *NO
Use outline fonts.....	*NO	*YES, *NO
PSF defined option.....	*NONE	
	+ for more values	
Font substitution messages.....	*YES	*YES, *NO
Capture host fonts at printer.....	*NO	*NO, *YES
Font resolution for formatting ...	*SEARCH	*SEARCH, 240, 300
Font mapping table.....	*NONE	Name, *NONE
Library.....		Name
Cut sheet emulation mode	*NONE	*NONE, *CHKFIRST, *CHKALL
Use DBCS simulation fonts	*NO	*YES, *NO
Replace	*YES	*YES, *NO
Authority	*LIBCRTAUT	Name, *LIBCRTAUT, *CHANGE...

Figure 45. Example CRTPSFCFG Command (V4R2 and above)

3. The following parameters are recommended: PSF configuration (PSFCFG)

The name used for this PSF configuration object. The name must match the user-defined object name (USRDFNOBJ) in the printer DEVD.

PSF configuration (PSFCFG)

The name used for this PSF configuration object. The name must match the user-defined object name (USRDFNOBJ) in the printer DEVD.

IPDS pass through (IPDSPASTHR)

To print SCS files, specify ***YES**, PSF transforms SCS into IPDS before printing.

Release timer (RLSTMR)

Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. Printronix recommends ***SEC15**.

Page size control (PAGSIZCTL)

Specifies if the page size (forms) is set by PSF. Usually set to ***YES**.

Remote Location name or address (RMTLOCNAME)

Enter the IP address or hostname of the printer.

Configuring PSF with CRTDEVPRT On V4R2 and Above

This section describes how to create a printer device description.

1. At the iSeries command line, enter a command in the form:

```
CRTDEVPRT DEVD(P7000) DEVCLS(*LAN) TYPE(*IPDS) MODEL(0)
LANATTACH(*IP) AFP(*YES) PORT(5001) FONT(11)
FORMFEED(*CONT) RMTLOCNAME('128.9.12.134')
USRDFNOBJ(AFP/NETPRTP7000 *PSFCFG)
TEXT('Printronix P7000 NETWORK PRINTER')
```

Only use the USRDFNOBJ parameter if it was defined in the previous procedure.

A completed screen looks like the example shown in Figure 46.

Create Device Desc (Printer) (CRTDEVPRT)		
Device description.....:	**>P7000**	**Name**
Device class .....:	**>*LAN**	***LCL, *RMT, *VRT, *SNPT, *LAN**
Device type.....:	**>*IPDS**	**3287, 3812, 4019, 4201...**
Device model.....:	**>0**	**0, 1, 2, 3, 4, 10, 13, 301...**
LAN attachment .....:	**>*IP**	***LEXLINK, *IP, *USRDFN**
Advanced function printing	*YES	*NO, *YES
Port number .....:	**>5001**	**0-65535**
Online at IPL.....:	*YES	*YES, *NO
Font:		
Identifier	**>011**	**3, 5, 11, 12, 13, 18, 19...**
Point size.....	*NONE	000.1-999.9, *NONE
Form feed	*CONT	*TYPE, *CONT, *CONT2, *CUT...
Separator drawer	*FILE	1-255, *FILE
Separator program.....	*NONE	Name, *NONE
Library		Name, *LIBL, *CURLIB
Printer error message	*INQ	*INQ, *INFO
Message queue	*CTLD	Name, *CTLD, *SYSOPR, QSYSOPR
Library		Name, LIBL, *CURLIB
Activation timer	170	1-2550, *NOMAX
Image configuration	*NONE	*NONE, *IMGA01, *IMGA02...
Maximum pending requests.....	6	1-31
Print while converting.....	*YES	*NO, *YES
Print request timer	*NOMAX	1-3600, *NOMAX
Form definition	F1C10110	Name
Library	*LIBL	Name, *LIBL, *CURLIB
Remote location:		
Name or address		
User-defined options.....	*NONE	Character value, *NONE
+ for more values		
User-defined object:		
Object	***NONE**	**Name, *NONE**
Library		Name, *LIBL, *CURLIB
Object type.....		***DTAARA, *DTAQ, *FILE...**
Data transform program.....	*NONE	Name, *NONE
Library		Name, *LIBL, *CURLIB
User-defined driver program.....	*NONE	Name, *NONE
Library		Name, *LIBL, *CURLIB
Secure connection	*NO	*NO, *YES
Validation list.....	*NONE	Name, *NONE
Library		Name, *LIBL, *CURLIB

Publishing information:		
Support duplex.....	*UNKNOWN	*UNKNOWN, *SIMPLEX, *DUPLEX
Support color.....	*UNKNOWN	*UNKNOWN, *NOCOLOR, *COLOR
Pages per minute black	*UNKNOWN	1-32767, *UNKNOWN
Pages per minute color	*UNKNOWN	1-32767, *UNKNOWN
Location	*BLANK	
Data steams supported.....	*UNKNOWN	*UNKNOWN, *PCL, *PS, *PDF
+ for more values		
Text 'description'	*BLANK	
	Additional Parameters	
Remote network identifier.....	*NETATR	Name, *NETATR, *NONE
Workstation customizing object.....	*NONE	Name, *NONE
Library.....		Name, *LIBL, *CURLIB
Authority	*ALL	Name, *LIBCRTAUT, *CHANGE...

Figure 46. Example CRTDEVPRT Command (V4R2 and above)

2. Values must be entered for the following parameters:

Device Description (DEVD)

The device description or name.

Device Class (DEVCLS)

Specify ***LAN**.

Device Type (TYPE)

Specify ***IPDS**.

Device Model (MODEL)

Specify **0**.

LAN attachment (LANATTACH)

Specify ***IP**.

Port number (PORT)

Specify **5001**.

Font (FONT)

Enter an appropriate value.

Form Feed (FORMFEED)

Specify ***CONT**.

Activation timer (ACTTMR)

This value specifies the number of seconds that PSF waits for a printer to respond to an activation request. If only one system is using the printer, use the default value (170 seconds). If more than one system is using the printer, specify ***NOMAX**, which causes PSF to wait indefinitely for a response to an activation request.

Remote Location (RMTLOCNAME)

Enter the IP address or hostname of the printer.

User-Defined Object (USRDFNOBJ)

To use a PSF configuration object, specify its name and library here. This object type must be *PSFCFG. For V3R7 and higher, a single PSF configuration object may be referenced by multiple device descriptions, if required.

Verifying The IPDS Configuration On AS/400

To test IPDS printing:

1. If it is not already on, vary on the line description:
   VRYCFG CFGTYPE(*LIN)
2. To start TCP/IP, enter **STRTCP**.
3. Verify that the AS/400 TCP/IP interface is active. Use the command:
   WRKTCPSTS
   and then select option 1.
4. Turn the printer on and wait until the printer control panel displays “ETHERNET ADAPTER IS READY.”
5. To verify the printer is connected to AS/400, **ping** the printer from an AS/400 workstation with one of the following commands:
   PING *ip_address*
   or
   PING *hostname*

   where *ip_address* is the Internet address of the remote system printer (the NIC), and *hostname* is the hostname you defined for the printer, if any.

   - If the ping is not successful, refer to “Cannot PING The Printer” on page 179.
   - If the ping is successful, vary on the printer device description with the command:
     VRYCFG (*printer_device***) CFGTYPE(*DEV) STATUS(*ON)**
6. To use PSF/400 to send an IPDS file to the printer, enter:
   STRPRTWTR DEV (*printer_device***)**
   where *printer_device* is the name of the printer.

7. If you have problems printing, do the following:
   - Print an Ethernet Test Page. Refer to your *User's Manual*.
   - Verify that port number `5001` is being used.
8. If you are still unable to print IPDS files, contact technical support.

Sharing The AS/400 Printer On The Network

To support printer sharing, your printer automatically switches among all attached ports (serial, twinax/coax, LAN). Basically, the printer prints jobs for one port until no new jobs appear and the port “times out.” The printer then switches to the next port and does the same thing.

To change the default “time out” value for a port, update the TIMEOUT value for the port on the appropriate menu (Serial Interface, Ethernet Parameters, Twinax Interface, or Coax Interface).

Printer Sharing Parameters

To set up AS/400 for printer sharing, set the following parameters.

Table 5. Printer Sharing

AS/400 Version	Where Set	Parameter	Recommended Value	Description
V3R2	CRTPSFCFG CHGPSFCFG	RLSTMR	*NORDYF	Specifies the point at which the release timer (RLSTMR) is activated. Set to *NORDYF. This means that the release timer is activated when there are no spooled files in the printer's output queue with a status of RDY and the last page of the last spooled file processed has printed. *NORDYF is used so that all files with a status of RDY are printed before releasing the session (which does not terminate the writer).
V3R2	CRTPSFCFG CHGPSFCFG	ACTRLSTMR	*SEC15	Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. The recommended value is *SEC15.

Table 5. Printer Sharing (continued)

AS/400 Version	Where Set	Parameter	Recommended Value	Description
V3R2	CRTPSFCFG CHGPSFCFG	ACTTMR	*NOMAX	The value specifies the number of seconds that PSF/400 will wait for a printer to respond to an activation request. If only one system will be using the printer, use the default value (170 seconds). If more than one system will be using the printer, set the value to *NOMAX, which causes PSF/400 to wait indefinitely for a response to an activation request.
V3R7 V4R1	CRTPSFCFG CHGPSFCFG	ACTRLSTMR	*NORDYF	Specifies the point at which the release timer (RLSTMR) is activated. Set to *NORDYF. This means that the release timer is activated when there are no spooled files in the printer's output queue with a status of RDY and the last page of the last spooled file processed has printed. *NORDYF is used so that all files with a status of RDY are printed before releasing the session (which does not terminate the writer).

Table 5. Printer Sharing (continued)

AS/400 Version	Where Set	Parameter	Recommended Value	Description
V3R7 V4R1	CRTPSFCFG CHGPSFCFG	RLSTMR	*SEC15	Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. The recommended value is *SEC15.
V3R7 V4R1	CRTDEVPRT CHGDEVPRT	ACTTMR	*NOMAX	The value specifies the number of seconds that PSF/400 will wait for a printer to respond to an activation request. If only one system will be using the printer, use the default value (170 seconds). If more than one system will be using the printer, set the value to *NOMAX, which causes PSF/400 to wait indefinitely for a response to an activation request.

AS/400 Troubleshooting

Use this section to resolve problems configuring AS/400 on TCP/IP networks.

Cannot PING The Printer

If you have problems trying to `ping` the printer:

- Verify the configuration of AS/400, including the printer and any intervening devices such as routers and bridges.
- Verify that the AS/400 line description is varied on and the printer is turned on and displays a status of ONLINE.
- Verify that the AS/400 TCP/IP interface is active.

PSF/400 Terminates When Initialized

If PSF/400 terminates when you initialize it for IPDS printing and issues message PQT3603, check for the following error codes:

- Code 10 means an incorrect `RMTSYS` or `RMTLOCNAME` (V3R2, V3R7, or V4R1) has been specified for the printer.
- Code 15 means that PSF/400 timed out waiting for the printer's response. Check the value you entered for Activation Timer when using `WRKAFP2`, `CRTPSFCFG` (V3R2), or `CRTDEVPRT` (V3R7 or V4R1).
- Codes 20-39 indicate a general communications failure. Make sure all of the components in your network are operational, such as routers. If necessary, call Printronix technical support.
- Codes 40-59 indicate a logic error between PSF and the printer control unit. Contact Printronix technical support.

Spooled Print File Remains In PND Status

Check the output queue with the command:

WRKOUTQ ***queuename***

This typically indicates that PSF/400 is waiting for a response from the printer. This can be verified by displaying the QSPL subsystem, WRKACTJOBSBS (QSPL). If the status of the PDJ job for the printer is SELW, then PSF/400 is waiting for a response from the printer. Make sure that the printer is in ONLINE mode and that all network connections (for example, routers) between the AS/400 and the printer are active.

Spooled Files Disappear Without Printing

To resolve this problem:

- Check that the correct printer queue name and correct IP address have been used.
- **Ping** the IP address. If the ping is successful, disconnect the network cable from the printer/print server, and ping the address again. If the ping is still successful, there is another printer with that IP address on the network.

Data Is Being Clipped

To resolve this problem, you may want to set the PSC (Page Size Control) parameter to ***YES** in the CRTPSFCFG command (V3R2, V3R7, or V4R1).

9 *z/OS Configuration, TN3270E*

z/OS Configuration For A TN3270E Printer

The following configuration information shows how a line matrix printer can be configured on z/OS and Info Print Server to print TN3270E. Modtabs are provided for both an SCS and DSC printer. The z/OS level is 1.3.

These basic configurations provided a starting point for users new to printing in this manner.

NOTE: Since Info Print Server (IPS) treats the TN3270E printer as a COAX attached printer, additional COAX feature for IPS is required.

Coax Printer Support FMID

Coax Printer Support consists of the following FMID:

HPRT100

Program Materials

A program is identified by a program number and a feature number. The program number for Coax Printer Support is 5697-F51.

Additional information regarding the telnet server and Info Print Server can be found in the following manuals.

- For z/OS V1R2 and above, the TCPIP information can be found in SG24-5227-3, Communications Server for z/OS V1R2 TCP/IP Implementation Guide.
- InfoPrint Server Customization Guide, S544-5744-03.
- InfoPrint ServerOperation and Administration, S544-5745-03.

1. Look at the JES definition defining and associating printer, PRINTER9 with INFOPRINT SERVER.

```
/*    PRT9 AND FSSDEF FOR LINE MATRX 06/27/97 MM       */
PRINTER9   CLASS=K,SEP,NOMARK,MODE=FSS,FSS=PRINTWAY,                X
 PRMODE=(LINE,PAGE),WS=(W,Q),SETUP=NOHALT,START=NO
/*    ASSOCIATE PRINTWAY WITH ITS START UP PROCEADURE              */
FSS(PRINTWAY) PROC=COURWTR,AUTOSTOP=YES
```

Figure 47. JES Definition Defining PRINTER9

```
//COURWTR PROC
//* ------------------------------------------------------------*
//IEFPROC  EXEC  PGM=ANFFIEP,REGION=3M,PARM='INV=AOP1'  z/OS4 INV
//STEPLIB  DD DSN=IPPW.PW311.SANFLOAD,DISP=SHR
//ANFQUEUE DD DSN=ANDREE.z/OS4.QUEUE,DISP=SHR
//ANFMMSG  DD DSN=ANDREE.z/OS4.MSGFILE,DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//
```

Figure 48. Example Of Proc Used To Start INFOPRINT Server

```
NETSPL1   VBUILD TYPE=APPL
*
*    APPL REPRESENTING IPS
*
APIPP101 APPL MODETAB=MODETAB1,DLOGMOD=SCS,AUTH=(ACQ)
LUPRT101 APPL MODETAB=MODETAB1,DLOGMOD=SCS
```

Figure 49. Example Of The APPLID That Represents A Copy Of IPDS

VTAM Definitions For SCS and DSE TN3270E

The following are VTAM definitions for SCS and DSE TN3270E printers.

NOTE: These definitions are identical to those of COAX attached printers.

```
*****************************************************************
* JES2 TN3270E VTAM MAJOR NODE                          *
*****************************************************************
*
* LU1 Printer
RMT2     APPL  AUTH=(ACQ),EAS=1,PARSESS=NO,SESSLIM=YES,          X
         MODETAB=MODETAB1,DLOGMOD=SCS
*
* LU3 Printer
RMT3     APPL  AUTH=(ACQ),EAS=1,PARSESS=NO,SESSLIM=YES,          X
         MODETAB=MODE4245,DLOGMOD=LU3PRT
```

Figure 50. MODTAB Entries

```
*********************************************************************
*                                                                   *
*     PRINTER WITH SNA CHARACTER SET   (LU_1)            @DA22961*
*                                                                   *
*********************************************************************
SCS      MODEENT
LOGMODE=SCS,FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1',  *
            SECPROT=X'90',COMPROT=X'3080',RUSIZES=X'87C6',        *
            PSERVIC=X'01000000E100000000000000',                  *
            PSNDPAC=X'01',SRCVPAC=X'01'
        TITLE 'DSC4K'
```

```
*********************************************************************
*                                                                   *
*     DSC PRINTER (LU_3)                                            *
*                                                                   *
*********************************************************************
LU3PRT   MODEENT  LOGMODE=LU3PRT,FMPROF=X'03',TSPROF=X'03',          X
            PRIPROT=X'B1',SECPROT=X'20',COMPROT=X'3080',             X
            SSNDPAC=X'00',SRCVPAC=X'00',RUSIZES=X'C7C7',             X
       PSNDPAC=X'80',PSERVIC=X'038000000000018502B507F00'
```

TCPIP Configuration With TN3270E

The following is the portion of the system's TCPIP configuration involved with TN3270E printers.

```
;
; Define the VTAM parameters required for the Telnet server.
;
BeginVTAM
;

PRTGROUP PGRPLU1
   RMT2
 ENDPRTGROUP

PRTGROUP PGRPLU3
  RMT3
ENDPRTGROUP

IPGROUP TESTPRT
  9.99.98.62
ENDIPGROUP

IPGROUP TESTPRT3
  9.99.98.67
ENDIPGROUP

PRTMAP PGRPLU1 TESTPRT GENERIC

PRTMAP PGRPLU3 TESTPRT3 GENERIC

; End telnet printer section

EndVTAM
```

NOTE: Only additions required for the TN3270E printers are shown.

Printer Inventory Manager As Defined With TN3270E

The following screens show areas of the Printer Inventory Manager involved with the definition of the TN3270E printers.

1. At main panel, select option 4 to look at the FSS definition.

```
InfoPrint Server: Printer Inventory Manager
Option ===>

Printer Definitions
  1 Add             Add a printer definition
  2 List            List printer definitions
  3 Select          Select printer definitions to list

Other Functions
  4 FSS/FSA/Pool    Manage other inventory definitions
  5 PrintWay Queue  View IP PrintWay transmission queue
  6 PrintWay Message View IP PrintWay message log
  7 Configure       Change panel configuration


                  Printer Definition List          Row 17 of 23
```

2. Select option 5 from this panel to list the FSSs.

```
 FSA, FSS, and Pool Management
Option ===>

FSA
  1 Add          Add an FSA
  2 List         List FSAs
  3 Select       Select FSAs to list

FSS
  4 Add          Add an FSS
  5 List         List FSSs
  6 Select       Select FSSs to list

Pool of Printer Definitions
  7 Add          Add a Pool
  8 List         List Pools
  9 Select       Select Pools to list
```

3. From the panel below, browse the PRINTWAY FSS to see how the TN3270E FSS was defined.

```
                        FSS List                  Row 1 of 3
 Command ===>                                     Scroll ===> HALF

 Actions:
   A-Add  B-Browse  C-Copy  D-Delete  E-Edit
 A FSS Name Type Description
 = ======== ====
 ================================================================
 B PRINTWAY IPPW APPLID for TN3270E Printers  APIPP101
   PRT10    IPPW Howard's PrintWay FSS
   WTRES700 PSF  Howard's FSS
 ****************************** Bottom of data ********************************
```

The panel below shows how the FSS (PRINTWAY) is associated with its VTAM Applid APIPP101.

```
Browse                      IP PrintWay FSS
Command ==>

FSS name. . . PRINTWAY
Description . APPLID for TN3270E Printers  APIPP101          (extend)

   Old-style translation
  Hiperspace blocks . .
  TCP/IP job name . . .
  Document code page. .
  Applid. . . . . . . APIPP101
  National language . . 1   1. English  2. Japanese
  Trace mode. . . . . 1   1. None  2. Internal  3. No printing  4. Full
      Trace prompt
    Trace table size .
```

4. Next look at the printer definition for the DSE (LU_3) printer in the printer inventory.
5. Select option 2 from the Printer Inventory Manager main panel, to list the printers.

```
 Command ===>                                          Scroll ===> HALF

 Actions:

  A-Add  B-Browse  C-Copy  D-Delete  E-Edit  X-Chg type
 A Printer Name      Type Description  Location     DEST     C FORMS    LU Name
 = ================ ==== ============ ============ ======== =
======== ========
  PRT717       PSF  LINE MATRIX IPDS   B5 lab     PRT717  Y
 B VTAM_DSE1        IPPW A TN327E Pri IMPACT LAB           K
   VTAM_SCS1        IPPW A TN327E Pri IMPACT LAB          J
   VTAM_SCS2        IPPW                                  L
 ******************************** Bottom of data ********************************
```

6. While browsing VTAM_DSE1, notice that the DSC printer is defined to IPS as a COAX attached printer.

```
Browse                IP PrintWay Printer Definition
 Command ==>

 Printer definition name . VTAM_DSE1
 Description . A TN327E Printer using the DSE (LU_3) Datastream.    (extend)
 Location. . . IMPACT LAB                                          (extend)

                     Component name       Custom values
 Section               (enter to browse)    (enter to browse)
 Allocation          =>                   => *
```

```
Processing          =>                    => *
NetSpool options    =>                      =>
NetSpool end-of-file =>                     =>
IP PrintWay options  =>                     => *
Protocol            =>                  => *

/ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
NetSpool LU name .          LU classes . .                (extend)
```

The following panel shows the Allocation section of the setup, where the printer is associated with Class K jobs.

```
Browse                    Allocation
Command ==>

Printer definition name . VTAM_DSE1

                                          More:    +
Spool allocation values:
  CLASS . . . . K          LINECT. . .
  DEST. . . . .           PRMODE. . .
  JES node. . .            PRTY. . . .
  FCB . . . . .           SEGMENT . .
  FLASH count .             THRESHLD. .
  FLASH name. .              UCS . . . .

 FORMS . . . .            WRITER. . .
  GROUPID . . .
  USERDATA
   . .                                    (extend)
  BURST . . . .   1. Yes  2. No
  HOLD. . . . .   1. Yes  2. No
  OUTDISP . . .   1. Purge  2. Leave  3. Keep  4. Hold  5. Write
Values for Separator Pages:
  Address
   . .                                    (extend)
  Building . .
```

In the IP Printway options, retry time, retry limit, and response timeout is already for the printer.

NOTE: The values of these settings are account specific. Other values may best serve your printing environment.

```
Browse                    IP PrintWay Options
 Command ==>

 Printer definition name . VTAM_DSE1

                                                 More:    +
 Retention period:
   Successful. . . .          Failure . .
 Retry time . . . . . 0000:05:00
 Retry limit. . . . . 2

 Connection timeout . 30
 Response timeout . . 100
 Exits:
   Begin data set. .        End data set. .        Record. .


Document header  . .                                  (extend)
   / Translate document header
 Document trailer . .                                 (extend)
   / Translate document trailer
 Dataset grouping . . 2  1. None  2. Job  3. Concatenate job

 Formatting:
   Line termination. . . .
```

```
Browse                    IP PrintWay Options
Command ==>

Printer definition name . VTAM_DSE1

                                              More:   -

Document header  . .                                  (extend)
  / Translate document header
Document trailer . .                                  (extend)
  / Translate document trailer
Dataset grouping . . 2  1. None  2. Job  3. Concatenate job

Formatting:
  Line termination. . . .
  Transparent data char . 35
  Carriage control type . 2  1. None  2. Machine  3. ANSI
  Delete form feed. . . . 4  1. None  2. Leading  3. Trailing  4. Both
  Formatting. . . . . .    1. None          2. Standard
                           3. Translate only  4. Use FCB
  PostScript header . . .  1. Add           2. Ignore
                           3. Landscape     4. Always landscape
    Omit line termination at EOF
```

The following shows where the VTAM parameters were set for the printer. For the DSE printer we chose RMT3 and the logmode of LU3PRT.

```
Browse                    VTAM Protocol
 Command ==>

 Printer definition name . VTAM_DSE1

 Printer LU name. . . RMT3

 VTAM Processing Options:
   Printer logmode. . . LU3PRT
   Checkpoint pages . . 5
     Send as transparent data
```

The next panel shows these settings for the SCS printer.

```
Browse                    VTAM Protocol
Command ==>

Printer definition name . VTAM_SCS1

Printer LU name. . . RMT2

VTAM Processing Options:
   Printer logmode. . . SCS
   Checkpoint pages . . 5
     Send as transparent data
```

The last thing you need to configure is the printer.

NOTE: A this time, InfoPrint Server and all related LUs should be active.

Using the printer's web pages go to the configuration screen

Configuration Screens

1. To configure the line matrix printer, fill out and submit the forms using the following links.

Table 6. Configuration Forms

Configuration	HTML Forms
Network	TCP/IP (including Windows) and Novell network settings
Print Path	Destination, Model, Log Path, and I/O port configuration
Print Model	Shortcut to the print path model configuration forms
Log Path	Shortcut to the print path log path configurations form
TN5250/3270	TN5250/3270 configuration settings
SNMP	SNMP configuration settings
Administration	Names and passwords
System	System operation modes (reboot, factory defaults)

2. Select the TN5250/3270 section from the configuration screen.

NOTE: Changes will only take effect after you reset the line matrix printer from the System page.

The following displays:

Mode: TN5250	Click here for TN3270 mode
Host	ok (eg. 204.191.175.114 or host.domain.com)
Port	
Device Description	
Message Queue Name	
Message Queue Library	
Device Type	GENERIC PRINTER
WSCST Name	
WSCST Library	
Auto Connect	
Start Auto Connect	Click here

3. Select TN3270E Mode.

The following displays:

Configuration for Print Path d2prn	
Mode: TN3270	Click here for TN5250 mode
Host	ok (eg. 204.191.175.114 or host.domain.com)
Port	23
Resource Name	
Auto Connect	
Stop Auto Connect	Click here

NOTE: Changes will only take effect after you reset the line matrix printer from the System page.

4. Enter the address of your system for the host IP address

The port address is the port configured for your telnet server. It is usualy port 23.

The Resource name will be the printer name defined in the VTAM portion of your Telnet server configuration. For this example use RMT3.

5. Select auto connect.
6. Go to the system page and reboot for the changes to take effect.
7. After the printer reboots, enter the command /DTCPIP, T, CONN from the SDSF console. The following messages show that the printer is connected.

```
D TCPIP,,T,CONN
EZZ6064I TELNET CONNECTION DISPLAY 044
        EN                                  TSP
CONN     TY IPADDR..PORT           LUNAME   APPLID   PTR LOGMODE
-------- -- --------------------- -------- --------  --- --------
00000468    9.99.98.62..2000       RMT3     *PRINTER  PPE LU3PRT
----- PORT:      23    ACTIVE          PROF: CURR CONNS:      1
------------------------------------------------------------
3 OF 3 RECORDS DISPLAYED
```

You are now ready to print.

Chapter 9 Configuration Screens

10 *AS/400 Configuration, TN5250*

Setting Up TN5250 Print Queues On AS/400

Start with V3R7 or later and the most recent PTF level. The AS/400 should have tcpip installed, be fully configured, and functional. To set up the TN5250 print queues, do the following:

1. Make sure the AS/400 has sufficient resources to add additional virtual devices.
2. Establish the IP value (not the dns name) of the AS/400.
3. Set the IP, subnet mask, and default router on the NIC adapter.
4. Use a telnet session or web browser session to configure three items per dest (logical NIC queue) for use as a logical network connection to the AS/400.

NOTE: The three values (i.e., 192.168.168.34) represent the AS/400 IP in dotted notation and are the entries for the AS/400.

The newly created TN5250 device/queue (i.e. pallet form, first chair is alpha, 10 char. max) assumes the new name “devicedesc.”

5. Determine whether or not to autoconnect (initiate connection on power up or through NIC reset) the TN5250 device/queue.

NOTE: It is not necessary to set up the devd or queue name on the AS/400 manually or in advance. The configuration and reset of the NIC adapter automatically sets up the devd or queue name.

Setting Up A TN5250 Connection/Device Via A Telnet Session

In a telnet session, the command “list TN5250” shows the configured values. To set up a TN5250 connection/device via a telnet session, use the commands “store TN5250...” and the following:

NOTE: The NIC sessions can be configured either by a web browser or by telnet.

1. Use cmd WRKCTLD *VWS, choice 5, display, enter to list the number of virtual devices this controller.
2. Use cmd DSPSYSVAL QAUTOVRT. Note the number of auto-configured virual devices permitted on the system. This number must be greater than one.
3. Use cmd DSPYSYVAL QCHRID. This is the system language (code page) available.
4. Use cmd WRKTCPSTS *IFC to deterimine the IP address of the AS/400. This value is used in setting the NIC TN5250 devices.

User Supplied Values

Host: For this session, use the IP value from (step 4 above).

Device description: This is the name of the virtual device.

Auto connect:

- If true (enabled) then queue and device automatically attach.
- If not true (disabled) the command “tn dest dxprn start/stop” allows individual sessions to start or stop.

NOTE: Leave other values at their default descriptions.

Example of telnet session commands:

```
store tn dest d8prn host 192.168.168.34
store tn dest d8prn devicedesc palletform
store tn dest d8prn autoconnect
reset
```

This example creates a device/queue named “palletform” on the AS/400 host with IP 192.168.168.34. The NIC adapter initiates the connection each time it is reset or the printer power is cycled.

Using Telnet Commands for TN5250

Command List

The following commands for TN5250 are available via a Telnet session with the Network Interface Card (NIC).

Store Commands

```
store tn dest <dxprn>host<IPaddress>
store tn dest <dxprn>port<portnumber>
store tn dest <dxprn>devicedesc<devicename>
store tn dest <dxprn>msgqname<msgqname>msgqlib<msgqlib>
store tn dest
<dxprn>WSCSTname<WSCSTname>WSCSTlib<WSCSTlib>
store tn dest <dxprn>from default
store tn dest <dxprn>[-]autoconnect
```

```
store tn dest <dxprn>copytimeout<copytimeoutvalue>
```

See page 213 for store command descriptions.

List Commands

```
list tn
list stored tn
list default tn
```

See page 242 for list command descriptions.

TN5250 Auto Connect Command

```
tn dest <dxprn>start|stop
```

See page 249 for a detailed description.

Getting Started

Set the following items when first configuring the NIC for use with an AS/400 running TN5250:

- The IP address of the AS/400 you are planning to use.

  Example: store tn dest d1prn as400 192.75.11.1

- The device description or queue name you want built on the AS/400 for the printer. This must be unique to the printer.

  Example: store tn dest d1prn devicedesc MOCHA3812

- Enable the printer to autmatically connect to the AS/400 when it is first powered up or automatically reconnect if the original connection is lost.

  Example: store tn dest d1prn autoconnect

  In most circumstances, all other settings can be left as default. The printer should be reset (powered off and on again) for the settings to take effect.

  If you do not wish the printer to connect automatically when powered up then leave the autoconnect disabled and control the connection manually with the following command:

Example: tn dest d1prn start

By using the manual method, time is allowed to properly prepare the AS/400 after the printer is powered up but before a connection is established. This method should only be used during an initial installation until the printer and the AS/400 are synchronized. The normal method is to have autoconnect enabled.

The autoconnect feature has a cycle time of approximately one minute. A little patience may be required when first turning on the printer before the connection becomes visible on the AS400.

TN5250 Job Formatting

Forms width, forms length, CPI and LPI are controlled by the TN5250 data stream unless the front panel TN5250 Host Override option is enabled. The CPI is controlled through TN5250 via the font selection in the Change Device Description (CHGDEVPRT) command.

A completed screen looks like the example shown in Figure 51.

Change Device Desc (Printer) (CHGDEVPRT)		
Type choices, then press **Enter**.		
Device description	DEVD	
Online at IPL	ONLINE	*NO
Font:	**FONT**	
Identifier		**011**
Point Size		***NONE**
Form Feed	FORMFEED	*CONT

Separator drawer	SEPDRAWER	*FILE
Separator program	SEPPGM	*NONE
Library		
Printer error message	PRTERMSG	*INFO
Library		*LIBL
Host print transform	TRANSFORM	*NO
Manufacturer type and model	MFRTYPMDL	*SAME
Paper source 1	PPRSRC1	*MFRTYPMDL
Paper source 2	PPRSRC2	*MFRTYPMDL
Envelope source	ENVELOPE	*MFRTYPMDL
ASCII code page 899 support	ASCII899	*NO
Image configuration	IMGCFG	*NONE
Character identifier:	CHRID	
Graphic character set		*SAME
Code page		
User-defined options	USRDFNOPT	*SAME
+ for more values		
User-defined object:	USRDTATFM	
Object		*NONE
Library		
Object type		
Data transform program	USRDTATFM	*NONE
Library		
User-defined driver program	USRDRVPGM	*NONE
Library		

Text 'description'	TEXT	'Device created for S1045PXM.'
Workstation customizing object	WSCST	*NONE
Library		

Figure 51. Example of CHGDEVPRT Command

Font Identifier (FONT) - Help

Specifies the font identifier used by the 3812, 3816, and 5219 printers (including ASCII printers emulating the 5219 printer), and the IPDS printers.

The Printer Font Table (Font Parameter) in the CRTDEVPRT command lists the valid font identifiers, the display values, the characters per inch value implied with each font style, a description of each font style, and whether the font is supported on a particular printer.

NOTE: Some fonts may be substituted by the printer. Consult the various printer reference guides of details.

The possible values are:

- **identifier**. Specify the 3-, 4-, or 5-digit identifier associated with this printer.
- **point-size**. Specify a point size ranging from 0.1 through 999.9. If you do not specify a point size, the system will set one.
- ***SAME**. This value does not change.

The print quality/typeface setting in TN5250 mode is NOT set by the TN5250 data stream. It is only set through the front panel. This is true regardless of the front panel TN5250 Host Override setting.

Chapter 10 Font Identifier (FONT) - Help

11 *Monitoring Printers*

Implementing Printer Management

Printer management includes the following tasks:

- Monitoring the status of network printers
- Responding to alarms
- Gathering statistics on printer operations

The three elements of network printer monitoring and management are:

- Agent/manager model
- The management information database (MIB)
- SNMP, the protocol used to get management information

Agent/Manager Model

The elements of a monitoring system, MIB and SNMP, are implemented in an agent/manager model:

- The MANAGER is a console, workstation, or server on working hubs or routers which has a global knowledge of NICs and printers.
- AGENTS are utilities that reside on devices, such as a NIC, that respond through SNMP to management requests for information. The information is stored in an MIB.

MIB

An MIB contains information a device makes available through SNMP. The MIB is a management information base that describes information about actual objects to be managed and controlled.

Standards Of Network Printer MIBs

The Printer MIB is based on the following standards:

- System and Interfaces Group MIB (RFC 1213 of March 1991)
- Host Resource MIB (RFC 1514 of September 1993)
- Printer MIB (RFC 1759 of March 1995)
- NIC contains the Standard Printer MIB per RFC 1759, available from www.ietf.org.

Information Provided By The MIB

The printer MIB contains the following types of information about network printers:

Descriptions. Printer configuration, location, and contact.

Status. Current operating status of printers.

Alerts. Reportable events from printers.

General Information About MIBs

For further information on SNMP and MIB, refer to the following:

- RFC 1155 — Structure and Identification of Management Information for TCP/IP-based Internets (SMI)
- RFC 1156 — Management Information Base for Management of TCP/IP Internets (MIB)
- RFC 1157 — A Simple Network Management Protocol (SNMP)
- The Simple Book: An Introduction to Management of TCP/IP-based Internets

Getting The Latest MIB Information

The latest copy of these and other RFCs can be obtained from the Internet Engineering Task Force (IETF) at http://www.ielf.org.

SNMP

SNMP is the protocol used to communicate between manager and agent. Managers request information, usually through automated polling at specified intervals, and agents respond. Though used primarily on TCP/IP networks, SNMP can be implemented on other protocols, for example, IPX.

SNMP is a standard by which a network manager can get statistics and configuration information from the NICs and other devices on the network. This is done through a Network Management Station (NMS) such as NetView®. Currently only SNMP version 1 protocol is supported.

Monitoring Tools

Many tools can be used to monitor printers with SNMP agents. One of these tools is NetView. There are also other MIB browsers which are not described here.

Monitoring With AIX NetView/6000

The AIX NetView/6000 program can manage any IP-addressable device with an SNMP agent.

NetView/6000 can be used to set a network topology, monitor a network, diagnose problems, and measure network performance.

Through its MIB Browser, information about the resources affecting an event (such as an alarm) can be obtained.

PrintNet Enterprise Suite

PrintNet Enterprise Suite (PNE) is a versatile remote management software utility. It allows you to organize all of the printers in your office remotely in a single database, download software and printer settings from a host computer with a single mouse click, and use a virtual operator's panel to configure printers in the same room or on the other side of the world. Refer to the *PrintNet Enterprise Suite User's Manual* or www.Printronix.com for more details on this tool.

Setting The SNMP Community Name

The default SNMP read-only community name is "public" and cannot be changed.

Change the SNMP R/W community name with the command:

`set user passwd snmp com_name`

`save`

where *com_name* is the new SNMP R/W community name.

The default is no R/W community name.

NOTE: Changing SNMP community names or access rights may hinder or disable applications that are monitoring your printers.

12 *Commands*

Command Shell Overview

The NIC comes with an in-depth command shell called `npsh`. It allows you to manipulate objects like destinations, I/O ports, and models and provides monitoring and troubleshooting capabilities.

npsh Access Methods

There are many ways this command shell can be accessed:

- built in HTML forms
- a Telnet session from a TCP/IP host to the NIC
- a single remote shell command (e.g., `rsh`, `rcmd`, `remsh`) from a TCP/IP host
- a PTX_SETUP command file containing one or more npsh commands sent through a printer data port (serial, parallel, etc.)

Main npsh Command Prefixes

All configurable commands either start with `store` or `set`, and view commands start with `list`.

NOTE: If the `store` prefix is used, the NIC must be repowered to make the changes take effect. Since `store` affects flash memory settings only, the print server must reset and read the new settings now in flash memory.

NOTE: If the `set` prefix is used, a `save` command must be executed as well so that the new settings are retained after power cycles. Since `set` only affects the settings in memory, they will be lost after a power cycle unless they are saved to flash memory.

Getting Command Help

The NIC command shell provides several online help tools, including:

"?" Command

Typing "`?`" when logged in to the command shell will produce a full list of all available commands.

Command Prefixes

Typing in the first portion of a command will produce an error message showing the correct syntax. For example, typing in `store tcpip` will produce a list of all commands that start with this prefix.

Complete Command List

This section outlines the entire NIC command set including the command syntax, a description, and in most cases, an example for each command listed.

NOTE: If you see the word *ifnum* in any npsh commands, you should substitute a `1` or `2` unless told otherwise. The `1` represents the one network interface (e.g., Ethernet) supported. The `2` represents the wireless network interface if it exists in the system.

Store Commands

These commands change the settings stored in flash memory and do not affect the current or working settings in memory. A power cycle is needed before the stored settings become current.

`store ifc ifnum utp [-]li [-]rx`

Example: `store ifc 1 utp li`

Modify the physical UTP interface properties where `li` enables link integrity and `rx` enables the increased receive threshold.

`store ifc from default`

Set all UTP settings back to factory defaults.

`store ifc from current`

Store all current UTP settings to flash memory so they are retained after a power cycle. This ensures all current settings match what is stored in flash memory.

`store ifc default <IFNUM>|<0> (0 for no default)`

Store the specified interface as the default interface. The other interface is no longer active after power cycle. The 0 allows for both interfaces to be active.

`store ifc <IFNUM> mode auto|10half|10full|100half|100full`

Store the specified interface mode as automatic, 10mbps half duplex, 10mbps full duplex, 100mbps half duplex, 100mbps full duplex. See page 22.

Define the wireless authentication scheme:

```
store ifc <IFNUM> wlan auth <AUTH-METHOD>
(eg. open, shared)
```

<ifnum> is the interface number for the wireless interface.

- “Open” system authentication allows all devices that have the authentication algorithm number for open system to authenticate.
- “Shared” key authentication involves a four step process using secure or encrypted text by means of WEP.

Define a wireless auth-user-name to be used in the EAP operation:

```
store ifc <IFNUM> wlan user <AUTH-USER-NAME>
```

<ifnum> is the interface number for the wireless interface.

This auth-user-name needs to match the user name entered in the EAP Access Point.

Define a wireless auth-password to be used in the EAP operation:

```
store ifc <IFNUM> wlan pass <AUTH-PASSWORD>
```

<ifnum> is the interface number for the wireless interface.

This auth-password needs to match the password entered in the EAP Access Point.

Set the wireless network name (SSID):

```
store ifc <IFNUM> wlan ssid <NETWORK-NAME>
```

<ifnum> is the interface number for the wireless interface. <network-name> is a 1 to 32 ASCII character string.

```
store ifc <IFNUM> wlan mode adhoc|pseudo|managed
```

<ifnum> is the interface number for the wireless device. "pseudo" or "managed". "pseudo" stands for pseudo IBSS (Proprietary adhoc).

Set the wireless transfer rate (speed):

```
store ifc <IFNUM> wlan speed auto|<2 4 11 22 18 24 36
48 72 96 108>
```

<ifnum> is the interface number for the WLAN device. <speed-flags> are the speeds being selected. They are entered as a list of integers, separated by 'space' characters. The following rates are supported: 2 for 1Mbps, 4 for 2Mbps, 11 for 5.5Mbps, and 22 for 11Mbps. Using the word "auto" instead of any number will set the card to use automatic negotiation.

Set the wireless channel number:

```
store ifc <IFNUM> wlan channel default <1-15>
```

<ifnum> is the interface number for the wireless device. <channel-num> selects the RF channel number (1 to 15) used in ad-hoc mode. The word "default" will inform the device driver to use the card's factory set default channel.

Set wireless antenna type:

```
store ifc <IFNUM> wlan antenna diverse|primary|aux
<ANTENNA-TYPE>
```

<ifnum> is the interface number for the wireless device. <antenna-type> is the type of antenna to be used: "primary", "aux" (auxiliary or external) and "diverse". "diverse" allows the WLAN card to decide on the optimal antenna during operation.

Set the wireless preamble length:

```
store ifc <IFNUM> wlan preamble default|long|short
<LEN-TYPE>
```

<ifnum> is the interface number for the wireless device. <len-type> is the type of preamble length required. It can be "long", "short", or "default". "default" allows the card to use its own factory-default.

Set the wireless power management mode:

```
store ifc <IFNUM> wlan pmm on|off
```

<ifnum> is the interface number for the wireless device. The string "off" disables power-save mode. "on" enables power-save mode with a default sleep-time of 100ms.

Set wireless transmit power:

```
store ifc <IFNUM> wlan txpwr <0-100>
```

<ifnum> is the interface number for the wireless device.
<0-100> the power level as a percentage of full power .

Set options:

```
store ifc <IFNUM> wlan opts [[-]intnl]
```

<ifnum> is the interface number for the wireless device.
An option is enabled by including it in the list and disabled by preceding it with a '-' character in the list. Supported option is "intnl", for international mode and “openauth” for open authentication.

Set the default key for wireless encryption:

```
store ifc <IFNUM> wlan defkey disable|<1-4>
```

<ifnum> is the interface number for the wireless device.
<1-4> is the number identifying one of the four keys (1-4). A value of zero or the word "disable" disables encryption.

Set the key to a given value:

```
store ifc <IFNUM> wlan key <KEY-NUM> <HEX-KEY>|
<$<STRING-KEY>[<LENGTH>]>
```

<ifnum> is the interface number for the wireless interface.
<key-num> is the number identifying one of the four keys (1-4).
<hex-key> is the encryption key value for <key-num>.
The value must consist of 5 or 13 double- or quad-digit HEX numbers, separated by colon (':') or dash ('-') characters for readability (e.g. D1C2-B3A4-9586-7768-594A-3B2C-1D). Alpha characters are NOT case sensitive. All zero disables encryption for <key-num>. If '$' is the first character the remainder of the argument is treated as a literal string with all alpha-numeric characters allowed except spaces). Key length is inferred from the length of key-value so leading zeroes of longer keys must be entered (not blank).

`store ifc <IFNUM> wlan profile <WIFI-PROFILE>`

<ifnum> is the interface number for the wireless interface.

<WIFI-PROFILE> is a value in the range of 0 to 6, where:

0 = 802.11 b only
1 = mixed 802.11g,b
2 = mixed 802.11b,g without 5.5, 11 Mbps
3 = 802.11g only
4 = test 802.11g only
5 = 802.11b only without 5.5, 11 Mbps
6 = mixed 802.11b,g with 5.5, 11 Mbps

The default profile value is 1.

Selects the 802.11 g wireless (Wi-Fi) mode in which to operate.

`store ifc <IFNUM> wlan wpa disable|personal|enterprise`

<ifnum> is the interface number for the wireless interface.

Selects the WPA wireless security mode. The options are Disable (default), personal, and enterprise. Select personal mode for WPA/WPA2 authentication methods. Select enterprise mode for EAP authentication.

`store ifc <IFNUM> wlan eap leap|peap|ttls`

<IFNUM> is the interface number for the wireless interface.

Selects the EAP authentication method. Select leap for Cisco LEAP authentication. The ttls option is reserved for future use. Select peap to use PEAP authentication.

`store ifc <IFNUM> wlan cipher disable|tkip|aes|tkip+aes`

<ifnum> is the interface number for the wireless interface.

Selects the WPA wireless security cipher setting. Disable, TKIP, AES, and TKIP+AES are the available settings. TKIP is the default setting when WPA is enabled.

`store ifc <IFNUM> wlan passphrase <WPA PRE-SHARED KEY>`

<ifnum> is the interface number for the wireless interface.

<WPA Pre-Shared Key> is the passphrase used to communicate with an access point. The passphrase entered must be between 8 and 63 ASCII characters long.

`store ifc <IFNUM> wlan country <COUNTRY-CODE>`

<ifnum> is the interface number for the wireless interface.

<COUNTRY-CODE> can be one of the following 2 or 3 character strings:

US or USI (for USA, USA Indoor operation, respectively),
GB or GBI (for Great Britain, Great Britain Indoor operation),
NL or NLI (for Netherlands, Netherlands Indoor),
FR or FRI (for France, France Indoor),
DE or DEI (for Germany, Germany Indoor),
IT or ITI (for Italy, Italy Indoor)

The default country code is US.

This command is used to select the country and corresponding valid channel settings with which the 802.11g wireless NIC can use to communicate with an access point.

Enables or disables Kerberos for the wireless interface:

`store kerberos opts [-]auth`

Sets the maximum allowable amount of clock skew in seconds or minutes that Kerberos authentication will tolerate before assuming that a Kerberos message is invalid:

`store kerberos config clockskew <CLOCK_SKEW><s|m>`

The time units cannot be mixed and there must at least be one space between the <renew_life_time> value and the time unit (s or m). The default is 300 seconds, (i.e. five minutes). The minimum allowable value is 60 seconds (i.e. 1 minute). The maximum allowable value is 900 seconds (i.e. 15 minutes).

NOTE: The Microsoft step-by-step Guide to Kerberos 5 (krb5 1.0) Interoperability recommends that your system clock be sychronized within two minutes to the KDC system's clock. Otherwise, clock skew errors will cause Kerberos authentication to fail. If this is the case, the clock skew default may need to scale down to two minutes.

Sets the maximum allowable ticket lifetime in seconds, minutes, hours, or days:

```
store kerberos config tktlife <LIFE_TIME> <s|m|h|d>
```

<life_time> is between 300 seconds and 259200 seconds (3 days). The time units cannot be mixed and there must be at least one space between the <life_time> value and the time units (s, m, h, or d). Default value is 43200 seconds.

Sets the maximum allowable renewable lifetime in seconds, minutes, hours, or days:

```
store kerberos config renewlife <RENEW_LIFE_TIME>
<s|m|h|d>
```

<renew_life_time> is 0 (i.e. no limit) or between 300 seconds and 604800 seconds (7 days). The time units cannot be mixed and there must be at least one space between the <renew_life_time> value and the time unit (s, m, h, or d). Default value is 0.

Configures the KDC port:

```
store kerberos config kport <KDC_PORT>
```

<kdc_port> is the 2-byte UPD/TCP port used for Kerberos communication. Default is 88.

Configures the KDC name portion of the service principal:

```
store kerberos config kname <KDC_NAME>
```

<kdc_name> has a maximum of 127 characters excluding ":" and "/". Default is krbtgt.

Configures the KDC realm portion:

```
store kerberos config krealm <KDC_REALM>
```

<kdc_realm> is usually set to the uppercase name of the Windows 2000 KDC to which the Access Point is configured. <kdc_realm> has 0 to 127 characters excluding ":" and "/". Default is localrealm.

Sets the Kerberos password that must match the Windows 2000 user password for the Print Server:

`store kerberos password <KERBEROS_PASSWORD>`

<kerberos_password> is either a string without any space and tab, or a double quoted string with a maximum of 40 alpha-numeric characters or symbols. The administrator should choose at least 9 alphanumeric characters with a combination of upper and lower case characters and symbols. In the Windows environment, this is the Windows 2000 user password for the Print Server and they must be exactly the same.

`store pping opts [-]enable`

Example: `store pping opts enable`

Store the state of periodic ping flag. If the periodic ping flag is enabled the NIC periodic ping client will attempt to ping its default gateway on its active NIC interfaces.
Default: disabled

`store pping packet <NUMBER OF PACKETS>`

Example: `store pping packet 1`

Store the value of the packet. It is the number of ICMP Echo Request packets that will be sent by the periodic ping client on each period.
Default: 1

`store pping period <MINUTES>`

Example: `store pping period 5`

Store the value of the period. <minutes> is the amount of time from 1 to 5 minutes defines the periodic ping sequence will be repeated.
Default: 5

`store pping from default`

Example: `store pping from default`

Store all the periodic ping default settings to flash memory so that they are retained after power up.

`store pserver name`

Example: `store pserver name NIC1234`

Command to change the print server name.

```
store pserver opts [[-]jobsecurity]
[jobtimeout <SECONDS>] [jobcontrol[off|standard|
enhanced]] [multcp[enable|disable|disablewithRST]]
```

Example: `store pserver opts jobcontrol [off|standard|
enhanced]`

`jobcontrol` is used to have different levels of secure printing. This is available as a performance enhancement for LPR, TCP socket printing etc. When jobcontrol is set to enhanced all jobs will be supported with job flow control.

NOTE: When jobcontrol is disabled, dynamic config loading on a model change is also disabled.

- **off**. no job control; no SOJ/EOJ commands. The printer prints faster in off mode.
- **standard**. (the default) traditional job control with immediate acknowledgements of SOJ/EOJ commands.
- **enhanced**. job control with EOJ acknowledgements held off by the printer until job is fully printed. The printer prints slower in enhanced mode.

To monitor the printer, use the telnet command “lpstat.” The normal status reported on the first line of the lpstat response is the status of the queue (LPQ) within the NIC. The status reported does not reflect the state of the print job once it has been sent from the NIC to the printer.

The new line at the bottom of the lpstate response labeled “printer job:” can report one of two status values:

a. **In Progress**. A job in the printer is not yet finished.

b. **Done**. There are no jobs in the printer. All previous jobs are finished.

Example: `store pserver opts jobsecurity jobtimeout 5`

If `jobsecurity` is disabled, any user can cancel queued jobs on the NIC including guest users. If `jobtimeout` is set to some value other than 0, the NIC will only wait this amount of *`seconds`* when getting printer feedback. This is only used if you have a logpath port and type set on a particular destination.

The multcp option determines how many concurrent socket connections are allowed.

Example: `store pserver opts multcp disable`

When multcp is disabled, only a single socket connection is allowed at a time. The default is multcp enabled.

Example: `store pserver opts multcp disablewithRST`

With this option, only a single socket connection is allowed at a time. Other socket connection requests are refused with a RST packet.

Example: `store pserver opts multcp enable`

With this option, multiple concurrent socket connections are allowed.

`store pserver tcpsocket <TCP-PORT> port <NEW-TCP-PORT>`

Example: `store pserver tcpsocket 4000 port 5000`

Change a pre-defined TCP port number (<tcp-port>) on the NIC to a new TCP port number (<new-tcp-port>). The default number is 9100 for prn.

`store pserver tcpsocket <TCP-PORT> dest <DEST>`

Example: `store pserver tcpsocket 5000 dest d1prn`

Assign a pre-defined TCP port number (<tcp-port>) to a particular destination (<dest>) on the NIC. Therefore, if you are using a print method that sends jobs directly to a TCP port number, you still have the option to process the job data through this destination setting.

`store pserver tcpsocket add <TCP-PORT> dest <DEST>`

Example: `store pserver tcpsocket add 9101 dest d2prn`

Maps the port number to a destination.

`store pserver tcpsocket del <TCP-PORT> dest <DEST>`
Example: `store pserver tcpsocket del 9101 dest d2prn`

Deletes a mapped port number destination already defined by listed commands.

`store pserver smb workgrp <WORKGROUP>`
Example: `store pserver smb workgrp eng`

Define a different Windows workgroup as defined by <workgroup> for the NIC to be visible within (should be 14 characters or less). By default, the print server only comes up within the group called “WORKGROUP.”

`store pserver lpd [-]dest1default`
Example: `store pserver lpd dest1default`

If dest1default is disabled and upon verification, the printer name supplied by the LPR protocol and the destination name do not match, then an error message is returned and the service is refused. If dest1default is enabled and upon verification, the printer name supplied by the LPR protocol and the destination name do not match, then the job is automatically routed to the first destination and the service is accepted.

Default: enabled

`store pserver from default`

Set all general print server settings back to factory defaults.

`store pserver from current`

Store all current general print server settings to flash memory so they are retained after a power cycle. This ensures all current settings match what is stored in flash memory.

`store ptrmgmt pne <PNE PORT NUMBER>`

Change the port number to communicate with Printnet Enterprise.

Default: 9001

`store ptrmgmt status <STATUS PORT NUMBER>`

Example: `store ptrmgmt status 1025`

Receives printer status, print job status, and/or emulation verification data. The data sent through this port is defined by the printer code.

Default: 9002

`store ptrmgmt mgmt <MGMT PORT NUMBER>`

Used in PXML operation.

Default: 9007

`store tcpip <IFNUM> addr <ADDRESS>`

Example: `store tcpip 1 addr 192.75.11.9`

Store the IP address for the NIC.

`store tcpip <IFNUM> mask <MASK>`

Example: `store tcpip 1 mask 255.255.255.0`

Store the subnet mask for the NIC.

`store tcpip <IFNUM> opts [[-]rarp] [[-]bootp] [[-]dhcp] [[-]persistdhcp] [[-]dns]`

Example: `store tcpip 1 opts -rarp -bootp -dhcp`

Enable or disable the automatic RARP, BOOTP, DHCP, DNS, or persistent DHCP requests for IP addresses upon bootup. If you are storing the NIC TCP/IP network settings within the device, you will not need to rely on RARP, BOOTP, DHCP, or DNS for new settings.

`store tcpip` *`IFNUM`* `frametype [[-]ethernet2] [[-]802.2snap]`

Example: `store tcpip 1 frametype ethernet2 802.2snap`

Control which frame type(s) is supported with the TCP/IP protocol. By default, both `Ethernet 2` and `802.2snap` are enabled, but normal TCP/IP communications rely on Ethernet 2.

`store tcpip route add default[1|2] <ROUTER> <IFNUM> [<METRIC>]`

Example: `store tcpip route add default1 192.75.11.1 1`

Store a default router/gateway defined by router IP Address (<router> <ifnum>) so the NIC knows where to direct packets destined for another subnet. It is easier to store one default entry rather than an entry per remote host or network as in the previous command.

`store tcpip del default [1|2]`

Example: `store tcpip route del default1 192.75.11.1 1`

Delete a default router/gateway defined by router IP Address (<router> <ifnum>) so the NIC knows where to direct packets destined for another subnet.

`store tcpip route add [host|net] <NETWORK> [/mask] <ROUTER> <IFNUM> [<METRIC>]`

Example: `store tcpip route add net 192.75.12.0 1`

Add a static route to a particular TCP/IP host or subnet specified by <network> so the NIC knows how to communicate with it. Normally one entry for a default router/gateway is all that is needed for communications between different subnets. Please see the next command for details.

`store tcpip route del [host|net] <NETWORK>`

Example: `store tcpip route add net 192.75.12.0 1`

Delete a static route to a particular TCP/IP host or subnet specified by <network> so the NIC knows how to communicate with it. Normally one entry for a default router/gateway is all that is needed for communications between different subnets. Please see the next command for details.

`store tcpip tcp rxwin <PACKETS>`

Example: `store tcpip tcp rxwin 2`

Determine the receive window size for the NIC. Usually the *`packets`* value ranges from 2 to 8, with the lower number allowing for more simultaneous TCP connections with the print server.

`store tcpip tcp opts [-]keepalive [-]zeroIPArp [-]keepalivedata`

Example: `store tcpip tcp opts keepalive`

Control whether the NIC maintains a connection with a host when data cannot be accepted into its buffer. Normally the `keepalive` feature is enabled so when the printer cannot accept data, the print job connection is maintained and continued once the situation clears. The keepalivedata option controls whether the keepalive packet contains a data byte for hosts that require it. If zeroIPArp is disabled then a NIC with an IP address of 0.0.0.0 will not allow IP access until the IP address is configured. If zeroIPArp is enabled on a NIC with an IP address of 0.0.0.0 then any attempted access with a valid IP address is assumed for this NIC and an Arp lookup is performed.

Default: enabled

`store tcpip tcp access [root] add|del <NETWORK> [<NETMASK>]`

Example: `store tcpip tcp access add 192.75.11.25`

Add or remove an entry from the NIC TCP access list defined by <network>. If the list has an entry, only this host can print to and remotely interact with the print server.

`store tcpip from default|current`

Example: `store tcpip from default`

Set all TCP/IP network settings back to factory defaults.

Example: `store tcpip from current`

Store all current TCP/IP network settings to flash memory so they are retained after a power cycle. This ensures all current settings match what is stored in flash memory.

`store tn dest <DXPRN> mode 5250|3270`

Example: `store tn dest d1prn mode 3270`

Store the TN protocol mode.

Default: 5250

`store tn dest <DXPRN> host <IPADDRESS>`
Example: `store tn dest d1prn host 192.75.11.1`

Store the IP address of the TN5250/3270 host

Default: Unconfigured (empty) IP address

`store tn dest <DXPRN> port <PORTNUM>`
Example: `store tn dest d1prn port 27`

Store the UDP port number of the TN server.

Default: 23

`store tn dest <DXPRN> devicedesc <DEVNAME>`
Example: `store tn dest d1prn devicedesc MOCHA3812`

Store the name of the printer device. The description entered will be the name of the printer device created on the AS/400 host for the current session.

Default: Unconfigured (empty) description.

`store tn dest <DXPRN> connect <RESOURCENAME>`
Example: `store tn dest d1prn connect MYRESNM`

Store the resource name for the host session. The resource name must be the same as the name of the printer device created on the host for the session.

Default: Unconfigured (empty) resource name

`store tn dest <DXPRN> msgqname <MSGQNAME>`
Example: `store tn dest d1prn msqqname QSYSOPR`

Store the queue name to which system messages will be logged.

Default: QSYSOPR

`store tn dest <DXPRN> msgqlib <MSGQLIB>`
Example: `store tn dest d1prn msgqlib *LIBL`

Store the queue library to which system messages will be logged.

Default: *LIBL

`store tn dest <DXPRN> WSCSTname <WSCSTname>`
Example: `store tn dest d1prn WSCSTname *NONE`

Store the queue name to which system messages will be logged.

Default: *NONE

`store tn dest <DXPRN> WSCSTlib <WSCSTlib>`
Example: `store tn dest d1prn WSCSTlib *LIBL`

Store the queue library to which system messages will be logged.

Default: *LIBL

`store tn dest <DXPRN> [-]autoconnect`
Example: `store tn dest d1prn autoconnect`

Store the state of the autoconnect flag. If the autoconnect flag is enabled the NIC tn client will attempt a connection and binding with the specified tn host automatically on power-up. This connection sequence will be repeated every 60 seconds until successful or the autoconnect flag is disabled.

See “tn dest <dxprn> start | stop” command.

Default: disabled

`store tn dest <DXPRN> copytimeout`
Example: `store tn dest d1prn copytimeout 1000`

Store the value of the copytimeout. When consecutive TN5250/3270 jobs are sent to the NIC, they are treated differently depending how soon they arrive. In an attempt to provide a perception of collation when multiple copies are sent from one host, if the time between jobs is less than the copytimeout value then they are treated as copies and the job is given precedence over other host documents. This keeps documents, which are sent in rapid succession together as if they were copies of the same document. A higher value improves the likelihood of collation but impacts performance.

Default: 500

`store tn from default|current`
Example: `store tn from default`

Store all tn default settings or current settings to flash memory so that they are retained after power up.

Set Commands

These settings alter the current or working settings in memory only. Therefore, they will be lost if the NIC is power cycled. To ensure this does not happen, issue a `save` command so the current settings get written to flash memory.

`set dest <DEST> name <NEW_NAME>`
Example: `set dest d1prn name laser`

Change the current name of the <dest> to a new name as indicated by <new_name>. These names are case sensitive.

`set dest <DEST> backchannel [prn]`
Example: `set dest d1prn backchannel prn`

Establish a return path for printer feedback for a given destination (<dest>). The NIC I/O port is bi-directional, however, you will most likely use the same I/O port to which the destination is currently sending jobs.

`set dest <DEST> alternate [<ALT_DEST>]`
Example: set dest d1prn alternate d4prn

Sets an alternate destination for a queue other than itself.

`set dest <DEST> model <MODEL>`
Example: `set dest d1prn model m4`

Associate a model with a destination. Jobs sent to the named destination (<dest>) are processed according to the options defined in the named model.

`set dest <DEST> logpath <LOGPATH>`
Example: `set dest d1prn logpath l4`

Associate a logpath with a destination. Jobs sent to the named destination (<dest>) are logged according to the settings defined in the named logpath.

`set dest <DEST> service [[-]socket][[-]lpd] [[-]lpsched] [[-]rprinter] [[-]pserver] [[-]netbios] [[-]ftpd] [[-]tn]`

Example: `set dest d1prn service -netbios`

Set the destination (<dest>) to handle only certain print services. To add a service, specify the service name. To disable a service, use "-" before the name. The available services are described in the following table.

Services	
socket	Direct socket printing via TCP/IP.
lpd	LPR printing with TCP/IP, including LPR clients on any platform.
lpsched	LP or System V printing with TCP/IP.
netbios	Windows 95 and Windows for Workgroups printing.
ftpd	Printing using the File Transfer Protocol (FTP) via TCP/IP.
tn	Printing using the TN5250/3270 session.

`set dest from default`

Set all destination settings back to factory defaults.

`set dest from stored`

Set all current destination settings to the values stored in flash memory.

`set ifc`

Example: set ifc <IFNUM> up|down

Set state of the specified network physical interface up or down. <ifnum> is the interface number for the NIC device.

`set logpath <LOGPATH> name <NEW_NAME>`

Example: `set logpath l1 name pagecount`

Change the current name of the logpath (<logpath>) to a new name as indicated by <new_name>. These names are case sensitive.

`set logpath <LOGPATH> type [[-]job] [[-]user] [[-]cksum] [[-]printer] [[-]ioport]`

Example: `set logpath l2 type job user printer pgcnt`

Establish the type of printer and print job logging to be done within this <logpath>. The options are:

job	Job ID, username, etc.
user	User ID along with three messages per job about start and finish.
cksum	16-bit checksum value to confirm integrity of data printed.
printer	For special printer feedback.
ioport	Printer error messages determined through the parallel port pins.

`set logpath <LOGPATH> port <TCP-`*`port`*`>|email|syslog`

Example: `set logpath l3 port 2000`

Determine where the log information should be sent for a print job or attached printer. The choices are:

TCP-port	TCP port number ranging from 1024 to 65000.
email	Particular user's email address. This address is set using the `set sysinfo email` *`emailname@IPaddress`* or *`emailname@domain.com`* command.
syslog	A central TCP/IP host running the SYSLOG daemon. This host is set using the `set sysinfo syslog` *`IPaddress`* command.

`set logpath from default`

Set all logpath settings back to factory defaults.

`set logpath from stored`

Set all current logpath settings to the values stored in flash memory.

`set lpd [-]bytecount`

Example: `set lpd -bytecount`

Set the job control on the file size of a Line Printer Daemon (LPD). If bytecount is enabled, the printer does not allow the LPD client to send a job with an unconventional file size. Usually the unrecognized numeric operand in the LPD Receive Data File command attributes to this behavior. The print job stream is canceled and its TCP connection is closed.

Default: Disabled.

`set lpd [-]offlinedata`

The offlinedata flag helps minimize host disconnects when the printer goes offline for an extended time. Enable this option if you experience host disconnects when the printer goes offline.

`set model <MODEL> name <NEW_NAME>`

Example: `set model m1 name landscape`

Change the current name of the model (<model>) to a new name as indicated by <new_name>. These names are case sensitive.

`set model <MODEL> type raw`

Example: `set model m2 type raw`

Set the model `type` to `raw` so that it does not process the data passing through it in any way.

`set model <MODEL> banner [text][after]`

Example: `set model m2 banner text`

Determine whether a banner page should be added for print jobs passing through the <model> mapped destination/queue. By default, banner pages are added to the front of the job. If `after` is set, the banner page will come at the end.

`set model <MODEL> stty [[-]onlcr] [[-]descramble] [xtab <1-16>|none]`

Example: `set model m3 stty onlcr`

Control extra job processing done by the <model>. The processing options are:

onlcr Carriage return insertion for Unix text jobs. Adds carriage returns to text jobs with solitary linefeeds. This will prevent stair-stepped output or output running off the right side of the page.

descramble Automatic descrambling of print jobs passing through which have been scrambled using Printronix proprietary Unix scramble utility, `npscramble`.

xtab Tab expansion from 1 to 16 spaces.

`set model <MODEL> header [<STRING>]`

Example: `set model m1 header 0x20`

Set a header string to be sent to the printer at the start of any print jobs passing through this <model>. The headerstring (<string>) can consist of up to nine elements. An example element is a hexadecimal code (e.g., 0x04) or a pre-defined variable on the print server (e.g., $FF for a formfeed). Use *`list var`* to see all available variables. To erase the header, send the command with no *headerstring* value; for example 'set model m1 header'.

`set model <MODEL> trailer [<STRING>]`

Example: `set model m7 trailer $FF`

Set a trailer string to be sent to the printer at the end of any print jobs passing through this <model> . The trailerstring (<string>) can consist of up to nine elements. An example element is a hexadecimal code (e.g., 0x04) or a pre-defined variable on the print server (e.g., $FF for a formfeed). Use *`list var`* to see all available variables. To erase the trailer, send the command with no *trailerstring* value; for example 'set model m1 trailer'.

`set model <MODEL> config [config_num]`

Set a printer configuration number config_num to be loaded prior to printing a job on the specified model. If the command is sent with config_num set to 0, the factory configuration is loaded before the job prints. If config_num is in the range 1 through 8, the corresponding configuration number is loaded before the job prints. To return to the default state where no configuration is loaded, send the command with no config_num value; for example 'set model m1 config'. When no new configuration is loaded, the current configuration settings will be in effect for any jobs sent to model <model>. To see which configuration, if any, will be loaded at the start of a job, use the command 'list model' or 'list model <model>'.

`set model from default`

Set all model settings back to factory defaults.

`set model from stored`

Set all current model settings to the values stored in flash memory.

`set prn [-]autofd`

Example: `set prn -autofd`

Assert or do not assert the AUTOFD line for carriage return insertion. This only affects printers that support this function, such as impact printers.

`set prn flush`

Flush the data in the parallel port input and output buffers.

`set prn unlock`

Release the access lock on the parallel port.

`set prn timeout <INT>|none`

Example: `set prn timeout none`

Terminate the print job sent to the parallel port if it is not printed after the timeout period in minutes (<int>) expires. The <int> value ranges from 0 though 255, with 0 indicating no timing out to take place. This is the default setting and should be fine for most print setups.

`set prn [-]opost`
Example: `set prn -opost`

Allow or disallow output processing on the parallel port such as carriage return insertion (e.g., onlcr).

`set prn [-]onlcr`
Example: `set prn -onlcr`

Enable or disable carriage return insertion on the parallel port. This may be needed for Unix text jobs coming through with solitary linefeeds. This feature is almost always set at the model level rather than the I/O port level.

`set prn xtab <INT>|none`
Example: `set prn xtab none`

Set the tabstop width as indicated by `<int>`. The range is 1 through 16 spaces.

`set prn from default`

Set all parallel port settings back to factory defaults.

`set prn from stored`

Set all current parallel port settings to the values stored in flash memory.

`set snmp`

To add a user named `snmp` with root privileges, follow the steps below:

1. Login to the Ethernet as a root user.
2. Add a user named `snmp`:
   `set user add snmp`
3. Set the user type to `root`:
   `set user type snmp root`
4. Set the password for the snmp user:
   `set user passwd snmp` *`snmppassword`*
5. Save the changes:
   `save`

The user `snmp` is now created and *`snmppassword`* is the only community string which will allow write access.

`set snmp manager <INDEX> <IPADDRESS> <TRAP-COMMUNITY>`

The NIC continuously generates traps. To set the NIC to send traps to a particular SNMP manager, use this command to add an SNMP manager to the trap table.

<index> is the index number of the trap table. <ipaddress is the IP address of the SNMP manager receiving traps. <trap-community> is the community string sent along with the trap information.

`set snmp trapport <INDEX> <UDP_PORT>`

Set the UDP port number in the SNMP trap manager table. This value should correspond to the port number monitored by the SNMP manager application running on the host at the IP address specified in the 'set snmp manager' command.

<index> is the index number of the SNMP trap manager table. <udp_port> is the desired UDP port number. Acceptable values are 162, and 49152 through 65535.

`set snmp trap <INDEX> [-]active`

Enable or disable an SNMP trap manager table entry.

The *index* is the index number of the SNMP trap manager table. "active" enables the table entry, "-active" disables the entry.

`set snmp emailaddr <INDEX> <EMAILADDRESS>`

The NIC can also send SNMP alert messages to a desired e-mail address. To specify an e-mail address to send alert messages to, use this command to add the e-mail address to the SNMP alert table.

<index> is the index number of the SNMP trap manager table. The *emailaddress* is the desired e-mail address of the form user@domain.com.

`set snmp emailformat <INDEX> [-]short`

Enable or disable the short e-mail message format for an SNMP alert table entry. When enabled, the short e-mail format can be used when messages will be viewed on devices having a limited display size (a cellular phone or pager, for example).

<index> is the index number of the SNMP alert table. “short” enables the short e-mail format, “-short” disables it.

`set snmp shortmsglen <INDEX> <LENGTH>`

Specify the length of the short e-mail message format for an SNMP alert table entry. This command is effective only when the short e-mail message format for an SNMP alert table entry is enabled.

<index> is the index number of the SNMP alert table. “length” specifies the length of the short e-mail message, and has an acceptable range of 15 to 80 characters.

`set snmp email <INDEX> [-]active`

Enable or disable sending e-mail alert messages for an SNMP alert table entry.

<index> is the index number of the SNMP alert table. “active” enables sending e-mail alert mesages, “-active” disables it.

```
set snmp alerts <index> [-]all | [[-]warning]
[[-]offline] [[-]mediainput]  [[-]mediaoutput]
[[-]mediapath] [[-]marker] [[-]cutter] [[-]barcode]
[[-]scanner] [[-]intervention] [[-]consumable]
[[-]label][[-]powercart] [[-]rfid]
```

Example: `set snmp alerts 1 warning -cutter]`

Specifies which alert groups are enabled for reporting via an SNMP manager, e-mail alert message, and/or Unix syslog daemon. See Table 2 on page 76 for a description of specific printer events belonging to each group.

The *index* is the index number of the SNMP manager/alert table.

"-all" disables and "all" enables reporting of alerts in all alert groups. Individual alert groups can be selectively enabled or disabled via combinations of alert group switches. For example, to enable warning alerts and disable cutter alerts for SNMP table entry 1, enter the following:

set snmp alerts 1 warning -cutter

`set snmp syslog <INDEX> [-]active`

The NIC can also log SNMP alert messages to the defined SYSLOG host (see the 'set sysinfo syslog' command description). Use this command to enable or disable logging of alert messages for an SNMP alert table entry.

<index> is the index number of the SNMP alert table. "active" enables alert message logging, "-active" disables it.

`set sysinfo label|name [<STRING>]`

Example: `set sysinfo name salesprinter`

Set a descriptive name defined by <string> for NIC identification purposes. This is not used in the operation of the print server in any way.

`set sysinfo contact [<STRING>]`

Example: `set sysinfo contact Paul_Harris`

Set a person or department to contact in case of print server trouble.

`set sysinfo location [<STRING>]`

Example: `set sysinfo location salesdept`

Set the physical location of the NIC. This is for identification purposes and is not used in the operation of the print server in any way.

`set sysinfo prnserial [<STRING>]`

Example: `set sysinfo prnserial 000123456789`

Sets the printer serial number.

`set sysinfo loginfo [-]sys | [-]tcp | [-]ipx | [-]spx`
Example: `set sysinfo loginfo -sys ipx`

Set the NIC debugging information type. Usually this information includes unexpected errors or exceptions from the print server divided into these groups:

sys	General system messages
tcp	TCP stack messages
ipx	IPX stack messages
spx	SPX stack messages

NOTE: This is not printer or job logging information.

`set sysinfo logport null|prn|syslog`
Example: `set sysinfo logport null`

Define to where the debugging information should be sent. This can be sent to an output device off of the NIC I/O port or to a central TCP/IP host running a SYSLOG daemon. To set this host, use the command `set sysinfo syslog` *`hostIPaddress`*.

`set sysinfo smtp <IPaddress> [port <PORTNUM>]`
Example: `set sysinfo smtp 192.75.11.5 port 25`

Define the SMTP (Simple Mail Transfer Protocol) server IP address or domain name and port number where the mail is stored on your network.

Default: Unconfigured, 25

`set sysinfo email <EMAIL>`
Example: `set sysinfo email JohnDoe@Printronix.com`

Define the user email address to receive printer and job logging information from a particular logpath on the NIC. Email name is the host or IP name of the user.

Default: Unconfigured

`set sysinfo email` *`emailname@domain`*
Example: `set sysinfo email joe@printronix.com`

Define the user email address to receive printer and job logging information from a particular logpath on the NIC.

`set sysinfo syslog` *`hostIPaddress`*

Example: `set sysinfo syslog 192.75.11.30`

Set the IP address of the host running the SYSLOG daemon. NIC debugging or print job and printer logging information can be sent to that IP address.

`set sysinfo dns <IPaddress>`

Example: `set sysinfo dns 192.75.11.2`

Set your DNS server IP address so the NIC can resolve host names when used with its built-in `Telnet` and `ping` clients.

`set sysinfo domain <NAME>`

Example: `set sysinfo domain printronix.com`

Sets the domain name for the NIC, which when combined with the print server name, forms the fully qualified domain name of the NIC.

`set sysinfo module [[-]novell] [[-]netbios]`

Example: `set sysinfo module -novell`

Enable and disable certain network protocol stacks within the NIC. Sometimes it helps to disable any protocols you are not using on your network.

NOTE: [-] novell option is not available on the Integrated NIC.

`set user add|del <NAME>`

Example: `set user add eng`

Add or remove a user on the NIC defined by `<name>`.

IMPORTANT **Do not delete the root user, or you will be unable to configure any further settings on the print server. You will have to go back to factory defaults to correct this problem.**

`set user passwd <NAME> [<PASSWORD>]`

Example: `set user passwd eng mplex1`

Assign a password to a defined user on the NIC.

`set user type <NAME> root|guest`

Example: `set user type eng root`

Assign root or guest privileges to a particular user defined by *`username`*. Guest permissions allow viewing of settings only. Root permissions allow complete control of the NIC.

`set user from default`

Set all user settings back to factory defaults.

`set user from stored`

Set all current user settings to the values stored in flash memory.

`set user passwd snmp <COM_NAME>`

Set the new SNMP R/W community name as the <`com_name`> value.

`set var <VAR> [<VARIABLE-STRING>]`

Example: `set var LANDSCAPE 0x1b 0x26 0x6c 0x31 0x4f`

Define a new variable to be used in header, trailer, or switch strings on the NIC and call it <`variable-string`>. <`variable-string`> can be a space-separated list of words, hexadecimal numbers (e.g., 0x04), or references to other pre-defined variables. It is easiest to make up the <`variable-string`> with hexadecimal values, as shown in the example.

NOTE: One variable counts as one element within header and trailer strings.

Defined variables are referenced in strings by placing a "**$**" before the variable name (e.g., `set model m1 trailer $FF`).

`set var from default`

Set all variable settings back to factory defaults.

`set var from stored`

Set all current variable settings to the values stored in flash memory.

List Commands

These commands list the current or working settings for a particular section within the command shell. To view stored settings in flash memory, insert `stored` after `list`. For example, `list prn` shows the current printer settings but `list stored prn` shows the settings in flash memory. Normally these should match. To view default settings in flash memory, insert `default` after `list`.

`list all`

Lists all current settings.

`list arp`

List the current ARP table that the NIC adheres to in a TCP/IP network.

`list dest [destination]`

List the current destination settings (e.g., names and mapped I/O ports, models, and logpaths).

`list diff`

List the differences between the current settings and the stored settings in flash memory. Normally, you want these values to match, so issue a `save` command followed by a `reset` command.

`list ifc`

Lists the current NIC interface settings (e.g., link integrity).

For the wireless NIC, the WLAN interface settings will also be included. The WLAN parameters are displayed in the following manner, after the interface list has been displayed:

WLAN

ifnum = <*ifnum*>

radio = <*wireless-card-id*>

ssid = <*network name*>

mode = <*net-mode*>

channel = <*channel-num*>

antenna = <*antenna-type*>

speed = <*speed-flags*>

preamble = <*len-type*>

pmm = <*sleep-time*>

defkey = <*key-num*>

auth = <auth-method>

user = <auth-user-name>

pass = <auth-password>

txpwr = <*power*>

opts = <*option-list*>

profile = <*profile*>

wpa = <*wpa-mode*>

eap = <*eap-method*>

encryption = <*wpa-cipher*>

passphrase = <*wpa-passphrase*>

country = <country-code>

Status = <*status*>

Quality = <*comms-quality*>

Where:

<*ifnum*> is the interface number for the WLAN device.

<wireless-card-id> is a read only character string identifying the wireless card installed.

<*network name*> is a 1 to 32 ASCII character string.

<*net-mode*> is the type of network mode of operation: "adhoc", "pseudo" or "managed".

<*channel-num*> is the RF channel being used for communication.

<*antenna-type*> is the type of antenna ("Primary", "Auxiliary" or "Diverse").

<*speed-flags*> is the speeds being used for communication ([1 2 5 11], or "auto").

<*len-type*> indicates the selected preamble length ("long", "short"or "default").

<*sleep-time*> indicates the power-save sleep-time in milliseconds.

If power-save is disabled (time is set to zero), "normal (power-save off)" displayd.

<*key-num*> is the number identifying one of the four encryption keys, starting from one. Encryption is disabled if "Encryption disabled" displayd.

<*auth-method*> is the authentication method e.g. open, shared, kerb, leap.

<*auth-user-name*> is the authentication method user name.

<*auth-password*> is the authentication method password.

<*power*> is a percentage indicating the approximate fraction of full power.

<*option-list*> is a list of options that are enabled (disabled options are not shown).

<*profile*> is the 802.11g/b wireless mode in use.

<*wpa-mode*> is the WPA wireless mode selected.

<*eap-method*> is the EAP authentication method selected.

<*wpa-cipher*> is the selected WPA cipher setting.

<*wpa-passphrase*> is the WPA passphrase represented as * characters if configured.

<*country-code*> is the currently configured country setting that is used to determine valid channel settings with which the 802.11g wireless NIC is used to communicate with an access point.

<*status*> is the current access point association status (“disassociated” or “associated with <MAC address>”)

<*comms-quality*> indicates the strength or quality (in percent) of the wireless signal.

NOTE: The "list stored ifc" command does not display the "Status" or "Quality" lines.

`list kerberos`

For Wireless NIC with Symbol RF cards only.

`list key`

List the license details and license key number.

`list logins`

List any active user logins on the NIC.

`list logpath [logpath]`

List the current logpath settings (e.g., names and mapped destinations).

`list model [model]`

List the current model settings (e.g., names and mapped destinations). With no *model* parameter, a table of values for name, type, banner, config and the size in bytes of header and trailer are shown for all models m1 through m8. When the *model* parameter is supplied, the specific bytes used in the header and trailer are shown, along with the banner type, data type and configuration number for that specific model.

`list net`

List all current TCP/IP network settings (e.g., IP address and subnet mask).

`list pping`

List all the current periodic ping setting.

`list pserver`

List the current general print server settings (e.g., print server name and Novell mode). Novell parameters are listed on ADAPTER and WIRELESS NICs only.

`list prn`

List the current parallel port setting (e.g., mode).

`list ptrcfg`

List the printer configuration

`list ptrmgmt`

List the current printer management port numbers.

`list snmp`

List the Trap Table containing SNMP Managers.

`list sysinfo`

List the current NIC system information (e.g., contact name and protocol stacks enabled).

`list tcpip`

List all current TCP/IP network settings (e.g., IP address and subnet mask).

`list test`

List the status of output tests on the I/O ports.

`list tn`

List all current tn protocol settings.

`list uptime`

Lists how long the NIC has been up and running from the last reset.

`list user`

List the current user definitions (e.g., user names and types).

`list var`

List all pre-defined variables including any newly created ones. Any of these defined variables can be referenced in a string by placing a "`$`" before the variable name (e.g., `set model m1 trailer $FF`).

`list dhcp`

List all DHCP information for the NIC provided that DHCP is enabled.

`list lpd`

List the Line Printer Daemon (LPD) information, such as whether the bytecount is enabled or disabled.

Miscellaneous Commands

These commands do not fall under any specific section of the command shell, but they are used quite frequently.

`save [default]`

Save the current settings to flash memory so they are available after power cycles. Sysinfo, destination, model, logpath, variable, user, and I/O port settings will be saved. If `default` is specified as well, factory settings will be saved, overwriting any new settings you have configured.

`reboot`

Perform a warm boot or hardware reset to simulate a power-on reset. This restores current settings to those stored in flash memory, since the flash memory settings will be read and loaded into memory upon bootup.

`reset`

Perform a warm boot or hardware reset to simulate a power-on reset. This restores current settings to those stored in flash memory, since the flash memory settings will be read and loaded into memory upon bootup.

`load [default]`

Load the settings stored in flash memory and use them as the current or working settings. If `default` is specified as well, factory settings will be loaded.

`lpstat [`*`ioport`*`] [`*`jobID`*`]`

Example: `lpstat prn`

Display active and queued jobs and I/O port status for a given *`ioport`* or *`jobID`*. Specifying one of these parameters will shorten the output and focus on the particular I/O port or print job specified.

`cancel `*`jobID`*

Example: `cancel d1prn-10`

Remove a job from an I/O port queue. Use `lpstat` to find a particular job ID first.

`start fox|tts|loopb prn`

Example: `start fox prn`

Begin a debugging test on one of the I/O ports on the NIC. The tests available are:

fox	A continuous stream of text sent to the attached printer. This is a good test for troubleshooting hardware as long as the attached printer supports text output.
tts	A continuous stream of Gandalf 400C TTS-compatible text sent to the attached printer.
loopb	Loopback test. Any input characters from the device attached to the I/O port is echoed back.

`stop all|prn`

Stop an output test on an I/O port.

`disable` *`ioport|destination|tftp`*

Example: `disable prn`

Disable an *`I/O port`* so that queued jobs are not printed, or disable a *`destination`* so jobs cannot be queued to it.

Example: `disable tftp`

Disables processing of a boot file located on a TFTP server.

`enable` *`ioport|destination|printermgr|tftp`*

Example: `enable prn`

Enable an *`I/O port`* so that queued jobs are printed, or enable a *`destination`* so jobs can be queued to it.

Example: `enable printermgr`

Enables the printer debug port to allow remote printer management software to function.

Example: `enable tftp`

Enables proccessing of a boot file located on a TFTP server.

`close tcp` *`TCPindexnumber`*

Example: `close tcp 3`

Close the a TCP/IP connection between a TCP/IP host and the NIC. The *`TCPindexnumber`* can be retrieved from “debug tcp” output.

`ping [-s]` *`hostIPaddress`* `[`*`datasize`* `[`*`packetnumber`*`]]`

Example: `ping 192.75.11.30`

`ping` another TCP/IP host specified by *`hostIPaddress`* on the NIC network. *`datasize`* is the datagram packet size which defaults to 64 bytes if no size is included in the syntax and *`packetnumber`* is the number of requests to be sent.

NOTE: To use a host or IP name instead of the address, you must have set the DNS server on the NIC. Use the command `set sysinfo dns`... to do this.

`telnet` *`hostIPaddress`* `[`*`escapecharacter`*`]`

Example: `telnet 192.75.11.35`

Start a Telnet session with another TCP/IP host specified by *`hostIPaddress`* on the NIC network. If *`escapecharacter`* is used, it resets the key sequence used to exit the Telnet session. It will return you to the telnet> prompt where you can execute *`quit`*. Use the *`keycode`* command to find out exact escape characters if needed. The default character is `CTRL ]`.

NOTE: To use a host or IP name instead of the address, you must have set the DNS server on the NIC. Use the command `set sysinfo dns`... to do this.

`tn dest destination start|stop`

Example: `tn dest d1prn start`

Set the tn autoconnect flag temporarily, to enable (start) or disable (stop). See “store tn dest destination [-]autoconnect” command for further definition.

`chr <STRING>`

Echo < `string>` or redirect <`string>` to an I/O port using the `chr <string> ioport`.

`keycode`

Determine the hexadecimal value for a key to be used as the escape character with the NIC built-in `telnet` command.

`?` (Help)

Lists all available commands.

13 *Extra Features*

NIC Security

There are TCP access lists available to restrict host connections with the device.

Users And Passwords

The NIC supports two user types:

`root`	Access to everything within the print server including all configurable settings.
`guest`	Ability to list settings only.

Passwords can be set for each user type. However, most often you will just set a password for the `root` user to protect the NIC configuration. `Guest` users cannot alter the print server configuration in any way.

To configure a `root` password on your NIC:

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP. The commands to set a `root` password are:

   Syntax:

   ```
   set user passwd username password
   save
   ```

   Example:

   ```
   set user passwd root your_password_for_root
   save
   ```

2. Direct your Web browser to URL:
   `http://`*`NICIPaddress`*`/adminConf.html`
   (e.g., `http://192.75.11.9/adminConf.html`).

NOTE: If prompted for a "User ID" and password first, type in **`root`** for the user ID and press ENTER at the password prompt (since there is no password by default).

3. At the "Administration Configuration" HTML form that displays, scroll down to the "Passwords" section.
4. Click within the "Old" field beside the "Root Password" heading and enter the existing root password. By default, there is no root password, so you can go to the next step without typing anything in this field.
5. Within the "Root Password" section, click within the "New" field and enter the new root password.
6. Within the "Root Password" section, click within the "Confirm" field and enter the new root password again. Remember this is case sensitive.
7. Click on the SUBMIT button when done and physically repower the print server to make the new setting take effect.

From this point on, anytime you log in to the NIC as **`root`**, you will need to specify this password or your login attempt will fail.

NOTE: To clear this password or change it, use the same "Administration Configuration" HTML form. Just enter the appropriate "Old" password and put in the new one (or nothing if you do not want a root password any longer). The commands directly on the NIC are:

```
set user from default
save
```

Reset The NIC Password

Occassionally a user will set a root user password on the NIC adapter and then forget it. This is the procedure to reset the root password back to the default (no password).

1. Turn the printer on.
2. Take the printer offline and unlock the front panel by pressing the up and down arrows keys at the same time, then releasing.
3. Press all four arrow keys (up, down, prev, next) at the same time, and release.
4. Press the right (next) arrow until PRINTER MGMT appears.
5. Press the down arrow and then the right (next) arrow until “E-NET To DEFAULT” appears.
6. Press Enter.
7. Re-program the IP address information from the front panel.

NOTE: Steps 1 – 5 also clears the IP address information and sets the adapter back to the factory default.

TCP Access Lists

Within TCP/IP environments, the NIC can restrict host access to destinations/queues and remote command (e.g., rsh, rcmd, remsh, and telnet) execution services. This is done using an access list similar in function to the Unix .rhosts file.

NOTE: Access list settings are not configurable through the HTML forms provided with the NIC.

To view the current access list on the print server:

1. Start a Telnet session with the NIC.

   Syntax:

   `telnet` *`NICIPaddress`*

2. Log in as **`root`** and press ENTER at the password prompt since there is no password by default (or your password for your home set).

3. List the current access list.

   Syntax:

   ```
   list tcpip
   ```

   If the list is empty, all hosts have access to the NIC services. If there are entries in the list, only those hosts specified have access to printing and remote command execution.

   To add and delete access list entries, the commands are:

   Syntax:

   ```
   store tcpip tcp access add|del hostIPaddress|
   networkaddress
   reset
   ```

   where *hostIPaddress* is the IP address of a TCP/IP host on your network and *networkaddress* is the address of a subnet on your network.

   Example:

   ```
   store tcpip tcp access add 192.75.11.25
   store tcpip tcp access add 192.75.12.0
   store tcpip tcp access del 192.75.11.25
   reset
   ```

NOTE: Although the maximum number of entries in the access list is 10, each entry can refer to a network rather than a specific host. This allows all hosts on that specified network and any individual hosts specified in the list to have access.

Printer Monitoring And Logging

The NIC allows you to monitor printer status and log information through its built-in HTML forms, command set, and logpaths.

Printer And Print Job Monitoring

To view the current status of an I/O port on the NIC, two methods are available:

- select the desired I/O port on the “Status” HTML form (i.e., `http://`*`NICIPaddress`*`/indexStatus.html`; e.g., `http://192.75.11.9/indexStatus.html`) that comes with the NIC.
- enter the **`lpstat`** command directly on the print server once logged in as `guest` or `root`.

In each case, you are given a description of each I/O port status and a list of queued jobs. Table 7 describes some of the common terms you may encounter.

Table 7. Key Printer Logging Terms

Term	Description
idle	There is no job queued for the NIC I/O port.
blocked	The printer is not allowing the NIC to send data to it. Check that there is not a printer error and it is online and ready to go.
waiting	The NIC knows about a print job but is waiting for the host to send more data or to send an expected packet.

Printer Logging Through Logpaths

In the NIC product manual, destinations are described as logical queues with associated models and logpaths. Models determine if any extra processing is needed with the print jobs passing through, and logpaths determine whether any logging is needed for each job.

Each logpath on the NIC consists of two parts:

TYPE	The type of log information to be captured. The choices are `job` for job ID and username, `user` for user ID (and three messages per job), `cksum` for file checksums, `printer` for special printer feedback, and `ioport` for parallel printer status messages.
PORT	Where this log information will be sent to. The choices are a TCP port number (e.g., 2000), an email address (including an alias), or a central host running a SYSLOG daemon.

To view the current logpath settings on the print server:

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP or using Telnet (e.g. Telnet *ipaddress*). The command to view the logpath settings is:

   Syntax:

   ```
   list logpath
   ```

NOTE: If prompted for a “User ID” and password first, type in **`root`** for the ID and press ENTER at the password prompt since there is no password by default.

2. Direct your Web browser to URL **`http://`*`NICIPaddress`*`/destConf.html`** (e.g., `http://192.75.11.9/destConf.html`).

NOTE: If prompted for a “User ID” and password first, type in **`root`** for the ID and press ENTER at the password prompt (since there is no password by default).

3. At the “Print Path Configuration” HTML form that displays, select a destination link (e.g., d1prn) from the top of the page to bring up the appropriate destination form.
4. Once the desired destination HTML form displays, scroll down to the “Logpath Type” and “Logpath Port” sections to view the current logpath settings for this particular destination.

At this point, you can alter any of these settings and then click on the SUBMIT button to store them into the NIC. Remember to repower the NIC to make the settings take effect.

Downloading Software Through The Network Interface Card (NIC)

1. Make a printout of all saved configurations. (Installing new software erases all saved configurations. You will use the printouts to restore the printer configurations.)
2. Set the printer power switch to O (Off).
3. On the printer panel, press and hold down the appropriate keys for your particular printer model, as described below:

Printer Series/Models	Key Combination
P7000	ONLINE + PAPER ADVANCE
P5000	ONLINE + PAPER ADVANCE
T4204	PAUSE + FEED
T5000	☰ + ↓
L1524	ONLINE + PAGE EJECT
L5000	ONLINE + CLEAR

Without releasing the keys, power the printer on, and continue holding the keys down until you see “TESTING HARDWARE PLEASE WAIT” on the LCD. You may then release the keys.

4. Wait until you see “WAITING FOR PROGRAM DOWNLOAD” on the LCD before proceeding. This can take up to 30 seconds to appear, depending on the emulations and interfaces installed in the printer.
5. Using Windows Explorer, create a directory named **download** at the root level of your C: hard drive.
6. Insert the printer emulation software CD into your computer.
7. Using Windows Explorer, navigate to the appropriate file on the CD (using the Unzipped directory) based on the printer type, and desired emulation.

IMPORTANT **You must use the Unzipped directory, since this contains the uncompressed files necessary for NIC download.**

8. Make note of the file name, which is a six digit number plus **.prg**, e.g., 123456.prg.
   This is the file you will download into the NIC.
9. Copy the file to the download directory.
10. Start a command prompt session. (The Start Menu icon is usually labeled
    MS-DOS Prompt or Command Prompt.)
11. At the command prompt type:

    `C:`<Enter>
    `cd \download`<Enter>
12. Start the FTP protocol by typing:

    `ftp` ***`xxx.xxx.xxx.xxx`***<Enter>
    (where *xxx.xxx.xxx.xxx* represents the IP Address of the printer.)

13. Log in to the printer by typing:

    `root`<Enter>

    You are given a password prompt.

NOTE: The default is no password. If the FTP program requires a password, contact your system administrator.

14. At the password prompt, press <Enter>.
15. Once logged in, type the following sequence at the command prompt to download the *filename*.prg file to the printer:

    `cd dest`<Enter>
    `cd dlprn`<Enter>
    `bin`<Enter>
    `put filename.prg`<Enter>
    (where *filename*.prg is the file name you noted in step 8.)

CAUTION **Do not interrupt the downloading process once it has started. Interrupting a download will damage the flash memory on the controller board and NIC card.**

16. As the file downloads, the FTP program shows the progress as a percentage. Once the download is complete, exit out of the FTP program by typing:

    `quit`<Enter>

17. When the new program has successfully loaded into flash memory and the printer has reset itself, set the printer power switch to O (off).
18. Unplug the AC power cord from the printer.
19. Remove the CD from the host computer and store it with the printer.
20. Using the configuration printout(s), reconfigure the printer and reload any optional font files.

NIC Naming Schemes

A single I/O Port destination can be configured with a variety of model and logpath combinations. For instance, once you set the parameters for m1 and l1, you can assign the model and logpath to more than one I/O port destination such as d1prn, d2prn, and d8prn. You may now use the same set of model and logpath parameters more than once without having to redefine those parameters each time for another I/O Port destination.

Periodic Ping

This feature when enabled executes background ping from the print server to its default gateway. The operation is executed on every user defined period. This mechanism has no TCP traffic from the print server to anything on the network to keep route information alive. Since every member in the VLAN is subject to aging from bridging cache, a switch or bridge in between may be forgotten in the table at which port the printer was connected. If one ping is run from printer server to its default gateway through the switch, the switch learns again and the route is seen. The problem will not be seen with TCP since the ACKs keep the bridge relearning in a switch. Periodically send ICMP Echo Request between a print server and its gateway that is typically situated in the same VLAN and connected with the same switch or bridge.

The printer server allows a periodic group of ping packets [1 – 5] to be issued by a set time [1– 5] minutes, to the gateway value the NIC has from its routing table. This feature can be enabled or disabled. The default is disable.

This periodic ping is different from the normal ping process. The purpose of this ping is not an attempt at dead gateway detection. There is no ping client created in the print server and the ICMP Echo Reply packets received from the gateway are deleted without being processed by the ping client. This reduces the processing load on the print server. The data size of ICMP Echo Request Message is set to 16 bytes such that the Ethernet frame is set to 64 bytes to minimize the impact of bandwidth on the network. This process applies to all the active NIC interfaces.

Chapter 13 Periodic Ping

A *Troubleshooting Tips*

Windows Troubleshooting Tips

This section provides information on possible solutions to some standard Windows and NIC configuration errors.

Technical Support

If you require technical support, please have the following information available when you call:

1. What level of software are you running?
2. What type of attachment do you have?
3. What is your host operating system?
4. Give a detailed description of the problem.
5. How often, and when, does the problem occur?
6. Give a detailed description of your network and the components attached.
7. Provide printer configuration and E-Net test page in either hardcopy or softcopy if possible.

Appendix A Windows Troubleshooting Tips

NIC Cannot Be Found On The Network

Please follow these tips to determine what the problem may be with your NIC configuration.

- Have you assigned the NIC a unique and valid IP address which corresponds with the other IP addresses on your network? For example, are you sure no other device is using this IP address? To find whether the IP address is unique, unplug your ethernet cable and ping the IP address to make sure it is not alive.
- Are you sure you are trying to talk to the NIC from a Windows station on the same subnet? The print server can only be seen locally unless you configured a routing entry earlier.
- If you look at the back of the printer, is the STAT LED flashing once a second, or is it quicker than that? A slower, once-a-second rate indicates that the print server is in fact configured with an IP address. A faster rate means it knows nothing about this, so you may need to try the configuration process again.
- Have you confirmed that the network connection to the NIC is working correctly? Trying different network cables and locations will help narrow down the problem.
- For wireless NIC, is the SSID correct? Is the operation mode correct?

HTML Configuration Forms Will Not Display

- Can you `ping` NIC from the Windows station? If not, refer to “NIC Cannot Be Found On The Network” on page 264.
- Have you used the correct URL for the NIC home page? It should be `http://`*`NICIPaddress`* (e.g., `http://192.75.11.9`).
- Is HTTP support enabled? If not, refer to “Web Browser/HTTP Problem” on page 267.

Errors Occur When Defining An LPR Printer

- Can you `ping` the NIC from your Windows NT station? If not, please refer to “NIC Cannot Be Found On The Network” on page 264.
- Did you specify the correct IP address or host name for the NIC in the first field of the “Add LPR Compatible Printer” box?
- Did you specify a valid destination/queue on the NIC in the second field of the “Add LPR Compatible Printer” dialogue box? If so, did you also enter it in lowercase letters?

Cannot Browse The NIC On The Network

- Have you looked under the right Windows workgroup? By default, the NIC will be found under “WORKGROUP.”
- Are you able to browse other Windows stations and devices on the network from this same station?
- Has this Windows station been given enough time to update its registry so it can see this newly added workgroup device? Sometimes Windows stations can take considerable time, depending on the size of the network.

Printer Errors When Printing Or No Output

- Is there a large job currently printing which is taking up all of the printer resources? Usually when printing from Windows 95/98 stations, a busy printer can cause Windows to display a printer error message. This is because it demands immediate printer attention rather than holding the data until the printer is ready again. The best way around this is to use a central spooling station like an NT server.
- Have you tried restarting the spooler under “Control Panel:Services”? Sometimes this is needed to get printing started.

NOTE: As a last resort, you may want to reboot the Windows station. Sometimes this is the only option to completely clear this situation. The NIC usually has nothing to do with this problem.

TCP/IP Access Problem

If you can `ping` the printer from a workstation, but you cannot Web browse, Telnet, or print to the printer through the NIC, there may be an incorrect entry in the TCP access list. In order for this workstation to use the NIC interface in this case, one of two things must happen.

- The TCP list must have an entry added to grant access to this workstation, or
- All entries must be deleted from the TCP list to grant all workstations/hosts access to the above TCP services.

To view the current access list, use the printer control panel to access the configuration menu (see the *User's Manual* for configuration menu information). From the DIAGNOSTICS/Printer Tests menu choose the E-Net Test Page. When the page prints, look under the “TCP ACCESS TABLE” section for the TCP access list entries.

To add/delete a TCP access list entry, refer to “TCP Access Lists” on page 253.

NOTE: When the following procedure is used, the TCP access list will be cleared, but all IP addresses will need to be entered again after the procedure is complete.

To reset all Integrated NIC TCP/IP values to the factory defaults when access is impossible, contact your Printronix service representative for assistance.

If you are still experiencing difficulty accessing or browsing the printer, contact the Customer Solutions Center for further assistance.

Web Browser/HTTP Problem

In some cases, you may not be able to browse the printer Web page simply because the NIC HTTP may be turned off.

If you cannot `ping` the NIC IP address, make sure the IP Address, subnet mask, and default gateway are set correctly by checking the Ethernet Parameters menu from the operator panel. See the *User's Manual* for configuration menu information.

If you can `ping` the NIC IP address but cannot access the Web pages, perform the following procedure to verify the NIC HTTP is turned on.

1. **`Telnet`** into the NIC and log in as **`root`**. There is no password by default.
2. At the system prompt, enter the following commands:

   ```
   config http on
   save
   reset
   ```

3. After approximately 30 seconds, point your browser to the NIC IP address. The printer Web pages should now be accessible.

If you are still experiencing difficulty accessing or browsing the printer, contact the Customer Solutions Center for further assistance.

Windows NT 4.0 Or 2000 Host Setup Problems

The installation procedure covered earlier in this chapter assumes that the NIC adapter is configured with the correct IP address, subnet mask and gateway (if required), and that the administrator can `ping` and `telnet` to the NIC adapter from the server console. If this is not the case, use the printer front panel to configure the NIC adapter before proceeding.

Installing Microsoft TCP/IP Printing

The NIC installation for Windows NT 4.0/2000 also requires the "Microsoft TCP/IP Printing" service on the server. To install this service, click the Network icon in the Control Panel and click the Services tab. Click **Add Service** and select Microsoft TCP/IP printing.

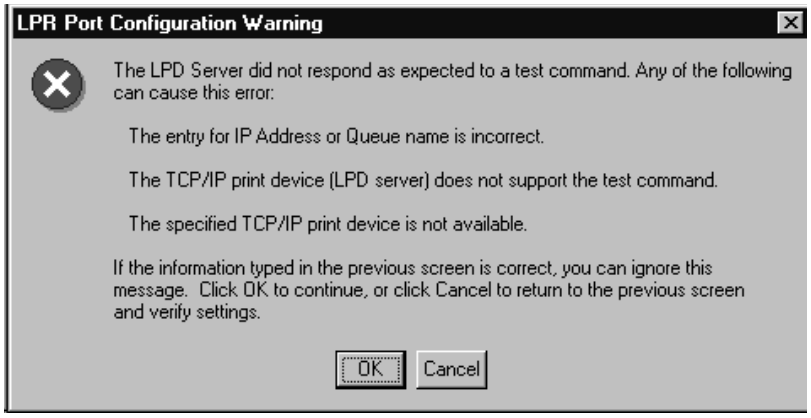
- Do you have administrative privileges?

  This installation requires administrator privileges.

- "LPR port" is not listed.

  Cancel the installation and install the Microsoft TCP/IP printing service on the server.

- LPR configuration warning.



The Ethernet cable is not plugged in or the printer is not turned on. This message is a communication failure between the NT/2000 server and the NIC. Check cabling, IP address settings, gateway, etc.

- Test page does not print or prints incorrectly:

1. Is the printer online? Re-send test page.
2. The print queue name should be d1prn; however, the name can be changed. To verify the queue names, print an E-Net Test Page. Refer to your *User's Manual* for information.
3. The Printronix NT print driver requires P-Series emulation active on the printer. The Generic/Text driver should print in any printer emulation.
4. Delete then re-install the Microsoft TCP/IP Print service on the server.

If you are still experiencing difficulty accessing or browsing the printer, contact the Customer Solutions Center for further assistance.

Unix Troubleshooting Tips

This section provides information on possible solutions to some standard configuration errors. If you require technical support, please have as much of the following information available when you call:

1. What level of software are you running?
2. What type of attachment do you have?
3. What is your host operating system?
4. How often, and when, does the problem occur?
5. Give a detailed description of the problem.
6. Give a detailed description of your network and the components attached.

NIC Cannot Be Found On The Network

- Have you configured the NIC with a unique and valid IP address which corresponds with the other IP addresses on your network? For example, are you sure no other device is using this IP address?
- Are you sure you are trying to talk to the NIC from a Unix station on the same subnet? Currently, the print server can only be seen locally unless you configured it with a routing entry.
- If you look at the back of the printer, is the STAT LED flashing once a second or is it quicker than that? A slower, once-a-second rate tells you that the print server is in fact configured with an IP address. A faster rate indicates it knows nothing about this, so you may need to try the configuration process again.
- Have you confirmed that the network connection to the NIC is working correctly? Trying different network cables and locations will help narrow down the problem.

Nothing Prints

- Can you `ping` the NIC from your Unix station? If not, please refer to “NIC Cannot Be Found On The Network” shown above.
- Is the NIC able to communicate with the attached printer? To test this, you can:

  1. **`Telnet`** to the print server (e.g., `telnet 192.75.11.9`) and log in as **`root`**.
  2. Enter the command **`start fox prn`**.
  3. Execute `stop prn` right after starting the test.
  4. This test will send the same text line over and over to the attached printer.
- Is the job getting stuck in the Unix host queue? If so, check that the printer is online. If it is, there is a configuration error on the Unix station, so creating a new print setup may be needed.
- Is the control panel showing any activity to indicate it is receiving data? If so, but there is nothing printing, check if a manual form feed is needed. Also, ensure that the printer can support the type of job coming through.
- Do all jobs fail or just certain ones? For example, is it possible that jobs from a certain application are the only ones to fail? If so, check the type of data it sends to make sure it matches the printer emulation. Check the application printer configuration for mistakes.
- If you are using System V, was the spooler restarted?

Stair-Stepped Output

Stair-stepped output is print which starts at the top left of the page but every line thereafter starts a little further over to the right. It also refers to Unix jobs that print one line of text at the top of a page followed by a series of blank pages.

This kind of output happens only with Unix text jobs if carriage return insertion is not incorporated into the print setup. The printer may be told to do a linefeed, but the Unix job does not specify anything about a carriage return to follow this.

To fix this, carriage return insertion must be enabled somewhere in the print setup. The easiest and most common location is on the NIC itself within the appropriate model. The feature is called “onlcr” and the command syntax is:

```
set model modelname stty onlcr
save
```

For example, if printing to the destination, `d1prn`, the associated model is `m1`. Therefore, the command is:

```
set model m1 stty onlcr
save
```

No Form Feed Or Extra Page Comes Out

Unix text jobs may also have problems outputting the last page of a job especially when the BSD Remote (LPD) print method is used. This means the form feed button has to be pressed on the printer to get this last page out.

To make this process automatic, tell the NIC to handle this task by setting this feature “on” in the appropriate model. The command syntax is:

```
set model modelname trailer $FF
save
```

For example, if printing to the destination, `d2prn`, the associated model is `m2`. Therefore, the command is:

```
set model m2 trailer $FF
save
```

For default destination model mappings of the NIC, please see “NIC Naming Schemes” on page 260.

Front Panel Message – Dynamically Set Params Read Only

This is not an error. It is an informational message warning that the IP address has been dynamically set by either dhcp, rarp, or bootp.

To assign a static IP address, turn off the rarp, bootp, and dhcp on the adapter. Use the following procedure:

1. Telnet to the adapter. Login = root, password = (Enter key)

Telnet commands are:

```
store tcpip 1 opts -rarp -bootp -dhcp
save
reset
```

Wait two minutes for the adapter to reset.

2. Program the IP address, Subnet Mask and Gateway (if required) from the front panel.

Wireless Connections Troubleshooting Tips

There are many contributing factors that result in wireless connectivity failures. 99% of the time the problems are configuration/setup related and 1% of the time hardware or parts. Check your wireless configuration on the Access Point (A/P) and the printer to make sure they are compatible before determining whether there is a bug.

LA5127 CF Radio Specifics

Securities supported with LA5127 CF Radio:

- **WEP** (static only, not dynamic)
- **LEAP**
- **WPA-PSK/TKIP** (WPA1)
- **WPA-PSK/AES-CCMP** (WPA2)
- **WPA-PSK/mixed mode**
  (both TKIP and AES are advertised and client and host negotiate)
- **EAP-TTLS** (allows TKIP, AES, or mixed mode)
- **EAP-PEAP [MSCHAPv2]** (allows TKIP, AES, or mixed mode)

Mixed mode settings:

A/P	Printer
TKIP+AES	TKIP+AES
TKIP+AES	TKIP
TKIP+AES	AES
TKIP	TKIP
AES	TKIP+AES
AES	AES

Securities not available or supported with LA5127 CF Radio:

- **Diversity is not supported** (requires two external antennas)
- **ADHOC**
- **Dynamic WEP** (windows config “key is automatically provided for me”)
- **EAP-TLS** (no local storing of certificates, difficult to manage)

General Issues When Using Wireless Ethernet

- **No wireless connectivity in a new or first time installation**
  Verify that the printer and A/P configuration contains no typos or missing information, i.e. SSID, etc.
- **Low signal strength**
  Orientation of external antenna is important. Signal strength can be diminished by up to 25% if the external antenna is pointed straight out, down, or sideways.
- **Difficulty when using static IP**
  Static IP is not compatible when using RF clients because the IP path to a client is found by non-RF means. The client announces or finds (by broadcasting) the IP path to use. In general, printers are passive, but the ‘pping’ option offers a path to work around this issue (refer to the telnet commands for details). Both dhcp and bootp allows for correct occurrences of association and authentication.
- **Using web browsers on a wireless device**
  Web browsers for wireless devices are useful after the device is associated and authenticated. If it is not communicating, verify whether web access is allowed or blocked by a firewall.

Tools Used To Gather Information or Configure The Device

- **E-net test page**
- **wired ethernet if installed** (6700 printer)
- **NIC_SETUP files to set up wireless parameters**. (See example on page -279).

  The advantages of using the NIC_SETUP file include:

  - customer's ability to edit their own values
  - ability to communicate via e-mail (i.e., send examples or request corrections)
  - ability to send the file via parallel, serial, USB, or wired connections
  - using the file to update current wireless connections by sending it through the wireless interface.

Quality (Signal Strength) = 0%

This indicates that the radio card is not communicating with the Access Point (A/P). Possible reasons include:

- **Incorrect SSID**

  SSID has the following characteristics:

  - It is case ase sensitive
  - Min 1, max 32 characters
  - Characters used including case have to match those of A/P
  - Front panel entry restricted to characters provided
  - Using methods other than the front panel [telnet, web, nic_setup] allows other characters to be used
  - Trailing spaces are significant if used. Trailing spaces can be accomplished with the web page, but is not possible from the front panel or telnet.

Cisco SSID rules:

NOTE: In this text field, the following characters are not allowed: +,], /, ", TAB, and trailing SPACE. In addition, the following three characters cannot be the first character: !, #, and ;.

- **Encryption/authentication selection does not match A/P's selection**
- **Antenna connection is in the wrong position**
  LA-5137 radio, primary antenna is in the centermost post
- **For countries other than North America, the country code does not match with the country of use**
- **Defective, missing or loose external antenna**
- **Defective PrintNet assembly**
- **Out of range or object blocked**
- **Missing or loose radio card**
- **Defective radio card**

Quality > 1-100%, Status = Disassociated

This indicates that the radio card is communicating with the access point, but has not yet been authenticated by the A/P.

- **Wrong WEP key** (if using WEP encryption)
- **WEP default key not selected** (if using WEP encryption)
- **WPA mode disabled** (if using TKIP/AES cipher)
- **WPA Cipher incorrect** (TKIP/AES cipher only)
  setting cipher to tkip+aes should work by negotiation to A/P set for either TKIP, AES, or mixed mode.
- **Wrong passphrase** (TKIP/AES cipher only)
- **Wrong Authentication method** (open/shared)
  generally shared authentication is not used and should be avoided.
- **Radio driver does not support the type of encryption that is used on the A/P**. i.e,, EAP-TLS or dynamic WEP, or EAP-FAST

Quality > 1-100%, Status = Associated, but Cannot Ping the Device

This indicates that the radio card is communicating with the access point but has not been allowed onto the IP layer.

- **Associated but not authenticated due to encryption mismatch, wrong passwords, etc.**
- **RADIUS server** [required for use with EAP-PEAP, EAP-TTLS, LEAP]
- **RADIUS server configured to allow device** (only if using a RADIUS server)
- **Enterprise mode set for EAP-PEAP and EAP-TTLS**
- **User name/password relates to item selected, EAP method or LEAP**
- **WEP must be disabled for LEAP and WPA personal**

NOTE: LEAP is only available on Cisco A/Ps

- **Enter MAC address in the A/P's MAC access table or other MAC address list control**
- **Check firewall policies for devices**
- **Check network settings** [gateway, subnet masks, IP assignment method]
- **Check switch arp cache to make sure device is not port blocked.**
  If static IP, get the latest firmware which includes gratuitous arp to avoid port blocking.

Cannot Ping But Associated and Authenticated

If static IP is being used, a gateway value must be set and pping (2 packets every 2 minutes) is set to enable.

NOTE: A/Ps are RF devices that route IP traffic to RF clients; A/Ps do not conduct IP traffic with clients. PPING forms the IP path and arp cache entry in switch or device A/P.

Can Ping the Device but Cannot Print

1. Check to see if assigned to right VLAN or IP method, or if DNS name is required.
2. Send a test job using FTP, LPR, etc., to isolate the problem and determine whether it is the print queue or printer.

Wireless Device Setup Example

Edit the example script below for your site. Send the script to a printer's interface in ASCII mode.

Example: >copy/b filename.ext lpt1:

All ethernet commands are listed in the PrintNet User manual.

---- remove this header before sending to the printer ----

```
!PTR_SETUP
NIC_SETUP
store tcpip 2 opts -rarp -bootp -dhcp

store tcpip 2 addr 10.10.10.10
store tcpip 2 mask 255.255.255.0
store tcpip route add default2 10.10.10.1 2

store tcpip tcp rxwin 4096
store tcpip tcp opts -keepalive

store ifc 2 wlan profile 6

store ifc 2 wlan opts -intnl
store ifc 2 wlan defkey disable
```

```
store ifc 2 wlan ssid YourSSID

store ifc 2 wlan wpa personal
store ifc 2 wlan cipher tkip
store ifc 2 passphrase !wxABCD0123
store ifc 2 wlan country US

set sysinfo module -netbios

store pping opts enable
store pping period 2
store pping packet 2

save

END_NIC_SETUP
PTR_END
!PTR_SETUP
CONFIG-RESET
PTX_END
```

B *Kerberos*

Kerberos Enabled Wireless NIC Configuration

This section provides an example of how a user configures the Print Server to use the Kerberos authentication via the wired Telnet session.

This example assumes Symbol's Access Point and RF card is used and the Print Server has not been configured for Kerberos authentication. It also assumes that the KDC, Access Point and the Print Server are in the same realm.

NOTE: Kerberos Authentication is only supported on Symbol technologies LA 4121 radio card.

To set up the Print Server for Kerberos authentication, the administrator first has to enable Kerberos in the Access Point according to Symbol's instructions. Symbol's Access Point must have its Network time set up with the correct time server. Once the Access Point is configured, the Print Server is ready to be configured for Kerberos authentication.

Configuring the Print Server for Kerberos Authentication

1. Create a user in the Windows 2000 server that identifies the Print Server.

NOTE: The user name should be the Print Server's name. The password selected will be used as the Kerberos password and should be set with no expiration.

2. In a secure networked environment, log in as a root user via Telnet in the wired LAN.
3. Once logged in, use the Telnet commands to set up the wireless LAN parameters (e.g. SSID = 103, operating mode = Infra Structure mode, etc.) that match the Access Point configuration.

   In addition to the normal wireless LAN parameter settings, use the following commands to enable Kerberos on the wireless LAN interface and Kerberos for authentication (minimum settings):

4. Set the wireless LAN interface parameters to enable Kerberos.

   ```
   store kerberos opts auth
   ```

5. Set the Kerberos parameters to enable Kerberos authentication.

   The Kerberos password must match the Windows 2000 user password for the Print Server. The administrator should choose at least 9 alphanumeric characters with a combination of upper and lower case.

   The following is a suggestion for creating strong password for computer security. Make sure the password:

   - is at least seven characters long. The most secure passwords are seven to 14 characters long.
   - contains characters from each of the following groups: letters (uppercase and lowercase), numerals, and symbols (all characters not defined as letters or numerals, i.e., ! @ # $ % ^ & *, etc.)

The kname is default to “krbtgt” which is the default name used in Windows 2000 KDC. It must be configured to match with the KDC if the default is changed. The krealm is case sensitive; it must match the Access Point’s realm.

The SSID of the Print Server must be configured to match the Access Point’s SSID which also has Kerberos enabled. For example, if a Windows 2000 user created the password aBcd-12345 and the Access Point’s realm is set to REALM.PRINTRONIX.COM, the following telnet commands are used:

```
store kerberos password aBcd-12345
store kerberos config krealm REALM.PRINTRONIX.COM
```

NOTE: If the Kerberos authentication fails, the user will not be able to Telnet to the Print Server via the wireless LAN interface. In this case, Telnet to the Print Server via the wired LAN interface. It should display an error message indicating the reason for the Kerberos authenticaion failure.

Appendix B Kerberos Enabled Wireless NIC Configuration

C *Customer Support*

Printronix Customer Support Center

IMPORTANT **Please have the following information available prior to calling the Printronix Customer Support Center:**

- Model number
- Serial number (located on the back of the printer)
- Installed options (i.e., interface and host type if applicable to the problem)
- Configuration printout:

  Thermal Printer
  See “Printing A Configuration” in the *Quick Setup Guide*.

  Line Matrix Printer
  Press PRT CONFIG on the control panel, then press Enter.
- Is the problem with a new install or an existing printer?
- Description of the problem (be specific)
- Good and bad samples that clearly show the problem (faxing of these samples may be required)

Americas	(714) 368-2686
Europe, Middle East, and Africa	(31) 24 6489 410
Asia Pacific	(65) 6548 4114
China	(86) 800-999-6836

http://www.printronix.com/public/support.aspx

Printronix Supplies Department

Contact the Printronix Supplies Department for genuine Printronix supplies.

Americas	(800) 733-1900
Europe, Middle East, and Africa	33 (0) 1 46 25 19 07
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http://www.printronix.com/supplies-parts.aspx

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Visit the Printronix web site at www.printronix.com

Appendix C Corporate Offices

D *Glossary*

ARP	Address Resolution Protocol. Associates a selected IP address with a network device Ethernet address.
bps	Bits per second.
Centronics	Parallel port interface standard found on most printers.
daemon	A continuously running process that handles system-wide functions like print spooling.
default router	Local device that forwards any IP packets destined for another subnet.
destination	Logical print queue on the NIC to which hosts send their print jobs. There are eight destinations by default.
DHCP	Dynamic Host Configuration Protocol. Allows a network device to discover its IP address dynamically upon bootup. The IP address does not need to be stored within the device itself permanently.
Download Mode	Refers to the condition of the NIC when in a startup condition, downloading configuration information.
DNS	Domain Name Server. Host providing responses to queries for a given host name IP address.

EEPROM	Electrically Erasable/Programmable Read-Only Memory.
factory defaults	Settings shipped with the NIC.
Factory Settings	S2 jumper position stating all factory default settings are to be used while the NIC is up and running.
Firmware Panic	Unrecoverable errors detected by the NIC firmware force the Print Server into Firmware Panic mode. Manually reset the NIC to resume operation.
Flash	Stores firmware code and configurable settings. Allows for upgrades without replacing hardware inside the NIC.
FTP	File Transfer Protocol. Used for transferring files from one TCP/IP host to another and used in the upgrade process.
gateway	Hardware device that translates data between two incompatible networks.
gateway address	The IP address of a gateway.
Hardware Exception	Bus errors, address errors, and illegal instructions force the NIC into this NIC non-operational mode.
HTML	HyperText Markup Language. Format used for documents viewable on the World Wide Web.
ifnum	Interface Number. Represents the network interface. With a NIC, this will always be “1” for Ethernet.
interface script	Unix host filter file that processes the print job before it is sent over the network to the NIC.
I/O port	Port for attaching peripherals to. The NIC provides four: PRN1, PRN2, COM1, COM2.

IP Address	The Internet Protocol Address. A numeric address such as 123.45.61.23 which identifies a printer or server in a LAN or WAN.
LAN	Local Area Network.
LED	Light Emitting Diode. The printer has an LED display which shows the status of the printer to the operator.
logpath	Determines the type of print job and printer logging needed per job. One logpath is associated with every destination.
LPD/LPR	Line Printer Daemon. The most common TCP/IP remote printing protocol that crosses all hardware utilizing IP.
MAC	Machine Address Code.
MIB	Management Information Base. A set of variables (database) managed by an SNMP manager application.
model	Defines how a print job should be processed (e.g., banner pages added, ASCII to PostScript conversion) as it passes through the NIC. One model is associated with every destination.
NetBIOS	Network Basic Input Output System. Common interface among PC networks.
Monitor Mode	Refers to the condition of the NIC with no configuration or IP address loaded.
npsh	Extensive built-in command shell within the NIC.
PDF	Portable Document Format. Encodes different types of documents enabling them to be read across multiple platforms.

Persistent DHCP — When this option is enabled, the IP Address, Gateway, and Subnet Mask obtained through DHSP is saved. If the DHCP server does not provide an address, the device will use the previously saved DHCP IP address. This option only works when DHCP is enabled. The default disable.

ping — Standard command to test a TCP/IP connection. (e.g., `ping 192.75.11.9`)

print path — Three-stage path a print job takes when it is sent from a host to a printer through the NIC.

protocol — A set of rules or conventions governing the exchange of information between computer systems or between a printer and a host computer. For computer printers, a protocol is the coding convention used to convey and print data. A printer protocol includes codes for printing text and graphics, as well as codes instructing the printer to perform special operations and machine-to-machine communication codes.

PSERVER — Print Server. A Novell print method where the NIC continuously polls the Novell file server print queue looking for print jobs.

RAM — Random Access Memory. Volatile memory within the NIC that contains current/ working settings. Settings are lost once the power is removed.

RARP — Reverse Address Resolution Protocol. Allows a network device to discover its IP address dynamically upon bootup. The IP address does not need to be stored within the device itself permanently.

ROM	Read-Only Memory.
router	A device that forwards IP packets to their destination. Also called a gateway.
RPRINTER	Remote Printer. A Novell print method where the NIC waits for jobs to be sent to it from a defined PSERVER.
SNMP	Simple Network Management Protocol. A standard protocol used to monitor network devices called “SNMP agents.”
socket	TCP connection between two hosts consisting of a source and destination TCP port number at each end.
subnet mask	A binary value used to divide IP networks into smaller sub-networks or subnets. This mask is used to help determine whether IP packets need to be forwarded to other subnets.
TCP/IP	Transmission Control Protocol/Internet Protocol. Suite of protocols that act as the base protocol for the Internet.
TCP port	A logical connection point in the software of a TCP host or device. When two IP devices talk, they establish a socket which consists of a source and destination TCP port number on both ends.
telnet	Command and protocol to establish a terminal connection between two hosts on an IP network.
UTP	Unshielded Twisted Pair. A cable used for telephone and computer-to-computer connections.
WAN	Wide Area Network.

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