MPI

PRINTRONIX®
AUTO ID

PrintNet Ethernet User's Manual

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Table of Contents

1   *Introduction*

Overview

This chapter introduces you to the PrintNet architecture and special features, as well as providing information on installation and configuration tools.

What is the PrintNet?

PrintNet adds Ethernet interface to Printronix printers. Network settings can be configured through the printer's control panel, telnet, or webpage.

PrintNet is supplied in one of two forms:

- Embedded Ethernet interface.
- Optional wireless network card.

What Special Features are Available?

PrintNet 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, commands, SNMP, and pre-defined log methods

- extensive built-in troubleshooting tools

- built-in ping client

- protocols can be individually disabled

- 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

PrintNet provides 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

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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 PrintNet consists of three different phases:

- **Phase 1** - the host sends the job to a destination or queue on PrintNet (e.g. d1prn).

- **Phase 2** - the print job passes through the associated "model" (e.g. model "m1") on PrintNet for any extra processing associated with the model.

- **Phase 3** - the processed print job is directed to the printer for output.
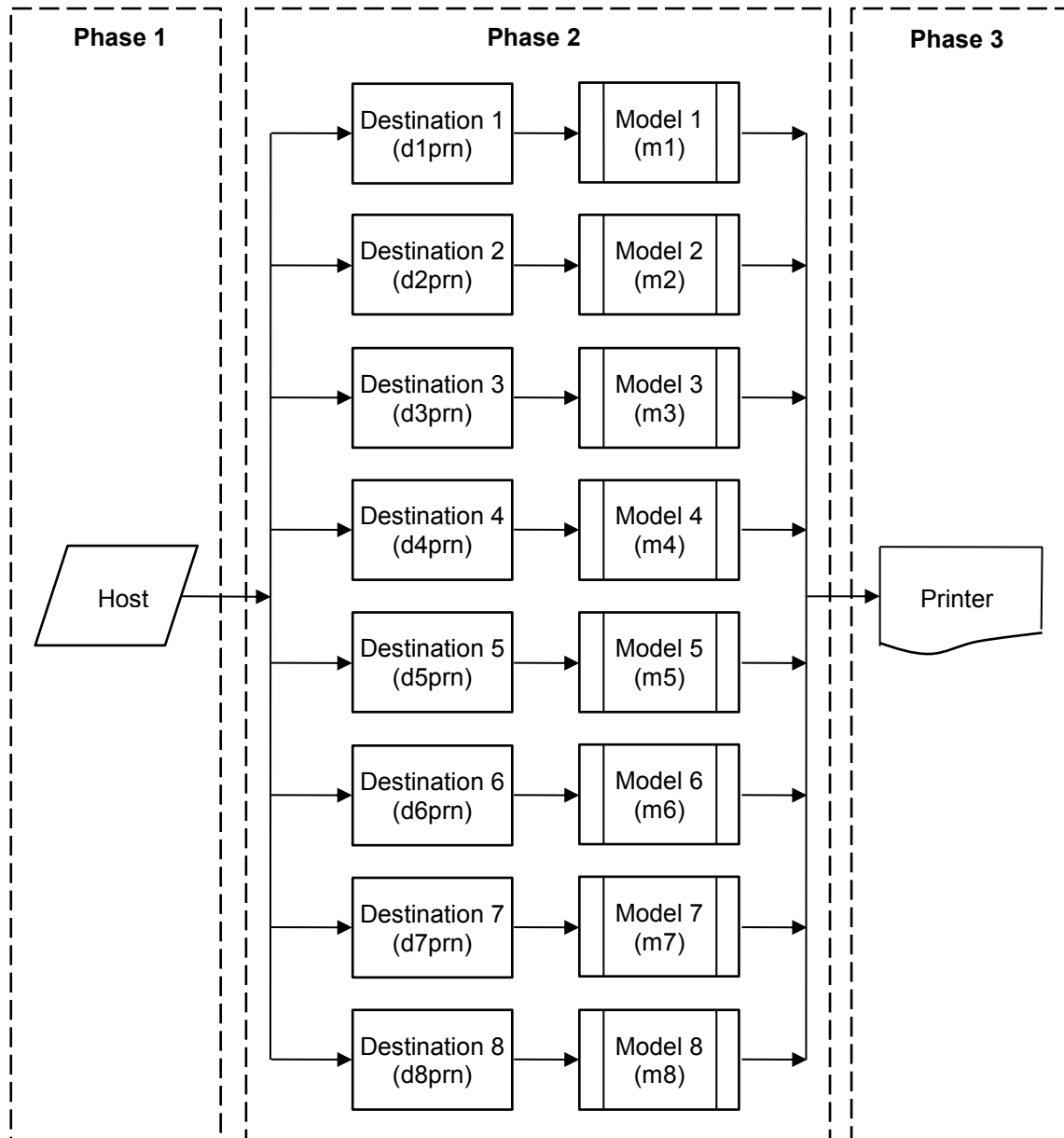
Figure 1 Print Path

Destinations/Queues

For every I/O port on PrintNet, 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.

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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

4. Insert trailer strings

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

   - 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 sent 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 virtual printers in one.

Interfaces

The Ethernet interface communicates with the host through an Ethernet network cable in the speed of 10/100Mb or 802.11a/b/g/n wifi option card.

Wired Ethernet is enabled with a security element. Wifi is enabled with the option card.

PrintNet Ethernet LED

Table 1 PrintNet Ethernet LED Indicator

LED	Indication	Description
Green	flashes	Indicates activity
Amber	Constant Off	Indicates that the link is good at 10 Mbps
Amber	Constant On	Indicates that the link is good at 100 Mbps

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.

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2   *Installation And Configuration*

Installation

The printer has an RJ-45 connector on the back panel for 10/100Base Ethernet interface. Print a test page to confirm that the Ethernet is working properly. Contact your service representative if the Ethernet is not enabled.

Connecting to the Network

To attach the PrintNet to a network, plug the network cable into the RJ-45 connector.

Configuration Tools

There are two parts to a PrintNet setup:

- Configuring the PrintNet 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, printer web server or from the control panel.

- Configuring a host with a new printer so it knows how to send data to the PrintNet. 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 PrintNet. However, all network setups require configuration on the host end.

The following methods are available for configuring the Ethernet:

- via the control panel

- HTML forms

- Telnet

- PTX_SETUP

Printing an Ethernet Test Page

Always print an Ethernet Test page before performing any updates or network configuration. Refer to the *Admin Manual* for instructions on printing a test page.

PrintNet Verification

Before performing the verification, you must connect PrintNet to the local area network.

1. Print an Ethernet Test page to verify the settings you selected.

2. Verify the network setting is correct.

HTML Forms

The network settings can be configured over TCP/IP through a standard Web browser. The PrintNet 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.

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To access the PrintNet 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 PrintNet 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 PrintNet.

See PrintNet Web Server on page 15 for details.

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

Telnet

Telnet commands can be used to configure PrintNet 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 PrintNet Security on page 119.

Setup through Data Stream

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

```
!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
```

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3 *PrintNet Web Server*

Overview

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

The PrintNet 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 PrintNet's configuration settings are protected by a password so unauthorized users cannot make changes. When you try to open any of the PrintNet '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 PrintNet Security on page 119.

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

The embedded PrintNet HTML server gives you the ability to configure the network setting, printer operation, monitor printer status, and to manage print jobs. The PrintNet Web page structure is divided into several menus.
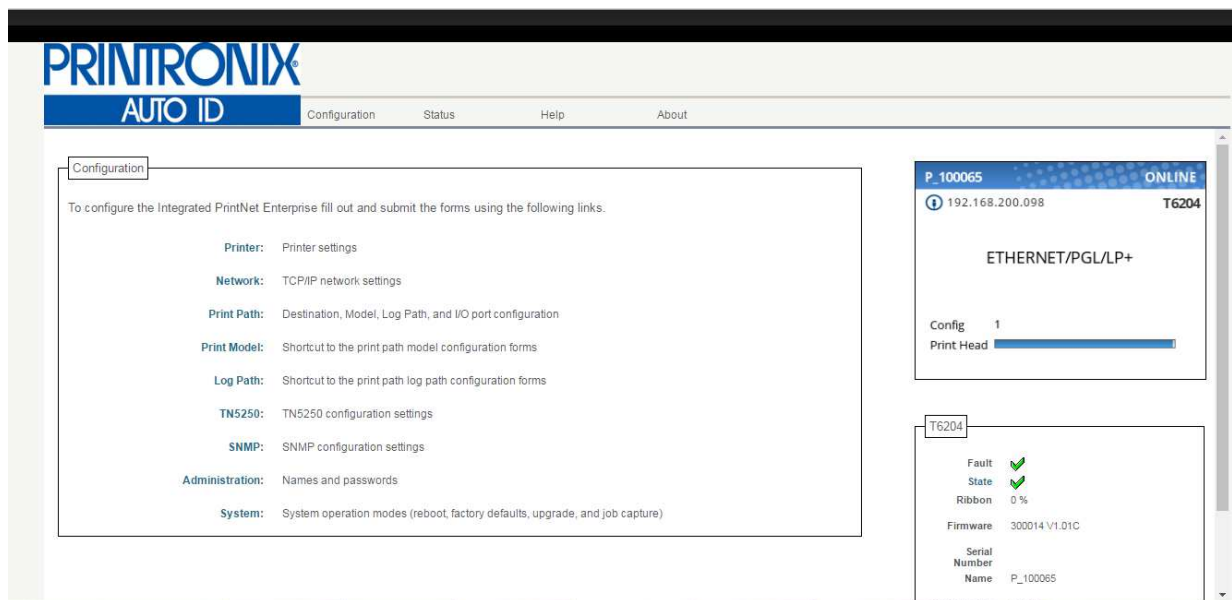
Figure 2 PrintNet Webpage

The main page is divided into three major sections: Configuration, Printer Status, and Print Server. The Printer Status and Print Server sections display on the right side amongst other pages.

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Configuration

This area allows the user to configuration the printer and network settings. The user can click each link to go to page options.

Printer Virtual Panel

This area displays the printer operator panel. Clicking the virtual panel will trigger a full operator panel display. The user can click the front panel keys like the real panel. There is no LED on the Virtual Panel.

To press multiple keys at the same time, hold down the shift key on the key board of the host system that runs the browser and click the multi-key one at a time and then release the shift key.

Since the browser can sometimes miss the display update, if you are questioning the display or a blank screen on the virtual panel, you can click the refresh button ⟳ or press function key F5 to update the display.

NOTE: When using older version of browser, you may need to enable compatibility View setting in order to receive proper display.

Printer Status

This area displays the printer type and information, control panel display, and printer state. The user can click "State" to change the printers between Online and Offline mode.

This section also shows PrintNet information and active print jobs.

Configuration

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

- Printer - this menu item allows you to configure the printer. You can change the printer's form size, character set, and emulation settings. You can also load/save configuration files, print configurations, and manage file systems.

- Network - this menu item allows you to change the TCP/IP network setting 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.

- Print Model - this menu item allows you to specify the print model name. 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 destination.

- TN5250/3270 - this menu item allows you to configure the TN5250/3270 settings if TN is enabled in the printer.

- 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, and to specify the SMTP server's IP address.

- System - this menu item allows you to reboot the printer, restore its settings to the factory default, upgrade printer firmware, and capturing the print data.

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Configuration

To configure the Integrated PrintNet Enterprise fill out and submit the forms using the following links.

Printer:	Printer settings
Network:	TCP/IP 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 configuration forms
SNMP:	SNMP configuration settings
Administration:	Names and passwords
System:	System operation modes (reboot, factory defaults, upgrade, and job capture)

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

NOTE: These settings only take effect after you reset the Integrated PrintNet Enterprise from the System page.

TCP/IP

Interface 1 10/100Mbps Ethernet

Dynamic IP	☐ RARP ☐ BOOTP ☑ DHCP	(current value = DHCP)
Persistent DHCP	☐	(current value = disabled)
Static IP Address	192.168.200.146	(current value = 192.168.200.98)
Static Subnet Mask	255.255.255.0	(current value = 255.255.255.0)
Static Gateway	192.168.200.1	(current value =)

Interface 2 802.11 Wireless

Dynamic IP	☐ RARP ☐ BOOTP ☑ DHCP	(current value = DHCP)
Persistent DHCP	☐	(current value = disabled)
Static IP Address		(current value =)
Static Subnet Mask		(current value =)
Static Gateway		(current value =)
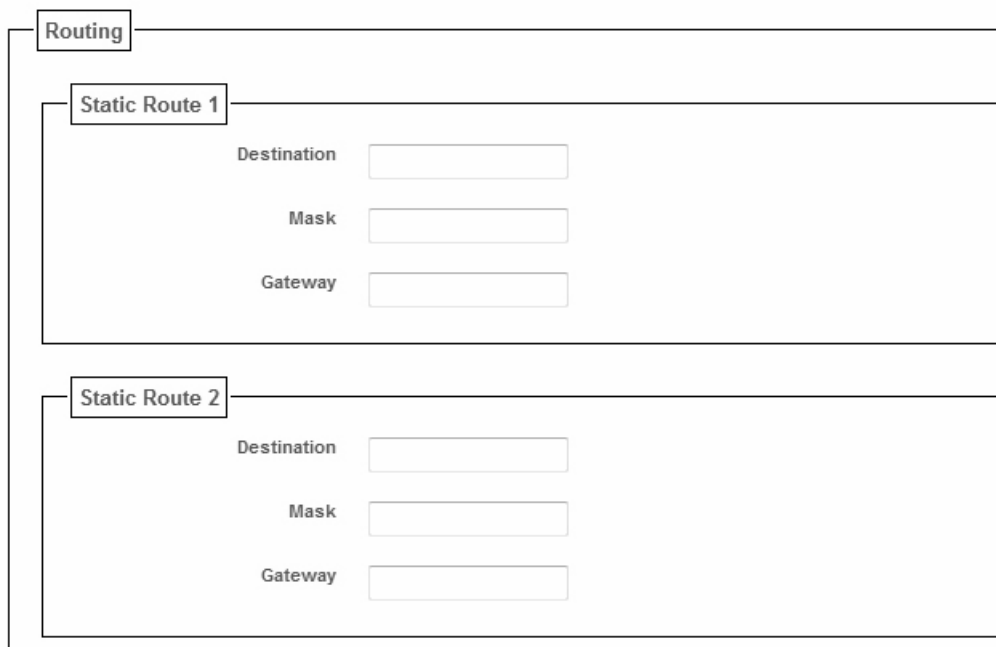
Figure 3 TCP/IP Network Configuration

Interface

The three editable fields contain the PrintNet's IP address, subnet mask, and Gateway. The check boxes enable the BOOTP, DHCP, and Persistent DHCP protocols, which are alternate methods of

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assigning IP addresses. On most networks, you want to enter a permanent IP address and subnet mask and disable 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. Interface 2 for the Wireless will only appear if the Wireless option card is installed.

Figure 4 TCP/IP Static Route

Routing

The routing table tells the PrintNet 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

The wireless selections are only shown if the Wireless Option Card is installed in the printer. These selections allow the setting of the various wireless configurations.

Network Name

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

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.

Antenna

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

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Preamble

Change the preamble from default to short or long.

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

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

WPA Cipher

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

WPA Passphrase

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

Select the EAP authentication method. LEAP, PEAP, TTLS, TLS 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.

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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

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

EAP Password

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

Certificate and Security Key

This section can be used to load the certificate for the for the WLAN Extensible Authentication Protocol (EAP) mode. For EAP-TLS, the printer requires three files. These files are the Certificate Authority (CA) file, a certificate file and a key file. For EAP-PEAP, the user can choose to load CA file. These files should be generated by the System Administrator.

Print Path Configuration

The PrintNet print path is the path a print job takes when it reaches the printer's Ethernet interface. 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 printer's data parser. The "Print Path" Webpage 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 5 Print Path Configuration

Name

Name of the destination. The default destination queue names are d1prn, d2prn, d3prn, d4prn, d5prn, d6prn, d7prn, and d8prn. The destination name can be modified by entering a new name in the field and clicking "Submit".

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.

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 PrintNet
lpd	Remote printing using the Line Printer Daemon
ftpd	printing using the File Transfer Protocol (FTP)

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.

Selected Logpath

Defines the logpath configuration associated with the current destination. The default logpath names are l1, l2, l3, l4, l5, l6, l7, and l8.
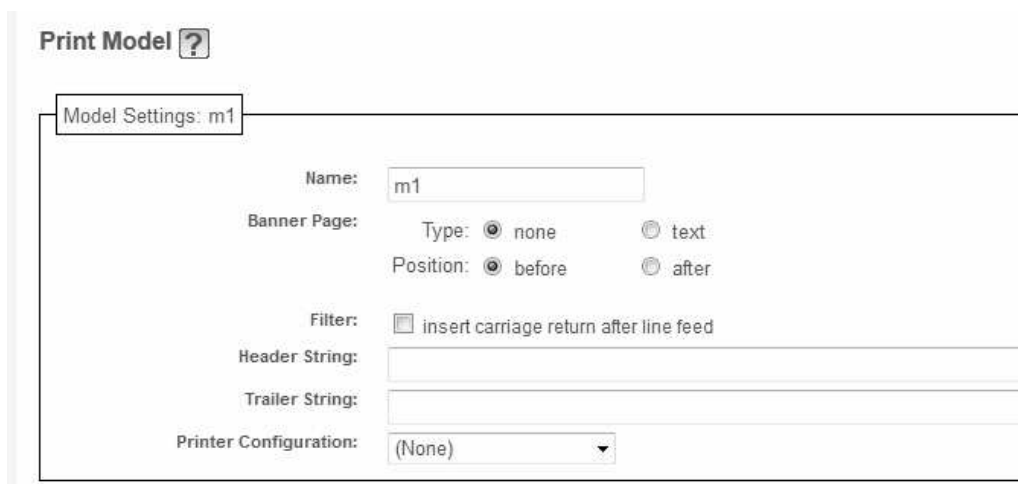
Chosen Model Settings

This section displays the model associated with the displayed destination. To change Print Model settings, see Print Model Configuration on page 23.

Chosen Logpath

This section displays the logpath setting associated with the displayed destination. To change Log Path settings, see Log Path Configuration on page 25.

Print Model Configuration

Figure 6 Print Model Configuration, Model Settings

Name

Name of the model. The default model names are m1, m2, m3, m4, m5, m6, m7, and m8. The model name can be modified by entering a new name in the field and clicking "Submit".

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.

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. 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.

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. See page 109.

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

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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
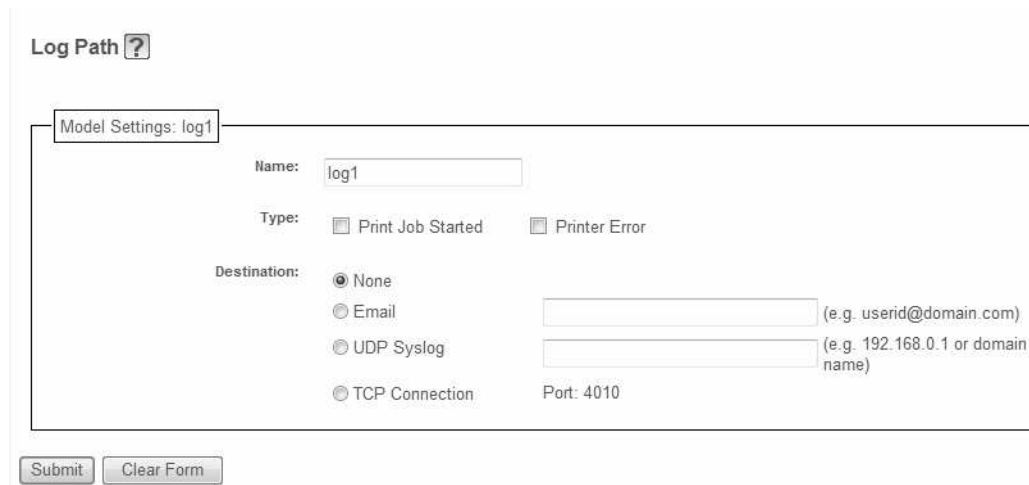
Figure 7 Log Path Settings

Name

Name of the log path. The default names are l1, l2, l3, l4, l5, l6, l7, and l8. The Log Path name can be modified by entering a new name and clicking "Submit".

Logpath Type

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

- **Print Job Started** - A notification is sent to 'Destination' when a print job is received in the PrintNet.

- **Printer Error** - A notification is sent to 'Destination' when a printer error occurs during printing. If no print job exists in the PrintNet, the notification will not be sent.

Logpath Port

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

- **None** (default) - do not report any logging information

- **Email** - to an e-mail address (SMTP server address is set in the Administration page)

- **UDP Syslog** - to a host (specified by the IP address in the edit field) running a SYSLOG daemon

- **TCP/IP port** - to a TCP port number.

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TN5250 Configuration

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

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

Figure 8 TN5250/3270 Configuration, TN5250 Mode

Figure 9 TN5250/3270 Configuration, TN3270 Mode

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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 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 PrintNet will automatically connect to the host.

Default: Disabled

Start/Stop Auto Connect

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

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

NOTE: TN manage needs to stay connected to the TN server in order to continue receiving data. To print to the ASCII port, the user will need to end the TN print queue writer first.

SNMP Configuration

The SNMP Configuration form allows you to configure SNMP trap managers and the e-mail alert features of PrintNet. 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 10 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 49157 through 65535

- **Community Name** - up to 15 character string specifying the trap community name.

Syslog Alert Posting Settings
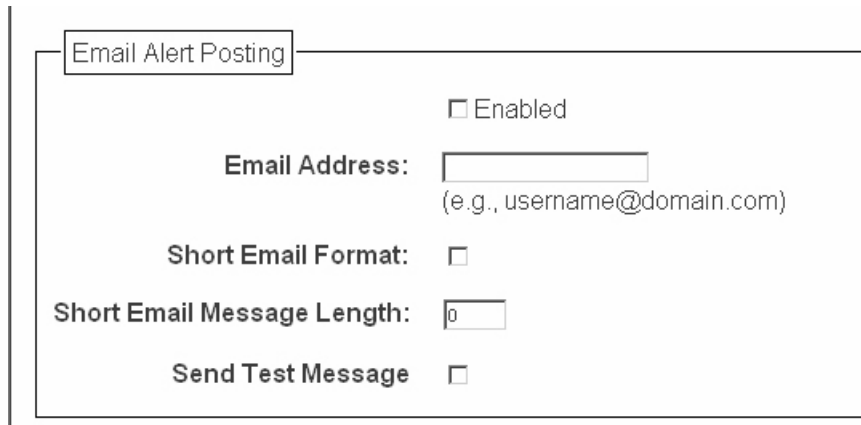
Figure 11 SNMP Syslog Alert Posting Configuration

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

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E-mail Alert Posting Settings

Figure 12 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.

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Alert Groups

Figure 13 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
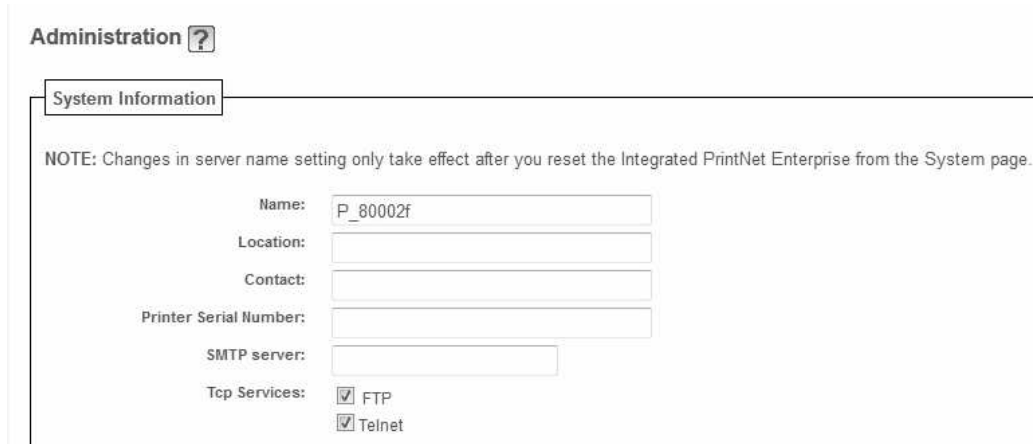
Alert Group	Printer Events
Warning	File System Full File Exist Hex Dump Mode Half Speed Mode
Offline	Printer is Offline
Media Input	Load Paper
Media Output	Stacker Full Stacker Jam Time Out Stacker Full Time Out Stacker Fault Time Out Stacker Jam Stacker Fault Stack Over Flow8 Stack Under Flow Stacker Fail Stacker Interlock Fail
Media Path	Clear Paper Jam
Marker	Ribbon Stall Time Out Ribbon Ink Out Ribbon Stall Ribbon Drive Shuttle Over Speed Ribbon Fault Ribbon Detected
Barcode	Barcode Fail Specification Barcode Quiet Zone Too Small Barcode Improper Data Format
Intervention	These are error messages that need some kind of user intervention to solve them.
Consumable	Ribbon Low

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.

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Administration Configuration

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

System Information

Figure 14 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 default name is "P_xxxxxx" where "xxxxxx" equals the last six digits of the PrintNet's Ethernet address. (e.g. P_01001C). The user can change the printer name in this field.

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's serial number. If the printer's controller board is replaced, this field will be blank. The service representative can enter the printer's serial number in this field.

SMTP Server

Specifies the IP address or domain name of the SMTP server to be used for processing email messages generated by the PrintNet.
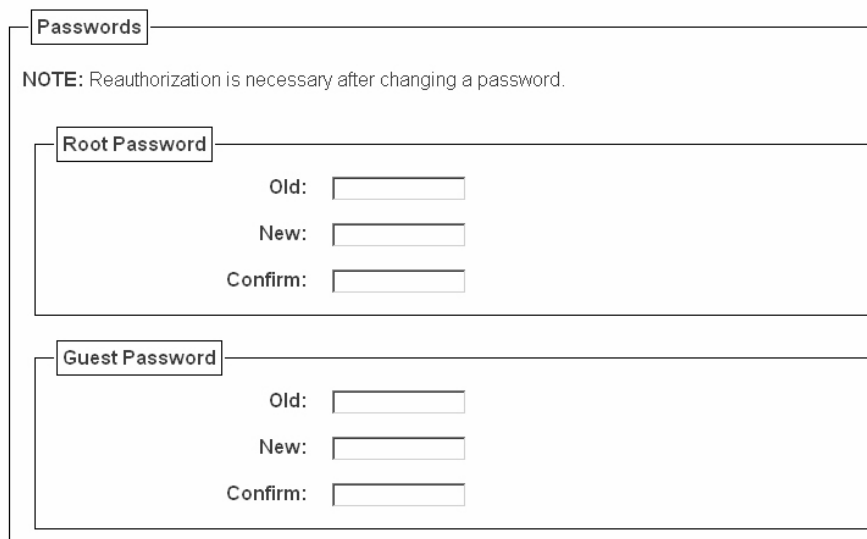
Default: Unconfigured (empty).

TCP Services

There are two protocols that users can disable. Usually major corporations prefer to disable ftp and telnet once configuration of the printer is complete. ftp and telnet protocols are set to enable by default. If these protocols are disabled, you can use the Webpage to enable them.

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If HTTP protocol is disabled along with ftp and telnet, the only way to enable these protocols is by sending a print job with PTX_SETUP commands. (Refer to printer's *User's Manual* for PTX_SETUP syntax.)

Passwords
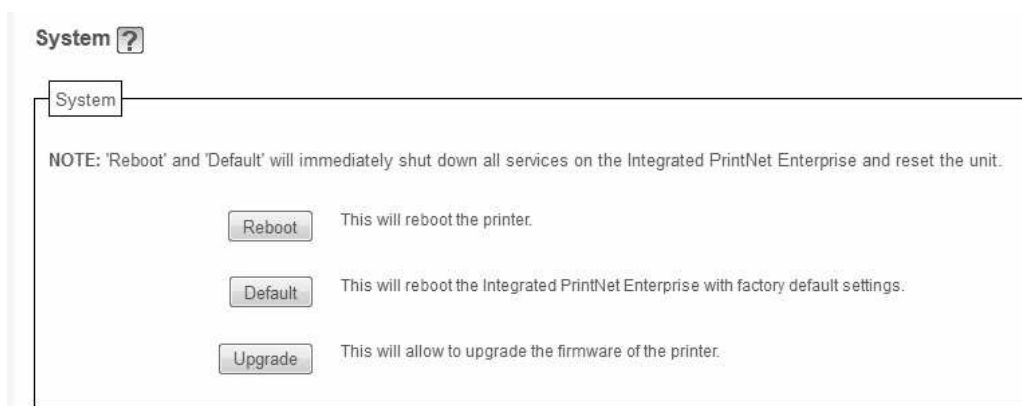
Figure 15 Administration Configuration, Passwords

Only a user with root privileges can alter the PrintNet'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 16 System Configuration

The System Configuration form allows you to change the PrintNet'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.

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Firmware Upgrade

Click "Upgrade" to upgrade the printer's firmware. The Firmware Upgrade webpage displays below.

System Firmware

Firmware Upgrade ?

```
┌─ System Firmware Upgrade ─────────────────────────────────────────────────┐
│                                                                           │
│  Current firmware version: 375001 V1.21F                                  │
│  Check with Printronix Auto ID Customer Support for the latest firmware updates. │
│                                                                           │
│  File to upload: [                                    ]     [ Browse... ] │
│                                                                           │
│  [ Upgrade ] [ Clear Changes ]   Note: The newly downloaded firmware will only take affect after a restart. │
│                                                                           │
│  After selecting a file to upload, press the Upgrade button once to begin the firmware upgrade process. │
│                                                                           │
└───────────────────────────────────────────────────────────────────────────┘
```

Figure 17 Firmware Upgrade Webpage

1. To find the upgrade file click the Printronix Auto ID Customer Support Center link.

2. Click "Browse..." to navigate to the directory, then click "Upgrade".

NOTE: Upgrading the printer firmware will erase all printer configurations except network setting. You may want to upload the configuration and save it to your PC before the upgrade process.

IMPORTANT **The upgrade process may take a few minutes. The process cannot be interrupted during upgrade or the printer will not be able to power up again.**

Wireless Firmware

```
┌─ Wireless Firmware Upgrade ───────────────────────────────────────────────┐
│                                                                           │
│  Current firmware version:                                                │
│  Check with Printronix Auto ID Customer Support for the latest firmware updates. │
│                                                                           │
│  File to upload: [                                    ]     [ Browse... ] │
│                                                                           │
│  [ Upgrade ] [ Clear Changes ]   Note: The System will reboot automatically after the firmware has been downloaded. │
│                                                                           │
│  After selecting a file to upload, press the Upgrade button once to begin the firmware upgrade process. │
│                                                                           │
└───────────────────────────────────────────────────────────────────────────┘
```

NOTE: The Wireless Firmware box will only be displayed if the Wireless Option card is installed in the printer. Wireless Firmware upgrade takes longer than normal due to the size of the file. Do not turn off the printer during upgrade process.

IMPORTANT **The wireless firmware can only be upgraded through the web page if the active PrintNet interface is Wireless.**

1. To find the wireless firmware upgrade file click the Printronix Auto ID Customer Support Center link.

2. Click "Browse..." to navigate to the directory, then click "Upgrade".

![MPI logo]

Job Capture

Figure 18 Job Capture Webpage

Sometimes the job does not work or your barcode does not print. Job Capture allows you to capture data sent to the printer. To start capturing data, click "Start Job Capture". To stop capturing data, click "Stop Job Capture". Upon job capture completion, click "Upload" to load the data from the printer to your host system. The captured file size depends on your available DRAM size.

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 PrintNet 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 PrintNet 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 PrintNet 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.

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Help

Through the provided HTML forms, you can configure settings on the Integrated PrintNet Enterprise and view printer status.

4 *Windows Configuration*

Overview

This chapter details a complete Windows configuration setup including:

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

Windows Environment Description

The PrintNet supports network printing under Windows environments by using TCP/IP. In a Windows setup, pure TCP/IP is used as the network protocol.

Windows PrintNet 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 PrintNet in a Windows environment and describes some of the more common optional settings available.

Mandatory

Since TCP/IP is used for Windows printing, the PrintNet 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 PrintNet from the printer control panel, Web browser, host commands, or other Printronix utility software. To configure these options, see Configuration Tools on page 13.

Configuration using ARP

To configure the PrintNet 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 PrintNet.
2. Find the Ethernet address for the PrintNet 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 PrintNet. 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 PrintNet 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 PrintNet can be seen on your network.

   At this point, you should be able to communicate with the PrintNet 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 PrintNet 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://IPaddress
      (e.g., http://192.75.11.9)
      where IPaddress is the IP address of your PrintNet.

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 PrintNet.

   c. Under the "Subnet Mask" heading, enter the PrintNet subnet mask.

NOTE: If you would like to communicate with the PrintNet from across routers, you will need to fill in an entry within the "Routing" section. Please see Communicating Across Routers on page 39 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 PrintNet, crossing routers becomes an issue.

After you have followed one of the PrintNet 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 PrintNet. In order for hosts across a router to see your PrintNet, 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 PrintNet:

1. Load a Web browser on your Windows station and direct it to the URL.

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 PrintNet subnet.

3. 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 PrintNet 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 19 displays.
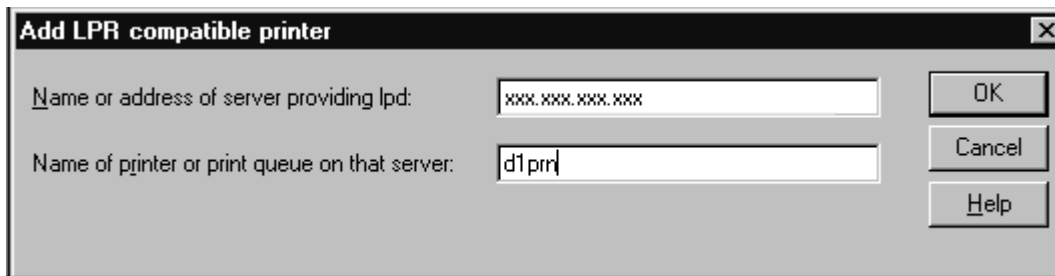
Figure 19 Windows NT Print Setup Dialogue Box

The first field requires the IP address for the PrintNet, 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.

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.

3. Once the desired destination HTML form displays, highlight the "Name" field and type in the new name for this destination.

4. Click the SUBMIT button when done and physically repower the print server to make the new setting take effect.

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5   *Unix Configuration*

Overview

This chapter details a complete Unix setup including:

- Configuring the PrintNet 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 PrintNet 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 PrintNet 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 PrintNet and mentions some of the more common optional settings available.

Mandatory

Since TCP/IP is used, the PrintNet 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 13.

Optional

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

Configuration of the PrintNet can be done from the control panel or through host commands. To configure these options, see Configuration Tools on page 13.

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 PrintNet since ARP is limited to subnets.

2. Find the Ethernet address for the PrintNet 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 PrintNet. Here is the most common syntax for this command:

   ```
   arp -s ipaddress ethernetaddress
   ```

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Example for Microsoft TCP stacks:

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

This example specifies a PrintNet 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 PrintNet can be seen on your network.

At this point, you should be able to communicate with the PrintNet 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 PrintNet 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 PrintNet.

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

NOTE: If you would like to communicate with the PrintNet from across routers, you will need to fill in an
entry within the "Routing" section. Please see Communicating Across Routers on page 43 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 BOOTP

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

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

   Syntax:

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

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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 PrintNet on so that it immediately sends out a BOOTP request. Wait one minute to allow the IP address assignment process to complete.

3. Try to **ping** the PrintNet 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 PrintNet 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 PrintNet, crossing routers becomes an issue.

After you have followed one of the PrintNet 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 PrintNet. 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 PrintNet:

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 PrintNet 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 PrintNet, 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
```

PrintNet 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 = PrintNet 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 PrintNet destination name is d1prn, however, this name can be changed. To verify the queue name, print an Ethernet Test Page or telnet to the print server's IP address and run a "list dest" command.

To print to this queue, use normal lp syntax:

```
# lp -dqueue_name filename
```

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Solaris 2.6 – 7 PrintNet Setup

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

The IP address of the PrintNet 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 PrintNet is configured with the correct IP address, subnet mask, and gateway (if required). You can also ping and telnet to the PrintNet.

Print an E-Net Test Page to verify the Ethernet settings. See Printing an Ethernet Test Page on page 13.

The default PrintNet 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 print server's IP address 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 PrintNet 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, `ICname` is the host or IP name of the print server, and `NICdestination` is one of the pre-defined destinations/queues on the device.

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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 PrintNet printer. Use the following command to test printing:

Syntax:

```
lpr -P printername filename
```

Example:

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

PrintNet 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.

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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 PrintNet 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 PrintNet 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 PrintNet is configured with the correct IP address, subnet mask, and gateway (if required). In addition you can also ping and telnet to the PrintNet.

To verify the PrintNet settings, print an E-net Test Page. See Printing an Ethernet Test Page on page 13.

The default PrintNet 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 print server's IP address 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. **PrintNet IP address.** The IP address or host name of the print server to which you want to print.

2. **PrintNet 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 PrintNet 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 PrintNet.

   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.

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9. Place the file to be printed within this directory on the PrintNet, so it can be spooled and printed.

    Syntax:

    ```
    put filename
    ```

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

    Syntax:

    ```
    quit
    ```

Alternate FTP Printing

1. Change the default ftp directory by entering the following command:

    ```
    store pserver ftp dest
    ```

2. Open an FTP session with the PrintNet.

    Syntax:

    ```
    ftp NICIPaddress
    ```

3. Log in as **root.**

4. At the password prompt, press ENTER (since there is no default password).

5. 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.

6. Send the file to be printed here.

    Syntax:

    ```
    put filename d1prn
    ```

7. 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 PrintNet, 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. **PrintNet IP address**. The IP address or host name of the print server to which you want to print.

2. **PrintNet TCP port number**. A predefined 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 PrintNet, 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 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. Set TCP/IP addresses for the printer, such as IP address, gateway address, or subnet mask. See Configuration Tools on page 13.
2. Configure the host environment. See Configuring PSF for z/OS to Print IPDS Files on page 50.
3. Verify the configuration. See Verifying a TCP/IP-Attached Printer on z/OS on page 57.
4. If you want to share the printer, do the procedure in Sharing Printers on z/OS on page 58.
5. If you have problems, refer to Handling z/OS Connectivity Problems on page 59.

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 51.

2. Modify the TCP/IP profile on your z/OS system, if necessary. See Modify the TCP/IP Profile in z/OS on page 51.

3. "`Ping`" the printer. See Verify the Printer Connection on page 53.

4. Define the printer as a writer-controlled printer to JES. See Define the Printer to JES on page 53.

5. Define the printer to PSF with a PRINTDEV statement, including the IP address. See Define the Printer to PSF on page 54.

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 20.

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```
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 20 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.

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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

NOTE: If the host has keep-alive enabled, be sure to to disable the printer's keep-alive function. See page 105 for the keep-alive command.

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 59.

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

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

NOTE: The 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
```

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```
//*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*/
```

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```
//*/* 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 21 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 Printers on z/OS on page 58. 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:

   $Sprinter_name

   - On **JES3**, the command is:

   *VARY printer_name,ON

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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:

  $Pprinter_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 Printers on z/OS

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, 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,).

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 51.

  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.

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 PrintNet printer on the AS/400, a line description needs to be created. 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 printer.

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 22.

.
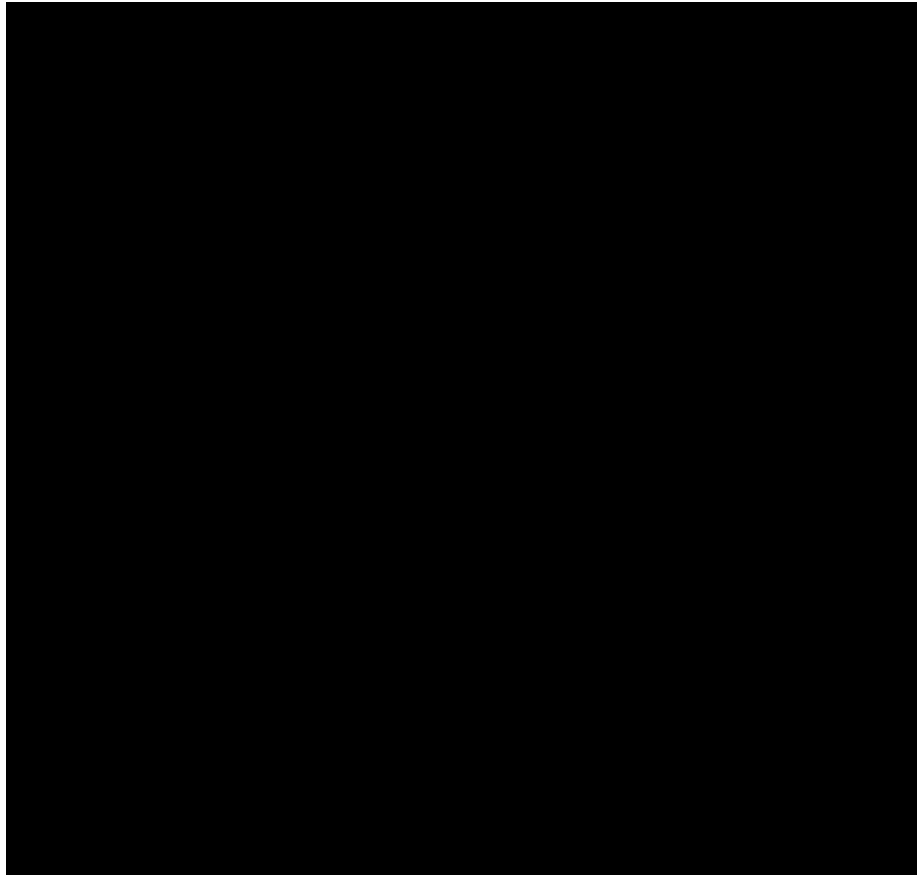
Figure 22 Example PrintNet Line Description

The following three parameters must be specified:

Line Description (LIND)

The line description name is the user's name for the AS/400 network printer. 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 PrintNet. Do not set the AS/ 400 interface address to the same address as the PrintNet IP address. Also, do not add the PrintNet to the AS/400 TCP/IP interface list.

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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 23.

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 23 Example of ADDTCPIFC Interface

The following parameters must be specified:

Internet Address

Internet address of the AS/400 LAN printer.

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

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 61.

NOTE: Each AS/400 LAN printer 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 64, 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 printer 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 PrintNet.

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 24 displays in **bold** the parameters you need to specify.

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```
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     >   *WSCSTCONT

Internet address            INTNETADR     >   '9.99.2.3'
```

Figure 24 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 *WSCSTCONT if you have AS/400 V3R2 and above or V3R7 and above.

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

      Manufacturer Type Model   = *WSCSTCONT

      Workstation Customizing Object = QWPDEFAULT

      Library   = QSYS

      This selects a generic object that passes the data unchanged without any escape

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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 Auto ID 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 PrintNet.

NOTE: You may specify either ***INTNETADR** (and the PrintNet IP address) or the hostname for the PrintNet (if you added the printer to the host table entry as directed in Configuring A TCP/IP Host Table Entry on page 64).

To Create an Automatic Remote Output Queue

1. From the AS/400 command line, enter `CRTOUTQ`.

2. Figure 25 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 65)
Workstation Customizing Object   WSCST           >  (See Note on
                                                    page 65)

      Library
Internet address                 INTNETADR       >  '9.99.57.173'
Destination options              DESTOPT            *NONE
Print separator page             SEPPAGE            *YES
User defined option              USRDFNOPT          *NONE
```

Figure 25 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 PrintNet on the printer (`*INTNETADR` prompts you for this) or the hostname of the PrintNet.

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 *WSCSTCONT.

Troubleshooting

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

Print an E-Net Test Page to verify the Ethernet settings. See Printing an Ethernet Test Page on page 13.

The default PrintNet 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 PrintNet 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 PrintNet) 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 64).

4. If the printer cannot be pinged, proceed to AS/400 ASCII Troubleshooting on page 69.

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 64.

   • 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 66).

   • 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 PrintNet 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 T4M 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.

- AFP 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 28 on page 75 or Figure 29 on page 77). 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 PrintNet.

2. Using the printer control panel, set up the parameters and values for IPDS.

3. Set TCP/IP addresses for the printer, such as an IP Address, Gateway Address, or Subnet Mask. See Configuration Tools on page 13.

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 PrintNet IP address to configure the PrintNet.

6. If you have not done so yet, create a line description for your PrintNet. See Developing Line Descriptions With CRTLINETH on page 61.

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7. Create or verify the existence of an AS/400 TCP/IP interface for PrintNet. See Configuring an AS/400 TCP/IP Interface with ADDTCPIFC on page 71.

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 72.

    - Configuring PSF/400 for IPDS on V3R7 and Above on page 76.

9. Notice that when the IPDS feature is installed, the queue name 'dipdsprn' displays in the print queue in place of d4prn.

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 84.

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 85.

14. If you have problems, refer to AS/400 Troubleshooting on page 87.

Configuring an AS/400 TCP/IP Interface with ADDTCPIFC

NOTE: Do not enter the IP address of the PrintNet. Do not set the AS/400 interface address to the same address as the PrintNet IP address. Also, do not add the PrintNet 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 26.

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 26 Example ADDTCPIFC Interface

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3. The following parameters must be specified:

    a. **Internet Address**

       Internet address of the AS/400 Ethernet LAN printer.

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

    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 61. Each AS/400 LAN printer 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 printer 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., T5204 or T8308) is the model of your printer.

2. A completed screen looks like the example shown in Figure 27 on page 73.

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```
        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 27 Example of CRTDEVPRT Command (V3R2)

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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 74.

   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., T5204 or T8308) is the model of your printer.

2. A completed screen looks like Figure 28.

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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 28 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

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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., T5204 or T8308) is the model of your printer.

2. A completed screen looks like Figure 29.

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```
                  PSF Configuration Information

PSF configuration: printer_typeNETPRT      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

Device resource library list:              *DFT
```

Figure 29 Example CRTPSFCFG Command (V3R7 or V4R1)

NOTE: The lines in **bold** in Figure 29 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**.

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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., T5204 or T8308) 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 76.

2. A completed screen looks like the example shown in Figure 30.

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**	

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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 30 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/NETPRTT8) IPDSPASTHR(*YES) RLSTMR(*SEC15)
TEXT('PRINTRONIX P7000 NETWORK ATTACHED PRINTER') PAGSIZCTL(*YES)
ACTRLSTMR(*NORDYF)
```

2.   A completed screen looks like Figure 31.

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```
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 31 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.

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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(T8IPDS) DEVCLS(*LAN) TYPE(*IPDS) MODEL(0)
LANATTACH(*IP) AFP(*YES) PORT(5001) FONT(11) FORMFEED(*CONT)
RMTLOCNAME('128.9.12.134')
USRDFNOBJ(AFP/NETPRTT8 *PSFCFG) TEXT('Printronix T8 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 32.

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 32 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 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 PrintNet), 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 87.

- 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, 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, or Ethernet Parameters).

Printer Sharing Parameters

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

Table 3 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).

Table 3 Printer Sharing

AS/400 Version	Where Set	Parameter	Recommended Value	Description
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.
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).

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Table 3 Printer Sharing

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 *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 PrintNet.

4. Use a telnet session or web browser session to configure three items per dest (logical PrintNet 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 PrintNet 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 PrintNet 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 PrintNet 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 PrintNet 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 d1prn host 192.168.168.34
store tn dest d1prn devicedesc palletform
store tn dest d1prn autoconnect
reset
```

This example creates a device/queue named "palletform" on the AS/400 host with IP 192.168.168.34. The PrintNet 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 PrintNet.

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 98 for store command descriptions.

List Commands
```
list tn
list tn dxprn – shows detail of a specific tn print queue.
list stored tn
list default tn
```

See page 113 for list command descriptions.

TN5250 Auto Connect Command
```
tn dest <dxprn> start|stop
```

See page 118 for a detailed description.

Getting Started

Set the following items when first configuring the PrintNet 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 tnqueue

- 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 33.

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

Change Device Desc (Printer) (CHGDEVPRT)		
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 33 Example of CHGDEVPRT Command

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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.

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10 *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 PrintNet, 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)
- PrintNet 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.

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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. PrintNet SNMP is used on TCP/IP network only.

SNMP is a standard by which a network manager can get statistics and configuration information from the print servers 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 Auto ID

PrintNet Enterprise Auto ID (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 Auto ID User's Manual* or www.PrintronixAutoID.com for more details on this tool.

11 *Commands*

Command Shell Overview

The PrintNet 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 PrintNet

* 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 PrintNet 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 PrintNet 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 PrintNet 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 value of 1 or 2 unless told otherwise. The value of 1 represents wired Ethernet network interface. The value of 2 represents the wireless network interface if the Wireless Option card is installed in the printer.

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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 ftpc addr <IPADDRESS>
```

Example: `store ftpc addr 192.168.10.10`

Store the ftpc server IP address. The printer starts an ftp client session at the power up time if ftpc is enabled. The print will connect to the IP address provided with this setting.

```
store ftpc user <USER-NAME>
```

Example: `store ftpc user joe`

The user ID used to log into ftp server.

```
store ftpc passwd <PASSWORD>
```

Example: `store ftpc passwd super`

To enter the password that allows the user to log into ftp server.

```
store ftpc file <FILENAME>
```

Example: `store ftpc file printer.inf`

This is the name of the file that is stored in the ftp server. The file will be loaded to the printer at the power up time if ftpc is enabled.

```
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 18.

```
store ifc <IFNUM> wlan auth <AUTH-METHOD> (eg. open, shared)
```

Define the wireless authentication scheme,<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.

```
store ifc <IFNUM> wlan user <AUTH-USER-NAME>
```

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Define the wireless auth-user-name to be used in the EAP operation,<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.

```
store ifc <IFNUM> wlan pass <AUTH-PASSWORD>
```

Define the wireless auth-password to be used in the EAP operation,<ifnum> is the interface number for the wireless interface. This auth-password needs to match the password entered in the EAP Access Point.

```
store ifc <IFNUM> wlan ssid <NETWORK-NAME>
```

Set the wireless network name (SSID),<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).

```
store ifc <IFNUM> wlan speed auto|<1 2 5 11 6 9 12 18 24 36 48 54>
```

Set the wireless transfer rate (speed), <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: 1Mbps, 2Mbps, 5Mbps, 11Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, and 54Mbps. Using the word "auto" instead of any number will set the card to use automatic negotiation.

```
store ifc <IFNUM> wlan channel default <1-15>
```

Set the wireless channel number, <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.

```
store ifc <IFNUM> wlan antenna diverse|primary|aux<ANTENNA-TYPE>
```

Set wireless 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.

```
store ifc <IFNUM> wlan preamble default|long|short <LEN-TYPE>
```

Set the wireless preamble length, <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.

```
store ifc <IFNUM> wlan pmm on|off
```

Set the wireless power management mode, <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.

```
store ifc <IFNUM> wlan txpwr <0-100>
```

Set wireless transmit power, <ifnum> is the interface number for the wireless device. <0-100> the power level as a percentage of full power .

```
store ifc <IFNUM> wlan opts [[-]intnl]
```

Set options, <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.

```
store ifc <IFNUM> wlan defkey disable|<1-4>
```

Set the default key for wireless encryption, <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.

```
store ifc <IFNUM> wlan key <KEY-NUM> <HEX-KEY>|<$<STRING-KEY>[<LENGTH>]>
```

Set the key to a given value, <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>
```

Select the 802.11 g wireless (Wi-Fi) mode in which to operate, <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.

```
store ifc <IFNUM> wlan wpa disable|personal|enterprise
```

Select the WPA wireless security mode., <ifnum> is the interface number for the wireless interface. 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 none|leap|peap|ttls|tls
```

Select the EAP authentication method, <IFNUM> is the interface number for the wireless interface. Select leap for Cisco LEAP authentication. Select peap to use PEAP authentication. Select ttls to use Tunneled Transport Layer Security. Select ttls to use Transport Layer Security.

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```
store ifc <IFNUM> wlan cipher disable|tkip|aes|tkip+aes
```

Select the WPA wireless security cipher setting, <ifnum> is the interface number for the wireless interface. 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>
```

Set the WPS Pass Phase, <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>
```

Set the wireless 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.

```
store pping opts [-]enable
```

Example: `store pping opts enable`

Store the state of periodic ping flag. If the periodic ping flag is enabled the PrintNet periodic ping client will attempt to ping its default gateway on its active PrintNet 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 opts [[-]jobsecurity][jobtimeout <SECONDS>]
[jobcontrol[off|standard| enhanced|fast]] [[-]multcp]
```

Example: `store pserver opts -jobsecurity`

`jobcontrol` is not used in this product.

Example: `store pserver opts jobcontrol [fast]`

`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.

- **fast**. The EOJ (End of Job) packet is acknowledged immediately. Use this selection if the job is timed out due to a delay in the acknowledgement of the EOJ packet because of the amount of data printing.

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 PrintNet. The status reported does not reflect the state of the print job once it has been sent from the PrintNet 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 jobtimeout 5`

The `jobtimeout` applies to the active job only and starts counting from zero each time data has been handed over to the printer successfully. If a blocked condition occurs for instance no data can be written the the printer, the print job will be cancelled after the timeout. The default for `jobtimeout` is 0 which is disable.

The `multcp` option determines how many concurrent socket connections are allowed.

Example: `store pserver opts -multcp`

When multcp is disabled, only a single socket connection is allowed at a time.

Example: `store pserver opts multcp`

With this option, multiple concurrent socket connections are allowed. The default multcp is set to be enabled.

```
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 PrintNet to a new TCP port number (<new-tcp-port>). The default number is 9100 for prn.

```
store pserver tcpsocket <TCP-PORT> dest <DEST>
```

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Example: `store pserver tcpsocket 5000 dest d1prn`

Assign a pre-defined TCP port number (<tcp-port>) to a particular destination (<dest>) on the PrintNet. 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 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 ftp [-]dest`

Example: `store pserver ftp dest`

This command is to set the default directory when ftp is launched. Example commands as follows:

`set dest d1prn name pr1`

`store pserver ftp dest`

`save`

The first command changes <dest> d1prn to pr1. The second command tells ftp to start at directory dest. To send the print job, ftp to the printer and enter 'put printjob pr1'.

```
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 PrintNet.

```
store tcpip <IFNUM> mask <MASK>
```

Example: `store tcpip 1 mask 255.255.255.0`

Store the subnet mask for the PrintNet.

```
store tcpip <IFNUM> opts [[-]rarp] [[-]bootp] [[-]dhcp]
[-]persistdhcp]
```

Example: `store tcpip 1 opts -bootp -dhcp`

Enable or disable the automatic RARP, BOOTP, DHCP, or persistent DHCP requests for IP addresses upon bootup. If you are storing the PrintNet TCP/IP network settings within the device, you will not need to rely on BOOTP or DHCP for new settings.

```
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 PrintNet 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 PrintNet 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 PrintNet 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 del net 192.75.12.0 1`

Delete a static route to a particular TCP/IP host or subnet specified by <network> so the PrintNet 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 PrintNet. 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 [-]zeroIPArp [-]keepalivedata
```
Example: `store tcpip tcp opts keepalive`

Control whether the PrintNet maintains a connection with a host when data cannot be accepted into its buffer. The keepalivedata option controls whether the keepalive packet contains a data byte for hosts that require it. If zeroIPArp is disabled then a PrintNet 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 PrintNet with an IP address of 0.0.0.0 then any attempted access with a valid IP address is assumed for this PrintNet and an Arp lookup is performed.

```
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
```

Example: `store tn dest d1prn mode 5250`

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

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```
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 PrintNet 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 page 118.

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 PrintNet, 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 PrintNet 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 PrintNet 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> 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.

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```
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] [[-]ftpd] [[-]tn]
```

Example: `set dest d1prn service`

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.
ftpc	File Transfer Protocol Client. This protocol initiates file transfers from an
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 logpath <LOG_NAME> 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 <LOG_NAME> type [[-]job] [[-]pfault]
```

Example: `set logpath l2 type job user printer`

Establish the type of printer and print job logging to be done within this <logpath>. The option is:

job　　　　Job ID, username, etc.

pfault　　　Printer fault

```
set logpath <LOG_NAME> email <EMAIL>@<IPADDRESS>
```

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Example: `set logpath l3` mailto:user@PrintronixAutoID.com

Determine where the log information should be sent for a print job or attached printer. The choice is:

email   Particular user's email address. This address is set using the set
`sysinfo email` *emailname@IPaddress* or
emailname@domain.com command.

`set logpath from default|stored`

Set all logpath settings back to factory defaults or 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> 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 <1-6>|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 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.

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```
set snmp on|off
```

SNMP service can be disabled by telnet to the printer and enter 'set snmp off'. To reenable SNMP, enter 'set snmp on'. The default is enabled.

```
set snmp manager <INDEX> <IPADDRESS> <TRAP-COMMUNITY>
```

The PrintNet continuously generates traps. To set the PrintNet 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 PrintNet 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 messages, "-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 32 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 sysinfo label|name [<STRING>]
```

Example: `set sysinfo name salesprinter`

Set a descriptive name defined by <string> for PrintNet 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 PrintNet. 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 smtpserver <IPaddress> [port <PORTNUM>]
```

Example: `set sysinfo smtpserver 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 user add|del <NAME>
```

Example: `set user add eng`

Add or remove a user on the PrintNet 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.**

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```
set user passwd <NAME> [<PASSWORD>]
```

Example: `set user passwd eng mplex1`

Assign a password to a defined user on the PrintNet.

```
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 PrintNet.

```
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 PrintNet 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.

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```
list arp
```

List the current ARP table that the PrintNet adheres to in a TCP/IP network.

```
list dest [destination]
```

List the current destination settings (e.g., names and mapped I/O ports, models, logpaths, and services.).

```
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 PrintNet interface settings (e.g., link integrity).
When the Wireless Option card is installed, 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>
mask = <mask>
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 6 9 12 18 24 36 48 54], 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.

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<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 logins
```

List any active user logins on the PrintNet.


```
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).


```
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 PrintNet 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 PrintNet 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 PrintNet 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.

`cancel` *`jobID`*

Example: `cancel d1prn-10`

Remove a job from an I/O port queue. Use `lpstat` to find a particular job ID first.

`chr <STRING>`

Echo < `string`> or redirect <`string`> to an I/O port using the `chr <string> ioport`.

`close tcp` *`TCPindexnumber`* `<SD> | all`

Example: `close tcp 3`

Close the a TCP/IP connection between a TCP/IP host and the PrintNet. `<SD>` is the socket destination. The *`TCPindexnumber`* `<SD>` can be retrieved from "debug tcp" output.

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`disable` *destination|ftpc|ftp|telnet*

Example: `disable`

Disable a protocol or disable a *destination* so jobs cannot be queued to it. You can also disable ftpc, ftp, or telnet protocol using the disable command.

`enable` *destination|printermgr|ftpc|ftp|telnet*

Example: `enable printermgr`

Enables the printer debug port to allow remote printer management software to function. You can enable ftpc, ftp, or telnet protocols using the enable command.

`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 [`*jobID*`]`

Example: `lpstat`

Display active and queued jobs and printer status for a given *printer* or *jobID*. Specifying one of these parameters will shorten the output and focus on the particular I/O port or print job specified.

`ping [-s]` *hostIPaddress* `[`*datasize* `[`*packetnumber*`]]`

Example: `ping 192.75.11.30`

`ping` another TCP/IP host specified by *hostIPaddress* on the PrintNet 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 PrintNet. Use the command `set sysinfo dns...` to do this.

`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.

`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.

`start emi|fox`

Example: `start fox prn`

Begin a test on the PrintNet. The tests available are:

fox A continuous stream of text sent to the attached printer. This is a good

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test for troubleshooting hardware as long as the attached printer supports text output.

emi   This is reserved.

```
stop
```

Stop the current test running.

```
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.

? (Help)

Lists all available commands.

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12 *Extra Features*

PrintNet Security

There are TCP access lists available to restrict host connections with the device.

Users and Passwords

The PrintNet 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 PrintNet configuration. Guest users cannot alter the print server configuration in any way.

To configure a root password on your PrintNet:

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.

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From this point on, anytime you log in to the PrintNet 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 PrintNet are:

```
set user from default

save
```

Reset the PrintNet Password

Occassionally a user will set a root user password on the PrintNet 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 PNE Access 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 PrintNet back to the factory default.

TCP Access Lists

Within TCP/IP environments, the PrintNet 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 PrintNet.

To view the current access list on the print server:

1. Start a Telnet session with the PrintNet.

   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 PrintNet 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
   ```

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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.

PrintNet 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.

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.

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 PrintNet 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 PrintNet interfaces.

MPI

A *Troubleshooting Tips*

Windows Troubleshooting Tips

This section provides information on possible solutions to some standard Windows and PrintNet 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.

PrintNet cannot be Found on the Network

Please follow these tips to determine what the problem may be with your PrintNet configuration.

- Have you assigned the PrintNet 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 PrintNet 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 PrintNet is working correctly? Trying different network cables and locations will help narrow down the problem.

HTML Configuration Forms will not Display

- Can you `ping` PrintNet from the Windows station? If not, refer to PrintNet Cannot be Found on the Network on page 128.

- Have you used the correct URL for the PrintNet home page? It should be http://PrintNetIPaddress (e.g., http://192.75.11.9).

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- Is HTTP support enabled? If not, refer to Web Browser/HTTP Problem on page 126.

Errors Occur when Defining an LPR Printer

- Can you `ping` the PrintNet from your Windows NT station? If not, please refer to PrintNet Cannot be Found on the Network on page 128.

- Did you specify the correct IP address or host name for the PrintNet in the first field of the "Add LPR Compatible Printer" box?

- Did you specify a valid destination/queue on the PrintNet 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 PrintNet on the Network

- Have you looked under the right Windows workgroup? By default, the PrintNet 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 PrintNet 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 PrintNet, there may be an incorrect entry in the TCP access list. In order for this workstation to use the PrintNet 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 Ethernet Test Page. When the page prints, look under the "TCP Sockets" section for the TCP access list entries.

To add/delete a TCP access list entry, refer to TCP Access Lists on page 120.

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 PrintNet 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 PrintNet HTTP may be turned off.

If you cannot `ping` the PrintNet 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 PrintNet IP address but cannot access the Web pages, perform the following procedure to verify the PrintNet HTTP is turned on.

1. **Telnet** into the PrintNet 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 PrintNet 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 PrintNet is configured with the correct IP address, subnet mask and gateway (if required), and that the administrator can `ping` and `telnet` to the PrintNet from the server console. If this is not the case, use the printer front panel to configure the PrintNet before proceeding.

Installing Microsoft TCP/IP Printing

The PrintNet 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.

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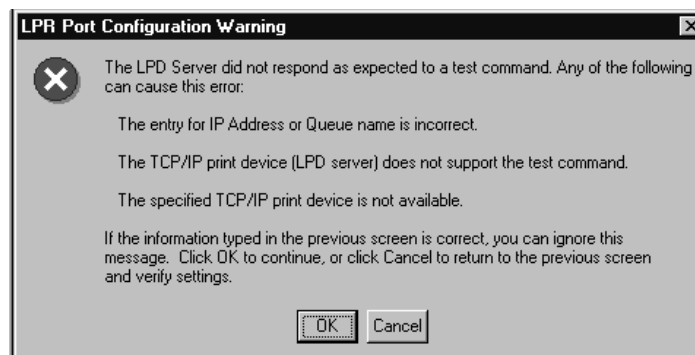
The Ethernet cable is not plugged in or the printer is not turned on. This message is a communication failure between the NT/2000 server and the PrintNet. Check cabling, IP address settings, gateway, etc.

- 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.

PrintNet Cannot be Found on the Network

- Have you configured the PrintNet 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 PrintNet 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 PrintNet is working correctly? Trying different network cables and locations will help narrow down the problem.

Nothing Prints

- Can you `ping` the PrintNet from your Unix station? If not, please refer to PrintNet Cannot be Found on the Network shown above.

- Is the PrintNet 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 PrintNet 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 PrintNet 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 PrintNet, please see PrintNet Naming Schemes on page 121.

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 PrintNet. Use the following procedure:

1. Telnet to the PrintNet. Login = root, password = (Enter key)

    Telnet commands are:

```
store tcpip 1 opts -bootp -dhcp
store tcpip tcp opts -zeroIPArp reset
```

Wait two minutes for the PrintNet 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.

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**
- **NIC_SETUP files to set up wireless parameters.**
  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

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- o Characters used including case have to match those of A/P
- o Front panel entry restricted to characters provided
- o Using methods other than the front panel [telnet, web, nic_setup] allows other characters to be used
- o 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

- 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
```

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```
store ifc 2 wlan wpa personal
store ifc 2 wlan cipher tkip
store ifc 2 passphrase !wxABCD0123
store ifc 2 wlan country US

store pping opts enable
store pping period 2
store pping packet 2

save
reset
END_NIC_SETUP
PTR_END
```

Setup FTP Client Tips

FTP Client can be used for automatic printer firmware upgrade and/or configuration update. This function requires deep understanding of network infrastructure and intimate knowledge of how printer operates. If you are not certain on any part of this discussion, please contact your system administrator.

The files to load into the printer are stored in the FTP server site. There is a specific format required to do the upgrade. The format is described below. If this format is not followed, the auto-upgrade process will stop.

Preparation for the process

- The printer is to be configured with ftp server name or IP address. The ftp server name can be resolved by using DNS name served by DHCP.
- If using static IP, you need to enter DNS server IP address using telnet command.
- Be sure to turn off firewall if the ftp server is at a different VLAN.
- The ftp server, login userid, and password need to be configured through telnet command.
- It is recommended to create a folder in the ftp server for storing files. A telnet command is provided to set the ftp server directory path.
- If ftp client is disabled, the upgrade operation does not take place. To start FTP Client process, telnet to the printer and type 'enable ftpc'.
- If printer.info does not exist, the upgrade operation does not take place.
- This process takes place every time the printer boots up.
- The Tokens and filenames are case sensitive.

Files for the Upload

There can be up to four files stored in ftp server.

a. Printer.Info. This file holds the name of each file for upgrade. This file is created and stored in ftp server together with any/all of the files to be loaded.
b. NIC file. Token is 'NIC'. The NIC file is sent to the printer as print file. It is a PTX_SETUP file with NPSH commands. PTX_SETUP command is processed by the printer and pipes NPSH commands to the NIC.
c. Printer firmware. Token is 'Program'. This file requires the printer to be in download mode before sending to the printer. The printer will be put in the download mode when the FTP Client detects upgrade is needed automatically. The printer firmware needs to have extension of .prg. This process does not handle .exe file.
d. Printer configuration file. Token is 'Config'Send to printer as a print job. This file is in PTX_SETUP format.

There may be many files stored in the ftp server directory. The printer will only look at the ones that are listed in Printer.Info. The sequence of files listed in Printer.Info is important.

The Process at the Printer Power Up

1) FTP client keeps the record of currently loaded part number of all files.
2) At the printer power up time, the printer will connect to FTP server.

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3) Load the Printer.Info file from the FTP server. The Printer.Info file has a list of files for the printer auto-upload process.

If Firmware Upgrade Needed

1) FTP client compares the printer firmware name with the name in the Printer.Info.
2) If the current printer firmware name is different one in Printer.Info, the printer will reboot into download mode. Otherwise go to step 5.
3) As the printer boots up in the download mode, FTP client loads and upgrades the printer firmware.
4) The printer boots up with the new printer firmware. FTP client will load printer configuration file and NIC configuration and printer will be ready to print.

No Firmware Upgrade Needed

5) FTP client will compare the file name of printer configuration and NIC configuration. Any one of the files has different name comparing to the name in Printer.Info, ftp client will connect to FTP server to get the files. During this process, the printer does not take any print jobs from Ethernet until these files loaded and processed.
6) The printer is ready to print.

Format of Printer.Info file

type: <filename>, reboot

type - is the type of the file.

Partnumber – is the filename of the type of the file

Reboot – means reboot the printer before loading the file

is comment. Skip to next line. Make sure no comment after the actual filename.

Example of the Printer.Info file:

Info: 123456.txt, v1.01a

NIC: 382937.ncg

Program: 234567.prg , reboot # reboot tells the printer to reboot after loaded this file.

Config: 371612.ptx

Logo: 361717.logo

The following Network commands can be used to do preliminary ftp client configuration:

'store ftpc addr <IPADDRESS>'
'store ftpc user <USER-NAME>'

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'store ftpc passwd <PASSWORD>'
'store ftpc file <FTP SERVER SUBPATH><FILENAME>'

'enable ftpc'
'disable ftpc'

'load ptrfw all' - to clear the stored file values and reboot the system.

Setup SNMP

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

To add a SNMP community name, telnet to the printer. Once it is set to a specific name, all the public names are disabled.

       set snmp community public <name>

To clear SNMP setting
       set user from default
       save

To set SNMP email, make sure SNMP is enabled.
       set snmp emailaddr 1 youremail@abc.com
       set snmp email 1 active
       set sysinfo smtpserver 192.168.1.5 port 25   (port number is optional)
       save

If you use DHCP to get IP address, DNS server information is provided through DHCP. If you are using static IP address, you will need to manually enter the DNS information. The information can be entered using printer's webpage or telnet command. DNS information is in the Configuration and Network page. To change the DNS setting using telnet, follow the steps below:

       store net dns 192.168.1.6
       store net domain abc.com

B   *Customer Support*

Printronix Auto ID 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: Refer to the *Administrator's Manual.*

- Is the problem with a new install or an existing printer?

- Description of the problem (be specific)

- Good and bad pictures that clearly show the problem (faxing or emailing of these pictures may be required)

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Visit the Printronix web site at www.PrintronixAutoID.com

MPI

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C *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 PrintNet 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 PrintNet 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 PrintNet.
Factory Settings	S2 jumper position stating all factory default settings are to be used while the PrintNet is up and running.
Firmware Panic	Unrecoverable errors detected by the PrintNet firmware force the Print Server into Firmware Panic mode. Manually reset the PrintNet to resume operation.
Flash	Stores firmware code and configurable settings. Allows for upgrades without replacing hardware inside the PrintNet.
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 PrintNet into this PrintNet non-operational mode.

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HTML	HyperText Markup Language. Format used for documents viewable on the World Wide Web.
ifnum	Interface Number. Represents the network interface. With a PrintNet, this will always be "1" for Ethernet and "2" for Wireless.
interface script	Unix host filter file that processes the print job before it is sent over the network to the PrintNet.
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 PrintNet. 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 PrintNet with no configuration or IP address loaded.
npsh	Extensive built-in command shell within the PrintNet.
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 PrintNet.
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

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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 PrintNet continuously polls the Novell file server print queue looking for print jobs.

RAM Random Access Memory. Volatile memory within the PrintNet 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 PrintNet 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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