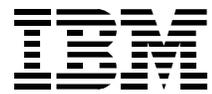


6400 Line Matrix Printers

*Ethernet Interface  
User's Manual*





6400 Line Matrix Printers

*Ethernet Interface*  
*User's Manual*

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**Second Edition (February 2002)**

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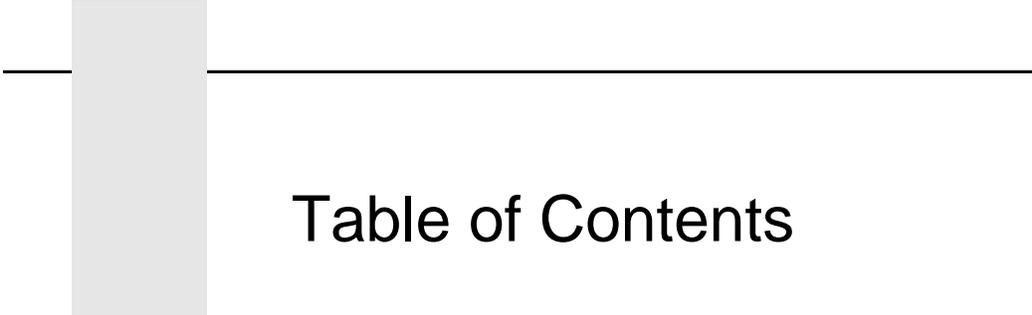
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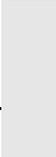
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# 1

## *Introduction*

### Overview

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

#### **What Is The Ethernet Interface?**

---

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

The Ethernet Interface package contains a Ethernet Interface to attach itself and the printer to the network.

#### **What Special Features Are Available?**

---

The Ethernet Interface offers an extensive list of features including:

- built-in HTML forms for easy cross-platform configuration
- availability of remote management software
- 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

## Chapter 1 Overview

---

- numerous printer logging methods (e.g., automatic email) to record printer errors and usage
- remote management through HTML forms, Telnet sessions, `rsh/rcmd/remsh` commands, SNMP, and pre-defined log methods
- extensive built-in troubleshooting tools
- built-in `telnet` and `ping` clients
- configurable memory usage by disabling protocols and destination services
- multiple destinations/queues for versatile printer manipulation and distinct print setups
- header and trailer strings to instruct printers on font, pitch, printing, etc.
- flexible naming conventions
- automatic network connection and frame type sensing
- simultaneous printing across all I/O ports and all supported protocols
- multiple network protocol support

## Logical Printer Architecture

---

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

**NOTE:** If the printer is configured for IPDS, any reference to “d4prn” should be understood to mean “dipdsprn.” This queue should only be used to print IPDS.

The logical print path for a print job going through the Ethernet Interface consists of three different phases:

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

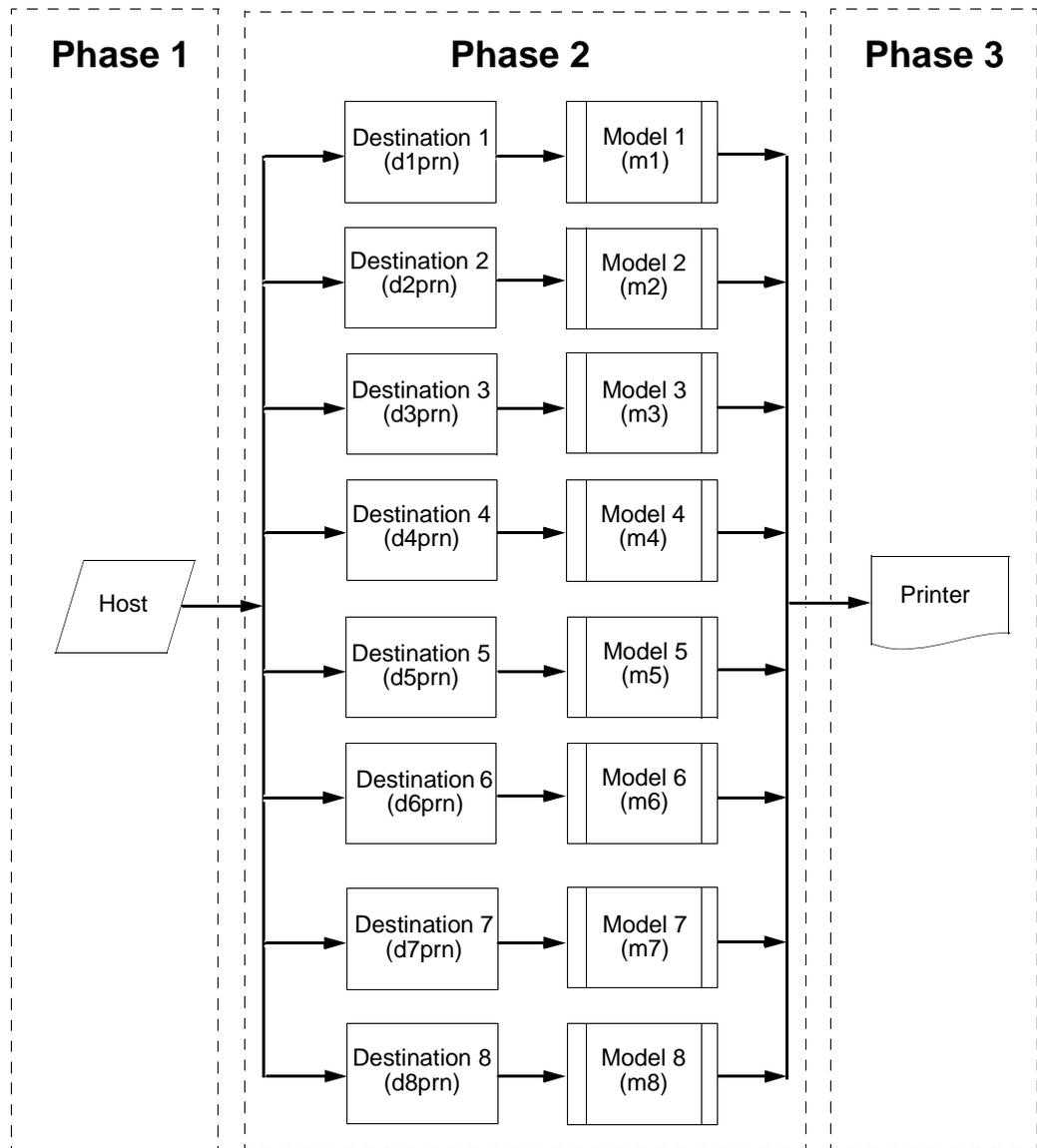


Figure 1. Print Path

## Destinations/Queues

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

## Models

---

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

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

## Chapter 1 Logical Printer Architecture

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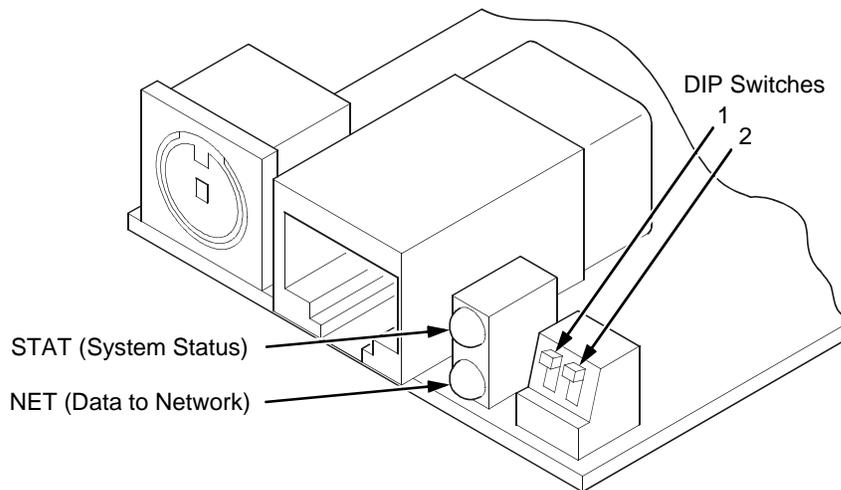
5. Log one or all of the following information as each print job passes through the model
  - Job ID and username
  - User ID and three messages per job about the start and finish
  - Checksum value of the data transferred
  - Miscellaneous messages from the printer
  - Status of the printer based on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

## Interfaces

The Ethernet interfaces with your printer through an Ethernet™ 10/100Base-T interface connector.

### 10/100Base-T

The Ethernet Interface at the rear of the printer for the 10/100Base-T interface has two indicator lights and two DIP switches, as shown in Figure 2.



**Figure 2. Status Indicator Lights and DIP Switches**

### Run and Auto Reset Modes

Run mode is the normal operating state of the Ethernet Interface. Auto Reset mode is entered when the watchdog timer is triggered and the Print Server resets itself. In either mode, the STAT LED flashes at a varying rate, depending on whether the unit IP address is configured. The Run Mode and Auto Reset Mode indicator descriptions are given in Table 1.

**Table 1. Run Mode and Auto Reset Mode Indicator Descriptions**

<b>STAT</b>	<b>Indication</b>	<b>Description</b>
OFF	flashes on once per second	Normal Mode, IP address configured
OFF	flashes on two times per second	IP address not configured
ON	flashes off once per second	Download (MOS)
ON	flashes off twice per second	Error

### **Network Indicator**

The NET LED displays the status of the network link. When the NET LED is on, link integrity is confirmed. The NET LED flashes off for 1/3 second when a data packet is being transferred. When the NET LED is off, the network connection has been severed.

**Table 2. NET LED Indicator**

<b>NET</b>	<b>Indication</b>	<b>Description</b>
ON	constantly	Indicates link integrity
ON	flashes off 1/3 second	Flashes off 1/3 second each time a packet is transmitted

**DIP Switches**

On the back of the printer, you will find a small window where you can access two DIP switches labeled 1 and 2 (see Figure 2 on page 29.). The functions of the DIP switches are explained in Table 3.

**NOTE:** The DIP switches are not marked with “on” or “off” labels. Instead, the status of the switch is indicated by its position, up or down. If the interface card has been installed upside down (i.e., the DIP switches are to the left of the cable connector), your DIP switch positions will be reversed and the settings inverted.

**Table 3. 10/100Base-T DIP Switch Settings**

DIP Switch		Comments
1	2	
up	up	<b>Normal operation.</b> With both DIP switches in the “off” position, the Ethernet Interface boots up using the settings in flash memory rather than the default settings.
down	up	<b>Factory default.</b> With the DIP switches in this configuration, the Ethernet Interface boots up and all settings stored in flash memory are erased except the Ethernet address and key value.
up	down	<b>Default IP.</b> With the DIP switches in this configuration, the Ethernet Interface boots up with factory default settings. However, the stored settings in flash memory are intact. Setting DIP switch 2 to “on” does not clear any settings stored in flash memory; it boots the unit in a different state with the settings in flash memory temporarily ignored.
down	down	<b>Reserved.</b> This DIP switch configuration is not for customer use.

## Speed Setting for 10/100Base-T

---

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

1. **10mbps Half Duplex**

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

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

2. **10mbps Full Duplex**

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

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

3. **100mbps Half Duplex**

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

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

4. **100mbps Full Duplex**

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

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

5. **Ethernet in Auto mode in 100mbps FD environment**

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

PORs to 100/FD. Resets to 100/FD. Reconnection at switch remains 100/FD.

6. **Ethernet in Auto mode in 10mbps HD environment**  
(determined using 10hd hub)

Use auto-negotiation to the highest common local and remote capability, i.e. 100FD in this case.

PORs to 10HD. Resets to 10HD. Reconnection at switch maintains 10HD.

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

## Conventions Used In This Manual

---

All uppercase print indicates control panel keys.

**Example:** Press the CLEAR key, then press the ONLINE key.

Quotation marks (“ ”) indicate messages on the Liquid Crystal Display (LCD).

**Example:** Press the ONLINE key. “OFFLINE” appears on the LCD.

Command syntax and examples are formatted as follows:

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

At the prompt, type:

```
ping ftp.CompanyWebsite.com
```

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

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

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

```
ping ipname
```

```
The ipname is working properly.
```

## Notes and Notices

---

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

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

---

# 2

## *Installation And Configuration*

### **Installation**

---

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

#### **Connecting To The Network**

---

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

Watch the LEDs in the rear of the printer as they cycle through the power-on self-test. When the test is complete, the STAT LED will begin to flash.

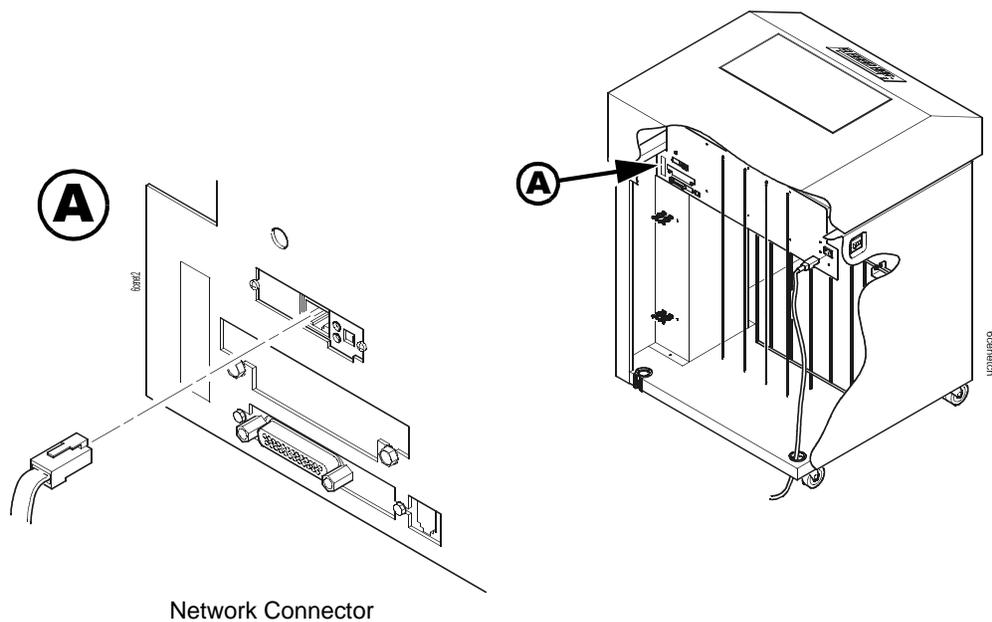


Figure 3. Physical Setup

## Configuration Tools

---

There are two parts to a Ethernet Interface setup:

- Configuring the Ethernet Interface so it can be seen on the network. This involves network-related settings (e.g., an IP address within TCP/IP environments) configured through the built-in command shell, npsh, or from the control panel.
- Configuring a host with a new printer so it knows how to send data to the Ethernet Interface. 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.

## Configuration Using The Control Panel

---

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

## Configuration Using The Control Panel

---

You can set Ethernet Interface settings from the printer control panel.

**CAUTION** When the printer is first powered on, the message “ETHERNET ADAPTER IS BEING INITIALIZED” displays on the control panel. This process takes about two minutes. To prevent a loss of Ethernet Interface configuration information, do not change the Ethernet Interface settings while this message is displayed. When the initialization is complete, the message “ETHERNET ADAPTER IS READY” displays, and you can safely change the Ethernet Interface settings from the control panel.

You can set any of three listed parameters from the printer control panel. These parameters are located in the Ethernet Parameters menu:

- IP Address
  - Gateway Address
  - Subnet Mask
1. Arrange to have an IBM service technician install the Ethernet Interface card if it is not already installed; this is not a customer installable feature.
  2. Power on the printer. The message “ETHERNET ADAPTER IS BEING INITIALIZED” appears when the printer is powered on. Configuration can be done after the “ETHERNET ADAPTER IS READY” message appears (about 1 to 2 minutes after the “ETHERNET ADAPTER IS BEING INITIALIZED” message displays).
  3. Disable the Power Saver mode before starting this procedure, see the *6400 Setup Guide* for instructions.

## Chapter 2 Configuration Tools

---

4. Always print an Ethernet Adapter test page before performing any updates or network configuration using the following steps:

For 6400 *printers*:

- a. Press **STOP** to take the printer offline. The printer is in the NOT READY state.
  - b. Press **Scroll**↑ + **Scroll**↓ simultaneously to unlock the printer menu.
  - c. Press **Menu** to display the “Operator Menu.”
  - d. Press **Scroll** until “Operator Print Test” displays, then press **Enter**.
  - e. Press the left arrow until “E-Net Test Page” appears.
  - f. Press **Enter**.
5. Verify the current Ethernet Interface firmware version number.

**NOTE:** Firmware exists within the Ethernet Interface and the printer itself. Each firmware is a separate entity with its own version number. Please pay close attention to the type of firmware referenced in the remaining sections of this document.

The Ethernet Interface version should be 1.1.3 or higher for 10/100Base-T Ethernet adapters. If the Ethernet Interface version is current, skip to step 6 below. If the Ethernet Interface version is not current, you need to update both the Ethernet Interface and printer firmware.

If you need to update the printer firmware, you must do so now. After the update is complete, you must restart this instruction from the beginning. To upgrade the printer firmware, contact your IBM service representative.

**CAUTION** Turning off the printer before the firmware update is complete may permanently damage the Ethernet Interface adapter.

Updating the printer firmware takes time. Please be patient and wait for the “ETHERNET ADAPTER IS READY” message to display on the LCD. Do not turn off the printer before it has completed the firmware download procedure. The LCD will display “ONLINE / ETHERNET ADAPTER IS READY” when the download is complete. Wait for this message before turning off the printer.

6. To enter IP Address parameters, do the following:
  - a. Press **STOP** to get to the NOT READY state.
  - b. Press **Scroll**↑ + **Scroll**↓ to unlock the printer menu.
  - c. Press **Menu** to display OPERATOR MENU.
  - d. Press **Scroll** until ETHERNET PARAMETERS displays, then press **Enter**.
  - e. Press **Scroll** until IP ADDRESS displays, then press **Enter**.
  - f. Press **Enter** again, then **Scroll** to choose an IP address octet to change. Press **Enter**.
  - g. Press **Scroll** to choose the desired value for the octet, then press **Enter**. The new value is shown with an asterisk. Press **Return**.
  - h. Repeat steps d and e until you have set all IP address octets to the desired value.
  - i. Press **Return** until ETHERNET PARAMETERS is on the first display line.
  - j. Press **Scroll** to choose other IP parameters to change, then follow the above steps for each of these.
  - k. When finished, press **Return** multiple times until NOT READY displays.
  - l. Press **Start**.
  - m. Wait for “ETHERNET ADAPTER IS READY” to display.
  - n. Press **Scroll**↑ + **Scroll**↓ to lock the printer menu.

7. Put the printer online and wait for the “ETHERNET ADAPTER IS READY” message to display on the front panel. Placing the printer online starts the Ethernet Interface IP Address and Netmask update process. This process will take several minutes.

**NOTE: If you do not put the printer online, the setting you just entered will not take effect.** Do not turn the printer off until you see the “ETHERNET ADAPTER IS READY” message. If you turn the printer off before the new values are written to memory in the Ethernet Interface adapter, you will need to repower the printer and repeat steps 6 and 7 above immediately.

8. Once the “ETHERNET ADAPTER IS READY” message displays, you may enter the Gateway Address by repeating front panel steps 6 and 7 above. This will ensure the correct Netmask becomes associated with the Gateway value you enter. From the front panel navigate to the Gateway Address and enter the appropriate value. You must press ENTER after inputting each segment of the Gateway Address.
9. Put the printer online and wait for the “ETHERNET ADAPTER IS READY” message to display on the front panel.
10. Enable the Power Saver mode if desired.

### Ethernet Interface Verification

---

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

1. Print an E-NET test page (following the steps on page 37) to verify the settings you made.
2. Verify the Netmask is correct in two locations on the E-NET test page:
  - NETWORK INTERFACES
  - TCP/IP ROUTING TABLE

The Netmask must be the same in both locations. For example, if the Netmask is listed as 255.255.255.0 in NETWORK INTERFACES and is listed as 255.255.255.255 in the TCP/IP ROUTING TABLE, they do not match and you must correct it for the Gateway. Also, if a Gateway Address was entered, verify that “xxx.xxx.xxx.xxx is alive” is printed under the Default Gateway Ping Test, where xxx.xxx.xxx.xxx is the Gateway Address. If a Gateway Address was not entered, the Default Gateway Ping test is not required and will not display on the page.

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

- a. Place the printer offline.
- b. Using the front panel, modify the Gateway value to 0.0.0.0. (non-configured).
- c. Place the printer online and wait for the “ETHERNET ADAPTER IS READY” message to display.
- d. Place the printer offline and enter the Gateway Address you desire.
- e. Place the printer online and wait for the “ETHERNET ADAPTER IS READY” message. This saves the new Gateway Address.

Your Ethernet Interface is now configured and connected to your network.

## HTML Forms

---

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

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

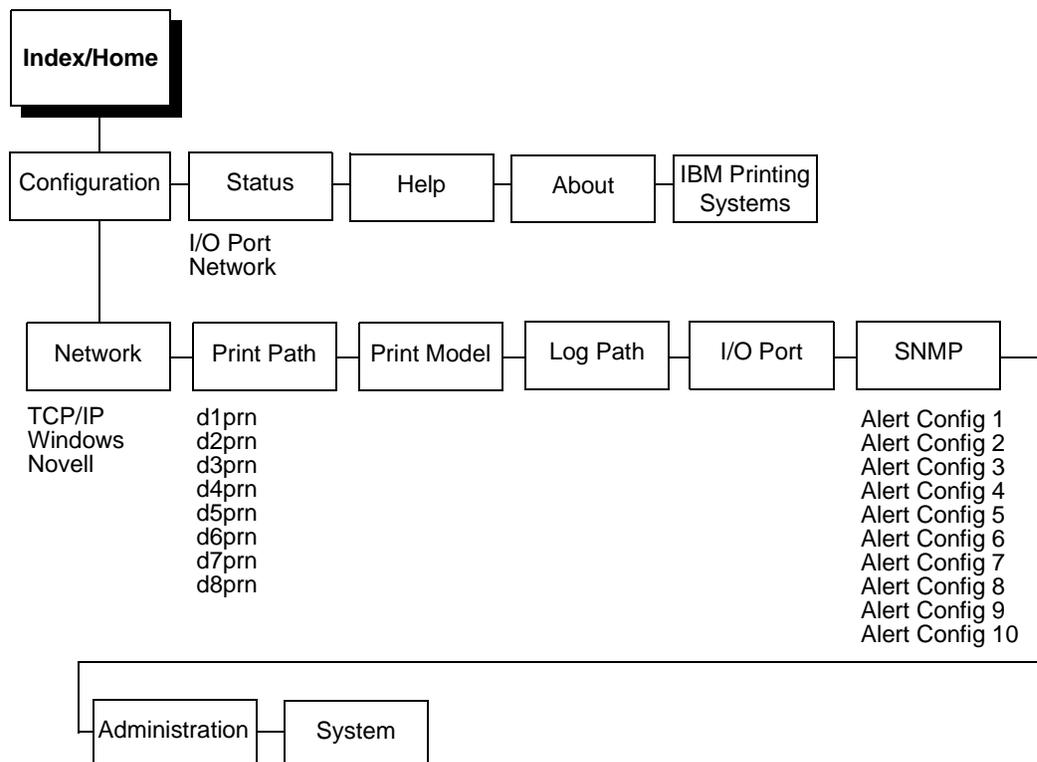
To access the Ethernet Interface home page:

1. Make sure the print server has an IP address and Subnet Mask so it is recognizable on your TCP/IP network.

## Chapter 2 Configuration Tools

2. Make sure your network station can successfully ping the Ethernet Interface 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 Ethernet Interface.

The Ethernet Interface HTML structure is divided into several menus as shown in Figure 4.



**Figure 4. Ethernet Interface HTML Structure**

**NOTE:** Online help is available for all HTML pages.

## Printer Status Screen

Using the printer IP Address and any standard Web browser, you can check the status of the printer. Figure 5 shows the exact state of the printer by showing the printer LCD message. (This screen automatically refreshes every minute.)

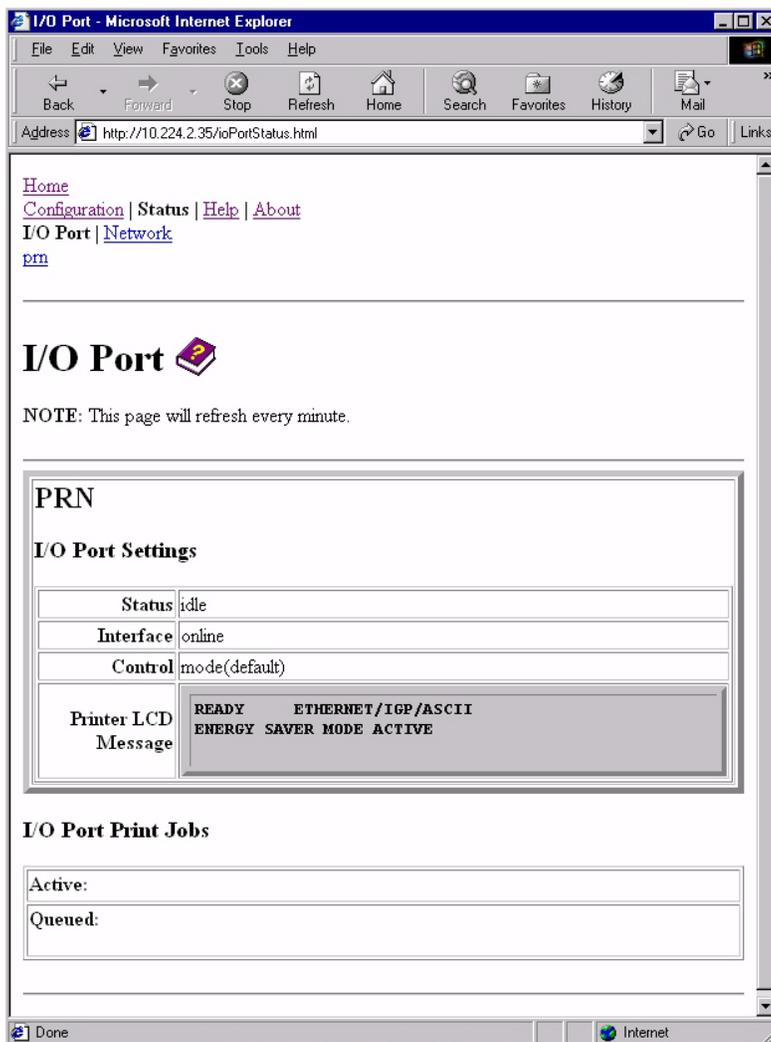


Figure 5. Printer Status Screen

## Configuration Alternatives

---

Besides the HTML forms and software provided, the Ethernet Interface internal command shell, `npsh`, can also be reached using Telnet and Remote Shell.

### Telnet

A TCP/IP command that helps configure Ethernet Interface 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
```

### Remote Shell

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

Example:

```
rsh spike list prn
```

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

---

# 3

## *Embedded Ethernet Interface Web Page*

### Overview

---

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

The Ethernet Interface 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 will display its home page, with links to the printer's status and configuration settings.

All of the Ethernet Interface's configuration settings are protected by a password so unauthorized users cannot make changes. When you try to open any of the Ethernet Interface'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 "Ethernet Interface Security" on page 263.

## Chapter 3 Configuration

---

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

The embedded Ethernet Interface Web server gives you the ability to configure the network adapter, monitor printer status, and to manage print jobs. The Ethernet Interface Web page structure is divided into several menus, as shown in Figure 4.

## Configuration

---

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

- Network - this menu item allows you to change the network setting for each protocol: TCP/IP, NetBIOS over TCP/IP, and Netware.
- Print Path - this menu item allows you to change the name of the destination queues, and define how the print job will be preprocessed before printing. It allows you to select what information to log, and to specify the SMTP server's IP address.
- Print Model - this menu item displays model settings one at a time.
- Log Path - this menu item displays log path settings one at a time.
- I/O Port - this menu item is typically not used. It allows you to configure the operation of the parallel port interface.
- SNMP - this menu item allows you to configure the SNMP trap manager settings. It also allows you to define the printer event types to monitor, and the e-mail address that should receive alert notifications.

- Administration - this menu item allows you to define or change the printer name, location, description, etc. It also allows you to change the root and guest user passwords.
- System - this menu item allows you to reboot the Ethernet Interface, or restore its settings to the factory default.

## Configuration - Network

---

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

---

#### Interface

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

#### Routing

The routing table tells the Ethernet Interface 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.

### Windows Network (NetBIOS TCP/IP)

---

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

### Workgroup Name

This name specifies which Windows workgroup the Ethernet Interface will reside in.

### Novell Network

---

#### File Server

Define a Novell file server for the Ethernet Interface to service as either a PSERVER or an RPRINTER.

#### FrameType

This option determines which framing scheme will be used in processing Novell signals. The different types of Ethernet packet formats include:

- Auto Sensing (the default)
- Ethernet II
- Ethernet 802.3
- Ethernet 802.2
- 802.2 Snap

### **Service Type**

Allows you to change the Nest Server. The options are:

- Bindery
- NDS
- Auto

### **File Server**

Use this option at the server to set the server's name.

### **NDS**

NDS (Novell Directory Services) is a distributed database of network information. An NDS contains information that defines every object on the network. For more information please see your Novell administrator.

### **Pserver**

Define a password for the Ethernet Interface to use when logging in to the file server as a PSERVER. This is an optional file server security feature.

### **Rprinter**

Define an RPRINTER setup so the Ethernet Interface knows to service a PSERVER.NLM on a Novell file server. Define the PSERVER.NLM name, the number of the printer serviced by the Ethernet Interface within this PSERVER.NLM, and the destination on the Ethernet Interface you want the print jobs to pass through.

## Configuration - Print Path

---

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

### Destination Settings

---

#### Name

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

#### Back Channel

I/O port to receive printer feedback when a print job passes through this destination. By default all print queues have no backchannel.

#### Services

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

- socket - printing to a TCP port number (e.g. 4000) on the Ethernet Interface
- lpd - remote printing using the Line Printer Daemon
- lpsched - System V printing using the "lp" command
- rprinter - Novell's remote printer setup
- pserver - Novell's PSERVER setup

## Current Model Settings

---

- netbios - printing from Windows stations relying on NetBIOS over TCP/IP
- 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.

## Current Model Settings

---

### **Model Type**

The option is available on the Print Model web page. For a description, see page 52.

### **Banner Page**

The option is available on the Print Model web page. For a description, see page page 53.

### **Filter**

The option is available on the Print Model web page. For a description, see page 53.

### **Header String**

The option is available on the Print Model web page. For a description, see page 53.

### **Trailer String**

The option is available on the on the Print Model web page. For a description, see page 53.

### **Printer Configuration**

The option is available on the Print Model web page. For a description, see page 54.

### **Selected Log Path**

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

### **Current Log Path Settings**

---

#### **Log Path Type**

The option is available on the Log Path web page. For a description, see page 55.

#### **Log Path Port**

The option is available on the Log Path web page. For a description, see page 55.

## **Configuration - Print Model**

---

### **Name**

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

### **Model Type**

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

### **Banner Page**

Tell 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 or to a certain tray on the printer. You can specify up to four separate sequences per header string. The Ethernet Interface will execute them in order from top to bottom. If specifying fewer than four sequences, be sure to start at the top leaving undefined fields at the bottom.

The most common sequences are listed on the form:

- Print landscape - tells the printer to print in landscape mode.
- Print portrait - tells the printer to print in portrait mode.

### **Trailer String**

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

## Chapter 3 Configuration - Print Model

---

The most common sequences are listed on the form:

- PCL Reset - tells the printer to reset itself once the data completes
- End of Transmission (EOT) - tells the printer to force the end of the job
- Formfeed - tells the printer to do a formfeed at the end of the data.

### Printer Configuration

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

## Configuration - Log Path

---

### Name

Name of the log path. The default names are I1, I2, I3, I4, I5, I6, I7, and I8.

### Logpath Type

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

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

### Logpath Port

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

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

## Chapter 3 Configuration - I/O Port

---

**NOTE:** The values defined in Logpath Type and Logpath Port are common among all destination queue.

*Default:* no logging turned on.

### Configuration - I/O Port

---

I/O port configuration can be reached through a Print Path destination form (by clicking on a port) or through the I/O Port option under the Configuration Menu.

#### Parallel Port (PRN)

---

The parallel port on the Ethernet Interface can have its throughput altered by selecting a particular "Mode". The choices are:

- default - normal throughput rate which will work with most printers
- fast - increase data transfer rate
- test, non-printing - emulate an attached printer though no printer is actually attached

## Configuration – SNMP

---

The SNMP Configuration form allows you to configure SNMP trap managers and the e-mail alert features of the Ethernet Interface. It allows you to configure how SNMP alerts are processed by a SNMP trap manager, an 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 12 alert group categories, providing the ability to filter alert notices as desired.

### SNMP Manager Alert Posting Settings

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

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

### Syslog Alert Posting Settings

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 Logpath Port section under the PrintPath menu item.

### Email Alert Posting Settings

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:

- Email 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, 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 name and location, alert description, alert group, and 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 Email 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, and device name (unless the length of the message exceeds the Short Email Message Length, in which case the message will be truncated).

---

## Parallel Port (PRN)

If the Short Email 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 email address when the submit button is pressed.

### Alert Groups

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.

**Table 4. Alert Groups and Printer Events**

Alert Group	Printer Events
Offline	Printer is Offline Hold Print Time Out
Warning	COMM Check Invalid Address CU Time Out CU Not Enabled File System Full File Exist Hex Dump Mode Half Speed Mode Printer Warm Print Head Warm 2B-Toner Density Too High 2C-Toner Density Too Low

**Table 4. Alert Groups and Printer Events**

Alert Group	Printer Events
Media Input	Load Paper Paper Out Time Out Fanfold Paper Empty No Fanfold Paper 63-CutSheet Feeder Fail Cutsheet Pick Miss No Paper Tray Paper Jam at Entrance Cutsheet Cover Open Cutsheet Paper Empty Tray Mismatch
Media Output	Stacker Full Stacker Jam Time Out Stacker Full Time Out Stacker Fault Time Out Stacker Jam Stacker Fault Stack Over Flow Stack Under Flow Stacker Fail Stacker Interlock Fail Stacker Not Ready

**Table 4. Alert Groups and Printer Events**

Alert Group	Printer Events
Media Path	Clear Paper Jam Paper Jam Time Out Paper Jam Fuser Paper Jam Exit Cutsheet Path Open Paper Jam at Drum Paper Jam at Fuser Paper Jam at Exit Tractor MTR FWD Speed Error Tracker MTR BKWD Speed Error Paper Jam at Entrance Cutsheet Motor Fail Cutsheet Feeder Fail Clear Jam at Fuser Input Clear Jam at Fuser Exit Clear Jam Near TOF Lever
Marker	Ribbon Stall Time Out Ribbon Ink Out Ribbon Stall Ribbon Drive Shuttle Over Speed Ribbon Fault Ribbon Detected Print Head Up Ribbon Broken Ribbon Load Bad Ribbon Take-up Full 2A-Toner Empty Add Toner Install Toner Cup
Cutter	Cutter Fault Cutter Fail
Bar Code	Barcode Fail Specification Barcode Quiet Zone Too Small Barcode Improper Data Format

**Table 4. Alert Groups and Printer Events**

<b>Alert Group</b>	<b>Printer Events</b>
Scanner	Unscannable Check Media Poor Scanning Check Head and Heat Poor Scanning Inspect Head Poor Scanning Check Media Contrast Too Low Check Media
Intervention	These are error messages that need some kind of user intervention to solve them.
Consumable	Ribbon Low Toner Low
Label	Label Present Gap Not Detected

**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.

## **Configuration - Administration**

---

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

### **System Information**

---

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

#### **Name**

Name given to the print server in Novell and Windows environments. The default name is "M\_XXXXXX" where "XXXXXX" equals the last six digits of the network adapter's Ethernet address (e.g. M\_031C1A).

### **Description**

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

### **Location**

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

### **Contact**

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

### **Printer Serial Number**

A serial number that the user can enter through the PrintNet Webpage to keep track of the PrintNet/printer.

### **Syslog**

Specifies the IP address of a host running the SYSLOG daemon. IBM 6400 debugging or printer logging information can be sent to the IP address.

*Default:* Unconfigured (empty).

### **Email**

Defines the user email address to receive printer and job logging information from log paths on the IBM 6400.

*Default:* Unconfigured (empty).

### **SMTP Server**

Specifies the IP address of the SMTP server to be used for processing email messages generated by the IBM 6400.

*Default:* Unconfigured (empty).

### **DNS Server**

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

Default: Unconfigured (empty).

### **Passwords**

---

Only a user with root privileges can alter the Ethernet Interface'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.

## **Configuration - System**

---

The System Configuration form allows you to change the Ethernet Interface'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.

## **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 Ethernet Interface 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 to) by clicking on the Cancel icon beside the desired job. If you see "waiting" in the "Status" line, this indicates the network adapter is either waiting for data from the host or for feedback from the printer. If you see "blocked" in this line, this indicates the printer is not allowing the Ethernet Interface to send anymore 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.

## 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.

## IBM Printing Systems

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The IBM Printing Systems web site which contains product information, technical support, and more.

**Chapter 3 IBM Printing Systems**

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# 4

## *Windows Configuration*

### **Overview**

---

This chapter details a complete Windows configuration setup including:

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

### **Windows Environment Description**

---

The Ethernet Interface supports network printing under Windows environments by using TCP/IP. In a Windows NT<sup>®</sup> setup, pure TCP/IP is used as the network protocol whereas with Windows 95/98<sup>®</sup> or Windows Millennium<sup>®</sup>, NetBIOS is used over TCP/IP.

The ideal configuration is a network printer defined on the NT/2000 server to be shared by Windows 95/98/Millennium clients. However, any Windows station can also go directly to the Ethernet Interface.

## **Windows Ethernet Interface 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 Ethernet Interface in a Windows environment and describes some of the more common optional settings available.

### **Mandatory**

---

Since TCP/IP is used for Windows printing, the Ethernet Interface 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 Ethernet Interface done from the printer control panel, Web browser, host commands, or other Printronix utility software. To configure these options, see “Configuration Tools” on page 36.

### **Configuration Using ARP**

---

To configure the Ethernet Interface 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 Ethernet Interface.
2. Find the Ethernet address for the Ethernet Interface on the configuration printout. It must be entered as part of this procedure.

## Configuration Using ARP

---

3. Use the `arp` command to add an entry into the Windows station ARP table for the Ethernet Interface. 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 00-80-72-07-00-60
```

This example specifies a Ethernet Interface using IP address 192.75.11.9 and Ethernet address 00-80-72-07-00-60.

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 Ethernet Interface can be seen on your network.

At this point, you should be able to communicate with the Ethernet Interface 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 Ethernet Interface 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://EthernetInterfaceIPaddress/  
networkConf.html
```

(e.g., `http://192.75.11.9/networkConf.html`).

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

- b. At the “Network Configuration” HTML form that displays, click in the field below the “IP Address” heading and type in the IP address for the Ethernet Interface.

## Chapter 4 Windows Ethernet Interface Configuration

---

- c. Under the “Subnet Mask” heading, enter the Ethernet Interface subnet mask.

**NOTE:** If you would like to communicate with the Ethernet Interface from across routers, you will need to fill in an entry within the “Routing” section. Please see “Communicating Across Routers” on page 70 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 Ethernet Interface, crossing routers becomes an issue.

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

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

```
http://EthernetInterfaceIPAddress/  
networkConf.html
```

(e.g., `http://192.75.11.9/networkConf.html`).

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

## Changing Workgroup Names

---

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

## Changing Workgroup Names

---

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

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

```
http://EthernetInterfaceIPAddress/  
networkConf.html
```

(e.g., `http://192.75.11.9/networkConf.html`).

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

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

### Changing Destination Names

When defining some printers within Windows environments, the Ethernet Interface 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 6 displays.

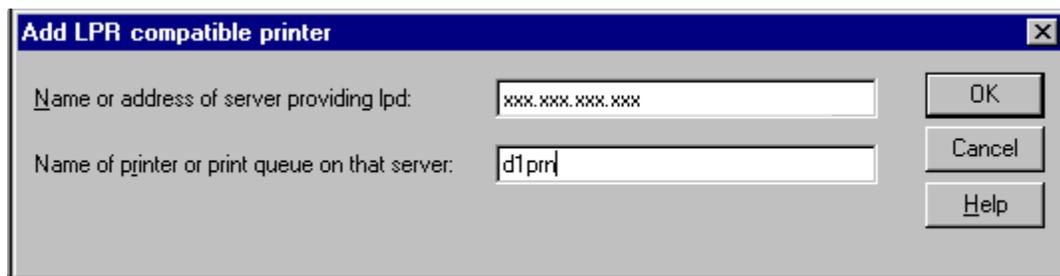


Figure 6. Windows NT Print Setup Dialogue Box

The first field requires the IP address for the Ethernet Interface, and the second field must be filled in with a valid destination from the print server (e.g., d1prn). Otherwise, LPR will not be able to access the printer. Table 5 outlines the default destinations to choose from.

Table 5. Ethernet Interface Default Destinations

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

## Changing Destination Names

---

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://EthernetInterfaceIPAddress/  
networkConf.html
```

(e.g., `http://192.75.11.9/networkConf.html`).

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

2. At the “Print Path Configuration” HTML form that displays, select a destination link from the top of the page to bring up the appropriate destination form. By default, you should see a line near the top of the form showing the destinations listed in Table 5.
3. Once the desired destination HTML form displays, highlight the “Name” field and type in the new name for this destination.
4. Click on the SUBMIT button when done and physically repower the print server to make the new setting take effect.

## Windows Host Configuration

---

This section covers Windows 2000, Windows NT, Windows Millennium, Windows 95/98, and Windows 3.1.

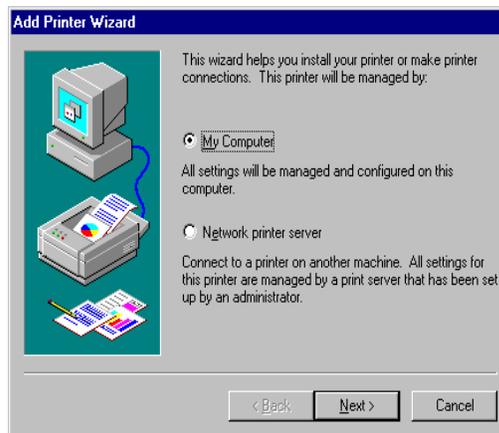
## Windows NT 4.0 Or 2000 Host Setup

---

This installation procedure assumes that the Ethernet Interface adapter is configured with the correct IP address, subnet mask and gateway (if required). In addition, the administrator can “ping” and Telnet to the Ethernet Interface adapter from the server console.

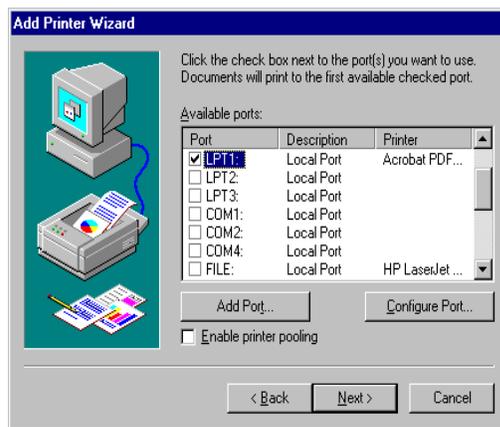
If this is not the case, use the printer front panel to configure the Ethernet Interface adapter before proceeding.

1. Select “Settings:Printers” from the “Start” menu.
2. Double click the “Add Printer” icon. The “Add Printer Wizard” window displays.
3. For Windows NT, skip to the next step.  
For Windows 2000, click “Next.”

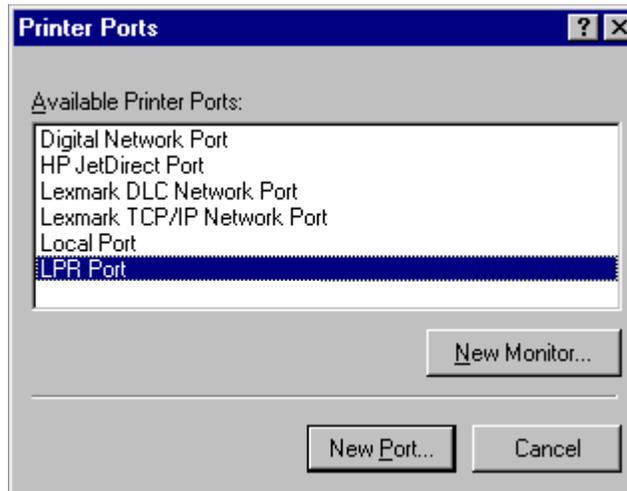


4. For Windows NT, select “My Computer” and click “Next.”  
For Windows 2000, select “Local Printer” and deselect “Automatically detect and install Plug and Play printers.” Then click “Next.”

## Windows NT 4.0 Or 2000 Host Setup



5. For Windows NT, click "Add Port ..."  
For Windows 2000, click "Create a New Port...."



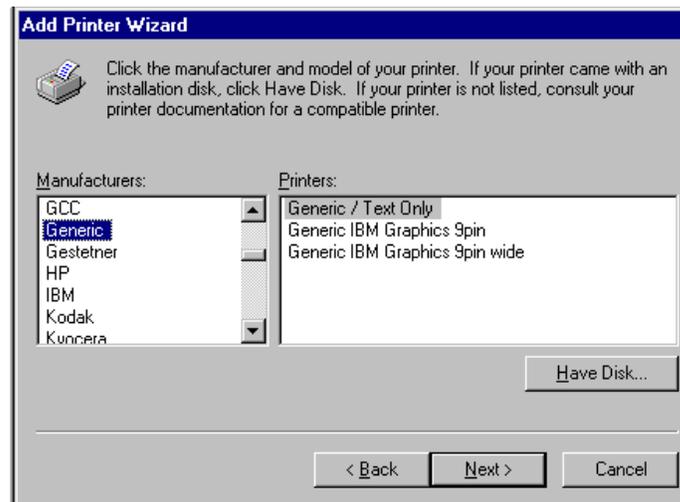
6. For Windows NT double click "LPR Port." If LPR Port is not listed, the Microsoft TCP/IP Printing service is not installed. For Windows 2000, select "LPR Port" from the pull down menu and then click "Next." If LPR Port is not listed, it means that the Microsoft TCP/IP Printing service is not installed. To install the Microsoft TCP/IP Printing service, refer to "Installing Microsoft TCP/IP Printing" on page 89.

## Chapter 4 Windows Host Configuration



7. In the "Name or address of server providing lpd:" field, enter the IP address of the Ethernet Interface. In the "Name of printer or print queue on that server:" field, enter the name of the print queue.

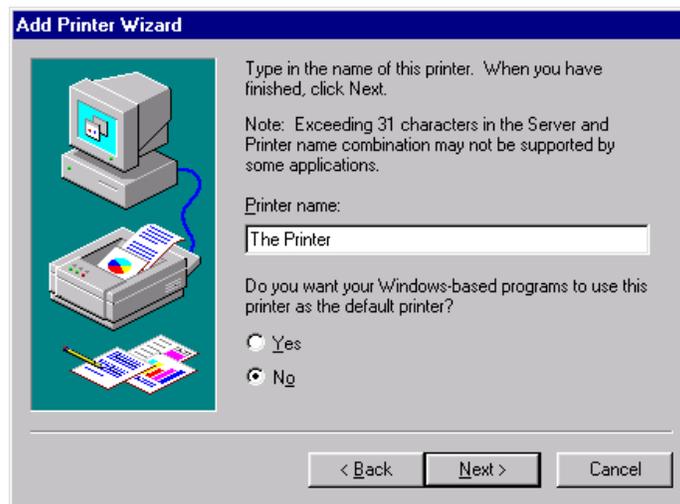
**NOTE:** This name must be a name of an existing destination/queue on the Ethernet Interface, and it must be lowercase by default. You will probably use d1prn.



## Windows NT 4.0 Or 2000 Host Setup

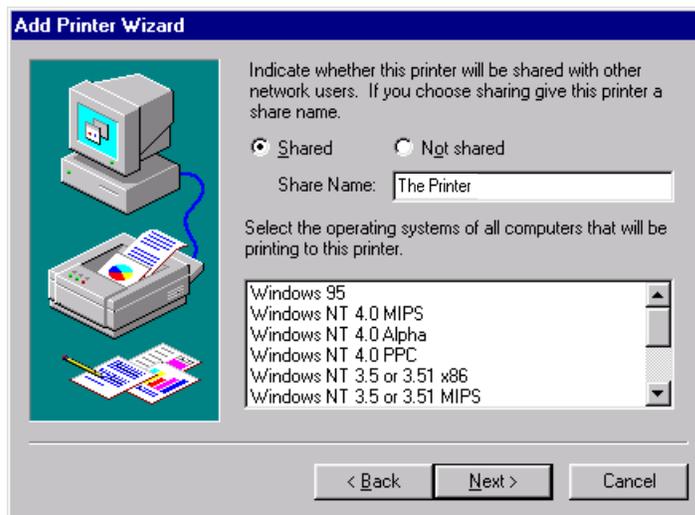
---

8. Select the “Generic/Text only” printer driver or install the IBM 6400 driver from the IBM Printer’s Web page at [www.printers.ibm.com](http://www.printers.ibm.com). The generic driver is good for troubleshooting installation problems. The network administrator can always go back and install the printer driver at a later time.



9. In the “Printer Name” field, enter a name for this printer.

## Chapter 4 Windows Host Configuration



- Determine if the printer is shared with other network users. If it is shared, the share name and operating system(s) of the other workstations that may use this printer must be selected.



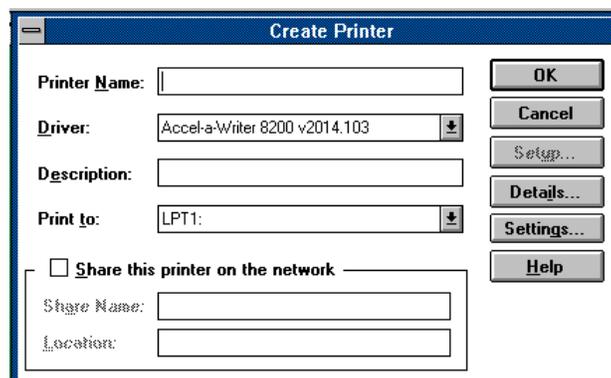
11. Print a Windows test page.
12. If there are any problems during or after installation, see “Windows NT 4.0 Or 2000 Host Setup Problems” on page 88.

## Windows NT 3.51 Host Setup

---

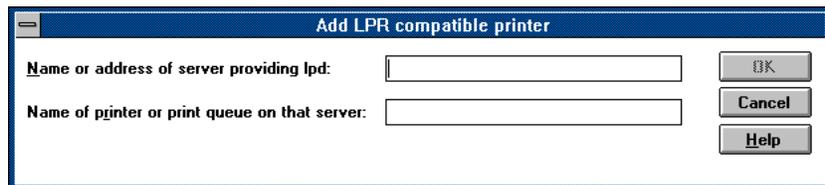
To configure a new printer on a Windows NT 3.51 station:

1. Open the “Control Panel.”
2. Double click “Printers.”
3. Select “Create a Printer” from the “Printer” menu to display the dialog box in Figure 7.



**Figure 7. Create a Printer Dialog Box**

4. Define a name to represent this print setup and select the appropriate driver for the printer that will be used in this setup. For printer driver, choose “generic text,” Epson “FX1050,” or “Proprinter.”
5. Under the “Print To” field, select “Other...”
6. Select “LPR Port” from the list that displays, and click OK to bring up a dialog box similar to the one in Figure 8.



**Figure 8. Add LPR Compatible Printer Dialog Box**

7. Type in the IP address or host name of the Ethernet Interface in the first field.
8. Type in the name of a predefined destination/queue on the Ethernet Interface in the second field.

**NOTE:** This name must be a name of an existing destination/queue on the Ethernet Interface, and it must be lowercase by default. You will probably use `d1prn`.

9. Click OK when you have specified these two fields.

You now have a new network printer which relies on the standard TCP/IP print protocol, LPD, to print remotely to a printer with the Ethernet Interface.

## Windows 95/98 Or ME Host Setup

---

To configure a new printer on a Windows 95/98 station:

1. Select "Settings:Printers" from the "Start" menu.
2. Double click the "Add Printer" icon.
3. Select "Network Printer" from the second window of the "Add Printer" wizard that loaded.
4. At the next window, click BROWSE to help fill in the network path of this printer.

## Windows 95/98 Or ME Host Setup

---

5. At the "Browse for Printer" dialog box that displays, double click the appropriate workgroup containing the Ethernet Interface. By default, the print server falls under the workgroup, "WORKGROUP."
6. Continue searching the network until you see the Ethernet Interface name, "M\_XXXXXX", where "XXXXXX" equals the last six digits of the print server Ethernet address found when a configuration is printed.
7. Once you see the Ethernet Interface, double click it to display a list of predefined destinations/queues from which to choose.
8. Select a destination/queue that will use `d1prn`.
9. Click OK once you have selected a destination.
10. Back at the network path window, select NEXT since this path should now be filled in for you.
11. At the next window, select the appropriate print driver and click NEXT.
12. Fill in a name for this new network printer at the next window and decide if you want this to be the default printer. This printer name can be anything you would like as long as it is unique.
13. When prompted for a test page, select either "Yes" or "No" depending on the state of the attached printer, and click FINISH.

**NOTE:** Windows may ask for a disk or CD-ROM to load the appropriate printer driver to complete this new printer setup.

There should now be a new printer icon within the "Printers" folder. This new network printer relies on NetBIOS over TCP/IP as the underlying protocol to print to the Ethernet Interface.

## Windows 3.1 Host Setup

---

If you are running Windows 3.1 stations on your network, you will need to rely on either TCP/IP or IPX to print to the Ethernet Interface. If IPX is used, you will have a print queue defined on a Novell file server to which your Windows 3.1 stations will send their print jobs. The Ethernet Interface will then service this print queue as either a PSERVER or an RPRINTER. Please see Chapter 5, “Novell Configuration” for further details.

If you want to rely on TCP/IP, you will need a third party TCP stack loaded onto your Windows station since TCP/IP support did not automatically come with Windows until the introduction of Windows NT and Windows 95. You may also be running a third party stack if you decided not to use a Microsoft operating system.

Some common TCP stacks are FTP Software's<sup>®</sup> OnNet<sup>®</sup>, NetManager's<sup>®</sup> Chameleon<sup>®</sup>, and Frontier Technologies<sup>®</sup> SuperTCP<sup>®</sup>. In each case, they allow your Windows 3.1 station to communicate with other TCP/IP devices. This means you can send print jobs to the Ethernet Interface as well.

The most common print method offered with Windows TCP stacks is LPR/LPD, a multi-platform remote printing protocol used on everything from PCs to mainframes. The LPR print setup is very simplistic, involving only two parameters:

1. **Ethernet Interface IP address.** The IP address or host name of the print server to which you want to print.
2. **Ethernet Interface destination/queue.** A pre-defined name on the print server telling the device to which I/O port to send the jobs. The standard name for the PRN port is `dlprn`.

**NOTE:** This destination name is case sensitive and, by default, all names are lowercase.

## Windows Troubleshooting Tips

---

This section provides information on possible solutions to some standard Windows and Ethernet Interface configuration errors.

### Technical Support

---

If you require technical support, please have the following information available when you call:

1. Level of software are you running.
2. Type of attachment do you have.
3. Your host operating system.
4. A detailed description of the problem.
5. How often, and when the problem occurs
6. A detailed description of your network and the components attached.

### Ethernet Interface Cannot Be Found On The Network

---

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

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

### HTML Configuration Forms Will Not Display

---

- Can you ping the Ethernet Interface from the Windows station? If not, refer to “Ethernet Interface Cannot Be Found On The Network” on page 83.
- Have you used the correct URL for the Ethernet Interface home page? It should be  
`http://EthernetInterfaceIPAddress`  
(e.g., `http://192.75.11.9`).
- Is HTTP support enabled? If not, refer to “Web Browser/HTTP Problem” on page 88.

### Errors Occur When Defining An LPR Printer

---

- Can you ping the Ethernet Interface from your Windows NT station? If not, please refer to “Ethernet Interface Cannot Be Found On The Network” on page 83.
- Did you specify the correct IP address or host name for the Ethernet Interface in the first field of the “Add LPR Compatible Printer” box?
- Did you specify a valid destination/queue on the Ethernet Interface 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 Ethernet Interface On The Network

---

- Have you looked under the right Windows workgroup? By default, the Ethernet Interface 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 Ethernet Interface 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 Ethernet Interface, there may be an incorrect entry in the TCP access list. For this workstation to use the Ethernet Interface interface in this case, one of two things must happen.

- The TCP list must have an entry added to grant access to this workstation

— OR —

- All entries must be deleted from the TCP list to grant all workstations/hosts access to the above TCP services.

To view the current access list, use the printer control panel to access the configuration menu (see the *User's Manual* for configuration menu information). From the DIAGNOSTICS/Printer Tests menu choose the E-Net Test Page. When the page prints, look under the "TCP ACCESS TABLE" section for the TCP access list entries.

To add/delete a TCP access list entry, refer to "TCP Access Lists" on page 265.

**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 TCP/IP values to the factory defaults when access is impossible:

1. Obtain a printer configuration printout using the control panel. See the *User's Manual* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface Interface, place SWITCH 1 in the down position.
4. Power on the printer and wait for the ONLINE state.
5. On the Ethernet Interface Interface, place SWITCH 1 in the up position.

## TCP/IP Access Problem

---

6. From a workstation attached to this network segment, create an ARP entry. The Ethernet Interface IP address and hardware or MAC address are needed. At the workstation enter:

```
arp -s <ipaddress> <MACaddress>
ping <ipaddress>
```

7. Try to ping this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the Ethernet Interface using the same IP address as above. Log in as root. There is no password by default.
9. At the system prompt, enter:

```
store tcpip from default
config http on
save
reset
```

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

10. Power the printer off and then back on.
11. Set the IP address, subnet mask, and default gateway parameters to the desired values.

## Web Browser/HTTP Problem

---

In some cases, you may not be able to browse the printer Web page simply because the Ethernet Interface HTTP may be turned off.

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

1. **Telnet** into the Ethernet Interface 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 Ethernet Interface IP address. The printer Web pages should now be accessible.

## Windows NT 4.0 Or 2000 Host Setup Problems

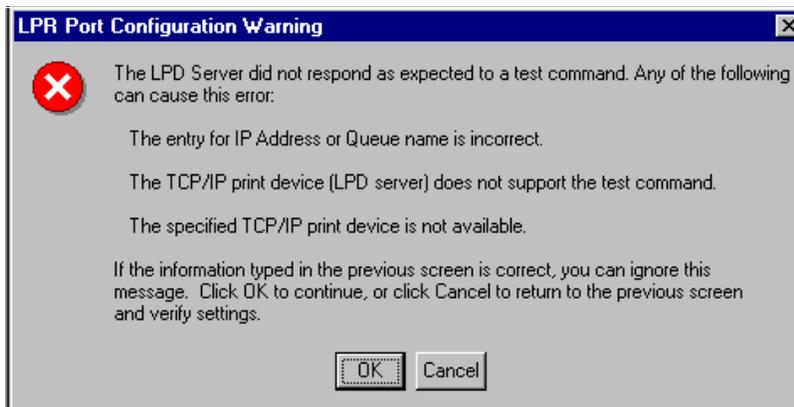
---

The installation procedure covered earlier in this chapter assumes that the Ethernet Interface adapter is configured with the correct IP address, subnet mask and gateway (if required), and that the administrator can ping and telnet to the Ethernet Interface adapter from the server console. If this is not the case, use the printer front panel or the Remote Management Software utility to configure the Ethernet Interface adapter before proceeding.

### Installing Microsoft TCP/IP Printing

The Ethernet Interface 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.” You may encounter the following:

- Do you have administrative privileges?  
This installation requires administrator privileges.
- “LPR port” is not listed in step 6 on page 75.  
Cancel the installation and install the Microsoft TCP/IP printing service on the server.
- LPR configuration warning during step 7 on page 76.



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 Ethernet Interface. Check cabling, IP address settings, gateway, etc.

## Chapter 4 Windows Troubleshooting Tips

---

- Test page does not print or prints incorrectly:
  1. Is the printer online? Re-send test page.
  2. The print queue name in step 6 on page 75 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 IBM 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 an IBM representative for further assistance.

---

# 5

## *Unix Configuration*

### **Overview**

---

This chapter details a complete Unix setup including:

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

### Mandatory

---

Since TCP/IP is used, the Ethernet Interface 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 36.

### Optional

---

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

Configuration of the Ethernet Interface can be done from the control panel or through host commands. To configure these options, see “Configuration Tools” on page 36.

### 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 Ethernet Interface since ARP is limited to subnets.

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

```
arp -s ipaddress ethernetaddress
```

Example for Microsoft TCP stacks:

```
arp -s 192.75.11.9 00:80:72:07:00:60
```

This example specifies an Ethernet Interface using IP address 192.75.11.9 and Ethernet address 00:80:72:07:00:60.

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 Ethernet Interface can be seen on your network.

At this point, you should be able to communicate with the Ethernet Interface 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 Ethernet Interface 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://EthernetInterfaceIPaddress/  
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 Ethernet Interface.

3. Under the “Subnet Mask” heading, enter the Ethernet Interface subnet mask.

**NOTE:** If you would like to communicate with the Ethernet Interface from across routers, you will need to fill in an entry within the “Routing” section. Please see “Communicating Across Routers” on page 96 for further details.

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

### Using RARP

---

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

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

Syntax:

```
ethernetaddress EthernetInterfaceIPaddress
```

Example:

```
00:80:72:07:00:60 192.75.11.9
```

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

Syntax:

```
kill -HUP pid
```

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

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

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

**NOTE:** You will only be able to communicate with the Ethernet Interface from a network station on the same subnet as the print server. The Ethernet Interface needs to be told about a default router/gateway so any packets that come in from a different subnet can be returned via this gateway. Please see “Communicating Across Routers” on page 96 to set this up.

## Using BOOTP

---

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

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

Syntax:

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

Example:

```
spike: \  
:sm=255.255.255.0: \  
:hd=/usr/null: \  
:bf=null: \  
:gw=192.75.11.1: \  
:ht=ethernet: \  
:ha=008072070060: \  
:ip=192.75.11.9: \  
:ts=192.75.11.7: \  
:to=25200:
```

## Chapter 5 Unix Ethernet Interface Configuration

---

2. Turn the Ethernet Interface on so that it immediately sends out a BOOTP request. Wait one minute to allow the IP address assignment process to complete. You should see the STAT LED (on the Ethernet Interface) slow down, indicating it knows about an IP address to use.
3. Try to `ping` the Ethernet Interface 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 Ethernet Interface 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 Ethernet Interface, crossing routers becomes an issue.

After you have followed one of the Ethernet Interface 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 Ethernet Interface. 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 Ethernet Interface:

1. Load a Web browser on your Windows station and direct it to the URL:  
`http://EthernetInterfaceIPAddress/  
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).

## Manual System V Host Setup

---

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 Ethernet Interface subnet.
3. Click the SUBMIT button 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<sup>®</sup>, HP-UX<sup>®</sup>, DG/UX<sup>®</sup>, etc.). This means an interface file is used for each defined printer and, in the case of any System V print setup involving an Ethernet Interface, 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/EthernetInterfacename.portname
```

where *EthernetInterfacename* 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
```

## Manual LPR/LPD Host Setup

The Ethernet Interface 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=EthernetInterfacename:\  
:rp=EthernetInterfacedestination:\  
: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, *EthernetInterfacename* is the host or IP name of the print server, and *NICdestination* is one of the pre-defined destinations/queues on the device.

Example:

```
6400:  
:sh:pw#80:mx#0:\  
:rm=spike:\  
:rp=dlprn:\  
:lp:\  
:sd=/usr/spool/lpd/ 6400:\  
:lf=/usr/spool/lpd/ 6400/log:\  
:af=/usr/spool/lpd/ 6400/acct:
```

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

Example:

```
touch /usr/spool/lpd/ 6400
```

## Printing From AIX

---

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/6400/log
touch /usr/spool/lpd/6400/acct
```

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

Example:

```
chmod -R g+rwX,o+rX /usr/spool/lpd/ 6400
chmod -R daemon.daemon /usr/spool/lpd/ 6400
```

5. Start the printer daemon for this new printer.

Example:

```
lpc start 6400
```

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

Syntax:

```
lpr -P printername filename
```

Example:

```
lpr -P 6400 /etc/hosts
```

## 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. **Ethernet Interface IP address.** The IP address or host name of the print server to which you want to print.
2. **Ethernet Interface 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 Ethernet Interface 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 Ethernet Interface.

Syntax:

```
ftp EthernetInterfaceIPAddress
```

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 `dlprn` for the PRN port.

7. Change to this destination directory.

Example:

```
cd dlprn
```

8. Change the mode to correspond with the type of file you are going to print. By default, ASCII is set for text-only files, but if you need to print both text and graphics, select binary using the `bin` command.

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

Syntax:

```
put filename
```

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

Syntax:

```
quit
```

## Setting Up AIX 4.x

---

1. Ensure the 6400 AIX driver/colon files are installed on the AIX machine. Syntax:

```
lsdev -P -c printer -F "type subclass description"  
| sort -u | grep 6400
```

If "ibm4400"/"ibm6400" does not appear on the list, the proper driver files are not installed. Obtain the driver files and follow the instructions included with them to install the files on your machine.

2. At the command prompt, enter **smitty mkvirprt**.
3. At the "Add a Printer Queue" screen, select "remote."
4. At "Type of Remote Printing," select "Local Filtering..."
5. At "Remote Printing Type," select "IBM."
6. At the next "Remote Printing Type," select "ibm6400."
7. At "Add a Remote Print Queue with Local Filtering," perform the following:
  - a. Type in any print queue names desired in the entry fields next to the desired emulation(s).  
**NOTE:** At least one print queue name field must be filled in.
  - b. In the "HOSTNAME" field, type in the hostname or IP address of the printer NIC.
  - c. In the "QUEUE" field, type in one of the four possible print queue names found on the printer NIC. d1prn, d2prn, d3prn, and d4prn are the four default LPD print queues on the NIC. If the defaults have not been changed, choose any one of these queues.  
**NOTE:** When the IPDS feature is installed, queue name d4prn is not available.

- d. In the "TYPE" field, leave the value as "AIX Version 3 or 4."
  - e. Leave "PASS-THROUGH FLAG" field as "yes."
  - f. Press ENTER to complete the setup.
  - g. After processing has finished, press F10 to exit SMIT.
8. At the command prompt, enter `eng -A` to view the print queues just entered.
  9. Enter `qprt -PqueueName filename` to send a job to the printer.

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

Though the host will be sending directly to a TCP port number on the Ethernet Interface, 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.

## **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. Level of software are you running.
2. Type of attachment do you have.
3. Your host operating system.
4. How often, and when the problem occurs.
5. A detailed description of the problem.
6. A detailed description of your network and the components attached.

### **Ethernet Interface Cannot Be Found On The Network**

---

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

## Nothing Prints

---

- Can you ping the Ethernet Interface from your Unix station? If not, please refer to “Ethernet Interface Cannot Be Found On The Network” shown above.
- Is the Ethernet Interface 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 Ethernet Interface 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 Ethernet Interface 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 Ethernet Interface, please see “Ethernet Interface Naming Schemes” on page 269.

## 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 Ethernet Interface, there may be an incorrect entry in the TCP access list. In order for this workstation to use the Ethernet Interface in this case, one of two things must happen:

- the TCP list must have an entry added to grant access to this workstation, or
- all entries must be deleted from the TCP list to grant all workstations/hosts access to the above TCP services.

To view the current access list, use the printer control panel to access the configuration menu (see the *User's Manual* for configuration menu information). From the DIAGNOSTICS/Printer Tests menu choose the E-NET Test Page. When the page prints, look under the “TCP ACCESS TABLE” section for the TCP access list entries.

## TCP/IP Access Problem

---

To add/delete a TCP access list entry, refer to “TCP Access Lists” on page 265.

**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 TCP/IP values to the factory defaults when access is impossible:

1. Obtain a configuration printout using the control panel. See the *User's Manual* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface, place SWITCH 1 in the down position.
4. Power on the printer and wait for the ONLINE state.
5. On the Ethernet Interface, place SWITCH 1 in the up position.
6. From a workstation attached to this network segment, create an ARP entry. The Ethernet Interface IP address and hardware or MAC address are needed. At the workstation enter:  

```
arp -s <ipaddress> <MACaddress>
ping <ipaddress>
```
7. Try to ping this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the Ethernet Interface using the same IP address as above. Log in as `root` with no password.
9. At the system prompt, enter:  

```
store tcpip from default
config http on
reset
```

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

## Chapter 5 Unix Troubleshooting Tips

---

10. Power the printer off and then back on.
11. Set the IP address, subnet mask, and default gateway parameters to the desired values.
12. If the Web browser access does not work, `telnet` into the Ethernet Interface as `root`. Enter the following command:  
`config http on`

---

# 6

## *Novell Configuration*

---

### Overview

This chapter details a complete Novell setup, including:

- Identifying the Ethernet Interface on the network.
- Configuring the Ethernet Interface with its mandatory print setup settings.
- Configuring a new print queue on the file server.

For information about additional options available with the 10/100 Base-T interface, see “Novell Configuration For 10/100Base-T Interfaces” on page 125.

**NOTE:** The NetWare 3.x PConsole procedures (page 112) use PConsole v3.75. The NetWare 4.x PConsole procedures (page 117) use PConsole v4.15.

---

### Novell Environment Description

The Ethernet Interface supports network printing under Novell environments by using IPX. It supports all 3.x versions of NetWare. Version 4.x and 5.x is supported under bindery emulation only.

## Novell Ethernet Interface Configuration

---

### Mandatory

Under all Novell environments, the Ethernet Interface does not require any network settings to make it visible on the network. Simply plug it in to your network and power it on. However, with a new print queue setup on a Novell file server, there can be mandatory settings needed on the Ethernet Interface.

### Optional

Additional settings are available to fine-tune the Ethernet Interface's Novell functionality. These options include:

- **NDS Context.** The NDS context in which the print server object was created. If you create the printer server object in a different file server object from the file server you logged into, then to ensure the absolute path, you must activate the NDS context.
- **NDS Tree.** The NDS tree the print server object was created in. This is only needed if your environment uses more than one NDS tree.
- **Mode.** The mode the Ethernet Interface will run in. This can be auto, bindery, or NDS. The default is auto so that the Ethernet Interface can autosense which mode it should run in. See "NetWare Version 4.x and 5.x RPRINTER Setup" on page 120 for information on what to do when using both bindery and NDS file servers at the same time.

- **Preferred File Server.** In a bindery setup, this specifies the file server that the print server object was created on. In an NDS setup, this specifies a file server(s) that the print server object resides on. Since NDS is distributed, most administrators will not know which file server(s) the print server object is actually stored on, so in most NDS environments this option is not used.

For additional information about these options, see “Novell Configuration For 10/100Base-T Interfaces” on page 125.

## Using HTML Forms

---

When defining a new print queue on a Novell file server, a new print server must be defined to represent the Ethernet Interface. This name must match the predefined name given to the print server. By default, this name is in the format “M\_XXXXXX” where “XXXXXX” equals the last six digits of the Ethernet Interface address found on a configuration printout or control panel settings under Ethernet parameters, MAC Address (e.g., M\_071C1A).

To use the HTML forms to define a print queue, do the following:

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP. The command to change the print server name is:

Syntax:

```
store pserver name newname
```

Example to change the name to `micro1`:

```
store pserver name micro1
```

2. Direct your Web browser to URL:

```
http://EthernetInterfaceIPAddress/  
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 ID and press ENTER at the password prompt (since there is no password by default).

3. At the “Administration Configuration” HTML form that displays, highlight the field beside the “Name” heading and type in the new name of the print server.
4. Click on the SUBMIT button when done and physically repower the printer to make the new setting take effect.

### Novell Host Configuration

---

Under all versions of NetWare, both PSERVER and RPRINTER setups are supported by the Ethernet Interface. Since a PSERVER setup is the most common, you will find the necessary steps to configure the Ethernet Interface as a PSERVER shown first. Configuration for RPRINTER and NPRINTER setup follow the PSERVER information.

**NOTE:** In a NetWare environment the Ethernet Interface will service only one of the four available printer objects (such as d1prn); do not configure more than one printer object from the printer. The Ethernet Interface cannot service multiple file servers at one time; do not configure multiple file servers to access the printer.

#### NetWare Version 3.x PSERVER Setup

---

To configure a print queue on a NetWare 3.x network:

1. Log on to the Novell file server as **supervisor**.
2. Enter PCONSOLE.
3. Select “Print Queue Information” from the PCONSOLE Main Menu.
4. Press INSERT to add a new queue to the list of currently defined queues showing.
5. Type in the name of this new queue when prompted and press ENTER. This can be any name you would like.
6. Press ESCAPE to return to the Main Menu.
7. Select “Print Server Information” and press ENTER.

## NetWare Version 3.x PSERVER Setup

---

8. Press INSERT when the list of existing print servers displays.
9. Type the name of the Ethernet Interface when prompted for a print server name, and press ENTER when done. By default, the Ethernet Interface is named "M\_XXXXXX" where "XXXXXX" equals the last six digits of the print server Ethernet address found on configuration printouts or by reading the MAC address on the control panel (e.g., M\_071C1A).
10. Back at the print server list, select this newly defined Ethernet Interface and press ENTER.
11. Select "Print Server Configuration" from the menu that displays.
12. Select "Printer Configuration" from the next menu to display a list of configured printers.
13. Select the first item listed as "NOT INSTALLED" and press ENTER.
14. At the printer configuration window, type in the name for this new printer. The name must be one of the predefined destinations/queues on the Ethernet Interface, normally d1prn.
15. Go to the "Type" field and press ENTER to see the possible choices.
16. Select "Defined Elsewhere" from this list.
17. When done, press ESCAPE and select "Yes" to save the changes to this new printer.
18. Press ESCAPE again to return to the "Print Server Configuration" menu.
19. Select "Queues Serviced by Printer."
20. Select this new printer from the printer list that displays and press ENTER.
21. At the empty queue list that displays, press INSERT.
22. Select the queue created in step 5 and press ENTER.
23. When prompted for the priority, press ENTER to select the default or select a priority.

24. Press ESCAPE until back at the PCONSOLE Main Menu.
25. Repower the printer.
26. Wait two minutes and then select "Print Queue Information" from the PCONSOLE Main Menu.
27. Select this new queue from the menu that displays.
28. Select "Currently Attached Servers" to see which print server is servicing this queue.

At this point, the Ethernet Interface name (e.g., M\_071C1A) should show within this window. This means the Ethernet Interface knows about this new Novell print queue it must service as a PSERVER. Therefore, it will poll this queue regularly looking for jobs to print.

**NOTE:** In a NetWare environment the Ethernet Interface will service only one of the four available printer objects (such as d1prn); do not configure more than one printer object from the printer. The Ethernet Interface cannot service multiple file servers at one time; do not configure multiple file servers to access the printer.

### NetWare Version 3.x RPRINTER Setup

---

These steps are for Novell environments with Netware 3.x (or earlier) file servers.

To configure a new RPRINTER on a NetWare 3.x network:

1. Log in to the Ethernet Interface command shell, npsh, as `root`.

If you have TCP/IP available and this print server already has an IP address stored within it, you can use the built-in HTML configuration forms or a Telnet session. Please see "Configuration Tools" on page 36 for further details. If you have only Novell available, you will need to use a PC, laptop, or terminal.

## NetWare Version 3.x RPRINTER Setup

---

**NOTE:** If you use HTML configuration, you will need to go to the “Network Configuration” HTML form (i.e., `http://IPaddress/networkConf.html`; e.g., `http://192.75.11.9/networkConf.html`) and look under the “Novell” section. The settings in the following step are found there. If using a Telnet session, you will need to manually execute the commands listed in the next step.

2. Store the RPRINTER settings on the Ethernet Interface. This will refer to an existing PSERVER.NLM on the file server or to one that you will create later in these steps.

Syntax:

```
store rprinter add PSERVERname printernumber  
EthernetInterfacedestination
```

An example for an RPRINTER servicing printer 0 of the PSERVER.NLM called `pserver1` and sending jobs to the Ethernet Interface destination `d1prn` is:

```
store rprinter add pserver1 0 d1prn
```

3. Leave this Ethernet Interface login session and log on to the NetWare 3.x file server as “Supervisor.”
4. Load a PSERVER.NLM if one is not already loaded. This will be the PSERVER that the Ethernet Interface services as an RPRINTER, so it must match the PSERVER name given in step 2.
5. Enter PCONSOLE.
6. Select “Print Queue Information” from the PCONSOLE Main Menu.
7. Press INSERT to add a new queue to the list of currently defined queues.
8. Type in the name of this new queue when prompted, and press ENTER. This can be any name you would like.
9. Click ESCAPE to return to the Main Menu.
10. Select “Print Server Information” and press ENTER.
11. Press INSERT when the list of existing print servers displays.

## Chapter 6 Novell Host Configuration

---

12. Select the print server that you want the Ethernet Interface to service as an RPRINTER. This is the PSERVER.NLM loaded in step 4.
13. Select "Print Server Configuration" from the menu that displays.
14. Select "Printer Configuration" from the next menu to display a list of configured printers.
15. Select an item from the list (e.g., an existing printer name or "Not Installed") to display the printer configuration window.
16. Assign a name (if not an existing printer) to this printer.
17. At the "Type" field, select "Remote Other/Unknown."
18. Click ESCAPE to save the changes.
19. Click ESCAPE until you are back at the "Print Server Configuration" menu.
20. Select "Queues Serviced by Printer" to display a list of defined printers.
21. Select the printer you just defined and press ENTER.
22. At the list of queues that displays, press INSERT to add a queue to the list.
23. Select the queue defined and press ENTER.
24. When prompted for a priority, press ENTER to select the default or select a priority.
25. Click ESCAPE until you have exited PCONSOLE.
26. Reload the PSERVER.NLM that the Ethernet Interface is to service as an RPRINTER.
27. Repower the Ethernet Interface by turning the printer off and then back on.
28. Wait two minutes and then check your PSERVER to see if the appropriate printer is being serviced. The PSERVER should indicate that the printer is "Waiting for job."

At this point, the Ethernet Interface knows to receive any jobs this PSERVER.NLM has to send to it through the defined printer.

## NetWare Version 4.x and 5.x PSERVER Setup

---

Ethernet Interface destinations are case sensitive and will not be recognized if they are typed incorrectly. By default, they are all lower case. If you are setting up a NetWare 4 environment, the destination must be renamed to uppercase to match the PCONSOLE entry.

The Ethernet Interface can be used in a NetWare 4 or 5 environment with either of the following options:

- Set the Ethernet Interface up as a PSERVER, replacing a dedicated printer.
- Set the Ethernet Interface up as an RPRINTER, interacting with an existing PSERVER (see page 120).

**NOTE:** Following a PSERVER setup, bindery emulation is required.

To configure the Ethernet Interface as a PSERVER in a NetWare 4 environment:

1. Log in to the Novell as **supervisor**.
2. Enter PCONSOLE.
3. Press F4.
4. Select PRINT QUEUES.
5. Press INSERT to add a queue.
6. Type in a new queue name and press ENTER.
7. Press ESCAPE.
8. Select PRINT SERVERS.
9. Press INSERT to add the new print server.
10. Type the name of the Ethernet Interface. By default, it is "M\_XXXXXX" where "XXXXXX" equals the last six digits of the Ethernet address (e.g., M\_000BF5).
11. Select this new print server and press ENTER.
12. Select PRINTERS.
13. Press INSERT to add a new printer (d1prn) to the list.

## Chapter 6 Novell Host Configuration

---

14. Select this new printer and press ENTER. Go to the Type field.
15. Press ENTER at this field and select DEFINED ELSEWHERE. If DEFINED ELSEWHERE is not available, choose PARALLEL.
16. Press ENTER on the Print Queues Assigned field.
17. Press INSERT to display all queues; select the one you defined in step 5 and press ENTER.
18. Select a priority and press ENTER. Priority 1 should be sufficient.
19. Press ESCAPE, saving your changes, until you are back to Main Menu.
20. Reboot the Print Server by repowering the printer.
21. Check the CURRENTLY ATTACHED SERVERS and verify the print server is active.
22. Press ESCAPE until you are out of the PCONSOLE.

Even though the entire print set up is done through PCONSOLE, you may want to communicate directly with the print server to modify settings, monitor the unit, etc. To communicate with the print server, the optional host software, `npsh.exe`, is included.

`npsh.exe` is a DOS executable program that can be run from a DOS prompt on a NetWare workstation.

`npsh.exe` performs the following:

`npsh nvplist`

Lists all of the Ethernet Interface devices on the network; each name is in the default format `M_xxxxxx` (where `xxxxxx` equals the last six digits of the unit Ethernet address). This is regardless of whether it is configured as a PSERVER or as an RPRINTER.

`npsh unitname`

Starts a Telnet-like session with the named print server, allowing you to configure, monitor, and troubleshoot the unit with the built-in command set.

`npsh unitname command`

Initiates a single command with guest access only to the unit instead of entering into a complete session.

## NetWare Version 4.x and 5.x PSERVER Setup

---

To communicate with the unit using `npsh.exe`:

1. From a DOS prompt on a Novell workstation, begin an `npsh` session with the unit:

`npsh unitname`

Starts a Telnet-like session with the named print server with guest access only.

2. To obtain root access to the unit, type:

`supervisor`

A standard login screen displays prompting you for the login name and password.

3. Log in to the unit as root user:

`root`

**NOTE:** Root users require the use of a password as configured in the unit user list.

4. Enter the password. If this password is not yet set, press ENTER at the password prompt. Otherwise, enter the password that is already stored in the unit:

`password`

You are now logged in to the unit as a root user and can access any `npsh` command on the unit.

**NOTE:** Because `npsh.exe` makes use of broadcasts, you may have problems communicating across a router.

## NetWare Version 4.x and 5.x RPRINTER Setup

---

The Ethernet Interface can be configured to service both RPRINTER, NDS mode, and PSERVER, bindery mode.

Use the following procedure to set up an RPRINTER form of attachment on a 4.x or 5.x server:

1. The Ethernet Interface requires a bindery server login on the 4.x or 5.x as the first step to servicing RPRINTER. This bindery login is necessary for registering the Ethernet Interface Pserver name; no bindery queues or printers are set up. Using PCONSOLE, bindery mode, create a bindery printer server object whose name matches that of the Ethernet Interface at the root context of the 4.x or 5.x box (e.g., M\_03092B). After creating the bindery PrintServer on the 4.x or 5.x server, reboot the Ethernet Interface and use the `debug Novell pserver` command via a Telnet or npsh session, or print out the E-NET Test Page to make sure there is a successful server login.
2. Using either PCONSOLE in NDS mode or NWADMIN:
  - a. Create an NDS queue (any name you want), or simply use an existing one
  - b. Create a print server to use (any valid name, or choose one already in existence)
  - c. Create a printer object to use with the print server object you chose or created, and attach it to the chosen queue

**NOTE:** The 4.x or 5.x queue name, print server name, and printer object do not have to match any Ethernet Interface name; multiple printers can be defined, but only one print server can be attached to.

Example:

NDS queue name:	Finance
NDS print server name:	Fin_Q
NDS printer name:	Fin_Prt_1
NDS printer name:	Accounting_Prt_1

## NetWare Version 4.x and 5.x RPRINTER Setup

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3. At a 4.x or 5.x console session, if a `pserver.nlm` session is already running for `Fin_Q`, first unload it, then reload it to find the new objects, or simply issue `load pserver Fin_Q`.

If you are successful, the print server console screen will show a "printer status" option. In the "printer status" window, note the numbers assigned to the printers you created. Assume for our example that one printer previously existed (number 0), and we are adding two more whose numbers became 1 and 2.

**NOTE:** On the load command, you must strictly follow the case of the name (this is not required on the Ethernet Interface).

4. Via a Telnet or npsh session, create RPRINTER attachments:

```
store rprinter add Fin_Q 1 d1prn
```

This command assigns destination `d1prn` as the RPRINTER 1 service path.

```
store rprinter add Fin_Q 2 d4prn
```

This command assigns destination `d4prn` as the RPRINTER 2 service path.

For Ethernet Interface entries, case does not have to be observed. Also, if you want to change the destination names from `dxprn`, do so first with the `set dest <dest> name <new name>` command, being sure to use the `save` command so these reappear after a reboot.

5. Reboot the Ethernet Interface adapter (power the printer off and on, or use the `reset` command) so the new RPRINTER service names are broadcast.
6. Open a Telnet or npsh session and log into the Ethernet Interface. Wait a minute or two, then use the `list rprinter` command, and you should see your entries. You could also do this by looking at the connection status on the 4.x or 5.x PSERVER printer status entries.

## Chapter 6 Novell Troubleshooting Tips

---

7. If you add, delete, or change RPRINTER entries on the Ethernet Interface or 4.x or 5.x console, you should always unload and reload the pserver.nlm module to register the changes. The Ethernet Interface can be configured and ready before the pserver.nlm is reloaded, or the Ethernet Interface can be reset after pserver.nlm is reloaded.
8. A Web browser can also be used to see the RPRINTER attachments and status.

### Novell 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. Level of software are you running.
2. Type of attachment do you have.
3. Your host operating system.
4. A detailed description of the problem.
5. When and how often the problem occurs.
6. A detailed description of your network and the components attached.

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

## NetWare 3.x - No PSERVER Connection

---

- Was the Ethernet Interface power cycled after the PCONSOLE steps were completed? This will make the print server boot up and realize which print queue and file server it needs to service.
- Is the Ethernet Interface already servicing a queue on another file server? If so, it cannot service another file server at the same time.
- When defining a new `print server` within PCONSOLE, did you use the correct name for the Ethernet Interface (e.g., M\_071C1A)? By default, it only recognizes itself as "M\_XXXXXX" where "XXXXXX" equals the last six digits of its Ethernet address found on the configuration printout.
- When defining a new `printer name` within PCONSOLE, did you use a predefined destination/queue rather than a name of your own? By default, the Ethernet Interface only recognizes names like `dlprn`. All other names will be ignored by the device.
- Is the Ethernet Interface in `Bindery` mode as seen under the `list pserver` output on the device? If servicing only a NetWare 3.x file server, it must be set to handle Bindery services. The default setting is Bindery.
- Is there an available NetWare user license for the Ethernet Interface to use while it acts as a PSERVER? Every PSERVER takes up one user license since it logs into the Novell file server.
- Have you given the connection process some time after repowering the Ethernet Interface? In larger Novell environments, the file server identification and connection process can take several minutes.

### NetWare 4.x and 5.x- No PSERVER Connection

- Was the Ethernet Interface power cycled after the PCONSOLE steps were completed? This will make the print server boot up and realize which print queue and file server it needs to service.
- Is the Ethernet Interface already servicing a queue on another file server? If so, it cannot service another file server at the same time.
- When defining a new `print server` within PCONSOLE, did you use the correct name for the Ethernet Interface (e.g., M\_071C1A)? By default, it only recognizes itself as "M\_XXXXXX" where "XXXXXX" equals the last six digits of its Ethernet address found on the configuration printout.
- When defining a new `printer name` within PCONSOLE, did you use a predefined destination/queue rather than a name of your own? By default, the Ethernet Interface only recognizes names like `d1prn`. All other names will be ignored by the device.
- Is the Ethernet Interface in `Bindery` mode as seen under the `list pserver` output on the device? If servicing only a NetWare 4.x or 5.x file server, it must be set to handle Bindery services. The default setting is Bindery.
- Is there an available NetWare user license for the Ethernet Interface to use while it acts as a PSERVER? Every PSERVER takes up one user license since it logs into the Novell file server.
- Have you given the connection process some time after repowering the Ethernet Interface? In larger Novell environments, the file server identification and connection process can take several minutes.

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# 7

## *Novell Configuration For 10/100Base-T Interfaces*

### Overview

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This chapter provides additional information for Novell environments using the 10/100Base-T interface, including:

- **Ethernet Interface Configuration.** This section includes setting the preferred file server, setting password security, adjusting polling time, changing the Ethernet Interface name, changing the Ethernet Interface frame type, changing the Ethernet Interface mode, setting the Ethernet Interface NDS context, and setting the Ethernet Interface preferred NDS tree.
- **Host Configuration.** This section includes NDS PSERVER setup, Bindery PSERVER setup, referencing a Bindery queue in NDS, and RPRINTER/NPRINTER setups.
- **Troubleshooting tips.** This section covers PSERVER setups, RPRINTER/NPRINTER setups, and printing related problems.

## **Novell Ethernet Interface Configuration (10/100Base-T)**

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There are no mandatory Novell settings needed before the print server can be detected on the network. However, there can be some mandatory settings needed before a Novell print queue can be serviced by the Ethernet Interface. These mandatory settings are covered separately for Netware 3.x, 4.x and 5.x under the Host Configuration heading.

The print server setup in a Novell environment is much simpler than that required in a TCP/IP one. No addresses, masks, or router entries are necessary and, in most cases, the Ethernet Interface can simply be connected to the network, turned on, and then configured for printing from a Novell station through PCONSOLE or Netware Administrator.

However, there are some optional parameters you may wish to change, such as the preferred file server(s), print server password, polling time, frame type, print server name, NDS context, and NDS preferred tree. The following sections describe these optional parameters.

### **Preferred File Server (NDS and Bindery Setups)**

---

In a bindery setup, the preferred file server specifies the file server on which the print server object was created. In an NDS setup, it specifies a file server on which the print server object resides. Since NDS is distributed, most administrators will not know which file server(s) the print server object is actually stored on, so in most NDS environments this option is not used. This feature is useful in a large Novell network, so that the Ethernet Interface does not ignore important file servers. If you are setting up the Ethernet Interface to work with a Bindery file server, it is a good idea to set a preferred server on the Ethernet Interface.

To view which file servers the Ethernet Interface does acknowledge at a given time, use the `debug nest fserver` command. For more information, see “Complete Command List” on page 240.

## Adding Preferred File Server

### HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.
2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
networkConf.html`  
(e.g., `http://192.75.11.9/networkConf.html`).

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

3. Look under the “Novell” section and add the name of the preferred file server in the “File Server” field.
4. Click on the SUBMIT button when done and physically repower the print server to make the new settings take effect.

### Manual (Telnet) Method

1. `Telnet` to the print server. This will bring up a login screen:  
`telnet ipaddress`

**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. You should see a prompt with the Ethernet Interface IP address:  
`ipaddress:root>`
3. At the prompt, enter:  
`store pserver novell fserver add fservername`  
where `fservername` is the name of the Novell file server you want to add as a preferred file server. This adds the specified file server as a preferred file server on the Ethernet Interface.
4. Reset the unit to ensure the changes take effect.  
`reset`

## Removing Preferred File Server

### HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.
2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
networkConf.html`  
(e.g., `http://192.75.11.9/networkConf.html`).

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

3. Look under the “Novell” section and remove the name of the preferred file server from the “File Server” field.
4. Click the SUBMIT button when done and physically repower the print server to make the new settings take effect.

### Manual (Telnet) Method

1. Telnet to the print server:  
`telnet ipaddress`

**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. You should see a prompt with the Ethernet Interface IP address:  
`ipaddress:root>`
3. At the prompt, enter:  
`store pserver novell fserver del fservername`  
where `fservername` is the name of the Novell file server you want to remove as a preferred file server.
4. Reset the unit to ensure the changes take effect.  
`reset`

### Setting Password Security (NDS and Bindery Setups)

---

Besides the general security measures, a Novell setup provides further password security. A password can be set on the Ethernet Interface and within your PCONSOLE or Netware Administrator setup so that when the Ethernet Interface tries to login to the file server, the passwords are compared.

To set the password on the Novell host for use in a PSERVER setup, you will need to:

#### Netware 4.x and 5.x

1. Log in to Netware Administrator on your Novell host as a user with security equal to "Admin."
2. Double click the print server object you are using for your setup. This will bring up the print server objects details page.
3. Select the "Change Password..." button on the "Identification" page.
4. At the prompts, type and retype the new password. Click OK when you are finished.
5. Proceed to the next section to store the password on the Ethernet Interface.

#### Netware 3.x

1. Log in to PCONSOLE on your Novell host as **supervisor**.
2. Select "Print Server Information" from the main menu.
3. Select the appropriate printer and press ENTER.
4. Select "Change Password."
5. At the prompts, type and retype the new password. Press ENTER when you are finished.
6. Proceed to the next section to store the password on the Ethernet Interface.

### Print Server Setup - HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.
2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
networkConf.html`  
(e.g., `http://192.75.11.9/networkConf.html`).

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

3. Look under the “Novell” section and add the new password to the “Pserver Password” field.

**NOTE:** The passwords entered in Netware Administrator or PCONSOLE must match the password set on the unit.

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

### Print Server Setup - Manual (Telnet) Method

1. `Telnet` to the print server:  
`telnet ipaddress`

**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.

2. You should see a prompt with the Ethernet Interface IP address:  
`ipaddress:root>`

3. At the prompt, enter:  
`store pserver novell passwd password`

**NOTE:** The passwords entered in Netware Administrator or PCONSOLE must match the password set on the unit.

4. Reset the unit to ensure the changes take effect:  
`reset`

### Adjusting Polling Time (NDS and Bindery Setups)

---

To set the poll time the Ethernet Interface will use when checking for new jobs under a PSERVER setup:

#### Netware 4.x and 5.x

1. Log in to Netware Administrator as a user with security equal to "Admin" on your Novell host.
2. Double click the printer object for which you wish to change the poll time. This will bring up the printer object detail pages.
3. Click "Configuration" to display the configuration page.
4. Change the "Service Interval" to the desired number (in seconds).

**NOTE:** You may also want to change the "Service mode for forms" to "Change forms as needed." If you do not do this, the Ethernet Interface will need to poll the file server twice as much to get all the information it needs.

5. Repower the Ethernet Interface by turning the printer off and on to make the changes take effect.

#### Netware 3.x

1. Log in to PCONSOLE on your Novell host as `supervisor`.
2. Select "Print Server Information" from the main menu and press ENTER.
3. Select the print server you have been using for your PSERVER setup and press ENTER. By default, this will be "M\_XXXXXX" where "XXXXXX" equals the last six digits of the print server's Ethernet address found on the bottom of the device (e.g., "M\_091C1A").
4. Select "Print Server Configuration" from the menu that displays.
5. Select "Printer Configuration" from the next menu to display a list of configured printers.

## Chapter 7 Novell Ethernet Interface Configuration (10/100Base-T)

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6. Select the printer for which you wish to alter the poll time, and press ENTER.
7. Change the "Sampling Interval" to the desired number (in seconds).

**NOTE:** You may also want to change the "Service mode for forms" to "Change forms as needed." If you do not do this, the Ethernet Interface will need to poll the file server twice as much to get all the information it needs.

8. Press ESCAPE and select "Yes" to save the changes to this new printer.
9. Repower the Ethernet Interface by turning the printer off and on to make the changes take effect.

### Changing The Ethernet Interface Name (NDS and Bindery Setups)

---

When defining a new print queue on a Novell file server, you must define a new print server to represent the Ethernet Interface. This name must match the predefined name given to the print server. By default, this name is in the format "M\_XXXXXX" where "XXXXXX" equals the last six digits of the Ethernet Interface's Ethernet address found on the bottom of the device (e.g., "M\_091C1A"). Make sure that the print server object you are using for your PSERVER setup has the same name as that stored on the Ethernet Interface. If you need to rename the print server object in Netware Administrator, delete the object and re-create it with the new name. Netware Administrator seems to have some problems with renaming objects.

**NOTE:** Changing the name will affect all of the protocols that are running on the Ethernet Interface.

## Changing The Ethernet Interface Name (NDS and Bindery Setups)

---

### HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.
2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/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 ID and press ENTER at the password prompt (since there is no password by default).

3. Look under the “System Information” section and enter the new name into the “Name” field.
4. Click the SUBMIT button when done and physically repower the printer to make the new settings take effect.

### Manual (Telnet) Method

1. **Telnet** to the print server:  
`telnet ipaddress`

**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).

2. You should see a prompt with the Ethernet Interface IP address:  
`ipaddress:root>`
3. At the prompt, enter:  
`store pserver name name`
4. Reset the unit to ensure the changes take effect.  
`reset`

## Changing The Ethernet Interface Frame Type (NDS and Bindery Setups)

---

The Ethernet Interface allows you to store a particular frame type for the unit to adhere to in a Novell environment.

### HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.
2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
networkConf.html`  
(e.g., `http://192.75.11.9/networkConf.html`).

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

3. Look under the “Novell” section and go to the “Frame Type” field to select the appropriate frametype.
4. Click the SUBMIT button when done and physically repower the printer to make the new settings take effect.

### Manual (Telnet) Method

1. Telnet to the print server. This will bring up a login screen:  
`telnet ipaddress`

**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).

2. You should see a prompt with the Ethernet Interface IP address:  
`ipaddress:root>`
3. At the prompt, enter:  
`store pserver novell frametype [ethernet2 | 802.3  
| 802.2 | 802.2snap | autosense]`

## Changing The Ethernet Interface Mode (NDS and Bindery Setups)

---

4. Reset the unit to make the changes take effect:

```
reset
```

## Changing The Ethernet Interface Mode (NDS and Bindery Setups)

---

The Ethernet Interface allows you to store a particular mode for the unit to operate in. This will be either NDS, Bindery, or autosense. If you use autosense, the Ethernet Interface will first attempt to log in to an NDS file server and, if it fails, will try to log in to a Bindery file server.

**NOTE:** If you are using both NDS and Bindery file servers in your setup, set the mode to auto.

### HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.
2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
networkConf.html`  
(e.g., `http://192.75.11.9/networkConf.html`).

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

3. Look under the “Novell” section and go to the “Service Type” field to select the appropriate mode.
4. Click the SUBMIT button when done and physically repower the printer to make the new settings take effect.

### Manual (Telnet) Method

1. Telnet to the print server:  
`telnet ipaddress`

**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).

2. You should see a prompt with the Ethernet Interface IP address:  
`ipaddress:root>`

3. At the prompt, enter:  
`store pserver novell mode [nds | bindery | auto]`

4. Reset the unit to make the changes take effect:  
`reset`

### Setting The Ethernet Interface NDS Context (NDS Setups)

---

The Ethernet Interface allows you to store the print server object in any context within the NDS tree you choose. By default the Ethernet Interface will look for the print server object in the same context as the file server object it connects to is stored in.

### HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.
2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
networkConf.html`  
(e.g., `http://192.75.11.9/networkConf.html`).

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

3. Look under the “Novell” section and enter the new context in the “NDS Context” field.

## Setting The Ethernet Interface Preferred NDS Tree (NDS Setups)

---

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

### Manual (Telnet) Method

1. **Telnet** to the print server:

```
telnet ipaddress
```

**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).

2. You should see a prompt with the Ethernet Interface IP address:

```
ipaddress:root>
```

3. At the prompt, enter:

```
store pserver novell context context
```

4. Reset the unit to make the changes take effect:

```
reset
```

## Setting The Ethernet Interface Preferred NDS Tree (NDS Setups)

---

The Ethernet Interface supports Novell environments that have multiple trees. If your environment has more than one tree you may want to set a preferred tree. By default, the Ethernet Interface will try to log in to each tree it finds until it is successful.

### HTML Method

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP.

2. Direct your Web browser to URL:

```
http://EthernetInterfaceIPAddress/  
networkConf.html
```

(e.g., `http://192.75.11.9/networkConf.html`).

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

## Chapter 7 Novell Host Configuration (10/100Base-T)

---

3. Look under the “Novell” section and enter the preferred tree in the “NDS Preferred Tree” field.
4. Click the SUBMIT button when done and physically repower the printer to make the new settings take effect.

### Manual (Telnet) Method

1. **Telnet** to the print server:  
`telnet ipaddress`

**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).

2. You should see a prompt with the Ethernet Interface IP address:  
`ipaddress:root>`
3. At the prompt, enter:  
`store pserver novell tree tree`
4. Reset the unit to make the changes take effect.  
`reset`

## Novell Host Configuration (10/100Base-T)

---

This section covers PSERVER and RPRINTER/NPRINTER setups on the Ethernet Interface. The Ethernet Interface can handle up to eight RPRINTER/NPPRINTER setups.

Although the entire print setup is done through Netware Administrator or PCONSOLE, you may need to communicate directly with the print server in order to modify settings, monitor the unit, etc.

For Netware 4.x and Netware 5.x environments, you can obtain a NWAdmn3x snap-in program called MPAdmin. This snap-in can be used to configure PSERVER setups as well as additional settings on the Ethernet Interface.

## NDS PSERVER Setup (Netware 4.x/5.x)

---

**NOTE:** NWAdmn3x is only included with Netware 4.11 and higher releases. If you are using Netware 4.10, you can either upgrade to Netware 4.11 or go to Novell's Web site and get the patches to upgrade the Nwadmin program for Netware 4.10 to Nwadm3x for Netware 4.11. Alternatively, you can perform the setup without using MPAdmin.

## NDS PSERVER Setup (Netware 4.x/5.x)

---

There are a number of ways to configure the Ethernet Interface for use in a Novell NDS PSERVER setup. These include using the MPAdmin snap-in for Netware Administrator, using generic print server objects in Netware Administrator, or by using PCONSOLE. The following steps describe a setup using a generic print server object in Netware Administrator. Setups using PCONSOLE are less common and will not be discussed.

To create a printer/print queue in an NDS environment using Netware Administrator print server objects:

1. Log in to Netware Administrator as a user with security equal to "Admin" on your Novell host.
2. Click the right mouse button on a branch in the tree in which you would like to create a print queue object.
3. Select "Create..." from the pop-up menu. The "New Object" dialog box displays.
4. Select "Print Queue" from the "Class of new object" list, and click "OK."
5. Select "Directory Service Queue" and type the name of the queue into the "Print Queue name" field.
6. Fill in the "Print Queue Volume" field by typing in a volume or browsing for one. Click "Create."
7. Click the right mouse button on a branch in the tree in which you would like to create a printer object.
8. Select "Create..." from the pop-up menu. The "New Object" dialog box displays.

## Chapter 7 Novell Host Configuration (10/100Base-T)

---

9. Select "Printer" from the "Class of new object" list and click "OK."

10. Type the name of the printer in the "Printer name" field.

**NOTE:** The Printer object name must match one of the destination names on the Ethernet Interface. Most likely, this will be `dlprn`.

In NDS, a printer object can only be attached to one print server object at a given time, because Novell uses the printer object to represent a physical printer. A physical printer can only be attached to one parallel or serial port at a time. Thus, if you assign a printer object to another print server object, the new print server object will "steal" it from the old one (this also happens with non-Ethernet Interface print server objects).

To properly process print jobs sent to the Ethernet Interface, the printer object created in Novell must refer to the destination on this server and not to the actual physical printer. On the Ethernet Interface, print jobs must pass through an extra layer (a "destination") before being sent on to the printer.

If you are using multiple print servers, you will have to either rename all your destinations to ensure that no printer object names conflict or keep all the printer objects for one print server in a different context than those for the other print server.

11. Select "Define additional properties" and click "Create."

12. Click "Assignments" in the dialog box and then click the "Add..." button.

13. Select the queue you defined earlier or browse for a different one.

14. Click "OK" to assign the queue to the printer.

15. Click "OK" to close the "Printers Details" dialog box and make the changes permanent.

## NDS PSERVER Setup (Netware 4.x/5.x)

---

16. Click on a branch in the tree (i.e., context) that you would like to create the Ethernet Interface print server object in.

**NOTE:** If the context you choose is different than the one the file server object for the file server you are using is in, you must set the context on the Ethernet Interface. See “Setting The Ethernet Interface NDS Context (NDS Setups)” on page 136.

17. Click the right mouse button to bring up a submenu and choose “Create...” from this menu.
18. A dialog box titled “New Object” displays. In the “Class of new object” list, select “Print Server” and click “OK.”
19. Type the name for the print server in the “Print Server name” field. By default, the name is “M\_XXXXXX” where “XXXXXX” equals the last six digits of the print server’s Ethernet address (found on the bottom of the device, e.g., “M\_091C1A”).

**NOTE:** The name you use here must match the name stored on the Ethernet Interface. This name can be found by using the `list pserver` command. See “List Commands” on page 258 for more information.

20. Select the “Define additional properties” and click the “Create” button.
21. Click “Assignments” in the dialog box and then the “Add...” button.
22. Select the printer you created earlier.
23. Click “OK” to assign this printer to this print server.
24. Click “OK” to close the “Printer Servers Details” dialog box and make the changes permanent.
25. Physically repower the printer to make the new settings take effect.

## **Bindery PSERVER Setup (Netware 3.x, Netware 4.x, and Netware 5.x)**

---

A Bindery PSERVER setup is possible under both Netware 3.x, Netware 4.x and Netware 5.x. If you are using Netware 4.x or Netware 5.x, Bindery emulation is required. Please consult your Novell manual on how to set up Bindery emulation. A Bindery set up using PCONSOLE in Netware 3.x is described in “NetWare Version 3.x RPRINTER Setup” on page 114. The setup using PCONSOLE in Netware 4.x or Netware 5.x is described in “NetWare Version 4.x and 5.x RPRINTER Setup” on page 120.

## **Referencing A Bindery Queue In NDS (Netware 3.x, Netware 4.x, and Netware 5.x)**

---

If you would like to reference a Bindery queue when you perform your PSERVER setup in NDS, you must create a PSERVER object for the Ethernet Interface on the file server where the Bindery queue resides. This is important because, in order to service the queue, the Ethernet Interface must log in to the queue’s file server. Since the queue is not an NDS queue, the Ethernet Interface cannot log in under NDS, so it must log in under Bindery.

This will only work if there is a valid PSERVER object on the file server. This PSERVER object must have the same name that was used for the NDS setup. By default this will be “M\_XXXXXX” where “XXXXXX” equals the last six digits of the print server’s Ethernet address (found on the bottom of the device, e.g., “M\_091C1A”). This PSERVER object does not need any printers or queues assigned to it. Also, when referencing a Bindery queue in NDS, set the Novell Mode on the Ethernet Interface to “auto” so that both NDS and Bindery logins are possible. See “Setting The Ethernet Interface NDS Context (NDS Setups)” on page 136.

### RPRINTER/NPRINTER Setup (Netware 3.x, Netware 4.x, and Netware 5.x)

---

This procedure associates an existing PSERVER with a remote Ethernet Interface acting as a RPRINTER/NPRINTER in a Netware 3.x, Netware 4.x, or Netware 5.x environment. It is the PSERVER's responsibility to get jobs from the queue and to pass them off to the Ethernet Interface acting as the remote printer. Unlike a PSERVER setup, the Ethernet Interface does not deal directly with the queues.

**NOTE:** As a RPRINTER/NPRINTER, the print server does not use a login ID. A non-Ethernet Interface print server such as PSERVER.NLM or PSERVER.EXE must be running for RPRINTER to operate. Also, if the Ethernet Interface loses a connection to a PSERVER, it will automatically reconnect when that server becomes available again.

The following steps assume that you have created a PSERVER object in Netware 3.x, Netware 4.x, or Netware 5.x and have assigned printers and queues to it. If you have not already done this, do it now. The setup is similar to creating a PSERVER setup for the Ethernet Interface, except that there are no restrictions about which names may be used for the print server and printer objects.

**NOTE:** Write down the printer number(s) assigned to the printer(s) you are going to be using for this setup. You will need them in a later step.

#### HTML Method

1. Load a PSERVER on your Netware 3.x, Netware 4.x, or Netware 5.x file server (i.e., issue a `load pserver pservername` command on the file server).

**NOTE:** If it is an NDS PSERVER on a Netware 4.x/5.x file server, you must specify the PSERVER name and context for `pservername`. For example:

```
load pserver .sales_ps.sales.microplex
```

2. Load a Web browser on a network station that can communicate with the print server over TCP/IP.

## Chapter 7 Novell Host Configuration (10/100Base-T)

---

3. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
networkConf.html`  
(e.g., `http://192.75.11.9/networkConf.html`).

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

4. Look under the “Novell” section and find a row in the RPRINTER category.
5. Click “Enabled” and enter the name used with the PSERVER.NLM into the “Print Server Name” field.

**NOTE:** If it is an NDS pserver, enter only the PSERVER name and not the context (e.g., `sales_ps`).

6. Enter the printer number of the printer you would like serviced into the “Printer Number” field, and then select the destination on the Ethernet Interface you would like to use for output.
7. Repeat steps 4 through 6 for each additional printer you would like to have serviced.
8. Click the SUBMIT button when done and physically repower the printer to make the new settings take effect.

### Manual (Telnet) Method

1. Load a PSERVER on your Netware 3.x, Netware 4.x, or Netware 5.x file server (i.e., issue a `load pserver pservername` command on the file server).

**NOTE:** If it is an NDS PSERVER on a Netware 4.x/5.x file server, you must specify the pserver name and context for `pservername`. For example:  
`load pserver .sales_ps.sales.printronix`

2. **Telnet** to the print server:  
`telnet ipaddress`

**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).

## RPRINTER/NPRINTER Setup (Netware 3.x, Netware 4.x, and Netware 5.x)

---

3. You should see a prompt with the Ethernet Interface's IP address:

```
ipaddress:root>
```

4. At the prompt, **store** the RPRINTER settings on the Ethernet Interface. The *pservername* refers to the existing PSERVER.NLM on the file server created in step 1.

Syntax:

```
store rprinter add pservername printernumber  
EthernetInterfacedestination
```

An example of an RPRINTER servicing printer 0 of the PSERVER.NLM called *pserver1* and sending jobs to the Ethernet Interface destination *d1prn* is:

```
store rprinter add pserver1 0 d1prn
```

**NOTE:** If it is an NDS pserver, enter only the PSERVER name and not the context (e.g., *sales\_ps*).

5. Physically repower the printer to make the new settings take effect.

Wait two minutes and then check your PSERVER to see if the appropriate printer is being serviced. The printer should display a message such as "Waiting for job." At this point, the Ethernet Interface knows to receive any jobs this PSERVER.NLM has to send to it through the defined printer.

## **NDPS Configuration (Netware 4.11 and Above)**

---

### **Overview**

In 1998, Novell released a new printing system designed to make network administration of printers easier and more fully functional. This system is called Novell Distributed Print Services (NDPS), and can be used with Novell Netware 4.11 and above along with the supporting software on clients. This section gives high-level instructions to install and use NDPS with the printer. These instructions assume that you understand NDPS architecture well enough to be able to use these instructions along with Novell's instructions to install the Ethernet Interface into NDPS. See Novell's documentation to understand terms not defined here.

The drivers used with the IBM printer, which can be from [www.printers.ibm.com](http://www.printers.ibm.com). In order for a driver to be automatically downloaded to a Windows machine when an NDPS printer is installed, the driver must be installed into the NDPS Broker Resource Management Service. See Novell's documentation for more information.

The Ethernet Interface can be installed into NDPS using the Novell Printer Gateway feature of NDPS. Within this Novell Printer Gateway, various printer connection modes can be used to install the printer into NDPS. The ones described here are:

- Setup using Forward Jobs to a Queue Mode
- Setup using LPR Mode
- Setup using RPRINTER Mode

### Setup using Forward Jobs to a Queue Mode

In this mode, an NDPS printer agent receives jobs from an NDPS client, then forwards these jobs to an existing Netware queue. The Netware queue would then be serviced by the printer in some manner.

1. The IBM printer must first be set up to service some Netware queue, either by doing a PSERVER or RPRINTER mode setup from previous chapters.
2. When setting up the NDPS printer agent, use the "Novell Printer Gateway".
3. For the "Novell PDS", choose "((NONE))".
4. For the "Port Handler", choose "Forward Jobs to a Queue", then choose the queue used in step 1 above, and note the Caution statement about the Queue User Name.
5. For the "Select Printer Drivers" dialog, choose no driver unless you have a driver installed into the Broker's RMS which is to be used with the printer.

Any jobs sent to this printer agent will then be forwarded to the specified queue.

### Setup using LPR Mode

In this mode, an NDPS printer agent receives jobs from an NDPS client, then forwards these jobs to a printer using the LPR protocol.

1. The printer must first be set up with IP connectivity and be able to receive jobs using the LPR protocol.
2. When setting up the NDPS printer agent, use the "Novell Printer Gateway".
3. For the "Novell PDS", choose "((NONE))".
4. For the "Port Handler", choose "Remote (LPR on IP)", then enter the hostname/ipaddress and printer name (d1prn - d8prn by default) in the next dialog.

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

5. For the “Select Printer Drivers” dialog, choose no driver unless you have a driver installed into the Broker’s RMS which is to be used with the printer.

### **Setup Using RPRINTER Mode**

In this mode, an NDPS printer agent receives jobs from an NDPS client, then forwards these jobs to a printer using the RPRINTER IPX protocol.

1. The printer must first be set up to function in RPRINTER mode, choosing any desired Print Server Name and Printer Number.
2. When setting up the NDPS printer agent, use the “Novell Printer Gateway”.
3. For the “Novell PDS”, choose “((NONE))”.
4. For the “Port Handler”, choose “Remote (rprinter on IPX)”.
5. In the next dialog, for the “SAP Name” enter the Print Server Name from step 1, and enter the Printer Number from step 1 above.
6. For the “Select Printer Drivers” dialog, choose no driver unless you have a driver installed into the Broker’s RMS which is to be used with the printer.

The printer will need to be rebooted to attach to the NDPS printer agent in this mode.

## Troubleshooting (10/100Base-T)

---

### PSERVER Setup

---

If you cannot get a connection with the Ethernet Interface after completing the print setup, confirm the following:

- Have you tried repowering the Ethernet Interface? Wait about a minute before checking if it has logged in and attached to a queue.
- Is the network connector fastened tightly to the unit?
- Is the Ethernet Interface already servicing a queue on another file server? If so, it cannot service another file server at the same time.
- Is there an available Netware user license for the Ethernet Interface to utilize while it acts as a PSERVER? Every PSERVER takes up one user license since it logs in to the Novell file server.
- When going through the PSERVER setup steps, did you name the Ethernet Interface “M\_XXXXXX” where “XXXXXX” equals the last six digits of the Ethernet address? This is the default format of the unit’s name when it is acting as a PSERVER.

**NOTE:** This “M\_XXXXXX” name must have six digits after the “\_” so, if necessary, pad out each byte with a zero (0).

- Has the Ethernet Interface’s name been changed from its default of “M\_XXXXXX” and, if so, have you incorporated this new name into your PSERVER setup?
- Is there a password set for the print server to utilize when it is logging in to the file server? Make sure the Ethernet Interface’s PSERVER password matches that of the PSERVER setup, or set both places to no password.

## Chapter 7 Troubleshooting (10/100Base-T)

---

- When setting the Ethernet Interface up as a PSERVER, did you specify a destination on the Ethernet Interface (e.g., `dlprn`) for the printer name, and did you remember this name is case sensitive?

**NOTE:** Ethernet Interface destinations are case sensitive, so they will not be recognized if they are typed incorrectly. By default, they are all in lowercase. If you are setting up in a Netware 4.x or Netware 5.x environment, the destination must be renamed to uppercase to match the PCONSOLE or Netware Administrator entry. Please see “`set dest destination name newname`” on page 247 for information on changing names.

- Does the destination you used in your PSERVER setup have the Novell service enabled? Please see “Commands” on page 239 for information on enabling/disabling services.

**NOTE:** The debug information that follows can be found by trying to `telnet` the Ethernet Interface and issuing the commands given or launching a browser to the Novell status page on the Ethernet Interface (e.g., `http://192.168.11.9/networkNovellStatus.html`).

- Try doing a `debug nest ipx telnet` command on the Ethernet Interface (or find the “IPX Layer” section on the Novell HTML status page). Check that a board has been bound to the Ethernet Interface and that the network number is correct for your network. If not, you may want to set a specific frame type for the Ethernet Interface to use. You can find out what frame type is bound to which board number using the `debug nest odi` command (or from the “ODI Layer” section on the Novell HTML status page).
- Try a `debug nest fserver telnet` command (or find the “File Servers” section on the Novell HTML status page). If no file servers show up, then there is probably a problem with the network connection, or the Ethernet Interface is not on a Novell network. Try a `debug nest sap telnet` command (or find the “SAP” section on the Novell HTML status page) to see if the Ethernet Interface is seeing any network activity.

- Try a `debug nest pserver telnet` command (or find the “PSERVER” section on the Novell HTML status page). Look for a valid queue under the “EPS QUEUES” section. If the printer field contains a number, and there is a valid file server but no queue, then you probably made an error in the setup. At this point try again. If it is an NDS PSERVER setup, look for a line with the following type of message: “Could not login to NDS Tree <TREE> as <PSERVER.<CONTEXT>”. This indicates one of the following: the tree is wrong; the context stored on the Ethernet Interface for the print server object is wrong; the print server object password is wrong; or the print server object name is wrong.
- Try a `debug nest rprinter telnet` command (or find the “RPRINTER” section on the Novell HTML status page). Look for the following type of line: “(0:ENPReadConfig):[0:213] Destination = <X>”, where <X> is between 0 and 3. If they all read: “Destination = 65536,” then the PSERVER setup did not complete properly. If there was a valid queue under “EPS QUEUES” in the `debug nest pserver` command, then the printer name probably does not match an existing destination name on the Ethernet Interface, or Novell has been disabled for that destination. If there is a valid “Destination =” line, then double check that there is an entry for this number under the “ENP INFO” section.

**NOTE:** Debug messages for the PSERVER setup are in the RPRINTER section here because the PSERVER setup on the Ethernet Interface shares some code with the RPRINTER setup.

- Try a `debug nest logs telnet` command (or find the “General Messages” section on the Novell HTML status page). Look for a valid entry for the printer. It will look something like this: “(0:InitSinglePrinter): printer=<X> name=<NAME>”. Then look for the following lines: “(0:Printf): RemoteMonitor(<X>); printer is” and “(0:Printf): WAITING\_FOR\_JOB”. If you see these lines, the Ethernet Interface is set up properly, and the problem points to a setup issue on the workstation.

## Chapter 7 Troubleshooting (10/100Base-T)

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- If the Ethernet Interface has logged in to the file server but has not attached to the queue, there may be a permission problem. Make sure the appropriate users have rights to this queue (they should be in the group “everyone”). Also, you may have to assign the queue to `root` so it is available to everyone.
- Did you rename any objects in Netware Administrator during your setup? Netware Administrator seems to have a problems renaming objects. If so, delete everything and start over.

If none of these solutions help your situation, try the whole setup again. Completely delete the setup that is giving you trouble and go through the setup again, following each step carefully.

**NOTE:** After completing a PSERVER setup and before beginning a new setup, be sure to reboot the printer. Wait at least a minute for the Print Server to login and attach to a queue.

### RPRINTER/NPRINTER Setup

---

If you cannot get a connection with the Ethernet Interface after completing the print setup, confirm the following:

- Have you tried repowering the printer? Wait about a minute before checking to see if it has logged in and attached to a queue.
- Is the network connector fastened tightly to the unit?
- Is the Ethernet Interface already servicing a queue on another file server? If so, it cannot service another file server at the same time.
- Is an entry produced when a `list rprinter telnet` command is done on the Ethernet Interface (not found on the Novell HTML status page)? When the Ethernet Interface is configured as an RPRINTER, this command should produce the appropriate entry.

## RPRINTER/NPRINTER Setup

---

- If the Ethernet Interface has logged in to the file server but has not attached to the queue, there may be a permission problem. Make sure the appropriate users have rights to this queue (they should be in the group “everyone”). Also, you may have to assign the queue to `root` so it is available to everyone.
- Does the destination you used in your RPRINTER setup have the Novell service enabled? Please see “Commands” on page 239 for information on enabling/disabling services.

**NOTE:** The debug information that is mentioned in the following section can be found by either `telnet`-ing to the Ethernet Interface and issuing the commands given, or launching a browser to the Novell status page on the Ethernet Interface (e.g., `http://192.168.11.9/networkNovellStatus.html`)

- Try doing a `debug nest ipx telnet` command on the Ethernet Interface (or find the “IPX Layer” section on the Novell HTML status page). Check that a board has been bound to the Ethernet Interface and that the network number is correct for your network. If not, set a specific frame type for the Ethernet Interface to use. You can find out what frame type is bound to which board number using the `debug nest odi` command (or from the “ODI Layer” section on the Novell HTML status page).
- Try a `debug nest sap telnet` command (or find the “SAP” section on the Novell HTML status page) to see if the Ethernet Interface is seeing any network activity.
- Try a `debug nest rprinter telnet` command (or find the “RPRINTER” section on the Novell HTML status page). Look for an entry for one of the numbers 4 to 7 under “ENP INFO.” The “dest” field should match the destination used on the Ethernet Interface. If no entry is found, check that the destination has the Novell service enabled. If the “ERROR-CODE” field has an error of 308, make sure no other RPRINTER setup is servicing this printer object at the same time. Only one RPRINTER connection is allowed to service a PSERVER.NLM printer.

- If the Ethernet Interface has logged in to the file server but has not attached to the queue, there may be a permission problem. Make sure the appropriate users have rights to this queue (they should be in the group “everyone”). Also, you may have to assign the queue to `root` so it is available to everyone.

If none of these help your situation, try the whole setup again. Completely delete the setup that is giving you trouble and go through the setup again following each step carefully.

**NOTE:** After completing a PSERVER set up and before beginning a new set up, be sure to reboot the printer. Wait at least a minute for the Print Server to login and attach to a queue.

### Printing Related

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#### The Job Goes To The Queue But Nothing Prints

If nothing is printing, first make sure you have a connection to the Ethernet Interface. Please see “RPRINTER/NPRINTER Setup” on page 152 if you are having connection-related problems. Otherwise, consider these points when trying to solve printing problems in a Novell environment:

- Does the job leave the queue or is it stuck there indefinitely? If it leaves properly, the problem points to the actual printing mechanism on your Novell system (e.g., CAPTURE, NPRINT, etc.), to the print job format, or to the printer itself. Otherwise, review the configuration steps you have already followed.
- Have you confirmed that you can print from the Ethernet Interface to the printer and ignore the Novell setup altogether? Please see “`start fox|tts|loopb prn`” on page 261 for a good test.
- Is anything happening on the printer when the print job is sent? Sometimes, the print job may have arrived at the printer but might be waiting for a manual form feed. If so see “Commands” on page 239 for information on trailer strings.
- Is the printing mechanism you are using (e.g., CAPTURE, NPRINT, etc.) configured to service the appropriate queue?

- Is the Ethernet Interface configured as the queue's "Currently Attached Server"? If not, make sure you have associated the queue and the printer. See "Novell Host Configuration" on page 112.
- Is there a hold on the print job? If you select the job from PCONSOLE's CURRENT PRINT JOB ENTRIES, change the User Hold or Operator Hold to "no."
- If you look in PCONSOLE's CURRENT QUEUE STATUS within the PRINT QUEUE INFORMATION menu, is the server configured to service entries in this queue? It is possible to turn servicing off here.

If you have followed the suggestions above and are still having printing problems, try rebooting the Ethernet Interface. Then either review every step you took when configuring the Ethernet Interface or try redoing the setup, paying special attention to each step explained in "Novell Host Configuration" on page 112.

### The Job Prints Incorrectly

This category can be broken down into several sub-categories such as lost characters, garbled data, extra banner pages, or blank pages at the end of a job. However, the reason for these mishaps can generally be traced back to the printing mechanism used on your Novell system. Consider these points when configuring your print method (e.g., CAPTURE, NPRINT, etc.):

- Did you include the "No Tabs" option?
- Did you specify "No Banner" with PostScript printers?
- Did you turn off banner pages and form feeds if this is already taken care of within an application or on the Ethernet Interface? Doubling up these types of print features is easy to do since these options are provided both on the Ethernet Interface (in a model) and within the print command.
- Are you running the latest version of PSERVER (later than 1.22)? If not, upgrade the PSERVER software.
- In a PSERVER setup, did you ensure that the printer name (e.g., d1prn) was set up as "Defined Elsewhere"?

## Chapter 7 Troubleshooting (10/100Base-T)

---

- Is the timeout option in the CAPTURE command set high enough so the printer does not time out before the print processing has had a chance to complete? This can be a problem with graphic jobs.
- When garbled data persists, consider the following:
  - tab expansion (`xtab`) set on (in a model) with graphic jobs
  - the correct driver for the printer if printing from within Windows

For additional information on these suggestions, please refer to your Netware user manuals.

---

# 8

## *OS/2 Configuration*

### **Overview**

---

This chapter details a complete OS/2 configuration setup including:

- configuring the Ethernet Interface Interface with its TCP/IP settings, and
- configuring a new printer on an OS/2 workstation. The procedure given is from an OS/2 Warp 4 system, but the setup is similar to OS/2 Warp 3 and v2.11.

OS/2 must have TCP/IP installed on it and be configured with the correct IP parameters. See OS/2 documentation/help and your network administrator.

### **Configuring The Ethernet Interface TCP/IP Settings**

---

There are mandatory TCP/IP settings (e.g., an IP address and subnet mask) needed before the print server can be detected on the network. There are also some optional settings for configuring your Ethernet Interface within an OS/2 environment. This section mentions some of the more common optional settings available.

## Mandatory Settings

---

The Ethernet Interface must be configured with an IP address and subnet mask, at a minimum. Consult your network administrator to obtain the proper values for these parameters.

## Optional Settings

---

One additional setting, the gateway address, is necessary if the OS/2 workstations must communicate with the Ethernet Interface across a router. Consult your network administrator to obtain the proper value for this parameter. To configure these options, see “Configuration Tools” on page 36.

## OS/2 Workstation Configuration

---

OS/2 must use the TCP/IP LPR protocol in order to send print jobs to the Ethernet Interface. This section explains how to use the LPR command and how to set up an OS/2 print queue (which will forward jobs to the printer using the LPR protocol).

## Using The LPR Command

---

At an OS/2 command prompt, enter:

```
lpr -s ip_address -p Ethernet Interface_queue  
filename
```

where *Ethernet Interface\_queue* is the name of an existing destination/queue on the Ethernet Interface, and it must be lowercase by default. You will most likely use *d1prn*. If the IPDS feature is installed, queue name *d4prn* is not available.

## Troubleshooting

Check the IP information on both the Ethernet Interface and the OS/2 station for correctness. Make sure the *Ethernet Interface\_queue* is actually defined on the Ethernet Interface and that you are spelling it correctly.

## Using An OS/2 LPR Print Queue

---

This section describes how to set up an OS/2 Warp 4 print queue to print to the Ethernet Interface using the LPR protocol. TCP/IP for OS/2 must be installed on your OS/2 workstation. This procedure is similar to OS/2 Warp 3 and v2.11.

To set up the printer queue:

1. Find the Printer template icon. It may be in the Printers folder or the Templates folder.
2. Right click on the icon, then select "Install." The "Create a printer" dialog box displays.
3. Enter any desired name for the printer. This will be the name of the printer queue.
4. In the "Default printer driver" list, select the desired driver. If the desired driver does not appear in the list, click on "Install new printer driver..." and follow the instructions to install the desired driver.
5. In the "Output port" list, double click an unshaded \PIPE\LPDx port. If all are shaded, double click a shaded port and change the parameters. If no \PIPE\LPDx ports displays, follow these steps to install them:
  - a. Right click a port and select "Install."
  - b. Select the "New port drivers" radio button.
  - c. In the "Directory" field, type `d:\TCPIP\DLL` where *d*: is the drive where the TCPIP subdirectory exists.
  - d. Click "Refresh." Several \PIPE\LPDx port icons should appear in the "Output port" list. If none appear, type `d:\MPTN\DLL` and repeat this step again.

**NOTE:** If no ports appear after completing step d, search your drives for the LPRPDRVR.PDR and type the path to this file, not including the file name (in step c). The final step available is to ask OS/2 support to install these ports.

## Chapter 8 OS/2 Workstation Configuration

---

- e. Select all the ports with the mouse pointer and click on "Install." The \PIPE\LPDx ports should now show in the "Output port" list.
6. The "\PIPE\LPDx - Setting" dialog box displays.
7. In the "LPD server" field, type the IP address of the Ethernet Interface.
8. In the "LPD printer" field, type the name of the defined destination/queue on the Ethernet Interface.

**NOTE:** This name must be the name of an existing destination/queue on the Ethernet Interface, and it must be lowercase by default. Most likely you will most likely use `d1prn`. If the IPDS feature is installed, queue name `d4prn` is not available.

9. Optionally, click "Help" to understand the other parameters and enter those values.
10. Click "OK."
11. Click "Create." The print queue is created and placed in the Printers folder or on the OS/2 desktop.
12. Make sure LPRPORTD is running. Press Ctrl-Esc and check the list for a line that contains "LPRPORTD." If it is running, this process is complete. If it is not running, enter the following at the OS/2 command prompt:

```
start lprportd
```

You will probably want to put this command in your "STARTUP.CMD" file, or use the TCP/IP Configuration tool to set it to autostart on bootup.

Any print jobs sent to this queue will now be forwarded to the Ethernet Interface.

### Starting The LPR Port Daemon

The LPR Port Daemon must be started to enable TCP/IP printing. To start the LPR Port Daemon:

1. Open the TCP/IP folder, which is in the OS/2 System folder for Warp 3.0.
2. Open TCP/IP Configuration.
3. Select the "Autostart" tab on the notebook.
4. In "Services to Autostart," select "lprportd."
5. Select "Foreground Session" and "Minimized."
6. Close the notebook by double clicking the system icon, which is located in the upper left corner.
7. Select "Save."
8. If prompted, press "Yes" to save the configuration changes.
9. At the OS/2 command prompt, enter `tcpstart` to restart TCP.

### Troubleshooting

Check the IP information on both the Ethernet Interface and OS/2 station for correctness.

Make sure the value in step 8 of "Using An OS/2 LPR Print Queue" is actually defined on the Ethernet Interface. See "Configuration Tools" on page 36 to determine how to verify this. Also verify that you are spelling the printer name correctly, and verify that LPRPORTD is running.

## 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 Ethernet Interface, there may be an incorrect entry in the TCP access list. So the workstation can use the Ethernet Interface, one of two things must happen.

- the TCP list must have an entry added to grant access to this workstation, or
- all entries must be deleted from the TCP list to grant all workstations/hosts access to the above TCP services.

To view the current access list, use the printer control panel to access the configuration menu (see the *User's Manual* for configuration menu information). From the DIAGNOSTICS/Printer Tests menu, choose the E-NET Test Page. When the page prints, look under the "TCP ACCESS TABLE" section for the TCP access list entries.

To add/delete a TCP access list entry, refer to "TCP Access Lists" on page 265.

**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 TCP/IP values to the factory defaults when access is impossible:

1. Obtain a printer configuration printout using the control panel. See the *User's Manual* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface, place SWITCH 2 in the down position.
4. Power on the printer and wait for the ONLINE state.
5. On the Ethernet Interface, place SWITCH 2 in the up position.
6. From a workstation attached to this network segment, create an ARP entry. The Ethernet Interface IP address and hardware or MAC address are needed. At the workstation enter:

## TCP/IP Access Problem

---

```
arp -s <ipaddress> <MACaddress>
ping <ipaddress>
```

7. Try to ping this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the Ethernet Interface using the same IP address as above. Log in as `root` with no password.

9. At the system prompt, enter:

```
store tcpip from default
config http on
reset
```

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

10. Power the printer off and then back on.
11. Set the IP address, subnet mask, and default gateway parameters to the desired values.
12. If Web browser access does not work, telnet into the Ethernet Interface as `root`. Enter the following command:  

```
config http on
```

**Chapter 8 OS/2 Workstation Configuration**

---

---

# 9

## *AS/400 Configuration, ASCII Printer*

---

### Overview

---

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

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

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

#### **Developing Line Descriptions With CRTLINETH**

For each LAN adapter on the AS/400, a line description needs to be created for the Ethernet Interface.

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

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

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

## Chapter 9 Overview

**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) RSRNAME(LIN041)
```

Your completed screen should look like Figure 9.

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

Figure 9. Example Ethernet Interface Line Description

---

## Configuring With ADDTCPIFC

---

The following three parameters must be specified:

### Line Description (LIND)

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

### Resource Name (RSRCNAME)

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

### SSAP

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

## Configuring AS/400 For ASCII Using TCP/IP

---

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

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

## Configuring With ADDTCPIFC

---

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

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

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

Your completed screen should look like Figure 10.

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

**Figure 10. Example of ADDTCPIFC Interface**

The following parameters must be specified:

**Internet Address**

Internet address of the AS/400 LAN adapter.

**NOTE:** Do not use the IP address of the Ethernet Interface.

**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 165.

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

### Configuring A Router Definition With ADDTCP RTE

---

If necessary, use the ADDTCP RTE 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 170, require a local name and hostname. If you have already configured LAN attached TCP/IP printers on the AS/400 system, you will have a local domain name and hostname configured on the system.

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

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

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

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

### Configuring A TCP/IP Host Table Entry

---

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

## Configuring The AS/400 For Printing

---

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

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

You will need the following information:

### Remote Printer Queue name

Set to 'd1prn' through 'd8prn'.

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

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

### IP Address

The IP address for the Ethernet Interface.

## 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 11 displays in **bold** the parameters you need to specify.

## Setting Up Printing For ASCII Files

---

```
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    > DBM42023
Internet address       INTNETADR        > '9.99.2.3'
```

**Figure 11. 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.

## Chapter 9 Configuring The AS/400 For Printing

---

### 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 \*IBM6400 for Proprinter Emulation or IBM6400EP for Epson Emulation.

### Internet Address (INTNETADR)

The IP address of the Ethernet Interface.

**NOTE:** You may specify either \*INTNETADR (and the Ethernet Interface IP address) or the hostname for the Ethernet Interface (if you added the printer to the host table entry as directed in “Configuring A TCP/IP Host Table Entry” on page 169).

### To Create An Automatic Remote Output Queue

1. From the AS/400 command line, enter CRTOUTQ.
2. Figure 12 displays in **bold** the parameters you need to specify.

Send TCP/IP Spooled File (LPR)		
Type choices, press Enter.		
<b>Output queue</b>	<b>OUTQ</b>	<b>&gt; USERNAME</b>
Library		*CURLIB
<b>Maximum spooled file size:</b>	<b>MAXPAGES</b>	
Number of pages		*NONE
Starting time		

## Setting Up Printing For ASCII Files

---

Ending time		
	+ for more values	
Order of files on queue	SEQ	*FIFO
<b>Remote system</b>	<b>RMTSYS</b>	<b>&gt; *INTNETADR</b>
<b>Remote printer queue</b>	<b>RMPRTQ</b>	<b>&gt; 'd1prn'</b>
<b>Writer to autostart</b>	<b>AUTOSTRWTR</b>	<b>1</b>
Queue for writer messages	MSGQ	QSYSOPR
Library		*LIBL
<b>Connection type</b>	<b>CNNTYPE</b>	<b>&gt; *IP</b>
<b>Destination type</b>	<b>DETTYP</b>	<b>*OTHER</b>
<b>Host print transform</b>	<b>TRANSFORM</b>	<b>*YES</b>
<b>Manufacturer type and model</b>	<b>MFRTPMDL</b>	<b>&gt; IBM6400</b>
Workstation Customizing Object	WSCST	*NONE
Library		
<b>Internet address</b>	<b>INTNETADR</b>	<b>&gt; '9.99.57.173'</b>
Destination options	DESTOPT	*NONE
		XAUTOQ XAIX
Print separator page	SEPPAGE	*YES
User defined option	USRDFNOPT	*NONE

**Figure 12. 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 Ethernet Interface on the printer (\*INTNETADR prompts you for this) or the hostname of the Ethernet Interface.

### **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.

---

## Setting Up Printing For ASCII Files

---

### Destination Options (DESTOPT)

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

### Manufacturer Type (MFRTYPMDL)

Select a manufacturer type and model. This is the name of the WSCO. Select **\*IBM6400** for Proprinter Emulation. Or **6400EP** for Proprinter for Epson Emulation.

### 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 Ethernet Interface) 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 169).

4. If the printer cannot be pinged, proceed to “AS/400 ASCII Troubleshooting” on page 176.

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 170.
  - Enter `STRMTWTR 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 172).
  - 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 Ethernet Interface 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.

## 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 Ethernet Interface, there may be an incorrect entry in the TCP access list. So that the workstation can use the Ethernet 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 menu. See the *User's Manual* for configuration menu information. From the Operator Print Test menu, choose the Ethernet Test Page. When the page prints, look under the "TCP ACCESS TABLE" section for the TCP access list entries.

To add/delete a TCP access list entry, refer to "TCP Access Lists" on page 265.

**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 TCP/IP values to the factory defaults when access is impossible:

1. Obtain a printer configuration printout using the control panel. See the *User's Manual* for configuration menu information.
2. Power off the printer.
3. On the Ethernet Interface, place SWITCH 1 in the down position.
4. Power on the printer and wait for the ONLINE state.
5. On the Ethernet Interface, place SWITCH 1 in the up position.

## Chapter 9 AS/400 ASCII Troubleshooting

---

6. From a workstation attached to this network segment, create an ARP entry. The Ethernet Interface IP address and hardware or MAC address are needed. At the workstation, enter:  

```
arp -s <ipaddress> <MACaddress>
ping <ipaddress>
```
7. Try to ping this IP address to see if the Ethernet Interface can be seen on your network. If the interface does not respond, verify you are on the same network segment as the printer and that the ARP entry was created.
8. Telnet into the Ethernet Interface using the same IP address as above. Log in as root with no password.
9. At system prompt, enter:  

```
store tcpip from default
config http on
reset
```

**NOTE:** This will reset all TCP/IP settings to factory default and reset the Ethernet Interface.

10. Wait five minutes for the Ethernet Interface to reset.
11. Power the printer off and then back on.
12. Wait for the “E-NET READY” message to display.
13. Set the IP address, subnet mask, and default gateway parameters to the desired values. (See “Configuration Tools” on page 36.)

## Web Browser/HTTP Problem

---

In some cases you may not be able to browse the printer Web page simply because the Ethernet Interface HTTP may be turned off.

If you cannot ping the Ethernet Interface IP address, make sure the IP address, subnet mask, and default gateway are set correctly by checking the ETHERNET PARAMS menu from the control panel. See the *User's Manual* for configuration menu information.

If you can ping the Ethernet Interface IP address but cannot access the Web pages, perform the following procedure to verify the Ethernet Interface HTTP is turned on:

1. **Telnet** into the Ethernet Interface and log in as **root** with no password.
2. At the system prompt, enter the following commands:  

```
config http on
save
reset
```
3. After approximately 5 minutes, point your browser to the Ethernet Interface IP address. The printer Web pages should now be accessible.

**Chapter 9** AS/400 ASCII Troubleshooting

---

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# 10

## *AS/400 Configuration, IPDS Printer*

---

### **Configuring On AS/400 As An IPDS 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.

#### **Printing AFP, IPDS, And SCS Files**

---

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

- APF files are transformed directly by Print Services Facility™ (PSF/400, an integrated feature of OS/400), which then sends the transformed file to the printer.
- SCS files are transformed into IPDS by setting the IPDSPASTHR parameter to YES (see Figure 15 on page 190 or Figure 14 on page 187). 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 Ethernet Interface. See “Configuration Using The Control Panel” on page 37.
2. Using the printer control panel, set up the printer for IPDS by setting the parameters and values shown in Table 6.

**Table 6. Control Panel Settings**

Menu	Item	Setting
C/T PORT	Port Type	Twinax
TWINAX SETUP 4234-12	IPDS Emulation	I4234-12

3. Set TCP/IP addresses for the printer, such as an IP Address, Gateway Address, or Subnet Mask. See “Configuration Tools” on page 36.
4. If the printer and AS/400 are not on the same LAN segment, verify there is a route defined in the TCP/IP route list. If necessary, use the `ADDTCPRTE` command to create a route definition. You need this if your printer is somewhere other than on a local segment.
5. You need the IP address of the Ethernet Interface to configure the Ethernet Interface.

## Configuration Checklist

---

6. If you have not done so yet, create a line description for your Ethernet Interface. See “Developing Line Descriptions With CRTLINETH” on page 165.
7. Create or verify the existence of an AS/400 TCP/IP interface for the Ethernet Interface. See “Configuring An AS/400 TCP/IP Interface With ADDTCPIFC” on page 184.
8. The next step depends on your AS/400 release. See “Configuring PSF/400 For IPDS On V3R7 Or V4R1” on page 186 to configure your printer.

**NOTE:** When the IPDS feature is installed, the queue name ‘d4prn’ is not available.

9. Verify the printer is ON using the `VFYCFG` command.
10. Verify that TCP/IP has been started using the `STRTCP` command.
11. Test your configuration. See “Verifying The IPDS Configuration On AS/400” on page 199.
12. 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 201.
13. If you have problems, refer to “AS/400 Troubleshooting” on page 203.

## Configuring An AS/400 TCP/IP Interface With ADDTCPIFC

**NOTE:** Do not enter the IP address of the Ethernet Interface. Do not set the AS/400 interface address to the same address as the Ethernet Interface IP address. Also, do not add the Ethernet Interface 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 13.

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

Figure 13. Example ADDTCPIFC Interface

---

## Configuring An AS/400 TCP/IP Interface With ADDTCPIFC

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

Internet address of the AS/400 Ethernet LAN adapter.

**NOTE:** Do not use the IP address of the Ethernet Interface.
  - 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 165. Each AS/400 LAN adapter will have its own line description.

### Configuring A TCP/IP Host Table Entry

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

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

## Configuring PSF/400 For IPDS On V3R7 Or V4R1

---

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 WRKAFF2, 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/NET6400
           IPDSPASTHR(*YES) RLSTMR(*SEC15)
           TEXT('printer_type NETWORK PRINTER')
```

2. A completed screen looks like Figure 14.

## Configuring PSF/400 For IPDS On V3R7 Or V4R1

---

PSF Configuration Information	
PSF configuration: NET6400	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:	*YES
Resident fonts:	*YES
Resource retention:	*YES
Edge orient:	*NO
<b>Remote location:</b>	
<b>Name or address:</b>	<b>*NONE</b>
<b>TCP/IP port:</b>	<b>*NONE</b>
<b>TCP/IP activation timer:</b>	<b>170</b>
PSF defined options:	
*NONE	
Text description:	6400 Network Printer
Device resource library list:	*DFT

Figure 14. Example CRTPSFCFG Command (V3R7 or V4R1)

## Chapter 10 Configuring On AS/400 As An IPDS Printer

---

**NOTE:** The lines in **bold** in Figure 14 are not used by PSF/400. Instead, PSF/400 uses the information entered in the device description screen.

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

The name used for this PSF configuration object. The name must match the user-defined object name (USRDFNOBJ) in the printer DEVD.
  - b. **IPDS pass through (IPDSPASTHR)**

To print SCS files, specify **\*YES**, PSF/400 transforms SCS into IPDS before printing.
  - c. **Activate release timer (ACTRLSTMR)**

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

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

Specifies if the page size (FORMS) is set by PSF.400. Usually set to **\*YES**.

## Configuring PSF With CRTDEVPRT On V3R7 Or V4R1

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(NETPRT64) 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')
```

**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 186.

2. A completed screen looks like the example shown in Figure 15.

Display Device Description		
5716SS1 V3R7M0 961108	BLDRB1	
<b>Device Description:</b>	<b>DEVD</b>	<i>NETPRT64</i>
Option:	OPTION	*ALL
Category of device:		*PRT
<b>Device class:</b>	<b>DEVCLS</b>	<b>*LAN</b>
<b>Device type:</b>	<b>TYPE</b>	<b>*IPDS</b>
<b>Device model:</b>	<b>MODEL</b>	<b>0</b>
<b>LAN attachment:</b>	<b>LANATTACH</b>	<b>*IP</b>
<b>User-defined object:</b>	<b>USRDFNOBJ</b>	<i>NET6400</i>
Library:		AFP
Object type:		*PSFCFG
Data transform program:	USRDTATFM	*NONE
User-defined driver program:	USRDRVPGM	*NONE
Advanced function printing:	AFP	*YES

## Chapter 10 Configuring On AS/400 As An IPDS Printer

<b>Port number:</b>	<b>PORT</b>	<b>5001</b>
Online at IPL:	ONLINE	*YES
<b>Font:</b>	<b>FONT</b>	
<b>Identifier:</b>		<b>011</b>
<b>Point size:</b>		<b>*NONE</b>
<b>Form feed:</b>	<b>FORMFEED</b>	<b>*CONT</b>
Separator drawer:	SEPDRAWER	*FILE
Separator program:	SEPPGM	*NONE
Library:		
Printer error message:	PRTERRMSG	*INQ
Message queue:	MSGQ	QSYSOPR
Library:		*LIBL
<b>Activation timer:</b>	<b>ACTTMR</b>	<b>170</b>
Maximum pending requests:	MAXPNDRQS	6
Print while converting:	PRTCVT	*YES
Print request timer:	PRTRQSTMR	*NOMAX
Form definition:	FORMDF	F1C10110
Library:		*LIBL
<b>Remote location:</b>	<b>RMTLOCNAME</b>	
Name or address:		128.9.12.134
Dependent location name:	DEPLOCNAME	*NONE
Text:	TEXT	6400 Network Printer
User-defined options:	USRDFNOPT	

Figure 15. Example CRTDEVPRN Command (V3R7 and above)

---

### Configuring PSF/400 For IPDS On V3R7 Or V4R1

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

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/400 for IPDS On V4R2 And Above

---

To configure IPDS on the AS/400 V4R3, use the following commands:

- CRTDEVPRT
- CRTPSFCFG (Optional)

## Configuring AFP with CRTPSFCFG on V4R3 and above (Optional)

To configure the AS/400 for IPDS printing on V4R3:

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

```
CRTPSFCFG PSFCFG(AFP/NETPRT6400) IPDSPASTHR(*YES)
RLSTMR(*SEC15) TEXT('IBM 6400 NETWORK ATTACHED
PRINTER') PAGESIZCTL(*YES) ACTRLSTMR(*NORDYF)
```

2. A completed screen looks like Figure 16.

**Configuring PSF/400 for IPDS On V4R2 And Above**

---

<b>PSF configuration .....</b>	<b>&gt;NETPRT6400</b>	<b>Name</b>
<b>Library .....</b>	<b>&gt;AFP</b>	<b>Name, *CURLIB</b>
User resource library list .....	*JOB LIBL	*JOB LIBL, *CURLIB, *NONE
Device resource library list .....	*DFT	Name, *DFT
<b>IPDS pass through .....</b>	<b>&gt;*YES</b>	<b>*NO, *YES</b>
Activate release timer .....	*NORDYF	*NORDYF, *IMMED...
<b>Release timer .....</b>	<b>&gt;*SEC15</b>	<b>1-1440, *NOMAX, *SEC15...</b>
Restart timer .....	*IMMED	1-1440, *IMMED
APPC and TCP/IP retry count ..	2	1-99, *NOMAX
Delay between APPC retries ....	0	0-999
Automatic session recovery .....	*NO	*NO, *YES
Acknowledgment frequency .....	100	1-32767
<b>Text 'description' .....</b>	<b>&gt;IBM 6400 NETWORK PRINTER</b>	
	Additional Parameters	
Blank page .....	*YES	*YES, *NO
<b>Page size control .....</b>	<b>&gt;*YES</b>	<b>*NO, *YES</b>
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	
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, *LIBL, *CURLIB
Cut sheet emulation mode .....	*NONE	*NONE, *CHKFIRST, *CHKALL
Replace .....	*YES	*YES, *NO
Authority .....	*L	

**Figure 16. Example CRTPSFCFG Command (V4R2 and above)**

## Chapter 10 Configuring On AS/400 As An IPDS Printer

---

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

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

### **PSF configuration (PSFCFG)**

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

### **IPDS pass through (IPDSPASTHR)**

To print SCS files, specify **\*YES**, PSF/400 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. IBM recommends **\*SEC15**.

### **Page size control (PAGSIZCTL)**

Specifies if the page size (forms) is set by PSF/400. 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 AS/400 command line, enter a command in the form:

```
CRTDEVPRT DEVD(P6400) DEVCLS(*LAN) TYPE(*IPDS) MODEL(0)
LANATTACH(*IP) AFP(*YES) PORT(5001) FONT(11)
FORMFEED(*CONT) RMTLOCNAME('128.9.12.134')
USRDFNOBJ(AFP/NETPRT6400 *PSFCFG)
TEXT('IBM 6400 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 17.

## Chapter 10 Configuring On AS/400 As An IPDS Printer

<b>Device description</b> .....	<b>&gt;P6400</b>	<b>Name</b>
<b>Device class</b> .....	<b>&gt;*LAN</b>	<b>*LCL, *RMT, *VRT, *SNPT, *LAN</b>
<b>Device type</b> .....	<b>&gt;*IPDS</b>	<b>3287, 3812, 4019, 4201...</b>
<b>Device model</b> .....	<b>&gt;0</b>	<b>0, 1, 2, 3, 4, 10, 13, 301...</b>
<b>LAN attachment</b> .....	<b>&gt;*IP</b>	<b>*LEXLINK, *IP, *USRDFN</b>
Switched line list.....		Name
LAN remote adapter address .....		000000000001-FFFFFFFFFFFFE
Adapter type.....	<b>*INTERNAL</b>	<b>*INTERNAL, *EXTERNAL</b>
Adapter connection type .....	<b>*PARALLEL</b>	<b>*PARALLEL, *SERIAL</b>
Emulated twinaxial device .....		3812, 5219, 5224, 5256
Advanced function printing.....	<b>*YES</b>	<b>*NO, *YES</b>
AFP attachment.....	<b>*WSC</b>	<b>*WSC, *APPC</b>
<b>Port number</b> .....	<b>&gt;5001</b>	<b>0-65535</b>
Switch setting .....		0, 1, 2, 3, 4, 5, 6
Local location address .....		00-FE
Auxiliary printer .....		<b>*YES, *NO</b>
Emulating ASCII device .....	<b>*NO</b>	<b>*NO, *YES</b>
Physical attachment .....		<b>*DIRECT, *PTT, *MODEM...</b>
Online at IPL .....	<b>*YES</b>	<b>*YES, *NO</b>
Attached controller .....		Name
Language type .....	<b>*SYSVAL</b>	<b>*SYSVAL, AGB, AGI, ALI...</b>
Print quality .....	<b>*STD</b>	<b>*STD, *DRAFT, *NLQ</b>
Font:		
<b>Identifier</b> .....	<b>&gt;011</b>	<b>3, 5, 11, 12, 13, 18, 19...</b>
Point size .....	<b>*NONE</b>	000.1-999.9, *NONE
Form feed.....	<b>*CONT</b>	<b>*TYPE, *CONT, *CONT2, *CUT</b>
Separator drawer.....	<b>*FILE</b>	1-255, *FILE
Separator program .....	<b>*NONE</b>	Name, *NONE
Library .....		Name, *LIBL, *CURLIB
Number of drawers.....		1, 2, 3
Printer error message .....	<b>*INQ</b>	<b>*INQ, *INFO</b>
Message queue.....	<b>*QSYSOPR</b>	Name, *CTLD, *SYSOPR, QSYSOPR
Library .....	<b>*LIBL</b>	Name, LIBL, *CURLIB
Maximum length of request unit	<b>*CALC</b>	<b>*CALC</b>
Application type.....	<b>*NONE</b>	<b>*NONE, *NRF, *DEVINIT...</b>
Activation timer.....	170	1-2550, *NOMAX
Inactivity timer .....	<b>*ATTACH</b>	1-30, *ATTACH, *NOMA
SNA pass-through device desc.....	<b>*NONE</b>	Name, *NONE
SNA pass-through group name.....	<b>*NONE</b>	Name, *NONE
Host signon/logon command.....	<b>*NONE</b>	
Pacing .....	7	1-7

## Configuring PSF/400 for IPDS On V4R2 And Above

Line speed .....	*TYPE	*TYPE, 150, 300, 600
Word length .....	*TYPE	*TYPE, 7, 8
Type of parity .....	*TYPE	*TYPE, *EVEN, *ODD, *NONE...
Stop bits .....	*TYPE	*TYPE, 1, 2
Host print transform .....	*NO	*NO, *YES
Manufacturer type and model.....		
Paper source 1 .....	*MFRTYPMDL	*MFRTYPMDL, *LETTER...
Paper source 2 .....	*MFRTYPMDL	*MFRTYPMDL, *LETTER...
Envelope source .....	*MFRTYPMDL	*MFRTYPMDL, *MONARCH...
ASCII code page 899 support .....	*NO	*NO, *YES
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
Character identifier:		
Graphic character set.....	*SYSVAL	1-32767, *SYSVAL
Code page.....		1-32767
Remote location:		
<b>Name or address .....</b>	<b>&gt;128.9.12.134</b>	
Local location..... :	*NETATR	Name, *NETATR
Mode.....	QSPWTR	Name, QSPWTR, *NETATR
User-defined options .....	*NONE	Character value, *NONE
<b>User-defined object:</b>	<b>&gt;NETPRT6400</b>	
<b>Object .....</b>	<b>&gt;AFP</b>	<b>Name, *NONE</b>
Library .....		Name, *LIBL, *CURLIB
<b>Object type.....</b>	<b>&gt;*PSFCFG</b>	<b>*DTAARA, *DTAQ, *FILE...</b>
Data transform program .....	*NONE	Name, *NONE
Library .....		Name, *LIBL, *CURLIB
User-defined driver program.....	*NONE	Name, *NONE
Library .....		Name, *LIBL, *CURLIB
System driver program .....		
Text 'description' .....	IBM 6400 Network Printer	
Dependent location name.....	*NONE	Name, *NONE
	Additional Parameters	
Remote network identifier.....	*NETATR	Name, *NETATR, *NONE
Workstation customizing object .....	*NONE	Name, *NONE
Library .....		Name, *LIBL, *CURLIB
Authority .....	*LIBCRTAUT	Name, *LIBCRTAUT, *CHANGE...

**Figure 17. Example CRTDEVPRN Command (V4R2 and above)**

## Chapter 10 Configuring On AS/400 As An IPDS Printer

---

2. Values must be entered for the following parameters:

**Device Description (DEVVD)**

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/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 V4R2 And Above

---

### 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:  
`VRFCFG CFGTYPE (*LIN)`
2. To start TCP/IP, enter `STRTCP`.
3. Verify that the AS/400 TCP/IP interface is active. Use the command:  
`WRKTCPSTS`  
and then select option 1.
4. Turn the printer on and wait until the printer control panel displays "ETHERNET ADAPTER IS READY."

## Chapter 10 Verifying The IPDS Configuration On AS/400

---

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 Ethernet Interface), 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 203.
  - If the ping is successful, vary on the printer device description with the command:  

```
VRYCFG (printer_device) CFGTYPE (*DEV)  
STATUS (*ON)
```
6. To use PSF/400 to send an IPDS file to the printer, enter:  

```
STRPRTWTR DEV (printer_device)
```

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

## Sharing The AS/400 Printer On The Network

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

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

### Printer Sharing Parameters

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

**Table 7. Printer Sharing**

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

## Chapter 10 Sharing The AS/400 Printer On The Network

Table 7. Printer Sharing (continued)

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

## AS/400 Troubleshooting

---

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

### Cannot PING The Printer

---

If you have problems trying to ping the printer:

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

### PSF/400 Terminates When Initialized

---

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

- Code 10 means an incorrect `RMTSYS` or `RMTLOCNAME` (V3R2, V3R7, or V4R1) has been specified for the printer.
- Code 15 means that PSF/400 timed out waiting for the printer's response. Check the value you entered for Activation Timer when using `WRKAFFP2`, `CRTPSFCFG` (V3R2), or `CRTDEVPR` (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 IBM technical support.
- Codes 40-59 indicate a logic error between PSF and the printer control unit. Contact IBM 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).

---

# 11

## *MVS Configuration for an IPDS Printer*

### Overview

---

Use this chapter to configure MVS to print IPDS files on your IBM 4400/6400 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/MVS Version 2.2.0 with APAR OW15599 (for TCP/IP support)
- MVS 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 MVS

To obtain the PTFs associated with these APARs, contact the IBM Support Center.

## Configuration Checklist

---

All of the following configuration steps carried out on MVS require appropriate RACF authority.

1. Using the printer operator panel, set up the IPDS printer emulation to 6408/6412.
2. Set TCP/IP addresses for the printer, such as IP address, gateway address, or subnet mask. See “Configuration Tools” on page 36.
3. Configure the host environment. See “Configuring PSF for MVS to Print IPDS Files” on page 207.
4. Verify the configuration. See “Verifying a TCP/IP-Attached Printer on MVS” on page 217.
5. If you want to share the printer, do the procedure in “Sharing IBM 6400 Printers on MVS” on page 218.
6. If you have problems, refer to “Handling MVS Connectivity Problems” on page 220.

## Configuring PSF for MVS to Print IPDS Files

---

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

### Configuration Procedure

---

Configuring PSF/MVS to print IPDS files includes the following steps:

1. Define the MVS communications control unit to MVS. See “Define the Communications Control Unit to MVS” on page 208.
2. Modify the TCP/IP profile on your MVS system, if necessary. See “Modify the TCP/IP Profile in MVS” on page 208.
3. “Ping” the printer. See “Verify the Printer Connection” on page 211.
4. Define the printer as a writer-controlled printer to JES. See “Define the Printer to JES” on page 212.
5. Define the printer to PSF/MVS with a PRINTDEV statement, including the IP address. See “Define the Printer to PSF/MVS” on page 213.

This section does not provide all the information you need to install and configure TCP/IP on your MVS system. For more information on installing TCP/IP, refer to *TCP/IP for MVS: 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 MVS host appears to be communicating directly with the TCP/IP-attached printer.

### Define the Communications Control Unit to MVS

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

- When using a version earlier than MVS 4.1.0, use an MVSCP.
- When using a version of MVS 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 MVS

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/MVS on TCP/IP-attached printers. Samples of these statements are printed in bold in the example shown in Figure 18.

## Configuration Procedure

---

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

**Figure 18. 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.

For information about the TCP/IP profile and the statements described in this section, refer to:

- IBM TCP/IP MVS Customization and Administration Guide
- IBM TCP/IP Performance and Tuning Guide

#### **DATABUFFERPOOLSIZ**

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

#### **SMALLDATABUFFERPOOLSIZ**

The SMALLDATABUFFERPOOLSIZ statement defines the number of small data buffers. For printing on TCP/IP-attached printers, IBM recommends that you specify at least **256** small data buffers.

#### **TINYDATABUFFERPOOLSIZ**

The TINYDATABUFFERPOOLSIZ statement defines the number of tiny data buffers. For printing on TCP/IP-attached printers, IBM recommends 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/MVS and its connection partner, TCP sends keep-alive probes to the connection partner periodically. These periodic probes, called keep-alive transmissions, enable TCP to discover when a connection is no longer usable even if the connection partner is abruptly powered off or is no longer accessible through the network.

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

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

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

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

### GATEWAY

The Packet Size parameter of the GATEWAY statement defines the maximum transmission unit (MTU) for the MVS host. For IBM 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 MVS 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 NIC.

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 MVS Connectivity Problems” on page 220.

## 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/MVS 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 MVS 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/MVS Startup procedure.

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

### Define the Printer to PSF/MVS

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

Figure 19 shows a sample PSFPROC procedure that you can modify to suit your installation. The PRINTDEV statement shows the required IPADDR keyword.

No 6400 printer-specific writer procedure is currently supplied by IBM. You can, however, copy the APSWPROT sample from the APAR medium and modify it for the IBM 6400 printer.

**NOTE:** The IBM 6400 printer supports only resident symbol sets.

```
//PSFPROC PROC
//***** IBM NETWORK PRINTERS WRITER PROCEDURE *****
//*
//*01* MODULE-NAME = PSFPROC
//*
//*01* DESCRIPTIVE-NAME = START PROCEDURE FOR PSF:
//*TCP/IP ATTACHED IBM 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
```

## Chapter 11 Configuring PSF for MVS to Print IPDS Files

---

```
/*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
/* *****/
```

## Configuration Procedure

---

```
/*PRINTDEV
/* *****/
//PRT1CNTL
//PRT1PRINTDEV FONTDD=.FONT300,/* 300 PEL FONT LIBRARY DD*/
//OVLDD=.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*/
//DATAACK=BLOCK,/* REPORT ALL DATA-CHECK*/
/*/* ERRORS*/
//TRACE=NO,/* CREATE INTERNAL TRACE*/
//FAILURE=WCONNECT,/* PSF ACTION ON PRINTER*/
```

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

**Figure 19. 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/MVS 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 IBM 6400 Printers on MVS” on page 218. For a description of the PRINTDEV statement, which is not given here, see the *PSF/MVS 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 MVS

---

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`

### 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 MVS 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 *Setup Guide*.
- 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 IBM support.

## Sharing IBM 6400 Printers on MVS

---

IBM 6400 printers can be shared on PSF/MVS 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/MVS ends the session with the printer. PSF/MVS attempts to restart the session when there is more work on the spool for the printer. After the session is restarted, PSF/MVS must reload the resources required for the print jobs. When using this method of network printer sharing, PSF/MVS 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/MVS 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/MVS attempts to establish a connection on TCP/IP, PSF/MVS 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/MVS 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/MVS redrive the printer FSA using the value of the MGMTMODE parameter. TIMEOUT=STOP requests that PSF/MVS 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. IBM suggests you set the value to **15**. When no output is available from JES for this time period, PSF/MVS ends the session with the network printer. If the value is set to zero, PSF/MVS does not end the session because of lack of output.

**NOTE:** PSF/MVS supports two other methods of printer sharing, which are not applicable to IBM 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, IBM 10/100Base-T Ethernet Interface printers automatically switch among all attached ports (serial port, the twinax or coax port, or the Ethernet network port). Basically, the printer prints jobs for one port until no new jobs appear and the port “times out”. The printer then switches to the next port and does the same thing.

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

## Handling MVS Connectivity Problems

---

If you encounter problems when “ping”-ing a network printer from MVS, 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 MVS 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 MVS system is equal to the MTU size of the printer. For information about the values recommended for the MVS system, see “Modify the TCP/IP Profile in MVS” on page 208.

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

You cannot change the MTU size on an IBM 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 MVS 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 *IBM TCP/IP MVS Customization and Administration Guide*.)
3. Enter the “ping” command again from the MVS system.

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

**Chapter 11 Handling MVS Connectivity Problems**

---

---

# 12

## *SNMP Installation Instructions*

---

### **Configuring for a \*LAN 3812 SNMP Device Description**

---

Support for SNMP is available in the base code for R450 OS/400 and above. \*LAN 3812 SNMP device descriptions are similar to \*LAN 3812 PJI device descriptions, and they fully support the page range function.

#### **Configuration Instructions**

---

To configure a 6400, for SNMP system device driver program, use the CRTDEVPRT command. The following parameters should be specified:

##### **Device Class (DEVCLS)**

This needs to be set to \*LAN.

##### **Device Type (TYPE)**

This needs to be set to 3812.

##### **Device Model (MODEL)**

This needs to be set to 1.

##### **LAN Attachment (LANATTACH)**

This needs to be set to \*IP.

## Chapter 12 Configuring for a \*LAN 3812 SNMP Device Description

---

### **Port number (PORT)**

This needs to be set to 9100.

### **Font (FONT) = 011**

This is typically set to 011, which is the default 10 CPI font. A font ID is required to create the device description. Unless special requirements in your operation dictate something different, this should suffice.

### **Form Feed (FORMFEED)**

This should be set to \*CONT. Leaving this set at \*TYPE or setting it to the wrong value can cause problems with both drawer selection and paper size.

### **Printer Error Message (PRTERMSG)**

This defaults to \*INQ, but can be set to \*INFO so the printer's message queue will receive informational messages whenever possible. If this is set to \*INQ and a problem occurs on the printer (such as out of forms or a paper jam) a message will be sent to the printer's message queue that must be answered before printing can continue.

### **Activation Timer (ACTTMR)**

This defaults to 170 (seconds), but can be set to any value from 1 to 2550 seconds (or 42.5 minutes). The activation timer refers to the amount of time for the system to wait for the LAN-attached printer device to respond before ending a connection attempt. If the printer refuses a connection attempt by the host for any reason before the timer expires, it will be considered not available and an error message will post.

### **Inactivity Timer (INACTTMR)**

This defaults to \*ATTACH, but can be set to any value from 1 to 30 (minutes), as well as \*SEC15 (15 seconds), \*SEC30 (30 seconds) or \*NOMAX (no maximum). This value determines when the print driver closes the connection to the printer (freeing it up to received spooled output from another source) once there are no OS/400 spooled files left in RDY (ready) status. It is recommended that this be set to \*SEC15 so OS/400 will free up the printer 15 seconds after all RDY spooled files have been processed. Setting it to \*NOMAX will cause OS/400 to maintain the connection until the writer ends, so the printer device will not be shared with other systems.

### **Host Print Transform (TRANSFORM)**

This needs to be set to \*YES so the OS/400 system's Host Print Transform (HPT) function will convert both SCS and AFPDS spooled files to the printer's data stream.

### **Manufacturer Type and Model (MFR TYPMDL)**

This indicates the type of ASCII printer being used. This value is used by HPT to determine what ASCII controls to use when converting the spooled file from SCS or AFPDS to ASCII. The recommended values are determined by the ASCII emulation setting on the printer. The choices are : \*IBM6400EP for Epson emulation, \*IBM6400 or \*IBM4203 for Proprinter.

### **Remote Location (RMTLOCNAME)**

This should be set to the printer's IP address, host name or DNS name. If an IP address is used, it should be entered without leading zeros (for example, use 192.186.10.2 instead of 192.186.010.002). If an IP address is used, verify that OS/400 can reach the printer by using either the PING or Verify TCP/IP Connection (VFYTCPCNN) command with that IP address. If a host name or DNS name is used, verify that OS/400 can reach the printer by using either the PING or Verify TCP/IP Connection (VFYTCPCNN) command with that host name or DNS name.

### **User-Defined Options (USRDFNOPT)**

Specifies, for spooled output only, one or more user-defined options to be used by user applications, user-specified programs or the writer. A maximum of four user-defined options can be specified. This should be set to \*IBMSHRCNN whenever configuring a \*LAN 3812 SNMP.

Specifying \*IBMSHRCNN will cause the print driver to open and close the connection to the data port on the printer for every copy of every spooled file. This allows multiple writers and systems to access the printer, while the print driver is active and there are files in ready status. When this option is specified, the printer is capable of being shared and the value that is specified for the Inactivity Timer is ignored.

### **System Driver Program (SYSDRVPGM)**

Specifies the name of a system-defined driver program, which provides the capability to send OS/400 printer output to a printer attached over a TCP/IP network. This should be set to \*IBMSNMPDRV whenever configuring a \*LAN 3812 SNMP device description.

### **Workstation Customizing Object (WSCST)**

This is typically set to \*NONE, but can be used to specify a modified workstation customer object.

All other parameters should be specified like any other printer.

### Configuration Example

To configure a \*LAN 3812 SNMP device description type CRTDEVPRT and press the F4 (Prompt) key. The following is an example of using the Create Device Printer (CRTDEVPRT) command to create a \*LAN 3812 SNMP device description:

```
CRTDEVPRT DEVD(SNMP6400) DEVCLS(*LAN) TYPE(3812)
MODEL(1) LANATTACH(*IP) PORT(9001) FONT(011)
FORMFEED(*CONT) PARITY(*NONE)
STOPBITS(1) TRANSFORM(*YES) MFRTPMDL(*IBM6400) RMTLOCNAME
('9.5.208.46') USRDFNOPT(*IBMSHRCNN) USRDRVPGM(*NONE)
SYSDRVPGM(*IBMSNMPDRV)
```

Create Device Desc (Printer) (CRTDEVPRT)

Type **choices**, then press Enter.

Device description	<b>SNMP6400</b>	Name
Device class	<b>*LAN</b>	*LCL, *RMT, *VRT, *SNPT, *LAN
Device type	<b>3812</b>	3287, 3812, 4019, 4201...
Device model	<b>1</b>	0, 1, 2, 3, 4, 10, 13, 301...
LAN attachment	<b>*IP</b>	*LEXLINK, *IP, *USRDFN
Port number	<b>9100</b>	0-65535
Online at IPL	<b>*YES</b>	*YES, *NO
Font:		
Identifier	<b>11</b>	3, 5, 11, 12, 13, 18, 19...
Point size	<b>*NONE</b>	000.1-999.9, *NONE
Form feed	<b>*CONT</b>	*TYPE, *CONT, *CONT2, *CUT...
Separator drawer	<b>*FILE</b>	1-255, *FILE
Separator program	<b>*NONE</b>	Name, *NONE
Library		Name, *LIBL, *CURLIB
Printer error message	<b>*INFO</b>	*INQ, *INFO

## Chapter 12 Configuring for a \*LAN 3812 SNMP Device Description

Message queue	*CTLD	Name, *CTLD, *SYSOPR, QSYSOPR
Library		Name, *LIBL, *CURLIB
Activation timer	170	1-2550, *NOMAX
Inactivity timer	*SEC15	1-30, *ATTACH, *NOMAX...
Host print transform	*YES	*NO, *YES
Manufacturer type and model	*IBM6400	
Paper source 1	*LETTER	*MFRTYPMDL, *LETTER...
Paper source 2	*LETTER	*MFRTYPMDL, *LETTER...
Envelope source	*NONE	*MFRTYPMDL, *MONARCH...
ASCII code page 899 support	*NO	*NO, *YES
Image configuration	*NONE	*NONE, *IMGA01, *IMGA02...
Character identifier:		
Graphic character set	*SYSVAL	1-32767, *SYSVAL
Code page		1-32767
Remote location:		
Name or address	<b>'9.5.208.46</b>	
User-defined options	*IBMSHRCNN	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

## Varying on the Printer

---

System driver program	<b>*IBMSNMPDRV</b>
Text 'description'	'*LAN 3218 SNMP Device Description for IBM 6400'

## Varying on the Printer

---

Once you have created the printer device description, you need to vary on the printer device description using either the Vary Configuration (VRYCFG) command or Work with Configuration Status (WRKCFGSTS) command. Once the device has been varied on, you must start the printer writer using either (STRPRTWTR) or Work with Writers (WRKWTR) command.

## Problem Areas for Consideration

---

If you then place a spooled file in the printer's output queue and it goes to MSGW (message wait) status with MSGCPA3394 "Load form type '&4' device &5 writer &1. (G B I H R C)" then chances are good that the spooled file will print once you answer this message with a "G".

However, if the spooled file stays in RDY (ready) status or goes to PND (pending) status without printing or if the WTR ends you can look in the Message que you specified in the devd, the SYSOPR message que or the writer job log for messages that may indicate why the spooled file is not printing or why the WTR ended.

To look in the message que you specified in the devd or the SYSOPR message que, simply Type, **DSPPMSG**, then press F4 ( to Prompt the cmd) and enter either your que name/library or \*SYSOPR. You should see the a message indicating that the job was submitted and then above that the failure. You may press F1 on that message to obtain the second level text. If you are referred to the WTR job log for additional information, refer to the following instructions.

## Chapter 12 Configuring for a \*LAN 3812 SNMP Device Description

---

To look at the writer job, do the following:

**NOTE:** Check to see if the writer is still active.

1. On the OS/400 command line, type the following:

**WRKJOB JOB (writer-name)** The writer name is typically the same name given to the device description. Press the Enter key. This brings you to the Select Job panel or the Work with Job panel. If you are at the Select Job panel, the most current writer job is at the top of the list. Place a 1 in the Option field to the left of the most recent WTR job and press the Enter key.

If the writer has ended, take menu option 4 (Work with spooled files) on the Work with Job panel. From the Work with Job Spooled Files panel, select Option 5 (Display) to display the QPJOBLOG spooled file or Option 2 (Change) to requeue the spooled file to a different output queue so it can be printed and investigated. Make any suggested corrections, restart the wtr, and re-submit the job.

If the writer is still active, select menu option 10 (Display job log, if active or on job queue) on the Work with Job panel. Press the F10 key and the Page Up and Page Down keys to view the messages in the writer job log.

### Additional Information

---

The success of \*LAN 3812 SNMP device descriptions is dependent on the configuration settings in OS/400 as well as on the printer and print server hardware. For more information about configuring the time-out values on the printer and print server hardware and common error messages that you can receive when printing through a \*LAN 3812 SNMP device description, please refer to the following document:

19935220 Configuration Settings and Error Messages for \*LAN 3812 SNMP Device Descriptions located on the /400 support line Knowledge base Web site.

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# 13

## *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
- Printer management utility (PMU)

#### **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 Ethernet Interfaces and printers.
- AGENTS are utilities that reside on devices, such as a Ethernet Interface, 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)

### Components Of The Printer MIB

The printer MIB gives the network manager access to most of the information that is normally accessible through the Ethernet Interface command set for configuring the server with SNMP. Some objects identified by this MIB are not applicable to the Ethernet Interface.

The printer MIB is composed of the following sections:

- General
- Cover
- Localization
- Input
- Output
- Marker
- Media Path
- Channel
- Interpreter
- Console
- Alert

## Information Provided By The MIB

The printer MIB contains the following types of information about network printers:

**Descriptions.** Printer configuration, location, and contact.

**Status.** Current operating status of printers.

**Alerts.** Reportable events from printers.

## General Information About MIBs

For further information on SNMP and MIB, refer to the following:

- RFC 1155 — Structure and Identification of Management Information for TCP/IP-based Internets (SMI)
- RFC 1156 — Management Information Base for Management of TCP/IP Internets (MIB)
- RFC 1157 — A Simple Network Management Protocol (SNMP)
- The Simple Book: An Introduction to Management of TCP/IP-based Internets

## Getting The Latest MIB Information

To obtain the latest copy of these and other RFCs, FTP the files from one of the following two sources:

Internet:

`ftp://ftp.isi.edu/internet-drafts`

World Wide Web:

`http://www.ietf.cnri.reston.va.us/lid-abstracts.html`

## SNMP

---

SNMP is the protocol used to communicate between manager and agent. Managers request information, usually through automated polling at specified intervals, and agents respond. Though used primarily on TCP/IP networks, SNMP can be implemented on other protocols, for example, IPX.

SNMP is a standard by which a network manager can get statistics and configuration information from the Ethernet Interfaces and other devices on the network. This is done through a Network Management Station (NMS) such as NetView®.

## The Printer Management Utility Software (PMU)

---

The IBM printer manager utility is a versatile and dynamic program. 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 *IBM Printer Management Utility User's Manual* for more details on this tool.

## 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.

## OS/2 TCP/IP

---

To get SNMP.EXE to work correctly to browse MIB items, you may need to delete the following file:

d:\mptn\etc\mib2.tbl

## 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.

## 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.

**Chapter 13** Monitoring Tools

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# 14

## *IBM Network Printer Manager*

### Overview

---

IBM Network Printer Manager (NPM) lets network administrators monitor, control, and configure IBM 6400 printers in various environments. NPM works with the IBM 6400, the network printer family, including IBM Infoprint 20 and 32 (except for NPM for OS/2), and IBM Network Printers 12, 17, and 24. For the Windows and IP and Web versions, you can also use NPM with other manufacturer's network printers that comply with RFC 1759, such as the Hewlett-Packard\*\* LaserJet\*\* 5si and the Lexmark\*\* Optra\*\* N.

**NOTE:** IBM 6400 is supported only in the "web" and NT versions, not OS/2.

Using NPM, administrators can:

- View the status of each printer, such as its alarm conditions
- View and change printer properties, such as the default input tray
- View and change printer network properties, such as the NetBIOS printer network workgroup name
- Add new network services to printers so you can customize the environment, such as creating high- and low-priority print services.

For detailed information on how to use NPM, please refer to NPM online help.

## Chapter 14 IBM Network Printer Manager

---

You can configure NPM using either the TCP/IP or NetBIOS network protocols, and use TCP/IP to monitor the printers.

NPM is available on the World Wide Web. To obtain the latest version of NPM:

1. Access the IBM Printing Systems Home Page at:  
`http://www.printers.ibm.com`
2. Navigate to IBM Network Printer Manager.
3. Follow the instructions to download NPM. Installation instructions are in the README file.

**NOTE:** NPM for Windows NT requires that a specific SNMP R/W community name be defined in the printer before it can be successfully discovered. The SNMP R/W community name must be set to `ibmpsc_admin` with the following telnet commands:

```
set user passwd snmp ibmpsc_admin
save
```

---

# 15

## *Commands*

---

### Command Shell Overview

---

The Ethernet Interface 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**

---

This command shell can be accessed by:

- built in HTML forms
- a Telnet session from a TCP/IP host to the Ethernet Interface
- a single remote shell command (e.g., `rsh`, `rcmd`, `remsh`) from a TCP/IP host

#### **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 Ethernet Interface 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.

## Chapter 15 Complete Command List

---

**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 Ethernet Interface 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 Ethernet Interface command set including the command syntax, a description, and in most cases, an example for each command listed.

**NOTE:** If you see the word *ifnum* in any npsh commands, you should substitute a `1` unless told otherwise. This `1` represents the one network interface (e.g., Ethernet) supported.

## Store Commands

---

These commands change the settings stored in flash memory and do not affect the current or working settings in memory. A power cycle is needed before the stored settings become current.

```
store ifc ifnum utp [-]li [-]rx
```

```
example: store ifc 1 utp li
```

Modify the physical UTP interface properties where `li` enables link integrity and `rx` enables the increased receive threshold.

```
store ifc from default
```

Set all UTP settings back to factory defaults.

```
store ifc from current
```

Store all current UTP settings to flash memory so they are retained after a power cycle. This ensures all current settings match what is stored in flash memory.

```
store pserver opts [[-]jobsecurity]
[jobtimeout seconds]
```

```
example: store pserver opts jobsecurity jobtimeout 5
```

If `jobsecurity` is disabled, any user can cancel queued jobs on the Ethernet Interface including guest users. If `jobtimeout` is set to some value other than 0, the Ethernet Interface will only wait this amount of `seconds` when getting printer feedback. This is only used if you have a logpath port and type set on a particular destination.

```
store pserver opts [[-]jobsecurity]
[jobtimeout <SECONDS>] [[-]jobcontrol]
```

```
example: store pserver opts [-]jobcontrol
```

If `jobcontrol` is disabled then the need for start of job / end of job flow control with the printer is determined by the printer. Job flow control is used for jobs requiring backchannel responses such as IPDS. This is available as a performance enhancement for LPR, TCP socket printing etc. When `jobcontrol` is enabled all jobs will be supported with job flow control.

## Chapter 15 Complete Command List

---

**NOTE:** When jobcontrol is disabled, dynamic config loading on a model change is also disabled.

Default : enabled

```
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 does 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 does not match, then the job is automatically routed to the first destination and the service is accepted.

Default : enabled

```
store pserver tcpsocket TCPportnumber port  
newTCPportnumber
```

example: store pserver tcpsocket 4000 port 5000

Change a pre-defined *TCPportnumber* on the Ethernet Interface to a *newTCPportnumber*. The default number is 9100 for prn.

```
store pserver tcpsocket TCPportnumber dest destination
```

example: store pserver tcpsocket 5000 dest dlprn

Assign a pre-defined *TCPportnumber* to a particular *destination* on the Ethernet Interface. 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 novell passwd password
```

example: store pserver novell passwd mplex

Store the *password* for the Ethernet Interface to use when logging in to a Novell file server. This *password* would have to match one set on the file server.

## Store Commands

---

```
store pserver novell user name username
```

```
example: store pserver novell user name micro1
```

Define a *username* on the Ethernet Interface to be used when it logs in to a Novell file server to find information. This *username* must match a user pre-defined on the Novell file server.

```
store pserver novell user passwd password
```

```
example: store pserver novell user passwd mplex2
```

Define a *password* on the Ethernet Interface for the Novell user already defined. This *password* must match the one stored on the Novell file server. Passwords are optional as long as there is not one defined on the file server for the user.

```
store pserver novell fserver add|del fileservername
```

```
example: store pserver novell fserver add fs1
```

Add or remove a server entry on the Ethernet Interface for the Novell file server it will be servicing.

```
store pserver novell frametype 802.2|802.3
```

Sets the frame type for the Novell protocol.

```
store pserver smb workgrp newworkgroupname
```

```
example: store pserver smb workgrp eng
```

Define a different Windows workgroup as defined by *newworkgroupname* for the Ethernet Interface to be visible within (should be 14 characters or less). By default, the print server only comes up within the group called "WORKGROUP."

```
store pserver 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.

## Chapter 15 Complete Command List

---

```
store rprinter add|del printservername printernumber
destination
```

```
example: store rprinter add pserver1 0 d1prn
```

Add or delete the RPRINTER settings on the Ethernet Interface for a Novell environment. The *printservername* must be the name of an existing PSERVER.NLM on your Novell file server. The *printernumber* is the printer number within this PSERVER.NLM. The *destination* is the queue on the Ethernet Interface where the print jobs will be sent to.

```
store tcpip ifnum addr IPaddress
```

```
example: store tcpip 1 addr 192.75.11.9
```

Store the IP address for the Ethernet Interface.

```
store tcpip ifnum mask netmask
```

```
example: store tcpip 1 mask 255.255.255.0
```

Store the subnet mask for the Ethernet Interface.

```
store tcpip ifnum opts [[-]rarp] [[-]bootp] [[-]dhcp]
```

```
example: store tcpip 1 opts -rarp -bootp -dhcp
```

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

```
store tcpip ifnum frametype [[-]ethernet2]
[[-]802.2snap]
```

```
example: store tcpip 1 frametype ethernet2 802.2snap
```

Control which frame type(s) is supported with the TCP/IP protocol. By default, both Ethernet2 and 802.2snap are enabled, but normal TCP/IP communications rely on Ethernet 2. This setting has no affect on other supported network protocols (e.g., Novell).

---

## Store Commands

```
store tcpip route add|del host|net IPaddress ifnum
```

```
example: store tcpip route add net 192.75.12.0 1
```

Add or delete a static route to a particular TCP/IP host or subnet specified by *IPaddress* so the Ethernet Interface 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 add|del default routerIPaddress ifnum
```

```
example: store tcpip route add default 192.75.11.1 1
```

Store a default router/gateway defined by *routerIPaddress* so the Ethernet Interface 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 tcp rxwin packets
```

```
example: store tcpip tcp rxwin 2
```

Determine the receive window size for the Ethernet Interface. Usually the *packets* value ranges from 2 to 8, with the lower number allowing for more simultaneous TCP connections with the print server.

```
store tcpip tcp opts [-]keepalive [-]disbufmgmt
```

```
example: store tcpip tcp opts keepalive -disbufmgmt
```

Control whether the Ethernet Interface maintains a connection with a host when data cannot be accepted into its buffer. Normally the *keepalive* feature is enabled so when the printer cannot accept data, the print job connection is maintained and continued once the situation clears. If *disbufmgmt* is disabled (i.e., "-"), the Ethernet Interface will not buffer any data when there is a blocked situation with the printer. Normally, it is best to have both *keepalive* and *disbufmgmt* enabled.

## Chapter 15 Complete Command List

---

```
store tcpip tcp opts zeroIPArp
```

```
example: store tcpip tcp opts zeroIPArp
```

If zeroIPArp is disabled then a Ethernet Interface 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 an Ethernet Interface with an IP address of 0.0.0.0 then any attempted access with a valid IP address is assumed for this Ethernet Interface and an Arp lookup is performed.

Default: enabled

```
store tcpip tcp access [root] add|del IPaddress
```

```
example: store tcpip tcp access add 192.75.11.25
```

Add or remove an entry from the Ethernet Interface TCP access list defined by *IPaddress*. If the list has an entry, only this host can print to and remotely interact with the print server.

```
store tcpip from default
```

Set all TCP/IP network settings back to factory defaults.

```
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.

### Set Commands

---

These settings alter the current or working settings in memory only. Therefore, they will be lost if the Ethernet Interface is power cycled. To ensure this does not happen, issue a *save* command so the current settings get written to flash memory.

```
set date year month day
```

```
example: set date 1997 02 10
```

Set the current date noting the four-digit *year*, the two-digit *month* from 1 through 12, and the *day* (the number in the month). If the Ethernet Interface is reset, this value will be lost so you will need to set the date again.

## Set Commands

---

set dest *destination* name *newname*

example: set dest dlprn name thermal

Change the current name of the *destination* to a new name as indicated by *newname*. This *newname* must be nine characters or less or it will be truncated. These names are case sensitive.

set dest *destination* backchannel prn [*prn*]

example: set dest dlprn backchannel prn

Establish a return path for printer feedback for a given *destination*. The Ethernet Interface 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 *destination* model *modelname*

example: set dest dlprn model m4

Associate a model with a destination. Jobs sent to the named *destination* are processed according to the options defined in the named model.

set dest *destination* logpath *logpathname*

example: set dest dlprn logpath l4

Associate a logpath with a destination. Jobs sent to the named *destination* are logged according to the settings defined in the named logpath.

set dest *destination* service [[-]socket] [[-]lpd] [[-]lpsched] [[-]rprinter] [[-]pserver] [[-]netbios] [[-]ftpd]

example: set dest dlprn service -netbios

Set the *destination* 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:

<b>socket</b>	Direct socket printing via TCP/IP.
<b>lpd</b>	LPR printing with TCP/IP, including LPR clients on any platform.
<b>lpsched</b>	LP or System V printing with TCP/IP.
<b>rprinter</b>	Novell RPRINTER support.
<b>pserver</b>	Novell PSERVER support.

## Chapter 15 Complete Command List

---

**netbios** Windows 95 and Windows for Workgroups printing.

**ftpd** Printing using the File Transfer Protocol (FTP) via TCP/IP.

`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 logpath name newname`

example: `set logpath l1 name pagecount`

Change the current name of the *logpath* to a new name as indicated by *newname*. This *newname* must be nine characters or less or it will be truncated. These names are case sensitive.

`set logpath logpath type [[-]job] [[-]user] [[-]pgcnt] [[-]cksum] [[-]printer] [[-]ioport]`

example: `set logpath l2 type job user printer pgcnt`

Establish the type of printer and print job logging to be done within this *logpath*. The options are:

**job** Job ID, username, etc.

**user** User ID along with three messages per job about start and finish.

**pgcnt** For total pages printed in a job.

**cksum** 16-bit checksum value to confirm integrity of data printed.

**printer** For special printer feedback.

**ioport** Printer error messages determined through the parallel port pins.

## Set Commands

---

```
set logpath logpath port TCPportnumber | email | syslog
```

```
example: set logpath l3 port 2000
```

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

***TCPportnumber*** TCP port number ranging from 1024 to 65000.

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

**syslog** A central TCP/IP host running the SYSLOG daemon. This host is set using the `set sysinfo syslog IPaddress` command.

```
set logpath from default
```

Set all `logpath` settings back to factory defaults.

```
set logpath from stored
```

Set all current `logpath` settings to the values stored in flash memory.

```
set model model name newname
```

```
example: set model m1 name landscape
```

Change the current name of the `model` to a new name as indicated by `newname`. This `newname` must be nine characters or less or it will be truncated. These names are case sensitive.

```
set model model type raw
```

```
example: set model m2 type raw
```

Set the `model` `type` to `raw` so that it does not process the data passing through it in any way.

```
set model model banner [ps|text|auto [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. `auto` will determine which type is needed depending on the type of print job data passing through. By default, banner pages are added to the front of the job. If `after` is set, the banner page will come at the end.

## Chapter 15 Complete Command List

---

```
set model model stty [[-]onlcr] [[-]descramble] [xtab  
tablength|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, `npscrumble`.

**xtab** Tab expansion from 1 to 16 spaces.

```
set model model header headerstring
```

example: `set model m7 trailer $FF`

Set a header string to be sent to the printer at the end of any print jobs passing through this *model*. The *headerstring* 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.

```
set model model config [config_num]
```

Set the printer configuration number *config\_num* to be loaded prior to printing a job on the specified printer model. If *config\_num* is omitted, the model resets to the default, which means no configuration is associated with it. If *config\_num* is 0, the factory configuration loads before the job prints. If *config\_num* is in the range 1 through 8, the corresponding configuration number loads before the job prints.

```
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 Commands

---

set prn [-]autofd

example: set prn -autofd

Assert or do not assert the AUTOFD line for carriage return insertion. This only affects printers that support this function, such as impact printers.

set prn flush

Flush the data in the parallel port input and output buffers.

set prn unlock

Release the access lock on the parallel port.

set prn timeout *minutes* |none

example: set prn timeout none

Terminate the print job sent to the parallel port if it is not printed after the timeout period in *minutes* expires. The *minutes* value ranges from 0 though 255, with 0 indicating no timing out to take place. This is the default setting and should be fine for most print setups.

set prn [-]opost

example: set prn -opost

Allow or disallow output processing on the parallel port such as carriage return insertion (e.g., onlcr).

set prn [-]onlcr

example: set prn -onlcr

Enable or disable carriage return insertion on the parallel port. This may be needed for Unix text jobs coming through with solitary linefeeds. This feature is almost always set at the model level rather than the I/O port level.

set prn xtab *tablength* |none

example: set prn xtab none

Set the tabstop width as indicated by *tablength*. The range is 1 through 16 spaces.

set prn from default

Set all parallel port settings back to factory defaults.

set prn from stored

Set all current parallel port settings to the values stored in flash memory.

## Chapter 15 Complete Command List

---

`set snmp`

To add a user named `snmp` with root privileges, follow the steps below:

1. Login to the Ethernet Interface as a root user.
2. Add a user named `snmp`:  
`set user add snmp`
3. Set the user type to `root`:  
`set user type snmp root`
4. Set the password for the `snmp` user:  
`set user passwd snmp snmppassword`
5. Save the changes:  
`save`

The user `snmp` is now created and `snmppassword` is the only community string which will allow write access.

`set snmp manager index ipaddress trap-community`

The Ethernet Interface continuously generates traps. To set the Ethernet Interface to send traps to a particular SNMP manager, use this command to add an SNMP manager to the trap table.

The *index* is the index number of the trap table. *ipaddress* is the IP address of the SNMP manager receiving traps. The *trap-community* is the community string sent along with the trap information.

`set snmp trappport index udpport`

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.

The *index* is the index number of the SNMP trap manager table. *udpport* is the desired UDP port number. Acceptable values are 162, and 49152 through 65535.

## Set Commands

---

```
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 Ethernet Interface 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.

The *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).

The *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.

The *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.

The *index* is the index number of the SNMP alert table. “active” enables the short e-mail format, “-active” disables it.

## Chapter 15 Complete Command List

---

```
set snmp syslog index [-]active
```

The Ethernet Interface can also log SNMP alert messages to the defined SYSLOG host (see the ‘set sysinfo syslog’ command description). Use this command to enable or disable logging of alert messages for an SNMP alert table entry.

The *index* is the index number of the SNMP alert table.

“active” enables alert message logging, “-active” disables it.

```
set snmp alerts index [-]all | [[-]warning]
[[-]offline] [[-]mediainput] [[-]mediaoutput]
[[-]mediapath] [[-]marker] [[-]cutter] [[-]barcode]
[[-]scanner] [[-]intervention] [[-]consumable]
[[-]label]set snmp alerts 1 warning -cutter]
```

example: enable warning alerts and disable cutter alerts for SNMP table entry 1

This specifies which alert groups are enabled for reporting via an SNMP manager, e-mail alert message, and/or Unix syslog daemon. See Table 4 on page 59 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.

```
set sysinfo name newname
```

example: set sysinfo name salesprinter

Set a descriptive name defined by *newname* for Ethernet Interface identification purposes. This is not used in the operation of the print server in any way.

```
set sysinfo location description
```

example: set sysinfo location salesdept

Set the physical location of the Ethernet Interface. This is for identification purposes and is not used in the operation of the print server in any way.

## Set Commands

---

```
set sysinfo contact contactname
```

```
example: set sysinfo contact Paul_Harris
```

Set a person or department to contact in case of print server trouble.

```
set sysinfo loginfo [-]sys | [-]tcp | [-]ipx | [-]spx
```

```
example: set sysinfo loginfo -sys ipx
```

Set the Ethernet Interface debugging information type. Usually this information includes unexpected errors or exceptions from the print server divided into these groups:

<b>sys</b>	General system messages
<b>tcp</b>	TCP stack messages
<b>ipx</b>	IPX stack messages
<b>spx</b>	SPX stack messages

**NOTE:** This is not printer or job logging information.

```
set sysinfo logport null|syslog
```

```
example: set sysinfo logport null
```

Define to where the debugging information should be sent. This can be sent to an output device off of the Ethernet Interface I/O port or to a central TCP/IP host running a SYSLOG daemon.

To set TCP/IP host, use the command `set sysinfo syslog hostIPaddress`.

```
set sysinfo email emailaddress
```

```
example: set sysinfo email JohnDoe@IBM.com
```

Define the user email address to receive printer and job logging information from a particular logpath on the Ethernet Interface.

Email name is the host or IP name of the user.

```
set sysinfo smtp IPaddress [port portnumber]
```

```
example: set sysinfo smtp 192.75.11.5 port 25
```

Define the SMTP (Simple Mail Transfer Protocol) server IP address and port number where the mail is stored on your network.

Default: Unconfigured, 25

## Chapter 15 Complete Command List

---

```
set sysinfo email emailname@domain
```

```
example: set sysinfo email joe@IBM.com
```

Define the user email address to receive printer and job logging information from a particular logpath on the Ethernet Interface.

```
set sysinfo syslog hostIPAddress
```

```
example: set sysinfo syslog 192.75.11.30
```

Set the IP address of the host running the SYSLOG daemon. Ethernet Interface debugging or print job and printer logging information can be sent to that IP address.

```
set sysinfo dns DNSserverIPAddress
```

```
example: set sysinfo dns 192.75.11.2
```

Set your DNS server IP address so the Ethernet Interface can resolve host names when used with its built-in Telnet and ping clients.

```
set sysinfo module [[-]novell] [[-]netbios]
```

```
example: set sysinfo module -novell
```

Enable and disable certain network protocol stacks within the Ethernet Interface. Sometimes it helps to disable any protocols you are not using on your network.

```
set user add|del username
```

```
example: set user add eng
```

Add or remove a user on the Ethernet Interface defined by *username*.

### IMPORTANT

**Do not delete the root user, or you will be unable to configure any further settings on the print server. You will have to go back to factory defaults to correct this problem.**

```
set user passwd username password
```

```
example: set user passwd eng mplex1
```

Assign a password to a defined user on the Ethernet Interface. This password must be less than eleven characters.

## Set Commands

---

```
set user type username 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 Ethernet Interface.

```
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 variablename variablestring
```

```
example: set var LANDSCAPE 0x1b 0x26 0x6c 0x31 0x4f
```

Define a new variable to be used in header, trailer, or switch strings on the Ethernet Interface and call it *variablename*. The *variablestring* 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 *variablestring* with hexadecimal values, as shown in the example.

**NOTE:** One variable counts as one element within header and trailer strings.

**NOTE:** 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.

`list arp`

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

`list date`

List the current date on the Ethernet Interface.

`list dest`

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

`list diff`

List the differences between the current settings and the stored settings in flash memory. Normally, you want these values to match, so issue a `save` command followed by a `reset` command.

`list ifc`

List the current UTP interface settings (e.g., link integrity).

`list key`

List the license details and license key number.

`list logins`

List any active user logins on the Ethernet Interface.

`list logpath`

List the current logpath settings (e.g., names and mapped destinations).

`list model`

List the current model settings (e.g., names and mapped destinations).

`list pserver`

List the current general print server settings (e.g., print server name and Novell mode).

## List Commands

---

- `list prn`  
List the current parallel port setting (e.g., mode).
- `list rprinter`  
List any current RPRINTER definitions.
- `list snmp`  
List the Trap Table containing SNMP Managers.
- `list sysinfo`  
List the current Ethernet Interface 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 time`  
List the current time on the Ethernet Interface.
- `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`).

## Miscellaneous Commands

---

These commands do not fall under any specific section of the command shell, but they are used quite frequently.

`save [default]`

Save the current settings to flash memory so they are available after power cycles. `Sysinfo`, `destination`, `model`, `logpath`, `variable`, `user`, and I/O port settings will be saved. If `default` is specified as well, factory settings will be saved, overwriting any new settings you have configured.

`reset`

Perform a warm boot or hardware reset to simulate a power-on reset. This restores current settings to those stored in flash memory, since the flash memory settings will be read and loaded into memory upon bootup.

`load [default]`

Load the settings stored in flash memory and use them as the current or working settings. If `default` is specified as well, factory settings will be loaded.

`lpstat [ioport] [jobID]`

example: `lpstat prn`

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

`cancel jobID`

example: `cancel d1prn-10`

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

## Miscellaneous Commands

---

`start fox|tts|loopb prn`

example: `start fox prn`

Begin a debugging test on one of the I/O ports on the Ethernet Interface. The tests available are:

- |              |  |
|--------------|--|
| <b>fox</b>   | A continuous stream of text sent to the attached printer. This is a good test for troubleshooting hardware as long as the attached printer supports text output. |
| <b>tts</b>   | A continuous stream of Gandalf 400C TTS-compatible text sent to the attached printer.  |
| <b>loopb</b> | Loopback test. Any input characters from the device attached to the I/O port is echoed back.   |

`stop prn`

Stop an output test on an I/O port.

`disable ioport|destination`

example: `disable prn`

Disable an *I/O port* so that queued jobs are not printed, or disable a *destination* so jobs cannot be queued to it.

`enable ioport|destination`

example: `enable prn`

Enable an *I/O port* so that queued jobs are printed, or enable a *destination* so jobs can be queued to it.

`close tcp TCPindexnumber`

example: `close tcp 3`

Close the a TCP/IP connection between a TCP/IP host and the Ethernet Interface. The *TCPindexnumber* can be retrieved from “debug tcp” output.

## Chapter 15 Complete Command List

---

`ping [-s] hostIPAddress [datasize [packetnumber]]`

example: `ping 192.75.11.30`

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

`telnet hostIPAddress [escapecharacter]`

example: `telnet 192.75.11.35`

Start a Telnet session with another TCP/IP host specified by *hostIPAddress* on the Ethernet Interface network. If *escapecharacter* is used, it resets the key sequence used to exit the Telnet session. It will return you to the `telnet>` prompt where you can execute `quit`. Use the `keycode` command to find out exact escape characters if needed. The default character is CTRL ].

**NOTE:** To use a host or IP name instead of the address, you must have set the DNS server on the Ethernet Interface. Use the command `set sysinfo dns...` to do this.

`chr string`

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

`keycode`

Determine the hexadecimal value for a key to be used as the escape character with the Ethernet Interface built-in `telnet` command.

---

# 16

## *Extra Features*

---

### **Ethernet Interface Security**

---

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

#### **Users And Passwords**

---

The Ethernet Interface supports two user types:

<code>root</code>	Access to everything within the print server including all configurable settings.
<code>guest</code>	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 Ethernet Interface configuration. `Guest` users cannot alter the print server configuration in any way.

To configure a `root` password on your Ethernet Interface:

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
```

## Chapter 16 Ethernet Interface Security

---

2. Direct your Web browser to URL:  
`http://EthernetInterfaceIPAddress/  
adminConf.html`  
(e.g., `http://192.75.11.9/adminConf.html`).

**NOTE:** If prompted for a “User ID” and password first, type `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 the SUBMIT button when done and physically repower the print server to make the new setting take effect.

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

```
set user from default  
save
```

## TCP Access Lists

---

Within TCP/IP environments, the Ethernet Interface 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 Ethernet Interface.

To view the current access list on the print server:

1. Start a Telnet session with the Ethernet Interface.

Syntax:

```
telnet EthernetInterfaceIPAddress
```

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 Ethernet Interface services. If there are entries in the list, only those hosts specified have access to printing and remote command execution.

To add and delete access list entries, the commands are:

Syntax:

```
store tcpip tcp access add|del hostIPAddress |  
networkaddress  
reset
```

where *hostIPAddress* is the IP address of a TCP/IP host on your network and *networkaddress* is the address of a subnet on your network.

## Chapter 16 Printer Monitoring And Logging

---

Example:

```
store tcpip tcp access add 192.75.11.25
store tcpip tcp access add 192.75.12.0
store tcpip tcp access del 192.75.11.25
reset
```

**NOTE:** Although the maximum number of entries in the access list is 10, each entry can refer to a network rather than a specific host. This allows all hosts on that specified network and any individual hosts specified in the list to have access.

## Printer Monitoring And Logging

---

The Ethernet Interface allows you to monitor printer status and log information through its built-in HTML forms, command set, and logpaths.

### Printer And Print Job Monitoring

---

To view the current status of an I/O port on the Ethernet Interface, two methods are available:

- select the desired I/O port on the “Status” HTML form (i.e., `http://EthernetInterfaceIPAddress/indexStatus.html`; e.g., `http://192.75.11.9/indexStatus.html`) that comes with the Ethernet Interface.
- enter the `lpstat` command directly on the print server once logged in as `guest` or `root`.

In each case, you are given a description of each I/O port status and a list of queued jobs. Table 8 describes some of the common terms you may encounter.

---

## Printer Logging Through Logpaths

---

**Table 8. Key Printer Logging Terms**

Term	Description
idle	There is no job queued for the Ethernet Interface I/O port.
blocked	The printer is not allowing the Ethernet Interface to send data to it. Check that there is not a printer error and it is online and ready to go.
waiting	The Ethernet Interface knows about a print job but is waiting for the host to send more data or to send an expected packet.

## Printer Logging Through Logpaths

---

In the Ethernet Interface product manual, destinations are described as logical queues with associated models and logpaths. Models determine if any extra processing is needed with the print jobs passing through, and logpaths determine whether any logging is needed for each job.

Each logpath on the Ethernet Interface consists of two parts:

TYPE	The type of log information to be captured. The choices are <code>job</code> for job ID and username, <code>user</code> for user ID (and three messages per job), <code>pgcnt</code> for total pages printed in a job, <code>cksum</code> for file checksums, <code>printer</code> for special printer feedback, and <code>ioport</code> for parallel printer status messages.
PORT	Where this log information will be sent to. The choices are a TCP port number (e.g., 2000), an email address (including an alias), or a central host running a SYSLOG daemon.

## Chapter 16 Printer Monitoring And Logging

---

To view the current logpath settings on the print server:

1. Load a Web browser on a network station that can communicate with the print server over TCP/IP or using Telnet (e.g. Telnet *ipaddress*). The command to view the logpath settings is:

Syntax:

```
list logpath
```

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

2. Direct your Web browser to URL  
**http://NICIPaddress/destConf.html**  
(e.g., <http://192.75.11.9/destConf.html>).

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

3. At the “Print Path Configuration” HTML form that displays, select a destination link (e.g., d1prn) from the top of the page to bring up the appropriate destination form.
4. Once the desired destination HTML form displays, scroll down to the “Logpath Type” and “Logpath Port” sections to view the current logpath settings for this particular destination.

At this point, you can alter any of these settings and then click the SUBMIT button to store them into the NIC. Remember to repower the NIC to make the settings take effect.

## Ethernet Interface 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.

## Chapter 16 Ethernet Interface Naming Schemes

---

---

# 17

## *Glossary*

<b>ARP</b>	Address Resolution Protocol. Associates a selected IP address with a network device Ethernet address.
<b>bps</b>	Bits per second.
<b>Centronics</b>	Parallel port interface standard found on most printers.
<b>daemon</b>	A continuously running process that handles system-wide functions like print spooling.
<b>default router</b>	Local device that forwards any IP packets destined for another subnet.
<b>destination</b>	Logical print queue on the NIC to which hosts send their print jobs. There are eight destinations by default.
<b>DHCP</b>	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.
<b>Download Mode</b>	Refers to the condition of the NIC when in a startup condition, downloading configuration information.
<b>DNS</b>	Domain Name Server. Host providing responses to queries for a given host name IP address.

<b>EEPROM</b>	Electrically Erasable/Programmable Read-Only Memory.
<b>factory defaults</b>	Settings shipped with the NIC.
<b>Factory Settings</b>	S2 jumper position stating all factory default settings are to be used while the NIC is up and running.
<b>Firmware Panic</b>	Unrecoverable errors detected by the NIC firmware force the Print Server into Firmware Panic mode. Manually reset the NIC to resume operation.
<b>Flash</b>	Stores firmware code and configurable settings. Allows for upgrades without replacing hardware inside the NIC.
<b>FTP</b>	File Transfer Protocol. Used for transferring files from one TCP/IP host to another and used in the upgrade process.
<b>gateway</b>	A hardware device that translates data between two incompatible networks.
<b>gateway address</b>	The IP address of a gateway.
<b>Hardware Exception</b>	Bus errors, address errors, and illegal instructions force the NIC into this NIC non-operational mode.
<b>HTML</b>	HyperText Markup Language. Format used for documents viewable on the World Wide Web.
<b>ifnum</b>	Interface Number. Represents the network interface. With a NIC, this will always be "1" for Ethernet.
<b>interface script</b>	Unix host filter file that processes the print job before it is sent over the network to the NIC.
<b>I/O port</b>	Port for attaching peripherals to. The NIC provides four: PRN1, PRN2, COM1, COM2.

---

<b>IP Address</b>	The Internet Protocol Address. A numeric address such as 123.45.61.23 which identifies a printer or server in a LAN or WAN.
<b>LAN</b>	Local Area Network.
<b>LED</b>	Light Emitting Diode. The printer has an LED display which shows the status of the printer to the operator.
<b>logpath</b>	Determines the type of print job and printer logging needed per job. One logpath is associated with every destination.
<b>LPD/LPR</b>	Line Printer Daemon. The most common TCP/IP remote printing protocol that crosses all hardware utilizing IP.
<b>MIB</b>	Management Information Base. A set of variables (database) managed by an SNMP manager application.
<b>model</b>	Defines how a print job should be processed (e.g., banner pages added, ASCII to PostScript conversion) as it passes through the NIC. One model is associated with every destination.
<b>NetBIOS</b>	Network Basic Input Output System. Common interface among PC networks.
<b>Monitor Mode</b>	Refers to the condition of the NIC with no configuration or IP address loaded.
<b>npsh</b>	Extensive built-in command shell within the NIC.
<b>PDF</b>	Portable Document Format. Encodes different types of documents enabling them to be read across multiple platforms.
<b>ping</b>	Standard command to test a TCP/IP connection. (e.g., <code>ping 192.75.11.9</code> )

<b>print path</b>	Three-stage path a print job takes when it is sent from a host to a printer through the NIC.
<b>protocol</b>	A set of rules or conventions governing the exchange of information between computer systems or between a printer and a host computer. For computer printers, a protocol is the coding convention used to convey and print data. A printer protocol includes codes for printing text and graphics, as well as codes instructing the printer to perform special operations and machine-to-machine communication codes.
<b>PSERVER</b>	Print Server. A Novell print method where the NIC continuously polls the Novell file server print queue looking for print jobs.
<b>RAM</b>	Random Access Memory. Volatile memory within the NIC that contains current/working settings. Settings are lost once the power is removed.
<b>RARP</b>	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.
<b>ROM</b>	Read-Only Memory.
<b>router</b>	A device that forwards IP packets to their destination. Also called a gateway.
<b>RPRINTER</b>	Remote Printer. A Novell print method where the NIC waits for jobs to be sent to it from a defined PSERVER.
<b>SNMP</b>	Simple Network Management Protocol. A standard protocol used to monitor network devices called "SNMP agents."

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<b>socket</b>	TCP connection between two hosts consisting of a source and destination TCP port number at each end.
<b>subnet mask</b>	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.
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol. Suite of protocols that act as the base protocol for the Internet.
<b>TCP port</b>	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.
<b>telnet</b>	Command and protocol to establish a terminal connection between two hosts on an IP network.
<b>UTP</b>	Unshielded Twisted Pair. A cable used for telephone and computer-to-computer connections.
<b>WAN</b>	Wide Area Network.

**Chapter 17**

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