IBM Infoprint 21
IBM Infoprint 45

IBM

Ethernet and Token Ring Configuration Guide

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> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information in
> "Appendix D. Notices" on page 215.
>
> Also, please note that updated versions of publications, drivers, and utilities may be available from the IBM
> Printing Systems home page at:
>
> `http://www.ibm.com/printers`

Contents

Book at a Glance

> **Note**
>
> This book is only for Infoprint 21 and Infoprint 45. See G544–5240 for the following printers:
>
> - IBM Infoprint 20, 32, and 40
> - IBM Network Printers 12, 17, and 24

This book is designed to help you install and configure the IBM Infoprint Ethernet 10/100 PCI Adapter or the IBM Infoprint Token Ring 4/16 PCI Adapter for your printer.

Notes:

1. This book uses the term **network printer** to generically refer to the Infoprint 21 and Infoprint 45.
2. This book uses the terms **network interface card** or **NIC** to generically refer to the IBM Infoprint Ethernet 10/100 PCI Adapter and the IBM Infoprint Token Ring 4/16 PCI Adapter. Some networking software uses the term **printer network card**.

Server-to-Printer Attachments Described in this Book

This book describes the server-to-printer attachments described in the following table. Direct attachment of multiple machines to the printer, without the use of a print server, is also described for OS/2 and Windows systems.

Table 1. Server-to-printer Attachments

Server Environment	Server-to-Printer Protocol	Datastreams
AIX	TCP/IP	ASCII, IPDS, PCL, PostScript
Apple	AppleTalk: • EtherTalk • TokenTalk	PostScript
AS/400	TCP/IP	EBCDIC, IPDS, PCL, PostScript
MVS	TCP/IP	IPDS, PCL, PostScript, Line Data
Novell NetWare	IPX/SPX	ASCII, PCL, PostScript

Table 1. Server-to-printer Attachments (continued)

Server Environment	Server-to-Printer Protocol	Datastreams
OS/2 • LAN Server • LAN Manager	• TCP/IP • NetBIOS	ASCII, PCL, PostScript
LINUX	TCP/IP	ASCII, PCL, PostScript
SUN Solaris	TCP/IP	ASCII, PCL, PostScript
HP-UX	TCP/IP	ASCII, PCL, PostScript
SCO UNIX	TCP/IP	ASCII, PCL, PostScript
Windows	• TCP/IP • NetBIOS	ASCII, PCL, PostScript, IPDS

Notes:

1. To print IPDS, you must install the optional IBM AFP/IPDS Module in the printer. You will also need to install Infoprint Manager for AIX (or NT), Infoprint Server for OS/390, PSF/400, or PSF/MVS on the host.
2. IPDS must use the TCP/IP protocol.

Contents of the NIC Package

The NIC package includes the following:

- The IBM Infoprint Ethernet 10/100 PCI Adapter or IBM Infoprint Token Ring 4/16 PCI Adapter
- The *Ethernet and Token Ring Configuration Guide* (this book)
- Installation sheet
- Software utilities, like Network Printer Manager (NPM), on CD-ROM
- Other notices and inserts, as required

Note: If something is missing from the NIC package, contact IBM Support (refer to "Product Support" on page xi).

Conventions

Typefaces

Bold	Bold is used for keywords, defined terms, application selections, options, and to draw attention to important terms.
Italic	Identifies command variables and names of publications.

underlining	Underlining is used occasionally to indicate alternatives or for emphasis.
`Examples`	Monospaced text is used for command syntax and examples.
CAPITALS	Used for all command names.

Graphical User Interface Conventions

click or select
> Press the left mouse button once.

double-click, run, or open
> Press the left mouse button twice in quick succession.

key+key
> Press both keys at once. (For example, **ALT+P**.)

NPM When NPM can be used to perform a function described in a chapter or section, you will see an indicator (**NPM**) immediately following the title.

WebPages
> When the printer web pages can be used to perform a function described in a chapter or section, you will see an indicator (**WebPages**) immediately following the title.

Platform-Specific Conventions

This book follows the command name and usage conventions used by the network operating systems, protocols, and environments described here. For example, AIX commands are in lower case, while AS/400 commands are in UPPER case.

Product Support

The IBM Support Center maintains current information about the IBM products described in this book, including updates and fixes to accompanying software. The phone number for the IBM Support Center is 1-800-358-6661. For international support, contact your local Call Center.

Please have the following information available when you call the IBM Support Center:
- Machine code 4322 for Infoprint 21, 4345 for Infoprint 45
- Printer serial number
- A printer configuration page, see page 6
- A network configuration page, see page 7
- A description of the problem
- Error messages and error logs, if appropriate

- Indicator light status on the operator panel and NIC, if appropriate
- A description of the type of hardware involved
- Host system software levels in use at your site
- A description of the network topology

Chapter 1. Start Here—Installation Checklist

> **Important**
>
> The information in this chapter applies to all NIC users. This chapter includes the following sections:
>
> - "NIC Installation Checklist"
> - "Default Parameter Values" on page 4
> - "Accessing the Printer Configuration Page" on page 6
> - "Accessing the Network Configuration Page" on page 7

NIC Installation Checklist

DANGER

<1-13>	Do not connect or disconnect a communication port, a teleport, or any other connector during an electrical storm.

hcsf0113

DANGER

<1-14>	Switch off printer power and unplug the printer power cord before connecting or disconnecting a communication port, a teleport, or any other attachment connector.

hcsf0114

__ 1. Set up the network printer. Refer to the setup documentation shipped with the printer.

__ 2. Carefully remove the NIC from its anti-static bag.

> **Beware of Static Electricity**
>
> Because static electricity can damage the NIC, care should be exercised when handling one.

___ 3. Write down the NIC MAC address which is located on a sticker on the card itself.

___ 4. Install the NIC in the printer. See page 9. **Do not attach the NIC cable to the network at this point.**

___ 5. Print a printer configuration page to verify the physical installation of the card. See "Accessing the Printer Configuration Page" on page 6. If the "Installed Hardware" section does not show Ethernet or Token Ring, repeat step 4.

___ 6. If you are using TCP/IP, see "Chapter 25. Setting TCP/IP and LAA Addresses" on page 187.

___ 7. If you want to change the MAC address on a Token Ring card to a Locally Administered Address (LAA), see "Setting the LAA on Token-Ring NICs" on page 191. Or use the printer web pages or NPM (see online help for either).

___ 8. Power off the printer and connect the NIC to the LAN cable. Power on the printer. See page 17.

___ 9. Verify the connection to the LAN cable. See "Verifying a LAN Connection" on page 18.

___ 10. Configure your environment. Refer to one of the chapters in the following list.

Windows

> **Note:** The CD-ROM supplied with the NIC contains a setup utility that runs in all Windows environments. The Setup Utility includes a printer setup wizard that can guide you through the network configuration steps. To run the Setup Utility, type:
>
> *drive*: setup
>
> at a command prompt, where *drive* is the letter of your CD-ROM drive.

- "Chapter 4. Windows Platforms on TCP/IP Networks" on page 27
- "Chapter 5. Windows NetBIOS" on page 45
- "Chapter 6. Infoprint Manager for Windows NT and Windows 2000" on page 49

NetWare
- "Chapter 7. NetWare 3.x" on page 57
- "Chapter 8. NetWare 4.x and Above" on page 67

AS/400
- "Chapter 9. Configuring AS/400 for an ASCII Printer" on page 91
- "Chapter 10. Configuring AS/400 for an IPDS Printer" on page 107

MVS and OS/390

UNIX

OS/2

Macintosh

Internet Printing Protocol

Optional Steps

__ 11. TCP/IP, NetWare, AppleTalk, and NetBIOS network protocols are all enabled by default. If you do not use all of these protocols for printing, you can use NPM, the printer web pages, or the printer operator panel menus to disable the unused protocols to reduce network traffic.

__ 12. For more information about monitoring your printer, see "Monitoring Network Printers" on page 199.

Default Parameter Values

Table 2 lists the default parameter values and other information for an IBM NIC.

Table 2. Principal NIC Default Parameters and Conditions

Parameter/Limit	Values	Affected Area
Administrative access to web pages	User ID = **admin** Password = **system**	Printer web pages
SNMP community name	• ibmpsc_admin (Read/Write) • ibmpsc_job (Read/Write) • public (Read)	Monitoring (for example, NPM, IBM TCP/IP Network Port Monitor)
LPD queue (PostScript or PCL)	**PASS** Either binary files or files formatted for PCL or PostScript using an IBM printer driver, or unformatted ASCII from AS/400, OS/2, or Windows systems	• AIX/UNIX for binary and formatted files • AS/400 • OS/2 • Windows NT/95 for TCP/IP
Note: Set to PASS. If you are printing plain text files without an IBM printer driver and experience formatting problems, try using the value TEXT.		
LPD queue (plain text)	**TEXT** Unformatted ASCII files with line text and no carriage return (CR)	• AIX/UNIX for unformatted files • AS/400
Note: Set to TEXT. If you are printing PCL or PostScript files with an IBM printer driver and experience formatting problems,try using the value PASS.		
LPD port	TCP port 515	LPR printing
Raw port for printing	TCP port 2501 TCP port 9100	• IBM TCP/IP Network Port Monitor • AIX/UNIX • AS/400 • Infoprint Server for OS/390
IPDS port	TCP port 5001	• PSF/400 • PSF for MVS • Infoprint Manager
IPP port	TCP port 631 or 80	IPP printing

Table 2. Principal NIC Default Parameters and Conditions (continued)

Parameter/Limit	Values	Affected Area
NetWare PServer	• IBME*nnnnnn* (Ethernet) • IBMT*nnnnnn* (Token Ring) *nnnnnn* is the last six digits of the MAC address.	NetWare
NetBIOS machine name	• IBME*nnnnnn* (Ethernet) • IBMT*nnnnnn* (Token Ring) *nnnnnn* is the last six digits of the MAC address.	NetBIOS
NetBIOS printer name	Printer1	NetBIOS
AppleTalk printer name	The default is Infoprint21_nnnnnn or Infoprint45_nnnnnn. *nnnnnn* is the last six digits of the MAC address.	AppleTalk
Locally administered address (LAA)	Replaces the default MAC address	• Token Ring only • Not available on Ethernet

Ethernet and Token Ring Frame Types on IBM NICs

Only one default frame type per protocol is supported. The default NetWare frame type is "auto", which means that the IBM printer selects all frame types it detects at printer startup.

The supported frame types are:

Protocol	Ethernet	Token Ring
AppleTalk	802.3/802.2 SNAP	802.5/802.2 SNAP
NetWare IPX/SPX	Ethernet II, 802.3, 802.3/802.2, 802.3/802.2 SNAP	802.5/802.2, 802.5/802.2 SNAP
NetBIOS/NetBEUI	802.2	802.5/802.2
TCP/IP	Ethernet II, 802.3	802.5/802.2 SNAP

Accessing the Printer Configuration Page

`WebPages`

The printer configuration page can be accessed either from the printer or from the printer web page.

Accessing the Printer Configuration Page from the Web

To access the printer configuration page from the printer web page, do the following:

1. From your web browser, access the printer web pages at the following location:

   ```
   http://n.n.n.n
   ```

   where n.n.n.n is the IP address of the printer.
2. Under **View Details**, select **Printer Configuration Page**.
3. To print the printer configuration page, select the right frame (IBM Infoprint printer configuration page) and select **Print**.

Accessing the Printer Configuration Page from the Printer

To access the printer configuration page from the printer, do the following:

1. On the operator panel, press the **Menu ⬆** key once. TEST MENU appears in the message display area.
2. Press the **Item ⬆** key once. PRINTER CONFIG appears in the message display area.
3. Press the **Enter** key to print the configuration page. If the printer is offline, you see the message PRESS ONLINE TO PRINT. Press the **Online** key to print the page.

Accessing the Network Configuration Page

WebPages

The network configuration page can be accessed either from the printer or the printer web page.

Accessing the Network Configuration Page from the Web

To access the network configuration page from the printer web page, do the following:

1. From your web browser, access the printer web pages at the following location:

   `http://n.n.n.n`

   where n.n.n.n is the IP address of the printer.
2. Under **View Details**, select **Network Configuration Page**.
3. To print the network configuration page, select the right frame (IBM Infoprint Network Configuration Page) and select **Print**.

Accessing the Network Configuration Page from the Printer

To access the network configuration page from the printer, do the following:

1. On the operator panel, press the **Menu ⬆** key once. TEST MENU appears in the message display area.
2. Press the **Item ⬆** key until you see NETWORK CONFIG.
3. Press the **Enter** key to print the configuration page. If the printer is offline when you press **Enter**, you see the message PRESS ONLINE TO PRINT. Press the **Online** key to print the page.

Chapter 2. Installing a NIC in the Printer

Use the procedures in the following sections to install a network interface card:

- "Installing a NIC in the Infoprint 21"
- "Installing a NIC in the Infoprint 45" on page 13

Installing a NIC in the Infoprint 21

Use the following procedure to install a network interface card:

DANGER

| <1-13> Do not connect or disconnect a communication port, a teleport, or any other connector during an electrical storm. |

hcsf0113

Attention: To avoid paper jams, make sure no jobs are printing when you start this procedure. If necessary, press the **Online** key to take the printer offline.

1. Power off and unplug the printer.
2. Remove the side cover.
   a. Loosen the screws at the top and bottom of the side cover and slide the cover to the left.
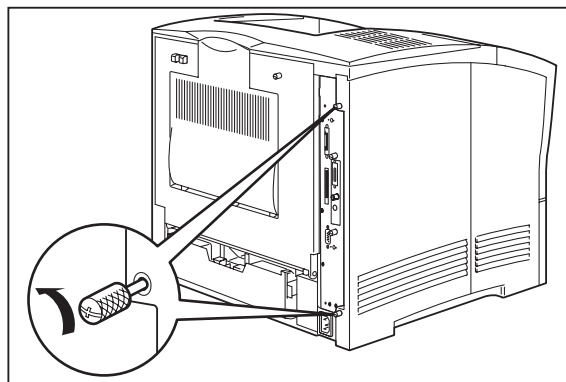
HAK164c

b. Pull the cover down and towards you to remove it.
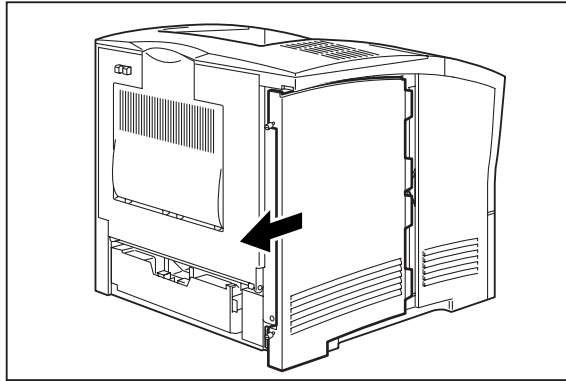
3. Loosen and remove the screws that hold the temporary slot cover. Remove the cover and store it for future use.
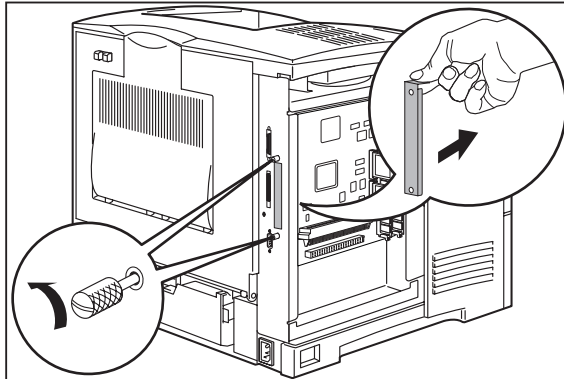
4. Remove the cover from the NIC interface connector, if present. Insert the card into the connector, lining up the faceplate with the slot.
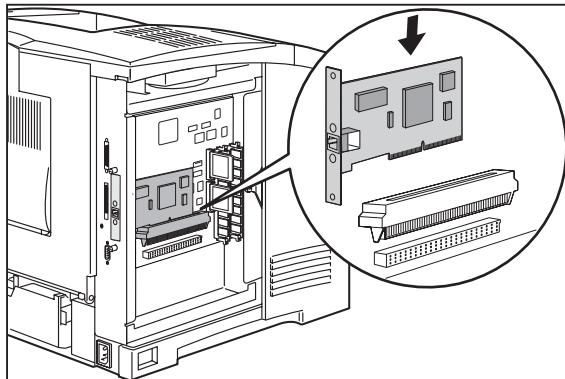
5. Tighten the thumbscrews to secure the card.

HAK174
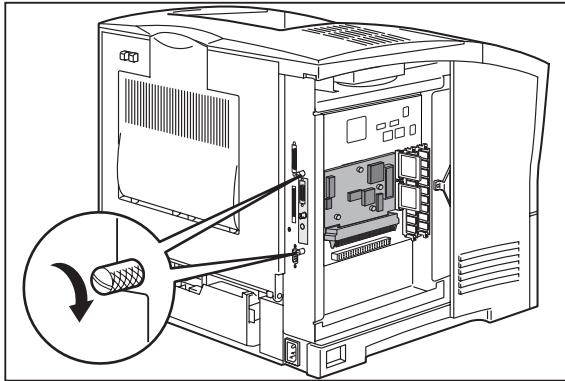
6. Replace the side cover.
   a. Insert the side cover into the left side of the printer.
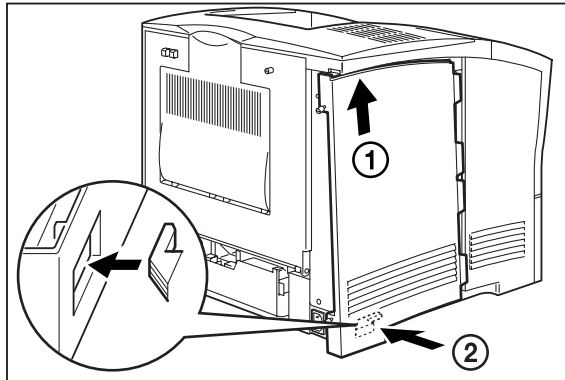
   b. Slide the cover to the right to install it.
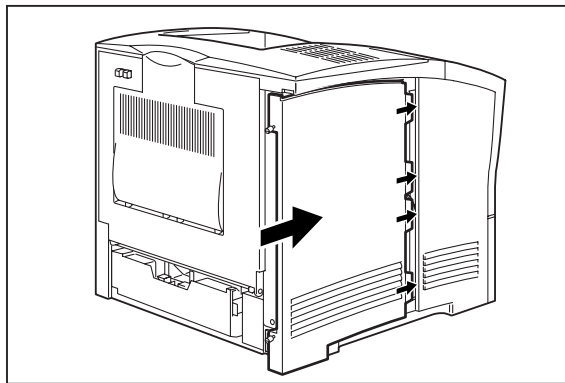
c. Tighten the screws at the top and the bottom of the cover.
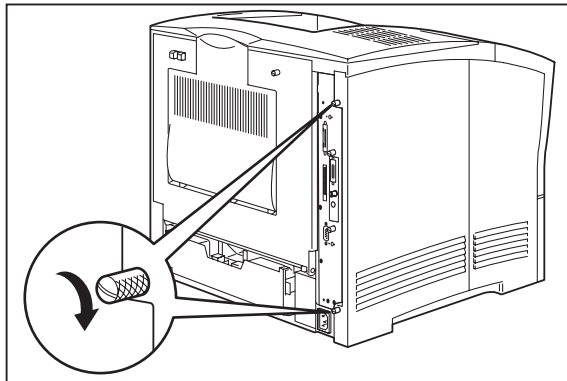
Setting Network Speed:

WebPages

By default, the printer automatically detects the Ethernet or Token-Ring speed. Note, however, that some network switches may not detect the speed correctly, and may report the wrong speed. In these cases, you can use the printer web pages or the NETWORK MENU on the printer operator panel to set it explicitly.

Installing a NIC in the Infoprint 45

The Infoprint 45 ships with Ethernet onboard. It also attaches to networks using the optional IBM Infoprint Token Ring 4/16 PCI Adapter.
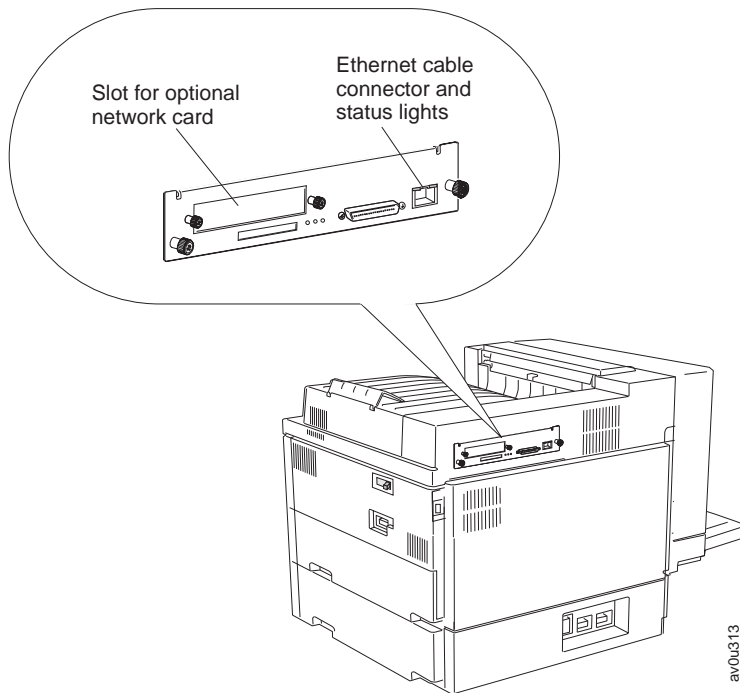
Installing the IBM Infoprint Token Ring 4/16 PCI Adapter on the Infoprint 45

Use the following procedure to install a token-ring card in the Infoprint 45:

⚠️ **DANGER**

<1-13>   Do not connect or disconnect a communication port, a teleport, or any other connector during an electrical storm.

Attention: To avoid paper jams, make sure no jobs are printing when you start this procedure. If necessary, press the **Online** key to take the printer offline.

1. Unpack the IBM Infoprint Token Ring 4/16 PCI Adapter, and set aside the software and documentation that arrived with the card.
2. Power off and unplug the printer.

3. Loosen the thumbscrews located on the controller card at the back of the printer. Slide out the controller card.
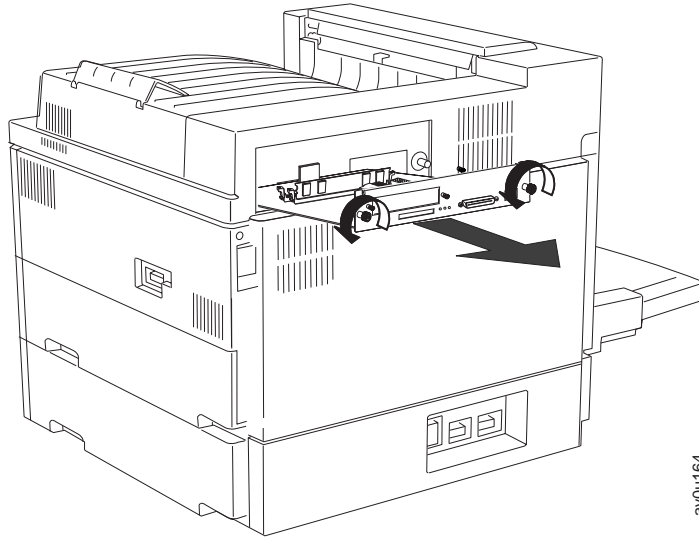
av0u164

4. Loosen and remove the screws that hold the slot cover. Remove the cover and store it for future use.
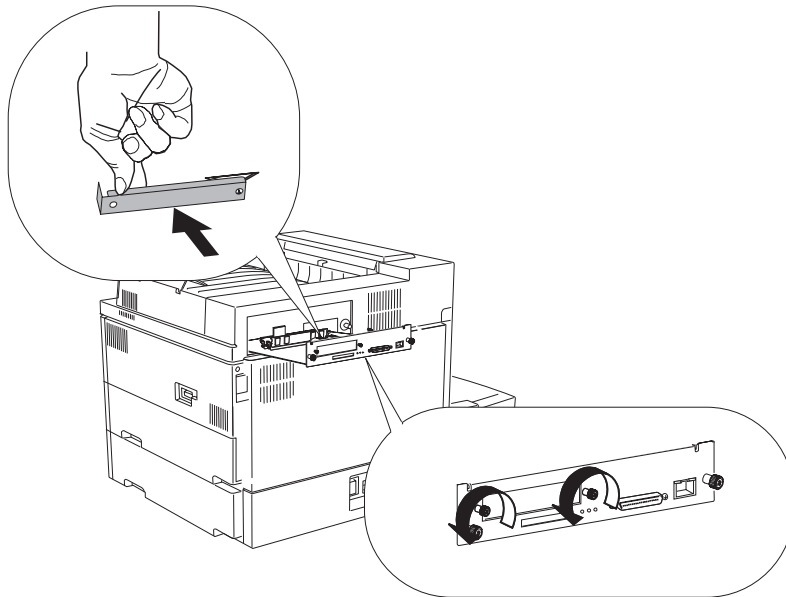
av0u289

5. Insert the card into its socket, lining up the faceplate with the slot.

av0u312
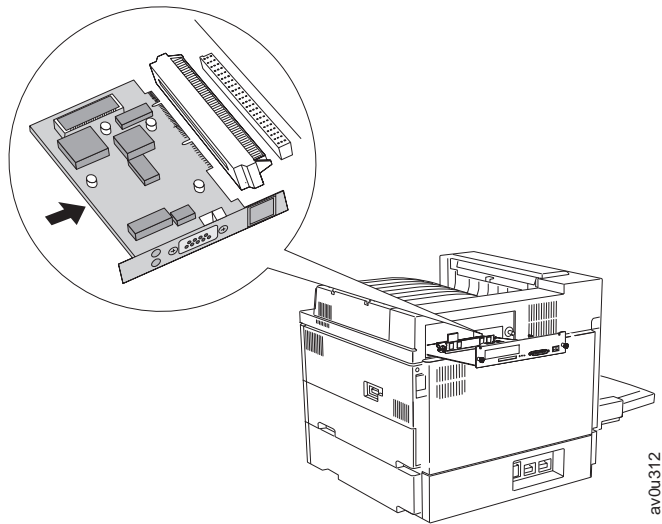
6. Tighten the thumbscrews on the network card.

av0u310
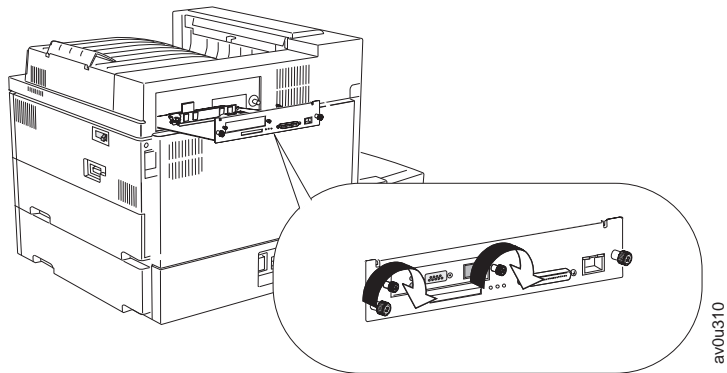
7. Slide the controller card back into the printer. Tighten the thumbscrews at the left and right ends of the controller card.
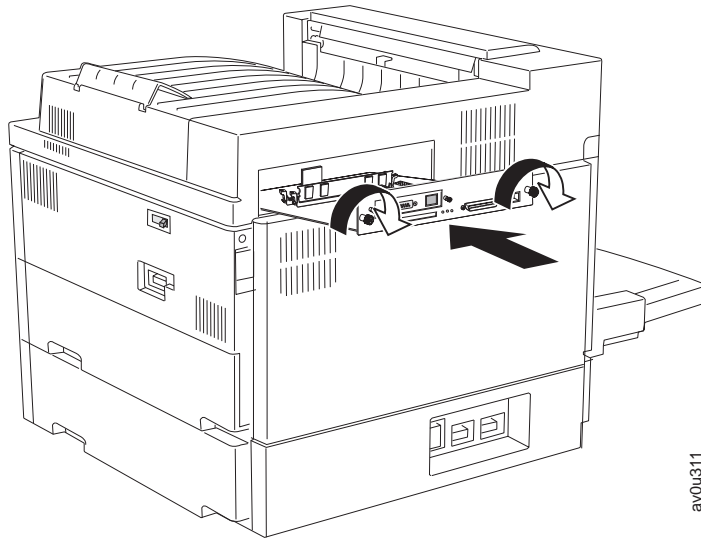
av0u311

Setting Network Speed:

WebPages

By default, the printer automatically detects the Ethernet or Token-Ring speed. Note, however, that some network switches may not detect the speed correctly, and may report the wrong speed. In these cases, you can use the printer web pages or the NETWORK MENU on the printer operator panel to set it explicitly.

Defining the Active NIC in the Infoprint 45
WebPages

If you install the IBM Infoprint Token Ring 4/16 PCI Adapter in the Infoprint 45, it becomes the active network card. If you need to switch between the onboard Ethernet and the IBM Infoprint Token Ring 4/16 PCI Adapter, you need to specify which NIC is active. You can reboot the printer and reset the active NIC from the Infoprint WebPages, or you can use the following procedure from the operator panel:

1. Press the **Menu** key until you see NETWORK MENU.
2. Press the **Item** key until you see ACTIVE NIC.
3. Press the **Value** key until you see EN for Ethernet or TR for token ring.
4. Press the **Enter** key.

Connecting to a LAN

DANGER

<1-13>	Do not connect or disconnect a communication port, a teleport, or any other connector during an electrical storm.

DANGER

<1-14>	Switch off printer power and unplug the printer power cord before connecting or disconnecting a communication port, a teleport, or any other attachment connector.

To connect to an Ethernet LAN, use one of the following:

- For a 10BASE-T Ethernet LAN, use a 10BASE-T (UTP, Unshielded Twisted Pair) cable with an RJ-45 connector (Category 3, 4, or 5 cabling).
- For a 100BASE-Tx Ethernet LAN, use a 100BASE-T (UTP, Unshielded Twisted Pair) cable with an RJ-45 connector (Category 5 cabling).

To connect to a token-ring LAN using the UTP connector:

1. Attach one end of the UTP cable to the NIC using a RJ-45 connector.
2. Attach the other end of the UTP cable to the LAN.

To connect to a token-ring LAN using the STP connector:

1. Attach one end of the STP cable to the NIC using a DB-9 connector.
2. Attach the other end of the STP cable to a Token Ring LAN.

Note: Since you should connect cables to only one port at a time, use only an STP or a UTP connection, not both.

Verifying a LAN Connection

1. Reattach the power cord to the printer.
2. Turn the printer on.
3. Wait for the printer to display READY.

   Note: This may take up to five minutes.

The NIC is properly connected to the LAN if the lights show:

Ethernet	• For a 10BaseT connection:
	   – The LNK light is **On**
	   – The ACT light is **Intermittent**
	   – The 100 TX light is **Off**
	• For a 100BaseTx connection:
	   – The LNK light is **On**
	   – The ACT light is **Intermittent**
	   – The 100 TX light is **On**

Token Ring	• The RING NSRT light is **On** • The SPD ERR light is **Off**
Note: Refer to "Token Ring 4/16 PCI Adapter Lights" on page 19 or "Ethernet 10/100 PCI Adapter Lights" for a description of what the lights show if a NIC is not connected properly.	

The following sections describe the lights in more detail.

Ethernet 10/100 PCI Adapter Lights

The Ethernet 10/100 PCI Adapter lights, labeled **LNK**, **ACT**, and **100TX** , may light up, depending on the NIC condition.

Condition	LNK	ACT	100 TX
Power Off	Off	Off	Off
Power on (Not connected to LAN)	Off	Off	Off
Power on (100 Mbit LAN)	On (Good connection to Ethernet)	Intermittent (Good connection to Ethernet)	On
Power on (10 Mbit LAN)	On (Good connection to Ethernet)	Intermittent (Good connection to Ethernet)	Off

Token Ring 4/16 PCI Adapter Lights

The Token Ring NIC lights are **RING NSRT** (green) and **SPD ERR** (yellow), **may** light up, depending on the NIC condition.

Condition	RING NSRT	SPD ERR
Power off	Off	Off
Power on (not connected to LAN)	Blinking	Off
Power on (connected to LAN)	On	Off
Power on (connected at wrong speed)	On	On

Chapter 3. Web-Ready Printing

Infoprint 21 and Infoprint 45 provide the following web-ready printing functions:

- Printer-resident Web pages, which allow end users to obtain printer status information before or after submitting a job. Administrators can also use the web pages to remotely perform configuration tasks otherwise done at the printer operator panel.

  See "Printer-Resident Web Pages" for more information.

- Web pull printing, which allows users to submit PostScript, PCL, PDF, and ASCII text files resident on Web servers directly to the printer. The user enters the URL of the print-ready file and the printer retrieves it from the Internet without tying up the user's workstation.

  See "Web Pull Printing" on page 24 for more information.

- Direct file printing, which allows users to submit PostScript, PCL, PDF, and ASCII text files resident on LAN servers directly to the printer without opening them in an application or using a printer driver.

  See "Direct File Printing" on page 26 for more information.

- Internet Print Protocol (IPP) communication with the printer.

  See "Chapter 24. Internet Printing Protocol (IPP)" on page 185 for more information.

Printer-Resident Web Pages

Infoprint 21 and Infoprint 45 contain a home page that includes printer status information for print-job submitters. To view the page, point your browser to the following location:

```
http://n.n.n.n
```

where `n.n.n.n` is the IP address of the printer.

Notes:

1. If the network administrator maps the printer's IP address to a host name in your network's name server, users can access the printer home page using the printer's host name, instead of its IP address.

   To make it easier for users to find the host name, you can define the host name in the printer using the printer web pages. (Host name is an option in the Addressing section of TCP/IP settings.) The host name will then appear on the printer's network configuration page. Note, however, that

setting the host name in the web pages does not set the name in the name server. The network administrator must assign a host name in the name server.

2. To use printer web pages, you require:

- Netscape Communicator 4.0 (or later) or Microsoft Internet Explorer 4.0 or later
- Your printer to be connected to the Internet via a token-ring card or Ethernet card, and have a TCP/IP address, subnet mask, and gateway address assigned to it.

You must also make sure the web pages are enabled. To do this, make sure that the WEB PAGE item on the TCP/IP Menu is set to ON (the default value).

A sample home page is shown below:

Note that the summary box on the right side of the page contains fields labeled Location and Contact. You can use the administrator access to the web pages to fill in these fields so that users know the physical location of the printer and who to contact if the printer has a problem.

Web Page Administrator Access

To display the administrator pages, select the access mode as **Administrator** from the bottom of the navigation frame. You will be prompted for the user name and password. The default user name is **admin** and the default password is **system**.

A sample expanded printer home page for administrators is shown below:

You can change the administrator user name and password settings by selecting **Web Page** from the TCP/IP settings entry in the navigation frame.

When you access the web pages as an administrator, you can customize all of the settings that are available on the operator panel menus of the printer. In addition, you can customize other values such as a URL for your company's help site, which is then accessible to job submitters from the printer's home page. Help is provided on each web page to describe the valid values and functions of each of the settings.

Web Pull Printing

Using the printer web pages, you can print formatted files from the Internet over TCP/IP without downloading them to your workstation. From the navigation frame of the printer's home page, select **Print an Internet File**. A window opens in which you can supply the URL of a PDF, PostScript, PCL, or ASCII text file, which you can cut and paste from the URL field in your browser. The URL can be up to 255-characters.
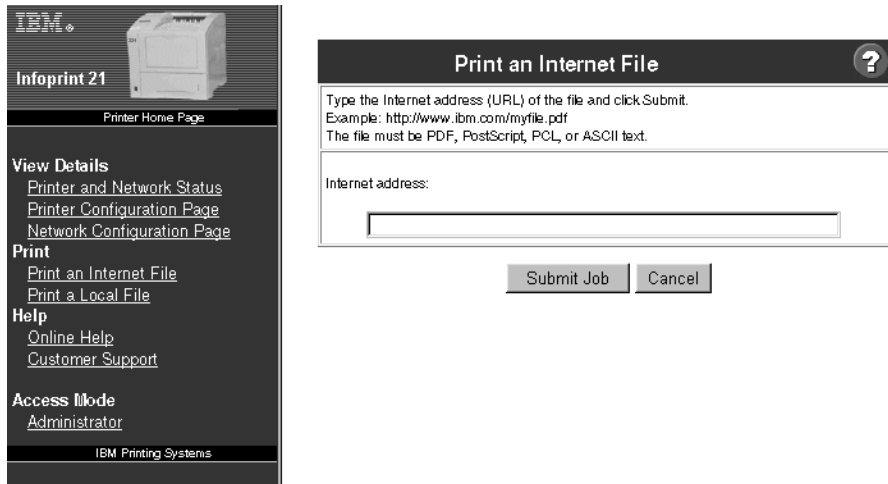
To print the file, select **Submit Job**. The URL is sent to the printer and the printer retrieves the file from the Internet, reducing the network traffic and workstation overhead associated with downloading the file and then printing it.

Notes:

1. To bookmark this page, click your right mouse button inside the Print an Internet File window and select Add Bookmark or Add to Favorites from the pop-up menu. This can be helpful if you want to frequently submit web pull print jobs.

2. To directly print PDF files without opening them in an application, you require the optional hard drive installed on your printer.

3. Configure the printer for Web Pull Printing. See the next section.

Configuring the Printer for Web Pull Printing
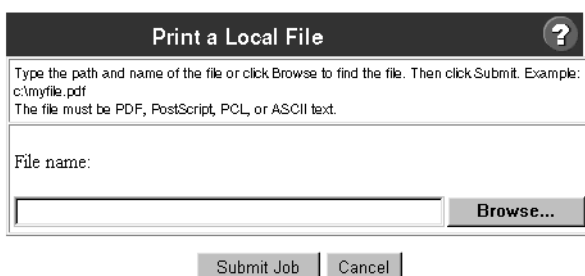
To configure the printer to enable web pull printing, perform these steps:

1. Ensure that the printer has an IP address, gateway address, and subnet mask defined. For more information, see "Chapter 25. Setting TCP/IP and LAA Addresses" on page 187.

2. Ensure that Internet printing is enabled on the printer. From the administrator web pages, select **Printing Details** from the TCP/IP Settings entry in the navigation frame. Internet printing is enabled by default.

3. Specify a domain name for the printer. From the administrator web pages, select **Internet Printing** from the TCP/IP Settings entry in the navigation frame.

4. Specify the IP address of the primary domain name server on your network. From the administrator web pages, select **TCP/IP Addressing** from the TCP/IP Settings entry in the navigation frame. You can also optionally specify a secondary domain name server on that web page.

5. If you want users to be able to print files that reside outside of your company's firewall, specify any proxy servers used on your network. From the administrator web pages, select **Internet Printing** from the TCP/IP entry in the navigation frame.

6. If you have a company intranet or have domains that you can connect to directly, you can configure the printer so that it bypasses the proxy server when retrieving files from those locations. From the administrator web pages, select **Internet Printing** from the TCP/IP entry in the navigation frame. In the Domains with no proxy field, enter one or more strings contained in the domain names that you want to access directly. For example, if your company's intranet has the characters 'w3' in its domain name, you could specify that string so that the printer bypasses the proxy server when retrieving web pull print files from those servers. You can enter up to 255 characters in this field, separating entries with commas or blanks. Wildcard characters cannot be used.

Direct File Printing

Using the printer web pages, you can print formatted files stored on any drive that your workstation can access without opening them in an application or installing the driver for the printer. This function can be useful when a file is shared between companies or departments, for example, a sales report or purchase order. If one department or company writes a PDF, PostScript, PCL, or ASCII text file onto a shared drive that your computer can access, you can print that file over TCP/IP without opening it or using the printer driver.

From the navigation frame of the printer's home page, select **Print a Local File**. A window opens in which you can browse to or supply the location and name of a PDF, PostScript, PCL, or ASCII text file.

To print the file, select **Submit Job**.

Notes:

1. To bookmark this page, click your right mouse button inside the Print a Local File window and select Add Bookmark or Add to Favorites from the pop-up menu. This can be helpful if you want to frequently submit direct file print jobs.

2. To directly print PDF files without opening them in an application, you require the optional hard drive installed on your printer.

3. Ensure that local printing is enabled on the printer. From the administrator web pages, select **Printing Details** from the TCP/IP Settings entry in the navigation frame. Local file printing is enabled by default.

Chapter 4. Windows Platforms on TCP/IP Networks

Use this chapter to configure Windows platforms (Windows NT 4.0, Windows 2000, Windows 95/98, or Windows Me) to print over a TCP/IP network to your printer.

Notes:

1. There are different ways of configuring Windows platforms on TCP/IP networks. This chapter provides guidance on some of those ways.

2. The CD-ROM supplied with the NIC contains a setup utility that runs in all Windows environments. The Setup Utility includes a printer setup wizard that can guide you through the network configuration steps. To run the Setup Utility, type:

   drive: setup

   at a command prompt, where *drive* is the letter of your CD-ROM drive.

Requirements

Verify that you have the required software available:

- IBM printer drivers for the desired operating systems
- TCP/IP protocol

Configuration Checklist

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Read the section "Recommendations for Your Print Configuration" on page 28. This section describes the various ways of configuring printers on Windows networks, and the merits of each. When you have decided on the best configuration for your network, continue at the next step.

__ 4. If you have decided on a peer-to-peer configuration for your network, do the following procedure for each machine that you want to be able to use the printer:

   - "Configuring Windows on TCP/IP Networks to Print Direct" on page 29

   If you have decided on a client-server approach, do the following steps:

a. Set up the machine that is going to be the print server to print directly to the print device. For this, follow the instructions in section "Configuring Windows on TCP/IP Networks to Print Direct" on page 29 for the operating system the print server will run on.

b. Share the printer set up in the previous step to the network. Follow the instructions in section "Configuring a Windows Print Server on TCP/IP Networks" on page 36.

c. On each client, create a printer icon that uses the shared printer set up in the previous step. To do this, follow the instructions in "Configuring Windows Print Clients on TCP/IP Networks" on page 39 for the operating system the print client uses.

__ 5. If you have any problems, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Recommendations for Your Print Configuration

There are two main configurations that you can select when setting up printers and Windows machines on TCP/IP networks. Those configurations are:

1. A "peer-to-peer" configuration where each machine prints directly to each printer.

2. A "client-server" configuration where one or more machines act as print servers and the other machines print through these print servers.

Client-server has the following advantages:

• Installing a client of a shared printer is simpler than installing a machine to print directly to a printer. The installation effort over the whole network is significantly reduced.

• The printer queue as seen by each client is the full queue, not just the queue of jobs on their own machine. That is, all clients using a shared printer see all jobs being submitted to that printer. The client can see that there is a queue of 10 jobs waiting on that printer, instead of seeing (as they would in a peer-to-peer configuration) that the print queue is empty, when in fact other jobs from other machines are queued on the printer.

• Communication from the clients to the server is by Microsoft Networking, so only the print server requires TCP/IP to be installed and configured.

IBM provides the TCP/IP Network Port Monitor, which can be used instead of the standard NT LPR port monitor on a Windows NT 4.0 print server, or instead of the Standard TCP/IP port monitor on a Windows 2000 print server. The Network Port Monitor can be used in both client-server and peer-to-peer configurations. This provides the following advantages:

- On the IBM Infoprint 21 and Infoprint 45, clients will receive both printer status and job status, including true end-of-job indication (the job disappears from the queue only when fully **printed**, not fully **sent**).
- If the print server software has been configured correctly, the client has its printer drivers downloaded and installed automatically.

Peer-to-peer configurations have the following advantage:
- Clients are not dependent on the server for printing. Only the client and the printer need to be ready for printing to occur.

Supported Windows Print Server Platforms

A print server can be a machine running any of the following:
- Windows NT 4.0 (any edition, including Workstation)
- Windows 2000 (any edition, including Professional)
- Windows 95
- Windows 98
- Windows Me

Note: Some operating systems may have restrictions on the number of print clients they can serve. For example, a printer created on Windows NT 4.0 Workstation can be shared by no more than 10 clients.

Supported Windows Client Platforms

Clients of shared printers can be running:
- Windows NT 4.0 (any edition, including Workstation)
- Windows 2000 (any edition, including Professional)
- Windows 95
- Windows 98
- Windows Me

One single print server can serve clients on all of these operating systems simultaneously.

Configuring Windows on TCP/IP Networks to Print Direct

This section explains how to set up to print directly to the print device on the operating systems listed below.
- Windows NT 4.0 (any edition, including Workstation). See "Configuring Windows NT 4.0 to Print Directly to the Printer" on page 30.
- Windows 2000 (any edition, including Professional). See "Configuring Windows 2000 to Print Directly to the Printer" on page 31.
- Windows 95, Windows 98, or Window Me. See "Configuring Windows 95/98 or Windows Me to Print Directly to the Printer" on page 35.

Configuring Windows NT 4.0 to Print Directly to the Printer

Use this procedure to use the IBM TCP/IP Network Port Monitor to set up a Windows NT 4.0 machine to print directly to a printer. This procedure is also the first step of setting up a Windows NT 4.0 print server.

Data Requirements
The following table lists the data requirements for setting up to print directly to the printer.

Parameter	Description	Your Value
Printer name	User-assigned name of the printer.	
Name and location of the printer driver installation file	The name and location of the printer driver installation file. On the CD-ROM that comes with the printer, the location is \Drivers\WinNT\Pcl6*language* where *language* is English, French, German, and so on, and the name is the only executable file in that directory (commonly setup.exe).	
IP address	IP address of the printer.	
SNMP community name	Only needed when adding an IBM TCP/IP network port if the value has been changed in the printer. Use the printer web pages or IBM Network Printer Manager to view the current values.	

Configuration Procedure

> **Authority Level Required**
> Some of the following configuration steps may require **administrative** authority.

1. Logon to the Windows NT 4.0 machine as an administrator.
2. Select **Start**, then **Run**.
3. Enter the name and location of the driver installation file.
4. Click **OK**.
5. Select **Install a printer driver**, then click **Next**.
6. Select the list entry corresponding to the desired printer. As an option, you can change the name of the printer that is going to be created by typing the name in the **Printer name** entry field. Then click **Next**.
7. Click **Next**.
8. Select **Add a single IBM TCP/IP Network Port**, then click **OK**.
9. Enter the network address of the printer. As an option, you can also enter a name for the port you are creating.

Note: Selecting **Help** displays the help for the IBM TCP/IP Network Port Monitor. The help includes information about the port monitor, including a section on Frequently Asked Questions. Access the **Help Contents** to see what information is available.

10. Click **OK**.

    Note: If the printer does not respond, an error dialog appears:
 - Check that the printer is Ready.
 - Click **Help** on the error dialog.

11. Verify that the information is correct, then click **Finish**.
12. If you want to share this printer, continue at "Configuring a Windows NT 4.0 Print Server" on page 36.

Verifying the Configuration
Test the configuration by printing a test page:

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
2. Right-click on the printer and select **Properties**.
3. Select **Print Test Page**.

Configuring Windows 2000 to Print Directly to the Printer

Use this procedure to set up a Windows 2000 machine to print directly to a printer. This procedure is also the first step of setting up a Windows 2000 print server.

IBM recommends you use the IBM TCP/IP Network Port Monitor, which is set up using the IBM Network Printer Driver Wizard. To do this, see "Using the IBM TCP/IP Network Port Monitor".

If the IBM TCP/IP Network Port Monitor is not available, use the Windows 2000 Standard TCP/IP port monitor, which is set up using the Windows 2000 Add Printer Wizard. To do this, see "Using the Windows 2000 Standard TCP/IP Port Monitor" on page 33.

Using the IBM TCP/IP Network Port Monitor
Use this procedure to use the IBM TCP/IP Network Port Monitor to set up a Windows 2000 machine to print directly to a printer.

Data Requirements: The following table lists the data requirements for setting up to print directly to the printer.

Parameter	Description	Your Value
Printer name	User-assigned name of the printer.	
Name and location of the printer driver installation file	The name and location of the printer driver installation file. On the CD-ROM that comes with the printer, the location is \Drivers\Win2k\Pcl6*language* where *language* is English, French, German, and so on, and the name is the only executable file in that directory (commonly setup.exe).	
IP address	IP address of the printer.	
SNMP community name	Only needed when adding an IBM TCP/IP network port if the value has been changed in the printer. Use the printer web pages or IBM Network Printer Manager to view the current values.	

Configuration Procedure:

> **Authority Level Required**
>
> Some of the following configuration steps may require **administrative** authority.

1. Logon to the Windows 2000 machine as an administrator.
2. Select **Start**, then **Run**.
3. Enter the name and location of the driver installation file, then click **OK**.
4. Select **Install a printer driver**, then click **Next**.
5. Select the list entry corresponding to the desired printer. As an option, you can change the name of the printer that is going to be created by typing the name in the **Printer name** entry field. Then click **Next**.
6. Click **Next**.
7. Select **Add a single IBM TCP/IP Network Port**, then click **OK**.
8. Enter the network address of the printer. As an option, you can also enter a name for the port you are creating.

   Note: Selecting **Help** displays the help for the IBM TCP/IP Network Port Monitor. The help includes information about the port monitor, including a section on Frequently Asked Questions. Access the **Help Contents** to see what information is available.

9. Click **OK**.

Note: If the printer does not respond, an error dialog appears:

- Check that the printer is Ready.
- Click **Help** on the error dialog.

10. Verify that the information is correct, then click **Finish**.

11. If you want to share this printer, continue at "Configuring a Windows 2000 Print Server" on page 37.

Verifying the Configuration: Test the configuration by printing a test page:

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
2. Right-click on the printer and select **Properties**.
3. Select **Print Test Page**.

Using the Windows 2000 Standard TCP/IP Port Monitor

Use this procedure to use the Windows 2000 Standard TCP/IP port monitor to set up a Windows 2000 machine to print directly to a printer.

Data Requirements: The following table lists the data requirements for setting up to print directly to the printer.

Parameter	Description	Your Value
Printer name	User-assigned name of the printer.	
Location of the printer driver files	The location of the printer driver files. On the CD-ROM that comes with the printer, the Windows 2000 drivers are in the following directory: \Drivers\Win2k\Pcl6*language* where *language* is English, French, German, and so on.	
IP address	IP address of the printer.	
SNMP community name	Only needed when adding an Standard TCP/IP port if the value has been changed in the printer. Use the printer web pages or IBM Network Printer Manager to view the current values.	

Configuration Procedure:

> **Authority Level Required**
>
> Some of the following configuration steps may require **administrative** authority.

1. Logon to the Windows 2000 machine as an administrator.
2. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
3. Double-click on the **Add Printer** icon.

4. In the **Add Printer Wizard**, click **Next**.

5. Click **Local printer**, uncheck **Automatically detect and install my Plug and Play printer**, then click **Next**.

6. Click **Create a new port**, select **Standard TCP/IP Port** in the **Type** field, then click **Next**.

7. In the **Add Standard TCP/IP Printer Port Wizard**:

   a. Click **Next**.

   b. Enter the hostname or IP address of the printer in the **Printer Name or IP Address** field. As an option, you can also enter a name for the port you are creating; however, IBM recommends that you let the system select your port name, for possible future migration to the IBM TCP/IP Network Port Monitor.

   c. Click **Next**.

   d. Click **Finish**.

8. If you have not installed the Windows 2000 driver for the IBM printer:

   a. Click **Have Disk**.

   b. Enter the location of the printer driver files, then click **OK**.

   c. Select the list entry corresponding to the desired printer, then click **Next**.

   If you have already installed the Windows 2000 driver for the IBM printer:

   a. Click **IBM** in the **Manufacturers** list, then select the entry in the **Printers** list corresponding to the desired printer.

   b. Click **Next**.

9. If asked, specify whether you want to reinstall the printer driver, then click **Next**.

10. Enter the desired printer name in the **Printer Name** field. In addition, specify whether you want this printer to be the default printer, then click **Next**.

11. Click **Do not share this printer** (you will share the printer in a later configuration procedure, if necessary), then click **Next**.

12. Click **Yes** to print a test page, then click **Next**.

13. Verify that the information is correct, then click **Finish**.

14. If you want to share this printer, continue at "Configuring a Windows 2000 Print Server" on page 37.

Verifying the Configuration: Test the configuration by printing a test page:

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.

2. Right-click on the printer and select **Properties**.

3. Select **Print Test Page**.

Configuring Windows 95/98 or Windows Me to Print Directly to the Printer

Use this procedure to set up a Windows 95/98 or Windows Me machine to print directly to a printer. This procedure is also the first step of setting up a Windows 95/98 or Windows Me print server.

Data Requirements

The following table lists the data requirements for setting up to print directly to the printer.

Parameter	Description	Your Value
Printer name	User-assigned name of the printer.	
Name and location of the printer driver installation file	The name and location of the printer driver installation file. On the CD-ROM that comes with the printer, the Windows 95/98 drivers are in the following directory: \Drivers\Win9xMe\Pcl6*language* where *language* is English, French, German, and so on, and the name is the only executable file in that directory (commonly setup.exe).	
IP address	IP address of the printer.	
LPR Printer/Queue Name	This is not the same as the printer name. Set to PASS. (If you are printing plain text files without an IBM printer driver and experience formatting problems, try using TEXT.)	

Configuration Procedure

1. Select **Start**, then **Run**.
2. Enter the name and location of the driver installation file.
3. Click **OK**.
4. Select **Install a printer driver**, then click **Next**.
5. Select the list entry corresponding to the desired printer. You may optionally change the name of the printer that is going to be created by typing the name in the **Printer name** entry field. Then click **Next**.
6. Click **Next**.
7. Enter the network address of the printer and verify that the **Printer/Queue Name** entry is correct.
8. Click **OK**.
9. Verify that the information is correct, then click **Finish**.
10. If you want to share this printer, continue at "Configuring a Windows 95/98 or Windows Me Print Server" on page 38.

Verifying the Configuration

Test the configuration by printing a test page:

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
2. Right-click on the printer and select **Properties**.
3. Select **Print Test Page**.

Configuring a Windows Print Server on TCP/IP Networks

This section explains how to set up a print server on the operating systems listed below.

- Windows NT 4.0 (any edition, including Workstation). See "Configuring a Windows NT 4.0 Print Server".
- Windows 2000 (any edition, including Professional). See "Configuring a Windows 2000 Print Server" on page 37.
- Windows 95, Windows 98, or Window Me. See "Configuring a Windows 95/98 or Windows Me Print Server" on page 38.

Configuring a Windows NT 4.0 Print Server

Data Requirements

The following table lists the data requirements for setting up a print server.

Parameter	Description	Your Value
Printer name	User-assigned name of the printer.	
Printer share name	User-assigned name of the printer as it will appear to network clients. This can be the same as the printer name if you want. Due to client limitations, this name should be limited to 8 characters.	
List of client operating systems	To facilitate automatic download of drivers from the server to the client, you must know in advance the operating systems of the clients which will use the shared printer.	

Configuration Procedure

> **Authority Level Required**
>
> Some of the following configuration steps may require **administrative** authority.

1. The first step in setting up a print server is to set the machine up to print directly to the printer. If you have not already done so, do the procedure "Configuring Windows NT 4.0 to Print Directly to the Printer" on page 30, and return here when done.
2. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
3. Right-click on the printer and select **Sharing...**.
4. Click the **Shared** radio button, then enter the printer's share name.
5. In the **Alternate Drivers** list, select all operating systems for which there will be clients using this shared printer.
6. As an option, you can enter the location of the printer (such as "Building 3, Room 107") and a comment about the printer (such as "For use by marketing only"). To enter this information, select the **General** tab.
7. Click **OK**.

   If you selected any operating systems, you will be prompted to install the printer drivers for those systems. Follow the instructions on the subsequent windows to do this.
8. Inform the clients that will be using the printer of the share name of the printer.

Verifying the Configuration

You will test the shared printer by installing a client of the printer and printing a test page from that client. To install a print client, see "Configuring Windows Print Clients on TCP/IP Networks" on page 39.

Configuring a Windows 2000 Print Server

Data Requirements

The following table lists the data requirements for setting up a print server.

Parameter	Description	Your Value
Printer name	User-assigned name of the printer.	
Printer share name	User-assigned name of the printer as it will appear to network clients. This can be the same as the printer name if you want. Due to client limitations, this name should be limited to 8 characters.	
List of client operating systems	To facilitate automatic download of drivers from the server to the client, you must know in advance the operating systems of the clients which will use the shared printer.	

Configuration Procedure

> **Authority Level Required**
>
> Some of the following configuration steps may require **administrative** authority.

1. The first step in setting up a print server is to set the machine up to print directly to the printer. If you have not already done so, do the procedure "Configuring Windows 2000 to Print Directly to the Printer" on page 31, and return here when done.
2. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
3. Right-click on the printer and select **Sharing...**.
4. Click the **Shared** radio button, then enter the printer's share name.
5. If there will be clients on other operating systems that are going to use this shared printer, click **Additional Drivers**, select all such operating systems in the resulting list, then click **OK**. At this point, you will be prompted to install the drivers by inserting the appropriate CD-ROM(s). Follow the instructions to do this.
6. As an option, you can enter the location of the printer (such as "Building 3, Room 107") and a comment about the printer (such as "For use by marketing only"). To enter this information, select the **General** tab.
7. Click **Close**.
8. Inform the clients that will be using the printer of the share name of the printer.

Verifying the Configuration

You will test the shared printer by installing a client of the printer and printing a test page from that client. To install a print client, see "Configuring Windows Print Clients on TCP/IP Networks" on page 39.

Configuring a Windows 95/98 or Windows Me Print Server

Data Requirements

The following table lists the data requirements for setting up a print server.

Parameter	Description	Your Value
Printer name	User-assigned name of the printer.	
Printer share name	User-assigned name of the printer as it will appear to network clients. This can be the same as the printer name if you want. Due to client limitations, this name should be limited to 8 characters.	

Configuration Procedure

1. The first step in setting up a print server is to set the machine up to print directly to the printer. If you have not already done so, do the procedure "Configuring Windows 95/98 or Windows Me to Print Directly to the Printer" on page 35, and return here when done.

2. Verify that all necessary network components have been installed:

   a. Select **Start**, then **Settings**, then **Control Panel**.

   b. Double-click on the **Network** icon.

   c. If the following network components are not already installed, install them by clicking **Add**:

      - Client for Microsoft Networks
      - An appropriate protocol for the other devices in your workgroup (for example, NetBEUI is the default for Microsoft networking)
      - File and printer sharing for Microsoft Networks

3. Back on the desktop, select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.

4. Right-click on the printer to be shared and select **Properties**.

5. Select the **Sharing** tab.

6. Click the **Shared As** radio button, then enter the printer's share name. Optionally, enter a comment or password.

7. Click **OK**.

8. Inform the clients that will be using the printer of the share name of the printer.

Verifying the Configuration

You will test the shared printer by installing a client of the printer and printing a test page from that client. To install a print client, see "Configuring Windows Print Clients on TCP/IP Networks".

Configuring Windows Print Clients on TCP/IP Networks

This section explains how to set up print clients on the following operating systems:

- Windows NT 4.0 (any edition, including Workstation). See "Configuring a Windows NT 4.0 Print Client" on page 40.
- Windows 2000 (any edition, including Professional). See "Configuring a Windows 2000 Print Client" on page 42.
- Windows 95, Windows 98, or Windows Me. See "Configuring a Windows 95/98 or Windows Me Print Client" on page 43.

A print client uses a printer shared to the network by a print server. Therefore, before setting up a print client, you must set up a shared printer on

a print server. For instructions on how to do this, see "Configuring a Windows Print Server on TCP/IP Networks" on page 36.

Authority Level Required

In connecting a print client to a print server, some level of authority might be necessary. Depending on the configuration of the print server and on the operating systems involved, one or more of the following might be required:

1. The user creating the print client might need a logon on the print server.
2. The logon on the print server might require an authority level greater than the default.
3. A password might be required to link to the shared printer.

Configuring a Windows NT 4.0 Print Client

Data Requirements

Parameter	Description	Your Value
Printer name	User-assigned name of the printer on the local machine.	
Share name of the printer	This is the name assigned to the shared printer when it was shared to the network. It is also useful, though not mandatory, to know the name of the machine where the shared printer is installed.	

Configuration Procedure

Authority Level Required

Some of the following configuration steps may require **administrative** authority.

---

1. Logon to the Windows NT 4.0 print client as an administrator.
2. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
3. Double-click on the **Add Printer** icon.
4. In the **Add Printer Wizard**, click the **Network printer server** radio button, then click **Next**.
5. In the **Printer** entry field, type the name of the shared printer as follows:

   *machinename**printersharename*

You may also use the **Shared Printers** area to browse the network for the printer you want to share.

6. Click **OK**.

7. If you need to install a printer driver (remember that if the print server is on Windows NT 4.0 or Windows 2000 and was installed correctly, you do not need to install the printer driver, since it will be installed for you), the **Add Printer Wizard** now asks if you want to install the driver on your local machine.

   If this happens:

   a. Click OK.

   b. Type the appropriate drive and path in the box. On the CD-ROM that comes with the printer, the Windows NT 4.0 drivers are in the following directory:

      \Drivers\WinNT\Pcl6*language* where *language* is English, French, German, and so on.

   c. Select **OK**.

8. Specify whether you want this printer to be the default printer, then click **Next**.

9. Click **Finish**.

Verifying the Configuration

Test the NT 4.0 client configuration by printing a test page as follows.

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.

2. Right-click on the printer and select **Properties**.

3. Select **Print Test Page**.

Configuring a Windows 2000 Print Client

Data Requirements

Parameter	Description	Your Value
Printer name	User-assigned name of the printer on the local machine.	
Share name of the printer	This is the name assigned to the shared printer when it was shared to the network. It is also useful, though not mandatory, to know the name of the machine where the shared printer is installed.	

Configuration Procedure

> **Authority Level Required**
>
> Some of the following configuration steps may require **administrative** authority.

1. Logon to the Windows 2000 print client as an administrator.
2. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
3. Double-click on the **Add Printer** icon.
4. In the **Add Printer Wizard**, click **Next**.
5. Click the **Network printer** radio button, then click **Next**.
6. In the **Name** entry field, type the name of the shared printer as follows:

   *machinename**printersharename*

   You may also leave the entry field blank to browse the network for the printer you want to share.
7. Click **Next**.
8. In the unlikely event that your printer drivers are not downloaded automatically from the print server, you will be asked if you want to install the printer drivers on the print client.

   If this happens, click **OK** and follow the instructions to install your printer driver. On the CD-ROM that came with the printer, the Windows 2000 drivers are in the following directory:

   \Drivers\Win2k\Pcl6*language*

   where *language* is English, French, German, and so on.
9. Specify whether you want this printer to be the default printer, then click **Next**.
10. Click **Finish**.

Verifying the Configuration

Test the Windows 2000 client configuration by printing a test page as follows.

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
2. Right-click on the printer and select **Properties**.
3. Select **Print Test Page**.

Configuring a Windows 95/98 or Windows Me Print Client

Data Requirements

Parameter	Description	Your Value
Printer name	User-assigned name of the printer on the local machine.	
Share name of the printer	This is the name assigned to the shared printer when it was shared to the network. It is also useful, though not mandatory, to know the name of the machine where the shared printer is installed.	

Configuration Procedure

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.
2. Double-click on the **Add Printer** icon. You see the **Add Printer Wizard**.
3. Select **Next**.
4. Select **Network printer**.
5. Select **Next**.
6. In the entry field, type the name of the shared printer as follows:

   *machinename**printersharename*

   You may also select **Browse** to browse the network for the printer you want to share.
7. Select **Next**.
8. If you need to install a printer driver (remember that if the print server is on Windows NT 4.0 or Windows 2000 and was installed correctly, you do not need to install the printer driver, since it will be installed for you), the **Add Printer Wizard** now asks you for the manufacturer and model of your printer.

   If this happens:

   a. Select **Have disk**. You see the **Install from Disk** dialog box.
   b. Type the appropriate drive and path in the box. On the CD-ROM that comes with the printer, the Windows 95/98 drivers are in the following directory:

      \Drivers\Win9xMe\Pcl6*language* where *language* is English, French, German, and so on.

c. Select **OK**.

d. Select the list entry corresponding to the printer you want to add.

e. Select **Next**.

> **Note:** If you are re-installing a printer driver, you may need to select **Replace existing driver** and then select **Next**.

9. Change the printer's name if you want.

10. Select **Yes** or **No** to indicate whether this printer should be the default.

> **Note:** If this is the first printer you have created on your computer, it will automatically be made the default -- you will not be given a choice.

11. Select **Finish**.

Verifying the Configuration

Test the Windows 95/98 client configuration by printing a test page:

1. Select **Start**, then **Settings**, then **Printers**. You see the **Printers** dialog box.

2. Right-click on the printer and select **Properties**.

3. Select **Print Test Page**.

Chapter 5. Windows NetBIOS

NPM

WebPages

Use this chapter to configure Windows 95, 98, 2000, NT 4.0, and Me to use NetBIOS to print to the printer.

Requirements

- Windows 95, 98, 2000, NT 4.0, Me
- NetBEUI, TCP/IP protocols, or both
- Client for Microsoft Networks

Configuration Checklist

> **Authority Level Required**
> All of the following configuration steps carried out on NetBIOS require **administrative** authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. You need the following data to configure the printer:

Table 3. NetBIOS Configuration Data

Parameter	Description	Your Value
Windows 95, 98, 2000, NT 4.0, Me queue name	A valid user-defined Windows queue name.	
NetBIOS workgroup name	On the network configuration page, this is the **NetBIOS Workgroup Name**. The default is WORKGROUP.	
NetBIOS machine name	On the network configuration page, this is the **NetBIOS Machine Name**. The default is IBMT or IBME plus the last six digits of the MAC address, for example IBMT9A1234.	

Table 3. NetBIOS Configuration Data (continued)

Parameter	Description	Your Value
NetBIOS printer name	On the network configuration page, this is the **NetBIOS Printer Name**. The name is PRINTER1.	**PRINTER1**

__ 3. Choose one of the following:
   - "Installing the Printer on Windows 95/98 or Windows Me"
   - "Installing the Printer on Windows 2000"
   - "Installing the Printer on Windows NT 4.0" on page 47

Installing the Printer on Windows 95/98 or Windows Me

1. From the start menu, select **Settings** and then **Printers**.
2. Double-click the **Add Printer** icon.
3. Choose the **Network printer** option.
4. For **Network path or queue name**, browse for the NetBIOS workgroup name as determined in Table 3 on page 45.
5. Under the workgroup name, double-click the NetBIOS machine name as determined in Table 3 on page 45.

   If browsing does not work, enter the following in the **Network path or queue name** field:

   nb_name\\printer1

   where *nb_name* is the NetBIOS machine name. Go to step 7.
6. Under the NetBIOS machine name, choose **PRINTER1**.
7. Follow the remaining prompts to complete the printer installation. When prompted for the driver, select **Have Disk**. Type the appropriate drive and path in the box. On the CD-ROM that came with the printer, the Windows 95/98 drivers are in the following directory:

   \\Drivers\\Win9xMe\\Pcl6*language*

   where *language* is English, French, German, and so on.

Installing the Printer on Windows 2000

1. From the start menu, select **Settings** and then **Printers**.
2. Double-click the **Add Printer** icon.
3. Choose the **Network printer** option.
4. In the **Name** entry field, enter the following:

   nb_name\\printer1

where *nb_name* is the NetBIOS machine name.

You may also leave the entry field blank to browse the network for the printer using the NetBIOS workgroup name, machine name, and printer name.

5. Follow the remaining prompts to complete the printer installation. When prompted for the driver, select **Have Disk**. Type the appropriate drive and path in the box. On the CD-ROM that came with the printer, the Windows 2000 drivers are in the following directory:

   \Drivers\Win2k\Pcl6*language*

   where *language* is English, French, German, and so on.

Installing the Printer on Windows NT 4.0

1. From the start menu, select **Settings** and then **Printers**.
2. Double-click the **Add Printer** icon.
3. Choose the **Network printer server** option.
4. In the **Connect to Printer** dialog, browse for the NetBIOS workgroup name as determined in Table 3 on page 45.
5. Under the workgroup name, double-click the NetBIOS machine name as determined in Table 3 on page 45.

   If browsing does not work, enter the following in the **Network path or queue name** field:

   nb_name\printer1

   where *nb_name* is the NetBIOS machine name. Go to step 7.
6. Under the NetBIOS machine name, choose **PRINTER1**.
7. Follow the remaining prompts to complete the printer installation. When prompted for the driver, select **Have Disk**. Type the appropriate drive and path in the box. On the CD-ROM that came with the printer, the Windows NT 4.0 drivers are in the following directory:

   \Drivers\WinNT\Pcl6*language*

   where *language* is English, French, German, and so on.

Chapter 6. Infoprint Manager for Windows NT and Windows 2000

Use this chapter to configure Infoprint Manager to print using your printer.

Requirements

For the printer, you require Infoprint Manager for Windows NT and Windows 2000 Version 1.1, with PTF VR52620.

Note: When you install the Infoprint Manager server software, you automatically install the Infoprint Manager Administration GUI and the Infoprint Manager Operations GUI on the same system. You can also install either the Infoprint Manager Administration GUI or the Infoprint Manager Operations GUI on remote systems. The Infoprint Manager Operations GUI provides a subset of the functionality available in the Infoprint Manager Administration GUI. This subset includes operator tasks.

Configuration Checklist

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. If you have not already done so, install the IBM Infoprint Manager Server. See the *Infoprint Manager for Window NT and Windows 2000: Getting Started*, G544–5717, for further instructions.

__ 3. Decide which type of destination you want to define in Infoprint Manager for this printer. See "Choosing an Infoprint Manager Destination Type".

__ 4. Define the printer to Infoprint Manager, using one of the following:
   - "Adding a PSF TCP/IP Printer" on page 50
   - "Adding a Passthrough Printer" on page 51
   - "Adding a PSF Other-Driver Printer" on page 54

__ 5. Verify the configuration by submitting a print job.

Choosing an Infoprint Manager Destination Type

Infoprint Manager supports several types of printer destinations. The type of destination that is most appropriate for your environment is based on what data stream you want to print (IPDS, PCL, or PostScript). Use Table 4 on page 50 to determine what type of destination you want to use.

Table 4. Infoprint Manager Destinations

Data Stream From Application	Data Stream To Printer	Infoprint Manager Destination
IPDS, PCL, PS, ASCII, line data, DBCS ASCII, PDF, AFP	IPDS	PSF TCP/IP Printer
PCL or PostScript	PCL or PostScript	Passthrough Printer
IPDS, PCL, PS, ASCII, line data, DBCS ASCII, PDF, AFP	PCL only – allows you to accept any input data stream and send PCL to the printer	PSF Other Driver Printer

Other destination types are also available in Infoprint Manager. For a complete description of the destinations and when to use them, refer to *IBM Infoprint Manager for Windows NT and Windows 2000: Getting Started*, G544-5717.

Adding a PSF TCP/IP Printer

Create a PSF TCP/IP destination to define a printer that receives IPDS jobs using the TCP/IP protocol.

1. Complete the following worksheet:

Table 5. PSF TCP/IP Printer Worksheet

Wizard Prompt	Description	Value
Name	The name for the actual destination object (8 character limit). **Note:** This name is case-sensitive.	
Server	The Infoprint Manager server that controls this actual destination.	
Model	The printer model, such as **Infoprint60** or **4320**.	
TCP/IP address	The dotted-decimal IP address used to access this printer.	
TCP/IP port	The port used by the printer for communication. (Typically, port 5001 is used.)	
Logical destination	The logical destination that directs jobs to this actual destination.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination.	
Queue	The queue that holds jobs destined for this actual destination.	__ Default __ Other:

2. Launch the Infoprint Manager Administration GUI.
3. On the menu bar, select **Printer --> Create --> PSF --> TCP/IP** to start the Create Printer Wizard.
4. Provide the worksheet information to the wizard. For assistance, refer to the Infoprint Manager Administration GUI online help.
5. If you did not enable the printer with the Create Printer Wizard, use the Infoprint Manager Administration GUI to enable it.

Adding a Passthrough Printer

Create a Passthrough destination to define a printer that receives PostScript and PCL jobs through the IBM TCP/IP Network Port Monitor.

1. Complete the following worksheet:

Table 6. Passthrough Destination Worksheet

Wizard Prompt	Description	Value
Name	The name for the actual destination object. For example, the name you will use for the passthrough printer you just attached. **Note:** This name is case-sensitive.	
Server	The Infoprint Manager server that controls this actual destination. The server name is the same as the name of the host system where the server is installed. **Note:** This name is case-sensitive.	

Table 6. Passthrough Destination Worksheet (continued)

Wizard Prompt	Description	Value
Windows® port name	The name of the Windows port to assign to this destination. Enter the Windows port name that you want to use **exactly** as it appears to Windows. To determine what ports exist on your server, open the **Start** menu and click **Settings->Printers**. On the **Printers** dialog, click on the **File** menu and click on **Server Properties**. The **Print Server Properties** dialog box appears where you can click on the **Ports** to display a list of available ports.	
TCP/IP address	The dotted-decimal IP address used to access this printer. This value is used for SNMP printers only.	
Logical destination	The logical destination that directs jobs to this actual destination. **Note:** This name is case-sensitive.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination. **Note:** This name is case-sensitive.	
Queue	The queue that holds jobs destined for this actual destination. **Note:** This name is case-sensitive.	__ Default __ Other:

2. Make sure that the Generic/Text Only printer driver is installed.
3. Ensure that the IBM TCP/IP Network Port Monitor is installed on your Windows NT 4.0 or Windows 2000 system. This port monitor is supplied on the CD that ships with the NIC. If you need to install the IBM TCP/IP Port Monitor, perform the following steps:

   a. Open the **Printers** folder.
   b. Select **File->Server Properties**.

c. Select the **Ports** page in the Properties notebook.

d. Click **Add port**.

e. On Windows NT 4.0, click **New monitor**. When you are prompted for the path to the monitor files, insert the printer CD in your CD drive, and use the path:

   drive:\Portmon\WinNt*language*

   where *drive* is the letter of the CD drive and *language* is the language you want to install.

   On Windows 2000, click **New Port Type**. When you are prompted for the path to the monitor files, insert the printer CD in your CD drive, and use the path:

   drive:\Portmon\Win2k*language*

   where *drive* is the letter of the CD drive and *language* is the language you want to install.

f. Click **OK**.

4. Create a Windows port for this printer:

   a. Open the **Start** menu and select **Programs--> IBM Infoprint Manager--> Management Console**.

   b. Go to **Edit--> New --> Windows Port**.

   c. In the **Create Windows Port** dialog, select the IBM TCP/IP Network Port Monitor and click **OK**.

   d. In the **New Port Options** dialog, select "Add a single TCP/IP Network Port" and click **OK**.

5. After the port is created, launch the Infoprint Manager Administration GUI.

6. On the menu bar, select **Printer--> Create --> Passthrough** to start the Create Printer Wizard.

7. Provide the worksheet information to the wizard. For assistance, refer to the Infoprint Manager Administration GUI online help.

8. If you did not enable the printer with the Create Printer Wizard, use the Infoprint Manager Administration GUI to enable it.

9. If you want clients to access this printer as a Windows shared printer, consider defining a Windows Gateway printer in Infoprint Manager. With a Windows Gateway printer, you can load the printer drivers on the NT server and have them installed on Windows 95, 98, and NT client workstations using the standard Windows shared printer methods. IBM recommends that you use the Infoprint 21 or Infoprint 45 printer drivers if you set up a Windows Gateway printer.

   Use the Infoprint Manager Management Console if you want to define a Windows Gateway printer. Consult the help in the Management Console for more information.

Adding a PSF Other-Driver Printer

Create a PSF other-driver actual destination to represent a PCL printer that receives data streams transformed by PSF through a Windows port monitor.

Note: The Infoprint Manager Administration GUI calls a PSF other-driver actual destination or printer, a PSF other printer.

Before you create a PSF other-driver printer, complete the following worksheet

Table 7. PSF Other-Driver Work Sheet

Wizard Prompt	Description	Value
Name	The name for the actual destination object (8 character limit). **Note:** The name is case-sensitive.	
Server	The server that controls this actual destination. The server name is the same as the name of the host system where the server is installed. **Note:** This name is case-sensitive	
Model	Select the printer model from the pull-down list in the Infoprint Manager Administration GUI. If the printer you are working with is not in the pull-down list, enter the name as it appears on the printer.	
SNMP TCP/IP address	The dotted-decimal IP address used to access this printer. This value is used only for SNMP printers.	
Windows port name	The Windows port name associated with this destination.	
Data stream	The data stream expected by the printing device (for example, PCL4 or PPDS).	

Table 7. PSF Other-Driver Work Sheet (continued)

Wizard Prompt	Description	Value
Logical destination	The logical destination that directs jobs to this actual destination. **Note:** The name is case-sensitive.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination. **Note:** The name is case-sensitive.	
Queue	The queue that holds jobs destined for this actual destination. **Note:** The name is case-sensitive.	__ Default __ Other:

To create this type of printer, use the **Create Print Wizard** in the Infoprint Manager Administration GUI. (On the menu bar, click **Printers–>Create–>PSF–>Other**.) Referring to the work sheet above, provide the information as prompted by the wizard. For assistance, refer to the Infoprint Manager Administration GUI online help.

Note: If the **Create PSF Other** printer option is not shown in the **Printer** menu, you can add it to the menu using customizing options in the Infoprint Manager Administration GUI. Select the **Customize** option from the **Options** menu to open the Customize dialog.

Select the **Printer** tab and select the Menu checkbox for **Create PSF Other**. Click **OK** to apply your change and close the dialog. The **Create PSF Other** printer option displays the **Printer** menu.

If you did not enable the printer with the **Create Printer Wizard**, use Infoprint Manager Administration GUI to enable it.

Chapter 7. NetWare 3.x

<div style="border:1px solid; display:inline-block; padding:2px 6px;">WebPages</div>

<div style="border:1px solid; display:inline-block; padding:2px 6px;">NPM</div>

Use this chapter to configure the printer under NetWare 3.x as a print server or remote printer using the NetWare DOS utilities. NPM can perform the procedures described here with a minimum of input from you. See "Configuring for NetWare using IBM NPM" on page 58.

Requirements

Verify that you have the required software:

- The NetWare file server needs NetWare 3.11 or higher.
- Requesters need NetWare Client Version 3.26 or higher.

Note: File servers and workstations that submit print jobs to the printer must support the IPX/SPX protocol (Novell NetWare Client Version 3.26 and above).

Configuration Checklist

> **Authority Level Required**
> All of the following configuration steps carried out on NetWare 3.x require **Supervisor** authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Determine whether you want to use the printer as a print server or a remote printer. See "Choosing Print Server or Remote Printer" on page 58.

__ 3. Optionally, change the default frame type. See "Ethernet and Token Ring Frame Types on IBM NICs" on page 5.

__ 4. Configure your printer:
- **NPM**: If you use NPM, see "Configuring for NetWare using IBM NPM" on page 58.
- **PConsole**: If you use PConsole, see one of the following:

__ 5. Verify the configuration. See "Verifying the NetWare Configuration" on page 64.

__ 6. If you encounter problems, see "Handling NetWare/IPX Problems" on page 82.

Choosing Print Server or Remote Printer

You can configure your printer either as a Print Server or a Remote Printer. Use the information in the following sections to choose the best configuration to meet your needs. As a PServer, the printer can be configured for Bindery, NDS, or both.

Print Server

Using the printer to act as a print server:

• Takes up one licensed connection on each NetWare server that has queues serviced by the print server

• Allows the printer to directly service NetWare print queues

• Replaces the need for NetWare Print Server (NLM or EXE)

• Usually provides faster throughput than using the Remote Printer facility

Remote Printer

The printer can function as a remote printer under versions 3.x and above operating under the control of a NetWare Print Server (EXE or NLM). Using the printer as a NetWare Remote Printer (RPrinter) reduces the number of licensed connections the printer uses on the file servers:

• If Remote Printer mode is used, the printer will not take up a licensed connection by itself, but a NetWare PServer running on a workstation (EXE) will take up one licensed connection.

   Note: See "Determining NetWare File Server Licenses" on page 86 for information about estimating the number of licenses needed.

• Requires a NetWare Print Server (NLM or EXE) module running on the network

• Usually provides slower throughput than using the printer as a Print Server

Configuring for NetWare using IBM NPM

This procedure requires Windows NT 4.0, Windows 95/98, or Windows 2000, and Novell Client 32 or later.

Data Requirements

You need a name for the queue to which the printer is to be assigned. The name can be anything you want.

Configuration Procedure

1. Turn on the printer.
2. Login to Windows from your workstation.
3. Login to the desired NetWare server (in bindery or bindery emulation mode) or NDS tree and context (NDS mode) as a supervisor equivalent. Use the tools and features of the Novell Client for NetWare installed on your system. (See the README file that accompanies NPM for a list of supported NetWare client software.)
4. Start NPM.

   NPM automatically discovers the printers currently visible on the network.
5. Select a printer that is not configured for NetWare, select Printer from the menu bar, and then click Configure New.

   Online instructions guide you through the configuration process.
6. When complete, NPM asks if you want to reset the printer (if necessary).
7. For remote printer mode, restart the NetWare print server.

Configuring under NetWare 3 as a Print Server using PConsole

Use this section to configure the printer under NetWare 3 as a print server.

Data Requirements

Table 8. Data Requirements for NetWare 3 as Print Server

Parameter	Description	Your Value
File server name	The name of the Novell file server that will service the printer, for example NovellFS. Obtain this name from the network administrator.	
Print queue name	The name you want to assign to the NetWare print queue, for example, PRINTQ1.	
Print server name	On the network configuration page, the NetWare PServer name. The **default** is IBMT or IBME plus the last six digits of the card's MAC address. The MAC address is printed on the network configuration page (see "Accessing the Network Configuration Page" on page 7).	
Printer name	The printer (specifically, the printer's PServer support) services all queues for the lowest numbered printer defined under the NetWare PServer object. This can be any valid name desired.	

Configuration Procedure

1. Power on the printer.
2. Login to the NetWare 3.x file server as supervisor, for example:
   ```
   LOGIN fileserver/SUPERVISOR
   ```
3. Run:
   ```
   PCONSOLE
   ```
4. From the **Available Options** menu, select **Print Queue Information**.
5. Press **Insert**.
6. Enter any new print queue name.
7. Press **Esc** until the **Available Options** menu appears.
8. From the **Available Options** menu, select **Print Server Information**.
9. Press **Insert**.
10. Enter the new print server name as determined in Table 8 on page 59.
11. Select the newly defined print server name.
12. Select **Print Server Configuration**.
13. Select **Printer Configuration**.

    Note: Only the first configured printer in the list will be used.
14. Select the first **Not Installed** printer from the list.
15. Enter a printer name. You can use any name (for example, PRINTER0).
16. Select the **Type** as **Remote Other/Unknown**.
17. Press **Esc**.
18. Select **Yes** to confirm the save.
19. Press **Esc** until the **Print Server Configuration** menu appears.
20. From the **Print Server Configuration** menu, select **Queues Serviced by Printer**.
21. Select the printer name you entered in step 15.
22. Press **Insert** to display the list of available queues.
23. Select the queue(s) to be serviced by the printer. Up to 32 queues can be serviced by the printer.
24. Enter a priority level. The default is one, which is the highest priority.
25. Press **Esc** until the **Print Server Information** menu appears.

    The following procedure allows the printer to read the new configuration in the file server's bindery.

    Important: When configuring a printer in print server mode, the printer acts as its own print server. Do not use the name of the printer as the name of a PSERVER NLM running on your file server.

26. From the **Print Server Information** menu, select **Print Server Status/Control**.
    - This option appears only if the printer is powered up and connected to the network and the configuration was successful.
    - If the procedure was not successful, return to step 8 on page 60 and make sure the correct names were entered at each step.
    - If that does not work, power the printer off and then on, wait about three minutes, then try step 26 again.
27. Select **Server Info**.
28. Scroll to **Current Server Status**.
29. Select **Running.**
30. Select **Down** or **Going Down After Current Jobs**.

    Note: The print server function goes down, but the printer brings it back up again automatically. (The print server function is **not** a NetWare print server NLM or EXE.)
31. Press **Esc** until the message **Exit PConsole** appears.
32. Select **Yes** to exit PConsole.
33. Send jobs to the Print Queue(s). The printer will take these jobs and print them.

Are the Print Queue(s) being serviced?

To answer this question, do one of the following:

- In NPM, use the NetWare tab on the Network Properties dialog to set the **Bindery file server** to the file server name in Table 8 on page 59.
- If you have TCP/IP, go to the NetWare settings on the printer web page. Set the **Bindery file server** to the file server name in Table 8 on page 59.

Configuring under NetWare 3 as a Remote Printer using PConsole

Use this section to configure the printer under NetWare 3 as a remote printer.

Data Requirements

Table 9. Data Requirements for NetWare 3 as Remote Printer

Parameter	Description	Your Value
File server name	The name of the Novell file server that runs the NetWare Print Server, for example NovellFS. Obtain this name from the network administrator.	
Print queue name	The name you want to assign to the print queue, for example, PRINTQ1.	
NetWare Print Server (NLM or EXE) name	For example, NovellPS. This is the advertising name for the Print Server (NLM or EXE) that runs either on the NetWare file server or client.	
Printer number	The printer number assigned to this printer when the printer is defined on the NetWare print server. In RPrinter mode, the printer connects to the NetWare print server using this number. Use a value of –1 to cause the printer to connect and operate as any available printer defined under the print server.	

Configuration Procedure

> **Is Remote Printer Enabled?**
>
> Before doing this procedure, obtain a network configuration page ("Accessing the Network Configuration Page" on page 7) to see if remote printer is enabled. Look for **Mode:** under the NetWare section. If remote printer is enabled, you will see the word **RPrinter**. If remote printer is disabled, you will see the word **PServer**. Use the printer web pages or NPM to switch the mode to RPrinter.

1. Power on the printer.
2. Login to the NetWare file server as supervisor, for example:
   ```
   LOGIN fileserver/SUPERVISOR
   ```
3. Run:
   ```
   PCONSOLE
   ```
4. From the **Available Options** menu, select **Print Queue Information**.
5. Press **Insert**.
6. Enter any new print queue name and record the name in Table 9.
7. Press **Esc** until the **Available Options** menu appears.

8. From the **Available Options** menu, select **Print Server Information**.

9. Select the NetWare print server (NLM or EXE) as determined in Table 9 on page 62.

10. Select **Print Server Configuration**.

11. Select **Printer Configuration**.

12. Select one of the **Not Installed** printers.

13. Enter a printer name such as **Printer0**. This name is not used by the IBM printer; however, the printer number is used. Record the number in Table 9 on page 62.

14. Select the **Type** as **Remote Other/Unknown**.

15. Press **Esc**.

16. Select **Yes** to confirm the save.

17. Press **Esc** until the **Print Server Configuration** menu appears.

18. From the **Print Server Configuration** menu, select **Queues Serviced by Printer**.

19. Select the printer name you entered in step 13.

20. Press **Insert**.

21. Select the queue to be serviced by the printer.

22. Enter a priority level. The default is one, which is the highest priority level.

23. Press **Esc** until the **Exit PConsole** window appears.

24. Exit PConsole.

25. Use NPM or the printer's web page to set the **Advertising print server name** to be the same as the NetWare print server (NLM or EXE) name used in step 9.

26. Use NPM or the printer's web page to set the **Printer number** to the value used in step 13.

27. If the print server (NLM or EXE) is already running, stop and then restart it to enable the new configuration. Use one of the following procedures:

    - **For NetWare 3 Non-Dedicated Print Servers (NLM)**, at the file server console, enter:

      ```
      UNLOAD pserver
      LOAD pserver pserver_name
      ```

      where *pserver_name* is the existing NetWare print server name used in step 9.

      Note: It may take up to five minutes for the printer to attach to the print server.

    - For **NetWare 3 Dedicated Print Server (EXE)**, login from any NetWare client other than where the print server is running:

```
LOGIN fileserver/SUPERVISOR
```

where: *fileserver* is the existing NetWare print server name.

  a. Run **PConsole**.

  b. Select **Print Server Information**.

  c. Select the NetWare print server to shut down.

  d. Select **Print Server Status and Control**.

  e. Select **Server Info**.

  f. Select **Running**.

  g. Select **Down** to perform an immediate shutdown. This step logs the print server user off.

  h. At the workstation where print server was running, log back into the file server with Read and File Scan access to the SYS:\PUBLIC directory.

  i. From the print server workstation, enter:

```
pserver pserver_name
```

where: *pserver_name* is the existing NetWare print server name used in step 9 on page 63.

> **Note:** It may take up to five minutes for the printer to attach to the print server.

Verifying the NetWare Configuration

The final step in the configuration process is to set up a NetWare client so print jobs can be sent to the printer. You can use the command line for NetWare 3 and earlier or the graphical interface provided with NetWare 4 user tools.

Guide to NetWare Printing

The following sections include examples of printing under Novell's NetWare. For additional examples, consult J.D. Marymee and Sandy Stevens, *Novell's Guide to NetWare Printing* San Jose: Novell Press, 1996.

Installing Printer Drivers

Before sending a test print job, install the printer drivers on each workstation that submits print jobs to the printer. The README file for the printer driver has the installation instructions. You may want to open the Notepad program on Windows systems to display the README online while you work.

Using the Command Line

1. From a NetWare client, enter the following command at the DOS prompt:

   `capture L=n q=queue_name [other options]`

   n   The number of the port you want to capture.This parameter defaults to 1.

   queue_name
           The name of the queue that services the printer. Obtain this name from the data requirements table.

   other options
           Consult the NetWare documentation for other options.

   Note: You may want to put the capture statement in the login script for each printer user.

2. Send a print job to the printer with the command:

   `copy file_name LPTn`

   where *n* is the port number. 1 is the standard port.

3. If the file does not print within three minutes, turn the printer off, wait ten seconds, and turn the printer on.

Problems?

If you have problems, refer to "Handling NetWare/IPX Problems" on page 82.

Using the NetWare Tools GUI

The port capture function can be set up on any NetWare 3 and above client with the NetWare tools GUI. The online help gives step-by-step instructions about how to capture a port.

Windows 95/98 using Novell NetWare Client 32

Setting Up the Printer:

1. Open **Network Neighborhood**.
2. Select the desired server (Bindery) or tree/context (NDS).
3. Select the desired NetWare print queue.
4. Answer "Yes" to the message offering to set up the printer. Follow the instructions in the **Add Printer** wizard.
5. Print from DOS programs? Enter Y or N.
6. Select the driver.
7. Use as a default printer? Enter Y or N.

8. Print a test page? Enter Y or N.

An object now exists in the "Printers" folder that points to the desired NetWare queue.

Printing a File: From an application, print a job to the printer just added.

OS/2

Setting Up the Printer:
1. Open the **Novell** folder.
2. Open **NetWare Tools**.
3. Select the **Tools** menu.
4. Select the **Printer Ports** menu item.
5. Double-click the LPT *n* port to capture.
6. From the **Capture LPT** *n* window, click the **Help** button and follow the help window directions.
7. When finished with the **Capture LPT** *n* window, click the **Capture** button to complete the port capture.

Printing a File: Send a print job to the print queue with the command:

```
copy file_name LPTn
```

where *n* is the port number.

> **Problems?**
> If you have problems, refer to "Handling NetWare/IPX Problems" on page 82 .

Chapter 8. NetWare 4.x and Above

`WebPages`

`NPM`

Use this chapter to configure the printer to attach to NetWare 4.x and above servers. NPM can perform the procedures described here with a minimum of input from you. Refer to the NPM online help.

Requirements

Verify that you have the required software:

- The NetWare file server needs NetWare 4.0 or higher (for NDS mode).
- Requesters need NetWare Shell Version 3.26 or higher for bindery-mode logins, and the VLM requester or Novell Client 32 for NDS-mode logins.
- Setting up the printer in NDS requires that:
  - Printer objects must be in the same context as the PServer object that references the printer objects.
  - Only one PServer object can be defined for each IBM printer.
  - The [Public] trustee—created by default during NetWare 4 installation—must have Browse object rights from the [Root] down to the container which holds the printer-related objects. Otherwise, the printer must be configured to use the NDS tree and context where the printer objects are located.
  - Spaces and trailers in the NDS tree name are converted to underscores to form a 47-byte field length.
- For the **network**, the requirements are:
  - The IPX/SPX protocol (NetWare File server version 4 or higher with NetWare requester VLM or Novell Client 32).
  - An IBM NIC.
  - The file server containing the NDS partition where the IBM printer configuration resides needs either:
    - A printer no more than two hops away from the file server
    - A printer no more than two hops away from a replica
    - If a printer is more than two hops away from the file server, you must specify the tree and context for it. See "NetWare Discovery Process of the Printer Acting as a Print Server" on page 85.

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on a NetWare NDS
> server require **Supervisor** authority.

__ 1. If you have not already done so, set up the printer and install the NIC
   as described in "Chapter 1. Start Here—Installation Checklist" on
   page 1.

__ 2. Determine whether you want to use the printer as a print server or a
   remote printer. See "Choosing Print Server or Remote Printer" on
   page 58.

__ 3. If you want to customize the print server name, use the printer's web
   pages or NPM. The **default** name is IBMT or IBME plus the last six
   digits of the card's MAC address. IBM recommends that you also set
   the tree and context at this time.

__ 4. Configure your printer:

   - If you use NPM, see "Configuring for NetWare using IBM NPM" on
     page 58.
   - If you use standard NetWare tools, see one of the following:
     - "Configuring as a Print Server in NDS Mode Using PConsole" on
       page 69
     - "Configuring as a Print Server in Bindery Mode Using PConsole"
       on page 71
     - "Configuring as a Remote Printer in NDS Mode Using PConsole"
       on page 74
     - "Configuring as a Print Server in NDS Mode Using NWAdmin"
       on page 76
     - "Configuring as a Remote Printer in NDS Mode Using
       NWAdmin" on page 78
     - "Configuring Using Novell NDPS" on page 79

__ 5. Verify the configuration. See "Verifying the NetWare Configuration" on
   page 64.

__ 6. If you encounter problems, see "Handling NetWare/IPX Problems" on
   page 82.

Configuring as a Print Server in NDS Mode Using PConsole

On NetWare 4 and above, resource information can be stored in one of two ways:

- NetWare Directory Services (NDS)
- Bindery Emulation

You can configure the printer to operate in either NDS or Bindery mode, or both. The following instructions show you how to complete the NDS configuration using PConsole in DOS. For NDS mode, you can use either PConsole in DOS or NetWare Administrator in Windows.

Data Requirements

Table 10. Data Requirements for Print Server in NDS Mode using PConsole

Parameter	Description	Your Value
Print queue name	The name you want to assign to the NetWare print queue, for example, PRINTQ1.	
Print server name	On the network configuration page, the NetWare PServer name. The **default** is IBMT or IBME plus the last six digits of the card's MAC address. The MAC address is printed on the network configuration page (see "Accessing the Network Configuration Page" on page 7).	
Printer name	The printer (specifically, the printer's PServer support) services all queues for the lowest numbered printer defined under the NetWare PServer object. This can be any valid name desired.	
NDS tree	The NDS tree in which the print server object is defined.	
NDS context	The NDS context in which the print server object is defined.	

Configuration Procedure

1. Power on the printer.
2. Go to the requester machine and login to the NetWare NDS tree in the desired context and with the appropriate privilege, usually as Admin. For example:

   LOGIN cn=admin

   Note: This command could fail if it is issued from the wrong context. The command works where user **admin** is in the current context.
3. At the DOS or NetWare prompt, enter:

PCONSOLE

4. Check the current context on the **Title Bar**. If it is correct, go to step 5. If it is incorrect do the following:

   a. From the **Available Options** menu, select **Change Context**.

   b. Press **Insert** to go to the desired context.

5. Select **Print Queues**.

6. Press **Insert**.

7. Enter any new queue name.

8. Press **Insert** to locate the volume where the queue is to be located.

9. Select the volume.

10. From the **Available Options** menu, select **Printers**.

11. Press **Insert**.

12. Enter a printer name. You can use any name (for example, PRINTER0). The name is not used by the PServer function in the IBM printer.

13. Select the newly defined printer.

14. From the **Printer "***printer name***" Configuration** menu, select **Printer Type**.

15. Select **Other/Unknown**.

16. Select **Print Queues Assigned**.

17. Press **Insert** to display a list of available print queues.

18. Select up to 32 print queues to be serviced by this printer.

19. Press **Esc** until the **Save Changes** message appears.

20. Select **Yes** to confirm the save.

21. Press **Esc** until you return to the **Available Options** menu.

22. Select **Print Servers**.

23. Press **Insert**.

24. Enter the print server name as specified in Table 10 on page 69. Do not use the name of a PServer NLM running on a file server as a print server name.

25. From the **Available Options** menu, select **Print Servers**.

26. Select the print server name set in step 24.

27. Select **Printers**.

    Note: Press **Enter** on the **Bindery Services** warning window if it displays.

28. Press **Insert**.

29. Select the printer name you entered in step 12.

30. Press **Esc** until the **Print Server Information** menu appears.

    The following procedure allows the printer to find its configuration in the NDS database.

a. From the **Print Server Information** menu, select **Information and Status**.

b. Make sure that the **Advertising name** is the same as the print server's name.

c. Verify that the printer is **Running**. This option appears only if the printer is powered up and connected to the network and the configuration was successful.

   - If the procedure was not successful, return to step 7 on page 70 and make sure the correct names were entered at each step.

   - If that does not work, power off and then power on the printer, wait about five minutes, then try step 30 on page 70 again.

d. Select **Running.**

e. Select **Down** or **Going Down After Current Jobs**.

   Note: The print server function goes down, but the printer brings it back up again automatically. (The print server function is **not** a NetWare print server NLM or EXE.)

31. Press **Esc** until the **Exit PConsole** window appears.

Configuring as a Print Server in Bindery Mode Using PConsole

In bindery mode, if multiple file servers are to be configured to use the printer, it must be defined consistently on each of the file servers. A bindery context must be set on the file server, and the file server object must be located in this context.

Data Requirements

Table 11. Data Requirements for Print Server in Bindery Mode using PConsole

Parameter	Description	Your Value
File server name	The name of the Novell file server that will service the printer, for example NovellFS. Obtain this name from the network administrator.	
Print queue name	The name you want to assign to the NetWare print queue, for example, PRINTQ1.	
Print server name	On the network configuration page, the NetWare PServer name. The **default** is IBMT or IBME plus the last six digits of the card's MAC address. The MAC address is printed on the network configuration page (see "Accessing the Network Configuration Page" on page 7).	

Table 11. Data Requirements for Print Server in Bindery Mode using PConsole (continued)

Parameter	Description	Your Value
Printer name	The printer (specifically, the printer's PServer support) services all queues for the lowest numbered printer defined under the NetWare PServer object. This can be any valid name desired.	

Configuration Procedure

1. Turn the printer on.
2. Login to the NetWare file server with supervisory authority, in bindery mode, for example:

   LOGIN *fileserver*/SUPERVISOR /b
3. At a DOS prompt, enter: PCONSOLE
4. From the **Available Options** menu, select **Print Queues**.
5. Press **Insert**.
6. Enter any new queue name. Record the queue name in Table 11 on page 71.
7. Press **Esc** until the **Available Options** menu appears.
8. From the **Available Options** menu, select **Print Servers**.

   Note: If a warning message tells you that you are not in NDS mode, ignore the message and continue.
9. Press **Insert**.
10. Enter the print server name as specified in Table 11 on page 71. Do not use the name of a PServer NLM running on a file server as a print server name.
11. Press **Enter**.
12. Select the newly defined print server, then press **Enter**.
13. From the **Print Server Information** menu, select **Printers**.

    Note: If a warning message that you are not running in NDS mode is displayed, ignore the message and continue.
14. Press **Insert**.
15. Enter a printer name. You can use any name (for example, PRINTER0). The name is not used by the PServer function in the IBM printer.
16. Select the printer name you entered in step 15.
17. Press **Enter**.
18. From the **Printer "***printer name***" Configuration** menu, select **Printer Type**.
19. Select **Other/Unknown**.

20. Select **Print Queues Assigned**.
21. Press **Insert**.
22. Select up to 32 print queues to be serviced by this printer.
23. Enter a **priority** level. The default is one, which is the highest priority.
24. Press **Esc**.
25. Press **F10** to save the changes.
26. Press **Esc** until the **Print Server Information** menu appears.

    The following procedure allows the printer to find its configuration in the file server's bindery.

    a. From the **Print Server Information** menu, select **Information and Status**.

    b. Verify that the printer is **Running**. This option appears only if the printer server is powered up and connected to the network and the configuration was successful.

      • If the procedure was not successful, return to step 13 on page 72 and make sure the correct names were entered at the correct steps.

      • If that does not work, recycle power on the printer, wait about three minutes, then try step 26 again.

    c. Select **Running.**

    d. Select **Down** or **Going Down After Current Jobs**.

      Note: The print server function goes down, but the printer brings it back up again automatically. (The print server function is **not** a NetWare print server NLM or EXE.)
27. Press **Esc** until the **Exit PConsole** window appears.

Configuring as a Remote Printer in NDS Mode Using PConsole

Use this section to configure the printer under NetWare 4 and above as a remote printer in NDS mode using PConsole.

Data Requirements

Table 12. Data Requirements for Remote Printer in NDS Mode Using PConsole

Parameter	Description	Your Value
Print queue name	The name you want to assign to the print queue, for example, PRINTQ1.	
NetWare Print Server (NLM or EXE) name	For example, NovellPS. This is the advertising name for the Print Server (NLM or EXE) that runs either on the NetWare file server or client.	
Printer number	The printer number assigned to this printer when the printer is defined on the NetWare print server. In RPrinter mode, the printer connects to the NetWare print server using this number. Use a value of –1 to cause the printer to connect and operate as any available printer defined under the print server.	

Configuration Procedure

> **Is Remote Printer Enabled?**
> Before doing this procedure, obtain a network configuration page ("Accessing the Network Configuration Page" on page 7) to see if remote printer is enabled. Look for **Mode:** under the NetWare section. If remote printer is enabled, you will see the word **RPrinter**. If remote printer is disabled, you will see the word **PServer**. Use the printer web pages or NPM to switch the mode to RPrinter.

1. Power on the printer.
2. Go to the requester machine and login to the NetWare NDS tree in the desired context and with the appropriate privilege, usually as Admin; for example:

   ```
   LOGIN cn=admin
   ```

   Note: This command could fail if it is issued from the wrong context. The command works where user "admin" is in the current context.
3. At a DOS prompt, enter:

   ```
   PCONSOLE
   ```
4. Go to the context you want, using the **Change Context** menu item.
5. From the **Available Options** menu, select **Print Queues**.

6. From the Print Queues menu, press **Insert**.

7. Enter any new queue name.

8. From the **Print Queues Volume** prompt, press **Insert** to get a list of volumes.

9. Select the volume where the print queue is to be created.

10. At the **Print Queues** menu, press **Esc** to return to the **Available Options** menu.

11. From the **Available Options** menu, select **Printers**.

12. Press **Insert** to add a printer.

13. Enter a printer name; for example, **Printer0**.

14. Press **Esc** to return to the **Available Options** menu.

15. From the **Available Options** menu, select **Print Servers**.

16. From the **Printer Servers** menu, select the name of the existing NetWare Print Server (NLM or EXE) as determined in Table 12 on page 74.

17. From the **Print Server Information** menu, select **Printers**.

18. At the **Serviced Printers** menu, press **Insert** to choose a printer to be added to this print server's list.

19. Select the printer name you entered in step 13. The selected printer appears in the **Serviced Printers** menu.

20. Select the printer.

21. From the **Printer "*printer name*" Configuration** menu, record the **Printer number** in Table 12 on page 74.

22. From the **Printer Type** menu, select **Other/Unknown**.

23. Select **Print queues assigned**.

24. Press **Insert** and select up to 32 print queues to be serviced by this printer.

25. Press **Esc** until you are asked to save changes. Select **Yes** to save the changes.

26. Press **Alt+F10** to exit PConsole.

27. Use NPM or the printer's web pages to set the **Advertising print server name** to be the same as the NetWare print server name used in step 16.

28. Use NPM or the printer's web pages to set the **Printer number** to the value used in step 21.

29. At the file server console, enter:
    ```
    UNLOAD PSERVER
    LOAD PSERVER pserver_name
    ```

    where *pserver_name* is the NetWare print server name used in step 16.

> **Note:** It may take up to five minutes for the printer to attach to the print server.

Configuring as a Print Server in NDS Mode Using NWAdmin

Use this section to configure the printer under NetWare 4 and above as a Print Server in NDS mode using NWAdmin.

Data Requirements

Table 13. Data Requirements for Print Server in NDS Mode using NWAdmin

Parameter	Description	Your Value
Print queue name	The name you want to assign to the NetWare print queue, for example, PRINTQ1.	
Print server name	On the network configuration page, the NetWare PServer name. The **default** is IBMT or IBME plus the last six digits of the card's MAC address. The MAC address is printed on the network configuration page (see "Accessing the Network Configuration Page" on page 7).	
Printer name	The printer (specifically, the printer's PServer support) services all queues for the lowest numbered printer defined under the NetWare PServer object. This can be any valid name desired.	
NDS tree	The NDS tree in which the print server object is defined.	
NDS context	The NDS context in which the print server object is defined.	

Configuration Procedure

1. Power on the printer.
2. Login to the NDS tree as a user with the appropriate rights.
3. From Windows, start NetWare Administrator.
4. Check the current context on the Title bar. If it is correct, go to step 6.
5. Select the appropriate context from the window display or by selecting the **View** menu, then the **Set Context** menu item.
6. Using the right mouse button, click the container object in which the queue is to be created.
7. Select **Create** from the displayed menu.
8. Select **Print Queue**.
9. At the **Create Print Queue** window, enter the queue name in the **Print Queue Name** field.

10. Select the volume from the **Print Queue Volume** pull down list on the **Select Object** window.
11. Click the **Create** button on the **Create Print Queue** window.
12. Using the right mouse button, click the container object in which the printer is to be added.
13. Select **Create** from the displayed menu.
14. Select **Printer** object.
15. Enter a printer name. You can use any name (for example, PRINTER0). The name is not used by the PServer function in the IBM printer.
16. Click the **Create** button.
17. Double-click the **Printer** icon for printer you just created.
18. Click the **Assignments** button.
19. Click the **Add...** button.
20. Select the Queue name, then click **OK**.
21. Click the **Configuration** button. Choose **Other/Unknown** for the **Printer Type**.
22. Click **OK**.
23. Using the right mouse button, click the container object to which the printer is to be added as a print server.
24. Select **Create** from the displayed menu.
25. Select **Print Server**.
26. Enter the print server name as specified in Table 13 on page 76. Do not use the name of a PServer NLM running on a file server as a print server name.
27. Click the **Create** button.
28. At the main NWAdmin screen, double-click the newly **Print Server** name.
29. Make sure the **Advertising name** is the same as the printer's PServer name.
30. From the **Print Server** window, click the **Assignments** button.
31. Select **Add**.
32. Select the previously created printer object, and then click **OK**.
33. Select **OK** at the **Print Server** window.

Configuring as a Remote Printer in NDS Mode Using NWAdmin

Use this section to configure the printer under NetWare 4 and above as a remote printer using NWAdmin in NDS mode.

Data Requirements

Table 14. Data Requirements for Remote Printer in NDS Mode using NWAdmin

Parameter	Description	Your Value
Print queue name	The name you want to assign to the NetWare print queue, for example PRINTQ1.	
NetWare Print Server (NLM or EXE) name	For example, NovellPS. This is the advertising name for the Print Server (NLM or EXE) that runs either on the NetWare file server or client.	
Printer number	The printer number assigned to this printer when the printer is defined on the NetWare print server. In RPrinter mode, the printer connects to the NetWare print server using this number. Use a value of –1 to cause the printer to connect and operate as any available printer defined under the print server.	

Configuration Procedure

> **Is Remote Printer Enabled?**
> Before doing this procedure, obtain a network configuration page ("Accessing the Network Configuration Page" on page 7) to see if remote printer is enabled. Look for **Mode:** under the NetWare section. If remote printer is enabled, you will see the word **RPrinter**. If remote printer is disabled, you will see the word **PServer**. Use the printer web pages or NPM to switch the mode to RPrinter.

1. Power on the printer.
2. Login to the NDS tree as a user with the appropriate rights.
3. From Windows, start NetWare Administrator.
4. Select **View**, then **Set Context** to select the context.
5. Right-click the container object in which the print queue is to be created.
6. Select **Create** from the displayed menu.
7. Select **Print Queue**.
8. At the **Create Print Queue** window, enter the queue name in the **Print Queue Name** field.
9. Select the **Print Queue Volume** using the browse button on that field.
10. Click the **Create** button on the **Create Print Queue** window.

11. Right-click the container object in which the printer is to be added.
12. Select **Create** from the displayed menu.
13. Select **Printer**.
14. Enter a printer name; for example, Printer0.
15. Click the **Create** button.
16. Double-click the **Printer** object for the printer you just created.
17. Click the **Configuration** button.
18. For the **Printer Type** item, select **Other/Unknown**.
19. Click the **Assignments** button.
20. Click the **Add...** button.
21. Select up to 32 print queues to be serviced by this printer.
22. Click **OK**.
23. At the main NWAdmin window, double-click the NetWare native print server that exists in the context.

    Note: The print server must already exist. If one does not exist, create one now.
24. From the **Print Server** window, click the **Assignments** button.
25. Select **Add**.
26. Select the previously created printer object from step 14.
27. Record the printer's number in Table 14 on page 78.
28. Select **OK** at the Print Server window.
29. Use NPM or the printer's web pages to set the **Advertising print server name** to be the same as the NetWare print server name used in step 23.
30. Use NPM or the printer's web pages to set the **Printer number** to the value used in step 27.
31. At the file server console, enter:
    ```
    UNLOAD PSERVER
    LOAD PSERVER pserver_name
    ```

    where *pserver_name* is the NetWare print server name used in step 23.

    Note: It may take up to five minutes for the printer to attach to the print server.

Configuring Using Novell NDPS

Overview

In 1998, Novell released a new printing system designed to make network administration of printers easier and more full-functioned. 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 will give some high-level instructions to allow the printer to be installed and used within NDPS. For more information on NDPS, see the Novell documentation.

The printer 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 are the following:

- "Installing the Printer Driver into the NDPS Broker"
- "Setup using Forward Jobs to a Queue Mode"
- "Setup using LPR Mode" on page 81
- "Setup using RPrinter Mode" on page 81

Installing the Printer Driver into the NDPS Broker

NDPS for Windows provides an automatic driver download feature. 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 the Novell documentation for instructions. Use the CD provided with the printer or a driver downloaded from the web as the driver file source in this setup.

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 printer must first be setup to service some NetWare queue, either by doing a PServer or RPrinter mode setup from previous sections of this chapter.
2. When setting up the NDPS printer agent, use the **Novell Printer Gateway**.
3. For the **Novell PDS**, choose **(NONE)**, **(Generic) PCL**, or **(Generic) PS**, according to whichever type of data stream you want to use to send to the printer. This option affects which banner pages are available to the user.
4. For the **Port Handler**, choose **Forward Jobs to a Queue**, then choose the queue used in step 1. Follow the instruction in the Caution statement that is displayed about the Queue User Name.
5. In the **Select Printer Drivers** dialog, select the printer driver(s) you installed into the Broker's RMS.

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 setup 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)**, **(Generic) PCL**, or **(Generic) PS**, according to whichever type of data stream you want to use to send to the printer. This option affects which banner pages are available to the user.
4. For the **Port Handler**, choose **Remote (LPR on IP)**, then in the next dialog enter the hostname/ipaddress and printer name (**PASS** is the default LPR printer name).
5. In the **Select Printer Drivers** dialog, select the printer driver(s) you installed into the Broker's RMS.

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. Use NPM or the printer web pages to set the printer to function in RPrinter mode:
   a. Enable **RPrinter mode**.
   b. Set **Advertising print server name** to any valid value.
   c. Set **Printer number** to any valid value.
   d. Record these values.
2. When setting up the NDPS printer agent, use the **Novell Printer Gateway**.
3. For the **Novell PDS**, choose **(NONE)**, **(Generic) PCL**, or **(Generic) PS**, according to whichever type of data stream you want to use to send to the printer. This option affects which banner pages are available to the user.
4. For the **Port Handler**, choose **Remote (rprinter on IPX)**.
5. In the next dialog, for the **SAP Name** enter the **Advertising print server name** from step 1, and enter the **Printer number** from step 1.
6. In the **Select Printer Drivers** dialog, select the printer driver(s) you installed into the Broker's RMS.

If the printer agent status is not **Idle** after three minutes, reboot the printer to attach to the NDPS printer agent.

Handling NetWare/IPX Problems

For finding and resolving printing problems on NetWare, see the following:
- "Hardware Problems"
- "Connectivity Problems"
- "Network Setup" on page 83
- "Print Formatting Problems" on page 83
- "Jobs not Printing" on page 83

Hardware Problems

When printing problems occur, the first task is to check the physical condition of the printer and related hardware, including the physical connection of the hardware to the network (10baseT, 100baseTX, Token Ring connectors), the cabling system (Ethernet or Token Ring), and the NIC.

To determine whether a problem is a hardware problem or not, check the following:

1. Verify that power is going to the printer by checking that the printer operator panel shows **Ready**.
2. Print a printer configuration page to verify that the NIC is installed correctly. See "Accessing the Printer Configuration Page" on page 6.
3. Verify that the printer is connected to the network. Refer to "Connecting to a LAN" on page 17.

Connectivity Problems

The network/transport level of a network provides the capability of routing packets from one device to another device on the network or to a different network on an internetwork system.

To troubleshoot connectivity problems:
- Verify that the NetWare protocol is enabled on the printer by printing a network configuration page (see "Accessing the Network Configuration Page" on page 7). Check under the NetWare section and make sure NetWare is enabled.
- Verify that the correct NetWare frame type is enabled in the printer and the host. On the configuration page, check the NetWare section. The desired frame type should be enabled and there should be a network number shown for that frame type.
- Verify that the required protocol is enabled on the system from which a print job is being sent. Use the NetWare documentation to help you setup your client so that it can send print jobs to a NetWare queue.

Network Setup

Before doing anything else to try to resolve problems, you should verify the following:

- For NDS print server objects, verify that the **Advertising name** is the same as the print server name. See, for example, step 29 on page 77.
- For NDS, make sure that the printer can browse the tree, by giving the [Public] trustee browse rights to the [Root] object. Alternatively, you can use NPM or the printer web pages to specify the tree and context where the print server object is located. The printer can then attach directly to that tree and context without searching the network.
- For Bindery, use NPM or the printer web pages to verify that the correct Bindery file server name is specified on the printer.

If you move a printer from one NetWare network to another, you may be unable to print if the printer was configured for an NDS tree and context on one network that is not on the other network.

To resolve such a problem, perform the following procedure:

1. Use NPM to set new network configuration values in the printer and NetWare server.
2. Verify that the print objects (print server, printer, and print queue) on the new NetWare tree or server are correctly configured. Use NPM or the printer web pages to set new network configuration values in the printer which match the new NetWare print objects and their tree or server location.

Print Formatting Problems

If printouts include unrecognizable characters (such as %% identifiers and other font information), ensure that the **PERSONALTY** item is set correctly (it is set to **Auto** by default).

Note: The **PERSONALTY** menu item is called **Data stream** in the printer web pages.

For example, a printer may be set up to handle PCL, but is sent PostScript data and thus prints the PostScript data as PCL text. To verify that the printer is set up to receive the correct data, access a network configuration page and check the NetWare section for the proper Personality setting. See "Accessing the Network Configuration Page" on page 7 for instructions. If this is set incorrectly, use NPM, the printer web pages, or the operator panel to change it to the appropriate value.

Jobs not Printing

If a job does not print, diagnose the problem by asking the following questions:

- "Did the Job Get to the Queue on the File Server?"
- "Did the Job Get to the Print Server?"
- "Is the Printer Picking Up the Job?" on page 85

The following is a description of how to get answers to these questions. If the questions can be answered in the affirmative, then printer problems may exist. Call IBM Support.

Did the Job Get to the Queue on the File Server?
Use a NetWare command, such as NPrint to get a print job to the NetWare print queue.

From the NetWare client workstation, enter the following command:

nprint *filename* q=*print_queue*

where *filename* is the name of the file to print and *print_queue* is the name of the printer's queue.

To determine if the print job got to the NetWare file server, do the following:
1. Run PCONSOLE.
2. Select **Print Queues**.
3. Highlight the desired queue, press **Enter**, then press **Enter** on the job entries item.
4. If the job is on the queue's job list, the status should be **Ready** or **Active**. Go to "Did the Job Get to the Print Server?". Otherwise, go to "Network Setup" on page 83. Verify the values entered in the capture command.

Did the Job Get to the Print Server?
If the job got to the file server, the next question to answer is, did the print server get the job?
1. At the NetWare file server console, switch to the Monitor. NLM screen or type "load monitor" if it is not yet loaded.
2. Press **Enter** on the **Connection Information** item.
3. The **Active Connections** screen should show if the print server name is on the list of active connections.
   - If the print server name is not shown, verify the configuration. Refer to "NetWare Discovery Process of the Printer Acting as a Print Server" on page 85 or "Determining NetWare File Server Licenses" on page 86 to understand more detailed ramifications and possible actions to remedy this problem.
   - If the print server name is shown, highlight it and press **Enter** to see if jobs appear in the list of files as they are sent to the printer. If the jobs do not appear, verify the NetWare print objects configuration using the

steps from the appropriate configuration section. If the configuration is correct, reboot the printer, then try to print a job again.

Is the Printer Picking Up the Job?
Check that the printer is **Ready**.

If the job does not print, check the network configuration page to make sure the NetWare parameters are set correctly on the printer and check the NetWare configuration to make sure the corresponding print objects are configured correctly.

NetWare Discovery Process of the Printer Acting as a Print Server

> **Note:** The configuration items mentioned in the following discussion can be seen in the NetWare section of the network configuration page. They can also be set using NPM or the printer web pages.

The printer is designed to be as "plug and play" as possible. The cost of this easy installation is some additional network traffic and NetWare directory search activity when the printer attempts to locate NetWare objects. This search process is called PServer Auto Discovery. PServer Auto Discovery for NDS mode is executed whenever the values for the NDS Tree or Context are null in the printer. PServer Auto Discovery for Bindery mode is executed whenever the value for the Bindery fileserver is null in the printer. The factory default values for the NDS Tree, NDS Context, and Bindery fileserver items are all null.

During Auto Discovery, the printer searches the NetWare directory for its PServer object in the following ways, depending on the Mode set in the printer:

- In **NDS** mode, the search begins in the tree and context of the nearest file server. The tree is searched from this context down. If the PServer object is not found, the search restarts at the root of the tree and proceeds to search the entire tree.
- In **Bindery** mode, the printer searches up to 10 file servers for its PServer object.
- In **NDS and Bindery** mode (the default mode), the search described above for NDS mode is performed first, followed by the Bindery mode search.

When the PServer object is found and a successful login is executed, the printer sets the respective NDS Tree, NDS Context, and/or Bindery fileserver values to the located values. This eliminates the Auto Discovery process the next time the printer is rebooted. If a successful login is not completed (because of objects not being found or incorrect passwords, for example), the printer configuration values are not updated and the Auto Discovery process restarts after the Rediscovery Delay interval set in the printer. In NDS and

Bindery mode, if the Auto Discovery process succeeds for one mode but fails for the other, the PServer commences operation with the mode that succeeded. The failing mode is not retried until the next time the printer is rebooted.

In large networks (approximately 20 or more file servers), the Auto Discovery process may cause noticeable delays and add to the network load. Or, the printer might not discover its NetWare configuration at all. These problems can be eliminated by setting the NDS Tree, NDS Context, or Bindery fileserver values in the printer. These values can be set using NPM or the printer web pages.

Determining NetWare File Server Licenses

You may configure many different NetWare file servers to use your printer. This can often be an advantage, but it does require that a user license be available on each file server. The licenses needed are as follows:

- When operating the printer in Print Server mode, one license is used on each file server that has a queue being serviced by the IBM printer.
- When operating the printer in Remote Printer mode, one license is used by a workstation where the NetWare print server (EXE) is running that is driving the IBM printer. But, if the NetWare print server is running as an NLM on a file server, then no licenses are used.

Printing Problems with TCP/IP and NetWare on the Same Network

If you have a mixed TCP/IP and NetWare environment, you may encounter problems with your TCP/IP printing from clients that have the following Novell NetWare client software installed:

- Novell Client 3.1 for Windows 95/98
- Novell Client 4.6 for Windows NT
- Novell Client 4.7 for Windows NT/2000

The problems that have been observed in IBM tests are as follows:

- **LPR printing**: larger print jobs stay in the Windows print queue and continually restart printing the first few pages.
- **Port 2501 printing (using the IBM TCP/IP Network Port Monitor or IP PrintWay from OS/390)**: after a job is submitted, the following error message is displayed:

```
Error writing to <portname> for Document <docname>:
Unrecognized error 10004 (0x2714).
```

Novell has documented a fix for these problems in Novell Support Technical Information Document (TID) 10023992 on Novell's support web site.

NetWare AppleTalk Printing Service

This section describes the use of AppleTalk Print Services (ATPS) on a NetWare NDS server. The setup creates a NetWare queue which is tied to a Macintosh-like spooler on the NetWare server. Data is sent from the spooler to the destination printer using AppleTalk protocol, not the IPX/SPX protocol. Clients including Macintosh, Windows, and others should be able to send PostScript jobs to this queue, from which the job is sent to the printer.

Installation and Configuration of ATPS

Follow these instructions to install and configure NetWare for Macintosh on the NetWare server.

Install NetWare for Macintosh on the NetWare Server

1. Install NetWare for Macintosh using the *Novell NetWare for Macintosh File and Print Services* manual. The instructions, *Installing NetWare for Macintosh*, are in Chapter 1 of that manual.
   - The AppleTalk protocol will be configured on the server.
   - Choose to install at least the AppleTalk Print Services.

     Note: After all the NetWare for Macintosh files have been installed and the NetWare server has been rebooted, you will use ATPSCON.NLM to configure the AppleTalk Print Services for the setup described here. The associated module, ATPS.NLM, will perform the printing redirection. A similar setup to that described in the NetWare manual (Chapter 6, ″Using ATPS to Access a LaserWriter II on Ethernet″) will be performed here.

2. Type:

   ```
   LOAD ATPSCON
   ```

   at the server console to start the ATPS configuration utility. Enter the name and password of the administrator who has the necessary rights to create this setup.

3. Choose **Change Context** to set the context where the NetWare queue will be created.

4. Next, you need to define your printer model to the NetWare server. Choose **Define Printer Models**, then press **Insert** to get to the **Printer Model Parameters** screen.

5. For **Printer Model Name**, enter any descriptive name for your printer, such as 'IBM Infoprint 21 PS' or 'IBM Infoprint 45 PS'.

6. For **AppleTalk Type**, leave it as **LaserWriter**, unless you are certain you want a different choice.

7. For **Supports PJL**, enter **No**.

8. For **PostScript Printer**, enter **Yes**.

9. For **Support TrueType Fonts**, enter **Yes**.

10. For the **Model PPD File**, press **Enter** and select the appropriate PPD file for your printer (for example, IBM43221.PPD for the Infoprint 21 or IBM43451.PPD for the Infoprint 45). If your PPD file doesn't show up here, copy the correct PPD file from the CD that ships with the printer to the 'SYS:\SYSTEM\NetWare-MAC\PPDS' directory, then perform this step again. The next screen will show the contents of the PPD file. Press **Esc** to close this screen and select this PPD file.

11. At the **Printer Model Parameters** screen, press **Esc** to save changes. The Available Printer Models list now has the printer defined. Press **Esc** until you return to the main menu.

12. Select **Quick Configuration** and the **Lookup Parameters** screen is displayed.

13. For **Printer Model**, press **Enter** and select your printer model (created in steps 4-11 above) from the list.

14. For **Printer Type**, you may or may not be able to change this parameter. **LaserWriter** should work.

15. For **Printer Zone**, select the AppleTalk zone where your printer's AppleTalk name will show up (see the AppleTalk section on the network configuration page).

16. For **Proceed**, select (perform lookup) and NetWare will look for the printers in the chosen zone. Select your printer's AppleTalk name from the Available Printers list.

17. On the **Quick Configuration Parameters** screen, only the Spooler's AppleTalk Name can be changed here. This name will be the NetWare queue name servicing the Macintosh-type spooler being run on this server, and will be placed in the NDS context specified previously; it also will show up in the Macintosh Chooser under the zone in which the NetWare server is located. Leave the default name, or type in any name of your choice.

18. Press **Esc** to enable changes, and the basic configuration is complete.

Printing from Clients
To print from Macintosh clients:

1. Open the Macintosh Chooser.

2. Select a type of printer.

3. Select the appropriate zone where the NetWare queue name will show up. Again, this name is the equivalent Macintosh spooler name for the queue as advertised by NetWare's ATPS.

4. Select this name and perform a Setup. Now you can print from your applications using this printer and its associated queue.

To print from non-Macintosh clients:

1. Send a PostScript job from a client (for example, Windows) to the NetWare
   queue (via IPX or maybe IP) created during this setup. The job will be
   handled by ATPS and will be sent to the printer using AppleTalk protocol.

Configuring Advanced Options
See the NetWare manual for more information on setting the parameters for
this setup in ATPSCON. View the menus in this utility and use the F1 (Help)
key to familiarize yourself with the available options.

Chapter 9. Configuring AS/400 for an ASCII Printer

Use this chapter to configure your printer on AS/400 as an ASCII printer. To configure the printer on AS/400 as an IPDS printer, see "Chapter 10. Configuring AS/400 for an IPDS Printer" on page 107.

Important!

AFP and SCS files cannot be printed directly over the network to network printers that are configured in ASCII mode. However, if the printer is defined on AS/400 using either a remote output queue or as an IBM PJL Driver device, then AFP and SCS files will be transformed by Host Print Transform (a component of the OS/400 print writer) to PCL and then sent to the printer. There are performance considerations involved in this transform process. An alternative method of printing AFP and SCS files is to define the printer as an IPDS printer. For details, see "Chapter 10. Configuring AS/400 for an IPDS Printer" on page 107. Also, refer to *IBM Infoprint IPDS and SCS Technical Reference*, S544-5312.

PostScript files can be printed transparently as USERASCII spooled data. In V4R2 and above, PostScript Level 1 can be transformed to PCL.

Requirements

AS/400 and Related Software Levels

IBM recommends that you apply the latest cumulative fix package for AS/400 or a related software feature.

- If you have a support line contract, visit the AS/400 web site at:

  http://www.as400service.ibm.com

- If you do not have a support line contract, please contact your software service provider. If you do not have a software service provider, you can contact IBM software support services at 1-800-237-5511. Outside the United States, contact your marketing representative or local IBM support group for assistance in obtaining a support contract.

Host Print Transform

The following are valid options for the Host Print Transform Manufacturer Type and Model:

- *IBM4321
- *IBM4345
- *WSCSTLETTER

Host Print Transform transforms non-ASCII spool files into PCL using the Manufacturer Type and Model or WSC object. ASCII spool files (for example, *USERASCII) are assumed to contain valid PostScript or PCL data and are sent directly to the printer without any data stream conversion. A typical source of *USERASCII spool files would be the virtual print function in Client Access/400.

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on the AS/400 may require "create" or "change" authority.

___ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1. Optionally, disconnect the printer from the LAN cable until directed to re-attach it.

___ 2. Set TCP/IP addresses for the printer, including an IP address, gateway address, and subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

___ 3. If the printer and AS/400 are not on the same LAN segment, verify that there is a route defined in the TCP/IP route list on the AS/400. See "Configuring a Route Definition with ADDTCPRTE" on page 97.

___ 4. If you have not yet done so, create a line description for your Ethernet or Token Ring IBM NIC. See "Developing Line Descriptions with CRTLINETH or CRTLINTRN" on page 93.

___ 5. Set up AS/400 for TCP/IP. See "Configuring AS/400 for TCP/IP" on page 96.

__ 6. Attach the LAN cable to the printer.

DANGER

<1-13> Do not connect or disconnect a communication port, a teleport, or any other connector during an electrical storm.

hcsf0113

DANGER

<1-14> Switch off printer power and unplug the printer power cord before connecting or disconnecting a communication port, a teleport, or any other attachment connector.

hcsf0114

__ 7. Configure your printer on the AS/400. See "Configuring AS/400 for Printing" on page 98.

__ 8. Verify the configuration. See "Verifying PCL Printing on AS/400 Using IBM SNMP" on page 105.

__ 9. If you have problems, see "Resolving AS/400 Problems" on page 116.

Developing Line Descriptions with CRTLINETH or CRTLINTRN

For each LAN adapter on the AS/400, you need to create a line description for Token Ring or Ethernet.

If a line description has already been created, make sure that the SSAP list includes options "AA" and "12" (these are default values),and that you know the LAN speed of your AS/400 LAN adapter.

Note: Vary the line off before you make changes. After you make the changes, vary the line back on.

Creating an Ethernet Line Description

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

    Note: SSAP's of "AA" and "12" are automatically set as default values in the line description when you use "*CALC" to create new line descriptions. You do not need to set these values unless they have been changed.

2. To create a line description, enter a command in the form:

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

3. Your completed screen should look like the following example:

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

Specify the following parameters:

Line description name (LIND)
> The user's name for the line description. This name must be identical to the name entered when you configure TCP/IP on the AS/400 (see "Configuring AS/400 for TCP/IP" on page 96).

Resource name (RSRCNAME)
> System-assigned name for the LAN adapter (for example, LIN041).

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

Creating a Token Ring Line Description

1. To change an existing line description, use CHGLINTRN for a Token Ring. To create a line description, use CRTLINTRN.

Note: SSAP's of "AA" and "12" are set as default values in the line description.

2. To create a line description, enter a command in the form:

   ```
   CRTLINTRN LIND(TRLAN) RSRCNAME(LIN031)
   ```

3. Your completed screen should look like:

```
                 Display Line Description                        Page    1
5763SS1 V3R2M0  960517                          BLDD60    09/11/96  12:24:07
Line description . . . . . . . . . . :   LIND      TRLAN
Option . . . . . . . . . . . . . . . :   OPTION    *ALL
Category of line . . . . . . . . . . :             *TRLAN
Resource name  . . . . . . . . . . . :   RSRCNAME  LIN031
Online at IPL . . . . . . . . . . . :    ONLINE    *YES
Vary on wait . . . . . . . . . . . . :   VRYWAIT   *NOWAIT
Maximum controllers  . . . . . . . . :   MAXCTL    40
Line speed . . . . . . . . . . . . . :   LINESPEED 16M
Maximum frame size . . . . . . . . . :   MAXFRAME  4060
TRLAN manager logging level  . . . . :   TRNLOGLVL *OFF
  Current logging level  . . . . . . :             *OFF
TRLAN manager mode . . . . . . . . . :   TRNMGRMODE *OBSERVING
Log configuration changes  . . . . . :   LOGCFGCHG  *LOG
Token-ring inform of beacon  . . . . :   TRNINFBCN  *YES
Local adapter address  . . . . . . . :   ADPTADR    *ADPT
Exchange identifier  . . . . . . . . :   EXCHID     056A1005
Error threshold level  . . . . . . . :   THRESHOLD  *OFF
Text . . . . . . . . . . . . . . . . :   TEXT       *BLANK
--------------Active Switched Controllers--------------
  (No active switched controllers attached)
SSAP list  . . . . . . . . . . . . . :   SSAP
----Source Service Access Points-----    ----Source Service Access Points-----
  SSAP    Maximum Frame    Type     SSAP     Maximum Frame    Type
   04      *MAXFRAME      *SNA       AA       *MAXFRAME      *NONSNA
   12      *MAXFRAME      *NONSNA    C8       *MAXFRAME      *HPR
Link speed . . . . . . . . . . . . . :   LINKSPEED 16M
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
Functional address . . . . . . . . . . . . . . . :   FCNADR
--------------------Functional Addresses----------------------
  (No functional addresses found)
```

Specify the following parameters:

Line description name (LIND)
   The user's name for the line description. This name must be identical to the name entered when you configure TCP/IP on the AS/400 (see "Configuring AS/400 for TCP/IP" on page 96).

Resource name (RSRCNAME)
   System-assigned name for the LAN adapter (for example, LIN031).

> SSAP   Make sure the default values of "12" and "AA" have not been
>   reset.

Configuring AS/400 for TCP/IP

> **Note:** The AS/400 interface is not the IBM printer. Do **not** set the AS/400
>   interface address to the same address as the printer IP address. Also do
>   **not** add the printer to the AS/400 TCP/IP interface list.

Configuring an AS/400 TCP/IP Interface with ADDTCPIFC

Configuring an Interface for Ethernet

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

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

2. A completed screen should look like the following:

```
System:   BLDD6                                                    0
Internet address . . . . . . . . . . . . . . :   9.99.15.188
Subnet mask  . . . . . . . . . . . . . . . . :   255.255.255.0
Line description . . . . . . . . . . . . . . :   ETHLAN
Line type  . . . . . . . . . . . . . . . . . :   *ELAN
Interface status . . . . . . . . . . . . . . :   Inactive
Type of service  . . . . . . . . . . . . . . :   *NORMAL
Maximum transmission unit  . . . . . . . . . :   *LIND
Automatic start  . . . . . . . . . . . . . . :   *YES
```

3. Specify the following parameters:

   Internet Address
   > Internet address of the AS/400 Ethernet LAN adapter.

   > **Note:** Do **not** use the IP address of the printer.

   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 or CRTLINTRN"
   > on page 93. Each AS/400 LAN adapter will have its own line
   > description.

Configuring an Interface for Token Ring:

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

   ADDTCPIFC INTNETADR('9.99.12.188') LIND(TRLAN) SUBNETMASK('255.255.255.0')

2. A completed screen should look like the following:

```
                    Display TCP/IP Interface
System:  BL                                                        DD60
Internet address . . . . . . . . . . . . . . . :   9.99.12.188
Subnet mask  . . . . . . . . . . . . . . . . . :   255.255.255.0
Line description . . . . . . . . . . . . . . . :   TRLAN
Line type  . . . . . . . . . . . . . . . . . . :   *TRLAN
Interface status . . . . . . . . . . . . . . . :   Inactive
Type of service  . . . . . . . . . . . . . . . :   *NORMAL
Maximum transmission unit  . . . . . . . . . . :   *LIND
Automatic start  . . . . . . . . . . . . . . . :   *YES
TRLAN bit sequencing . . . . . . . . . . . . . :   *MSB
```

3. Specify the following parameters:

Internet Address

> Internet address of the AS/400 Token Ring LAN adapter.
>
> **Note:** Do **not** use the IP address of the printer.

Subnet Mask

> The subnet mask for your AS/400 LAN adapter (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 or CRTLINTRN" on page 93. Each AS/400 network LAN adapter will have its own line description.

Note: Another important parameter in TCP/IP LAN communications is the CHGTCPA parameter "TCP keep alive". If the IDLE timeout (on HP printers), End of Job timeout (on Lexmark printers), or Port timeout (on IBM printers) is activated, the "TCP keep alive" value affects all TCP/IP communications from the AS/400. The ideal value is the largest one possible.

Configuring a Route Definition with ADDTCPRTE

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.

Configuring a Local Domain and Hostname

The AS/400 print commands (described in "Setting up Printing for PCL Files" on page 99) require a local domain name and hostname. If you have already configured LAN-attached TCP/IP printers on your AS/400 system, you will have a local domain name and hostname configured on your system. If you do, do **not** change your setup.

If, however, your local domain name and hostname file are empty, you need to set it 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, run the CFGTCP command, then select Option "12" from the menu. Enter a local domain name like *city.company.com*, for example `boston.rsox.com`. Enter a local hostname like `as400-01`. This is the name of your AS/400 system. This name must match the hostname for your system in the host entry table (see "Configuring a TCP/IP Host Table Entry").

> **Printer and AS/400 on same LAN Segment?**
>
> 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 optional, IBM recommends 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".

Configuring AS/400 for Printing

Data Requirements

You need the following data to configure the AS/400 for printing:

Parameter	Description	Your Value
Remote Printer Queue name	Set to PASS. If you are printing plain text files without an IBM printer driver and experience formatting problems, try using TEXT.	
IP address	IP address of the printer.	

Configuration Procedure

To configure AS/400 for TCP/IP to print PCL files, do the following:

1. Set up printing for PCL files. There are several ways to do this:

   - Use the IBM SNMP driver which is supplied as a PTF for OS/400 V4R3 and higher. See "Using IBM SNMP (V4R3 or higher only)" on page 99. See APAR II03291 for more information about the PTFs required.
   - Specify LPR for **manual** submissions. See "Using Manual LPR" on page 101.
   - Configure a remote output queue for **automatic** submissions. See "Creating an Automatic Remote Output Queue" on page 102.
   - Use the IBM PJL driver which is supplied with OS/400 V4R1 and higher. See "Using IBM PJL (V4R1 or higher only)" on page 103. **Please note that this technique has several restrictions and is not recommended.**

2. Verify PCL Printing on AS/400 Using IBM SNMP. See "Verifying PCL Printing on AS/400 Using IBM SNMP" on page 105.

Note: The procedures described here are performed from the AS/400 command line. You may use the AS/400 menu system, if you prefer.

Setting up Printing for PCL Files

The following sections describe different techniques for configuring the AS/400 to set up the remote printing capability:

- "Using IBM SNMP (V4R3 or higher only)"
- "Using Manual LPR" on page 101
- "Creating an Automatic Remote Output Queue" on page 102
- "Using IBM PJL (V4R1 or higher only)" on page 103 (this technique is not recommended)

Using IBM SNMP (V4R3 or higher only)

The IBM SNMP driver is the recommended method of attaching PCL LAN-attached printers to your AS/400 system (from V4R3 and higher). It offers additional printer status functions and better performance than the Remote Output Queue.

Note: PTFs are required to use this function. For more information, see APAR II03291.

1. To start TCP/IP, enter: STRTCP.
2. Enter CRTDEVPRT (or CHGDEVPRT) at the command line and enter the required parameters. You see a screen similar to the following:

```
Device Description      : P4321
Device class            : *LAN
Device type             : 3812
Device Model            : 1
LAN attachment          : *IP
Port Number             : 2501
Font                    : 011
Activation timer        : 170
Inactivity timer        : *SEC15
Host print transform    : *YES
Manufacturer type/model : *IBM4321
Remote Location:
  Name/Address          : 9.99.99.99
System driver program   : *IBMSNMPDRV
User-defined options    : *IBMSHRCNN
```

3. Specify the following parameters:

Device class (DEVCLS)
        Specify ***LAN**.

Device type (TYPE)
        Specify **3812**.

Device model (MODEL)
Specify **1**.

LAN attachment (LANATTACH)
Specify ***IP**.

Port number (PORT)
Specify **2501**.

Printer error message (PRTERRMSG)
The default of *INQ will cause an "operator intervention required" message to be posted to the designated message queue. This will require the operator to respond to the message before processing can continue. A value of *INFO will allow OS/400 to retry after any "operator intervention required" message is posted. When the proper response has been obtained, the message will be removed from the message queue and processing will continue. No response is required by the operator using *INFO.

Activation timer (ACTTMR)
The value specifies the number of seconds that OS/400 waits for a printer to respond to an activation request. If only one system will use the printer, use the default value (170 seconds). If more than one system will share the printer, set the value to *NOMAX, which will cause OS/400 to wait indefinitely for a response to an activation request.

Inactivity timer (INACTTMR)
This parameter is not used when the User-defined option is set to *IBMSHRCNN. This parameter specifies how long the writer will remain active after the last job in the AS/400 queue is sent to the printer. At the expiration of the inactivity timer, the TCP/IP connection to the printer is closed and the writer is ended.

Host print transform (HPT)
Specify ***YES** for all non-IPDS printers. HPT transforms SCS or AFPDS data into PCL before sending the job to the printer.

Manufacturer type and model
Specify *IBM4321 for Infoprint 21 or ***IBM4345** for Infoprint 45.

Remote location (RMTLOCNAM)
Specify the IP address or hostname of the printer.

User-defined options
Specify ***IBMSHRCNN**. This causes each job in the OS/400 spool queue to be sent to the printer with a separate TCP/IP connection. This is required in order for jobs to be properly processed out of the OS/400 spool queue.

System driver program (SYSDRVPGM)
    Specify ***IBMSNMPDRV**.

Using Manual LPR
To use LPR manually:

1. To start TCP/IP, enter: STRTCP.

2. At the AS/400 command line, enter LPR.

3. The following example displays the parameters you need to specify:

```
                  Send TCP/IP Spooled File (LPR)
Type choices, press Enter.
Remote system  . . . . . . . . . RMTSYS      > *INTNETADR
Printer queue  . . . . . . . . . PRTQ        > 'PASS'
Job name . . . . . . . . . . . . JOB           *
  User . . . . . . . . . . . . .
  Number . . . . . . . . . . . .
Spooled file number  . . . . . . SPLNBR      *ONLY
Destination type . . . . . . . . DESTTYP     *OTHER
Transform SCS to ASCII . . . . . TRANSFORM   *YES
Manufacturer type and model  . . MFRTYPMDL   > *IBM4321
Internet address . . . . . . . . INTNETADR   > '9.99.2.3'
```

4. Specify the following parameters:

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 PASS. (If you are printing plain text files without an IBM
    printer driver and experience formatting problems, try using
    TEXT.)

Destination type (DESTTYP)
    Specify ***OTHER** for the DESTTYPE parameter.

Transform (TRANFORM)
    Specify ***YES**.

Manufacturer Type and Model (MFRTYPMDL)
    Select a manufacturer type and model. This is the name of the
    WSCST. You can use *WCSTLETTER if you have not copied the
    *IBM4321 or *IBM4345 WSCST from the CD that was shipped with
    the printer.

Important: Envelope Printing

To print envelopes on Infoprint 21 and Infoprint 45 correctly,
you must use Manufacturing Type and Model *IBM4321 or
*IBM4345, or use a WSCST object.

Internet Address (INTNETADR)
>IP address of the printer.

>**Note:** You may specify **either** *INTNETADR (and the printer IP address) **or** you may specify the hostname for the printer (if you added the printer to the host table entry in "Configuring a TCP/IP Host Table Entry" on page 98).

Creating an Automatic Remote Output Queue

1. From the AS/400 command line, enter: CRTOUTQ.
2. You see a screen similar to the following:

```
                    Create Output Queue (CRTOUTQ)
 Type choices, press Enter.
 Output queue . . . . . . . . . OUTQ        > USERNAME
   Library  . . . . . . . . . .                *CURLIB
 Maximum spooled file size:      MAXPAGES
   Number of pages  . . . . . .                *NONE
   Starting time  . . . . . . .
   Ending time  . . . . . . . .
                        + for more values
 Order of files on queue  . . . SEQ           *FIFO
 Remote system  . . . . . . . . RMTSYS      > *INTNETADR
 Remote printer queue . . . . . RMTPRTQ     > PASS
 Writers to autostart . . . . . AUTOSTRWTR    1
 Queue for writer messages  . . MSGQ          QSYSOPR
   Library  . . . . . . . . . .                *LIBL
 Connection type  . . . . . . . CNNTYPE     > *IP
 Destination type . . . . . . . DESTTYPE    > *OTHER
 Host print transform . . . . . TRANSFORM     *YES
 Manufacturer type and model  . MFRTYPMDL   > *IBM4321
 Workstation customizing object WSCST         *NONE
   Library  . . . . . . . . . .
 Internet address . . . . . . . INTNETADR   > '9.99.57.173'
 Destination options  . . . . . DESTOPT       *NONE
 Print separator page . . . . . SEPPAGE       *YES
 User defined option  . . . . . USRDFNOPT     *NONE
                        + for more values
```

3. Specify the following parameters:

Output queue (OUTQ)
>The name of the AS/400 output queue. The name can be anything you want. This name is **not** the same as the printer's internal queue name, PASS.

Remote system (RMTSYS)
>Internet address of the printer (*INTNETADR prompts you for this) **or** the hostname of the printer.

Remote printer queue (RMTPRTQ)
>Default name of the printer. Specify **PASS**. (If you are printing plain text files without an IBM printer driver and experience formatting problems, try using TEXT.)

Writer to Autostart (AUTOSTRWTR)
> Specify **1**. This will start Remote Writer when the queue is created, after each IPL of the AS/400, and whenever TCP/IP is started.

Connection type (CNNTYPE)
> Specify ***IP**.

Destination type (DESTTYPE)
> Specify ***OTHER**.

Transform (TRANSFORM)
> Specify ***YES**.

Manufacturer Type and Model (MFRTYPMDL)
> Select a manufacturer type and model. This is the name of the WSCST. You can use *WCSTLETTER if you have not copied the *IBM4321 or *IBM4345 WSCST from the CD that was shipped with the printer.

Important: Envelope Printing

To print envelopes on Infoprint 21 and Infoprint 45 correctly, you must use Manufacturing Type and Model *IBM4321 or *IBM4345, or use a WSCST object.

Internet address (INTNETADR)
> Specify the IP address of the printer.

Using IBM PJL (V4R1 or higher only)

The IBM Printer Job Language (PJL) driver is an alternative method of attaching PCL LAN-attached printers to your AS/400 system (from V4R1 and higher). It offers additional job ticket and printer status functions and better performance than the Remote Output Queue. However, the following printer functions will cause unrecoverable AS/400 or printer error conditions when you use the IBM PJL driver:

- Jobs submitted from the AS/400 using the IBM PJL driver should not be cancelled from the printer operator panel, the printer web pages, or using SNMP, such as the IBM TCP/IP Network Port Monitor. You must cancel these AS/400 jobs from the AS/400. (Note that IPDS jobs from the AS/400 can be cancelled using any method).
- Jobs submitted from the AS/400 using the IBM PJL driver cannot be spooled to the optional hard drive. If you have a hard drive installed, you can configure the printer to only spool PDF jobs (which cannot be sent using the PJL driver anyway) using the printer web pages or the SPOOL JOBS=PDF item in the CONFIG MENU on the printer operator panel.

In addition, you must configure the Timeout setting for port 2501 to 0 (infinite) if you are using the PJL driver. Otherwise, time-outs will cause the AS/400 writer to terminate with an error. With this setting, the printer will not terminate the connection with the AS/400; the printer always waits for the AS/400 to terminate the connection. Use the printer web pages to change this setting.

Unless you can use the printer with these restrictions, IBM does not recommend using the PJL driver with the Infoprint 21 or Infoprint 45.

1. To start TCP/IP, enter: STRTCP.
2. Enter CRTDEVPRT (or CHGDEVPRT) at the command line and enter the required parameters. You see a screen similar to the following:

```
Device Description      : P4321
Device class            : *LAN
Device type             : 3812
Device Model            : 1
LAN attachment          : *IP
Port Number             : 2501
Font                    : 011
Activation timer        : 170
Inactivity timer        : *SEC15
Host print transform    : *YES
Manufacturer type/model : *HP4 (or *IBM4321 or *IBM4345)
Remote Location:
  Name/Address          : 9.99.99.99
System driver program   : *IBMPJLDRV
& Lib
```

3. Specify the following parameters:

Device class (DEVCLS)
    Specify ***LAN**.

Device type (TYPE)
    Specify **3812**.

Device model (MODEL)
    Specify **1**.

LAN attachment (LANATTACH)
    Specify ***IP**.

Port number (PORT)
    Specify **2501**.

Printer error message (PRTERRMSG)
    The default of *INQ will cause an "operator intervention required" message (CPA403D) to be posted to the designated message queue if a proper PJL command response is not obtained within the activation (the ACTTMR parameter) time. This will require the operator to respond to the message before processing can continue. A value of *INFO will allow the OS/400 to retry the PJL command

even after the "operator intervention required" message (CPD337F) is posted. When the proper PJL command response has been obtained, the message will be removed from the message queue and processing will continue. No response is required by the operator using *INFO.

Activation timer (ACTTMR)
The value specifies the number of seconds that OS/400 waits for a printer to respond to an activation request. If only one system will use the printer, use the default value (170 seconds). If more than one system will share the printer, set the value to *NOMAX, which will cause OS/400 to wait indefinitely for a response to an activation request.

Inactivity timer (INACTTMR)
Set this parameter to a value less than the TIMEOUT value on the printer LPD interface. You can set this value using the printer web pages or NPM. IBM recommends *SEC15. This value specifies the length of time OS/400 will maintain a session with the printer while there are no spooled files with a status of RDY. The use of the value *NOMAX is not recommended because this requires the printer connection to remain open which may create inconsequential error messages.

Host print transform (HPT)
Specify ***YES** for all non-IPDS printers. HPT transforms SCS or AFPDS data into PCL before sending the job to the printer.

Manufacturer type and model
Specify ***IBM4321** or ***IBM4345**.

Remote location (RMTLOCNAM)
Specify the IP address or hostname of the printer.

System driver program (SYSDRVPGM)
Specify ***IBMPJLDRV**.

Verifying PCL Printing on AS/400 Using IBM SNMP

To test printing, do the following:
1. To start TCP/IP, enter: STRTCP.
2. Turn the printer on.
3. To verify that 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, and *hostname* is the hostname you defined for the printer, if any.

4. If you are able to ping the printer, go to step 5. If you are unable to ping the printer, see "Printer Cannot be PINGed" on page 116.

5. Send a spooled file to the printer. There are several ways of doing this:
   - If you are using SNMP driver support (V4R3 or higher), use the following command:

     STRPRTWTR *dname qname*

     where *dname* is the name of the AS/400 printer device description and *qname* is the name of the AS/400 output queue from which the writer processes spooled files.
   - You can use Manual LPR (see "Using Manual LPR" on page 101).
   - Use the following command if using an Automatic Remote Output Queue:

     STRRMTWTR *name*

     where *name* is the name of the AS/400 remote output queue (not the remote printer queue), as described in "Creating an Automatic Remote Output Queue" on page 102.
   - If you are using PJL driver support (V4R1 or higher), use the following command:

     STRPRTWTR *name*

     where *name* is the name of the AS/400 remote output queue (not the remote printer queue), as described in "Creating an Automatic Remote Output Queue" on page 102.

Note: To print PCL files, you must have specified PASS in the Remote Printer queue name for CRTOUTQ. See "Creating an Automatic Remote Output Queue" on page 102.

Trouble Printing?

If you encounter problems with any of the procedures described in section "Configuring AS/400 for Printing" on page 98 refer to "Resolving AS/400 Problems" on page 116 for help.

Chapter 10. Configuring AS/400 for an IPDS Printer

Use this chapter to configure the printer on AS/400 as an IPDS printer. To print IPDS, you must install the IBM AFP/IPDS Module on your printer. Once configured as an IPDS printer, the printer can also print AFP, SCS and PostScript Level 1, but these data streams must be converted to IPDS first. See "Printing AFP, IPDS, SCS, and PostScript Files".

To configure AS/400 to format and print ASCII, PCL, or PostScript files, see "Chapter 9. Configuring AS/400 for an ASCII Printer" on page 91.

Requirements

Print Services Facility for OS/400 (PSF/400) Feature

Printing AFP, IPDS, SCS, and PostScript Files

Infoprint 21 and Infoprint 45 configured as IPDS will print only IPDS files. AFPDS, SCS, and PostScript Level 1 (V4R2 and later) files can be printed, but they must be transformed to IPDS before printing.

- AFP files are transformed directly by Print Services Facility (PSF/400 – an integrated feature of OS/400), which then sends the transformed file to the printer.
- SCS files are transformed into IPDS by one of two conversion paths. The path recommended by IBM – a straight SCS to device-independent IPDS transform – is controlled by setting the IPDSPASTHR parameter to YES (see step 1 on page 112). Setting IPDSPASTHR to YES provides the best performance because IPDS files are sent directly to the printer with no transform.

  If your SCS file requires any AFP processing, PSF/400 will automatically provide the requisite conversion.
- PostScript Level 1 can be printed by converting the file to AFP using Host Print Transform. PSF/400 then converts the AFP file to IPDS, and sends it to the printer. There may be performance considerations with this process.

For more information, refer to *IBM Infoprint IPDS and SCS Technical Reference*, S544-5312.

Configuration Checklist

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Using the printer operator panel or the printer web pages, set up the printer for IPDS by setting the parameters and values shown in the following table.

Menu	Item	Setting
IPDS	EMULATION	4322 or 4345
IPDS	FONTSUB	ON

__ 3. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 4. If the printer and AS/400 are not on the same LAN segment, verify that there is a route defined in the TCP/IP route list on the AS/400. If necessary, use the ADDTCPRTE command on the AS/400 to create a route definition.

__ 5. If you have not yet done so, create a line description for your Ethernet or Token Ring IBM NIC. See "Developing Line Descriptions with CRTLINETH or CRTLINTRN" on page 93.

__ 6. Create or verify the existence of an AS/400 TCP/IP interface for Token Ring or Ethernet. See "Configuring an AS/400 TCP/IP Interface" on page 109.

__ 7. Configure AS/400 with "Configuring PSF/400 for IPDS" on page 110.

__ 8. Vary the printer ON using the VFYCFG command.

__ 9. Verify that TCP/IP has been started using the STRTCP command.

__ 10. Test your configuration. See "Verifying the IPDS Configuration on AS/400" on page 114.

__ 11. To share the printer on the network, verify that the necessary parameters have been set correctly. See "Sharing the PSF/400 Printer on the Network" on page 115.

__ 12. If you have problems, refer to "Resolving AS/400 Problems" on page 116.

Configuring an AS/400 TCP/IP Interface

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

Configuring the AS/400 Interface with ADDTCPIFC

Configuring an Interface for Ethernet

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

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

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

2. A completed screen should look like the following:

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

3. The following parameters are required:

   Internet Address
   > Internet address of the AS/400 Ethernet LAN adapter.
   >
   > **Note:** Do not enter the IP address of the printer.

   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 or CRTLINTRN" on page 93. Each AS/400 LAN adapter will have its own line description.

Configuring an Interface for Token Ring

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

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

   ```
   ADDTCPIFC INTNETADR('9.99.12.188') LIND(TRLAN) SUBNETMASK('255.255.255.0')
   ```

2. A completed screen should look like the following:

```
                    Display TCP/IP Interface
System:   BLDD60
Internet address . . . . . . . . . . . . . . :  9.99.12.188
Subnet mask  . . . . . . . . . . . . . . . :    255.255.255.0
Line description . . . . . . . . . . . . . . :  TRLAN
Line type  . . . . . . . . . . . . . . . . :    *TRLAN
Interface status . . . . . . . . . . . . . . :  Inactive
Type of service  . . . . . . . . . . . . . . :  *NORMAL
Maximum transmission unit  . . . . . . . . . .: *LIND
Automatic start  . . . . . . . . . . . . . . :  *YES
TRLAN bit sequencing . . . . . . . . . . . . .: *MSB
```

3. The following parameters are required:

Internet Address
> Internet address of the AS/400 Token Ring LAN adapter.

> **Note:** Do not enter the IP address of the printer.

Subnet Mask
> The subnet mask for this AS/400 LAN adapter (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 or CRTLINTRN"
> on page 93. Each AS/400 network LAN adapter will have its own
> line description.

Configuring a TCP/IP Host Table Entry

Although optional, IBM recommends 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 should match what
you configured for host and domain name. 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

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

- CRTDEVPRT
- CRTPSFCFG (Optional)

Configuring PSF with CRTDEVPRT

This section describes how to set up a device description on AS/400.

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

```
CRTDEVPRT DEVD(P4321) DEVCLS(*LAN) TYPE(*IPDS) MODEL(0)
  LANATTACH(*IP) AFP(*YES) PORT(5001) FONT(11) FORMFEED(*AUTOCUT)
  RMTLOCNAME('128.9.12.134') USRDFNOBJ(AFP/NETWRKPRT *PSFCFG)
  TEXT('IBM Infoprint 21')
```

2. A completed screen looks like this:

```
                 Display Device Description                        Page    1
5769SS1 V4R4M0  990521                           BLDAS44  01/19/00  13:07:24
Device description . . . . . . . . :   DEVD      INFOPRNT21
Option . . . . . . . . . . . . . . :   OPTION    *ALL
Category of device . . . . . . . . :             *PRT
Device class . . . . . . . . . . . :   DEVCLS    *LAN
Device type  . . . . . . . . . . . :   TYPE      *IPDS
Device model . . . . . . . . . . . :   MODEL     0
LAN attachment . . . . . . . . . . :   LANATTACH *IP
Advanced function printing . . . . :   AFP       *YES
Port number  . . . . . . . . . . . :   PORT      5001
Online at IPL  . . . . . . . . . . :   ONLINE    *YES
Font . . . . . . . . . . . . . . . :   FONT
 Identifier . . . . . . . . . . . :             011
 Point size . . . . . . . . . . . :             *NONE
Form feed  . . . . . . . . . . . . :   FORMFEED  *AUTOCUT
Separator drawer . . . . . . . . . :   SEPDRAWER *FILE
Separator program  . . . . . . . . :   SEPPGM    *NONE
 Library  . . . . . . . . . . . . :
Printer error message  . . . . . . :   PRTERRMSG *INQ
Message queue  . . . . . . . . . . :   MSGQ      *CTLD
Current message queue  . . . . . . :             QSYSOPR
 Library  . . . . . . . . . . . . :               QSYS
Activation timer . . . . . . . . . :   ACTTMR    170
Image configuration  . . . . . . . :   IMGCFG    *NONE
Maximum pending requests . . . . . :   MAXPNDRQS 6
Print while converting . . . . . . :   PRTCVT    *YES
Form definition  . . . . . . . . . :   FORMDF    F1C10110
 Library  . . . . . . . . . . . . :               *LIBL
Character identifier . . . . . . . :   CHRID     *SYSVAL
Remote location  . . . . . . . . . :   RMTLOCNAME
 Name or address  . . . . . . . . :             128.9.12.134

User-defined object  . . . . . . . :   USRDFNOBJ NETWRKPRT
 Library  . . . . . . . . . . . . :             AFP
 Object type  . . . . . . . . . . :             *PSFCFG
Data transform program . . . . . . :   USRDTATFM *NONE
User-defined driver program  . . . :   USRDRVPGM *NONE
Dependent location name  . . . . . :   DEPLOCNAME *NONE
Allocated to:
Job name . . . . . . . . . . . . . :             QSYSARB
 User . . . . . . . . . . . . . . :              QSYS
 Number . . . . . . . . . . . . . :              075445
Text . . . . . . . . . . . . . . . :   TEXT      IBM InfoPrint 21
User-defined options . . . . . . . :   USRDFNOPT
----------------User-defined options-----------------
```

3. Enter values for the following parameters:

Device Description (DEVD)

The device description or name.

Device Class (DEVCLS)
Specify ***LAN**.

Device Type (TYPE)
Specify ***IPDS**.

Device Model (MODEL)
Specify **0**.

LAN attachment (LANATTACH)
Specify ***IP**.

Port Number (PORT)
The printer's default is **5001**. Use the printer web pages or NPM to set or view the IPDS port number.

Font (FONT)
Enter an appropriate value.

Form Feed (FORMFEED)
Specify ***AUTOCUT**.

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 will be using the printer, use the default value (170 seconds). If more than one system will be using the printer, specify ***NOMAX**, which will cause PSF/400 to wait indefinitely for a response to an activation request.

Remote Location (RMTLOCNAME)
Enter the IP address or hostname of the printer.

User-Defined Object (USRDFNOBJ)
To use a PSF configuration object, specify its name and library here. The object type must be *PSFCFG. A single PSF configuration object may be referenced by multiple device descriptions, if required.

Configuring PSF/400 with CRTPSFCFG

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:

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

```
CRTPSFCFG PSFCFG(AFP/NETWRKPRT) IPDSPASTHR(*YES) RLSTMR(*SEC15)
        TEXT('IBM Infoprint printer')
```

2. A completed screen looks like this:

```
                   PSF Configuration Information                           Page    1
5769SS1 V4R4M0  990521                                BLDAS44   01/19/00  13:17:18
PSF configuration:   NETWRKPRT      Library:   QGPL
User resource library . . . . . . . . . . . . . :     *JOBLIBL
IPDS pass through . . . . . . . . . . . . . . . :     *YES
Activate release timer . . . . . . . . . . . . :     *NORDYF
Release timer . . . . . . . . . . . . . . . . . :     *SEC15
Restart timer . . . . . . . . . . . . . . . . . :     *IMMED
APPC and TCP/IP retry count . . . . . . . . . . :     15
Delay time between retries . . . . . . . . . . :     90
Automatic session recovery . . . . . . . . . . :     *NO
Acknowledgment frequency . . . . . . . . . . . :     100
Blank page . . . . . . . . . . . . . . . . . . :     *YES
Page size control . . . . . . . . . . . . . . . :     *NO
Resident fonts . . . . . . . . . . . . . . . . :     *YES
Resource retention . . . . . . . . . . . . . . :     *YES
Edge orient . . . . . . . . . . . . . . . . . . :     *NO
Use outline fonts . . . . . . . . . . . . . . . :     *NO
PSF defined options:
  *NONE
Font substitution messages . . . . . . . . . . :     *YES
Capture host fonts at printer . . . . . . . . . :     *NO
Cut sheet emulation mode . . . . . . . . . . . :     *NONE
Font resolution for formatting . . . . . . . . :     *SEARCH
Font mapping table . . . . . . . . . . . . . . :     *NONE
  Library . . . . . . . . . . . . . . . . . . . :
Text description . . . . . . . . . . . . . . . :     IBM InfoPrint 21
Device resource library list:
  *DFT
```

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.

IPDS pass through (IPDSPASTHR)

> To print SCS and IPDS files (which do not use AFP functions) with minimal processing, specify ***YES**. PSF/400 transforms SCS into IPDS before printing.

Activate release timer (ACTRLSTMR)

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

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. Verify that the IPDS TIMEOUT value on the printer is **0** or **OFF**. Set the AS/400 parameter to ***SEC15**. This releases the printer to service other jobs from other ports 15 seconds after the last IPDS job has printed.

Verifying the IPDS Configuration on AS/400

To test IPDS printing, do the following:

1. Vary on the line description—VRYCFG CFGTYPE(*LIN)—if it is not already on.
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 operator panel displays READY.
5. To verify that 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 TCP/IP address of the remote system printer, and *hostname* is the hostname you defined for the printer, if any.
6. If the pings are not successful, refer to "Printer Cannot be PINGed" on page 116.
7. If pings are successful, vary on the printer device description with the command:

   VRYCFG (*printer-device*) CFGTYPE(*DEV) STATUS(*ON)
8. 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.

If you have problems printing, do the following:

- Print a network configuration page. Refer to "Accessing the Network Configuration Page" on page 7.
- Verify that the IPDS port number matches the port number in the device description.

If you are still unable to print IPDS files, contact IBM Support.

Sharing the PSF/400 Printer on the Network

To support printer sharing, the printer automatically switches among all attached ports (parallel port and LAN port). Basically, the printer prints one job at a time, and chooses the next job from the highest priority port. If the client does not end a job, then the printer applies the timeout value set for the print port.

To change the "time out" value, update the the timeout value on the printer web page for the appropriate port.

To set up PSF/400 for shared printing, set the following parameters:

Where Set	Parameter	Recommended Value	Description
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, however).
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. From the web pages or NPM, set the parameter to a value at least equal to the TIMEOUT value on the printer. IBM recommends *SEC15. In V3R1, this is the Inactivity timer.
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 will cause PSF/400 to wait indefinitely for a response to an activation request.

Resolving AS/400 Problems

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

Printer Cannot be PINGed

If you have problems pinging 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 READY.
- Verify that the AS/400 TCP/IP interface is active.

If 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.

- **10** means an incorrect RMTLOCNAME has been specified for the printer.
- **15** means that PSF/400 timed out waiting for the printer's response. You should check the value you entered for Activation Timer when using CRTDEVPRT.
- 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 support.

Spooled Print File Remains in PND Status

Check the output queue with the command:

```
WRKOUTQ OUTQ (queuename)
```

This typically indicates that PSF/400 is waiting for a response from the printer. This can be verified by displaying the QSPL subsystem, WRKACTJOB SBS(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 online and in READY status 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.

Printer Powered Off While Writer Is Active

The printer should not be powered off while the PSF writer is active. If this happens, you must stop and then restart the writer.

Optionally, you may specify *YES for Automatic session recovery in the PSF configuration object. When *YES is specified and the printer connection is lost (whether caused by accidentally powering off the printer or an unexpected network problem), PSF/400 will attempt to reconnect to the printer and resume printing at the last known point. You may have pages reprinted if the connection can be established. You can control the reprinting of pages by adjusting the value for the Acknowledgment frequency parameter in the PSF configuration object.

Chapter 11. Configuring OS/390 to Print IPDS Files

Use this chapter to configure OS/390 to print IPDS files on your IBM network printer.

To print IPDS files, you must install the IBM AFP/IPDS Module on the printer.

Requirements

Verify that you have the following required software:
- PSF/MVS 2.2.0
  - OW15599 — TCP/IP support
  - OW27622 — multi-resolution (auto) support
  - OW38078 — outline font support
- PSF 3.1.0 for OS/390
  - OW39102 — outline font support
- PSF 3.2.0 for OS/390
- 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 for PSF/MVS Version 2.2.0 or TCP/IP Version 3 Release 2 or higher, installed and configured on MVS for PSF 3.1.0 for OS/390 or PSF 3.2.0 for OS/390

To obtain the PTFs associated with these APARs, contact the IBM Support Center (see "Product Support" on page xi).

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on OS/390 require appropriate RACF authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Using the printer operator panel, set up the printer for IPDS by setting the parameters and values shown in the following table.

Menu	Item	Setting
IPDS	EMULATION	4028
IPDS	FONTSUB	ON

   __ 3. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

   __ 4. Configure the host environment. See "Configuring PSF to Print IPDS Files".

   __ 5. Verify the configuration. See "Verifying a TCP/IP-Attached Printer on OS/390" on page 126.

   __ 6. If you want to share the printer, do the procedure in "Sharing IBM Network Printers on OS/390" on page 127.

   __ 7. If you have problems, refer to "Handling OS/390 Connectivity Problems" on page 128.

Configuring PSF to Print IPDS Files

Data Requirements

You need the IP address of the printer.

Configuration Procedure

Configuring PSF to print IPDS files includes the following steps:

1. Define the OS/390 communications control unit to OS/390. See "Define the Communications Control Unit to OS/390" on page 121.
2. Modify the TCP/IP profile on your OS/390 system, if necessary. See "Modify the TCP/IP Profile in MVS" on page 121.
3. Ping the printer. See "Verify the Printer Connection" on page 122.
4. Define the printer as a writer-controlled printer to JES. See "Define the Printer to JES" on page 123.
5. Define the printer to PSF with a PRINTDEV statement, including the IP address. See "Define the Printer to PSF" on page 123.

Notes:

1. This section does not provide all the information you need to install and configure TCP/IP on your OS/390 system. For more information on installing TCP/IP, refer to *TCP/IP for MVS: Customization and Administration Guide*.
2. 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 OS/390 host appears to be communicating directly with the TCP/IP-attached printer.

Define the Communications Control Unit to OS/390

If you have not already done so, use a hardware configuration definition (HCD) to define the communications control unit for the OS/390® host, such as the 3172 or the 3745 control unit, to OS/390.

- *MVS/ESA Migration Planning: Dynamic I/O Configuration*
- *OS/390 Hardware Configuration Definition (HCD) Planning*, GC28-1750
- *OS/390 Hardware Configuration Definition (HCD) User's Guide*, SC28–1848

Modify the TCP/IP Profile in MVS

The TCP/IP profile contains system configuration statements used to initialize the TCP/IP address space. Figure 1 shows statements in the TCP/IP profile; however, this example is not a complete profile. For complete information about profile statements, refer to:

- *OS/390 eNetwork Communications Server IP Configuration*, SC31-8513
- *TCP/IP Performance Tuning Guide*, SC31-7188
- *OS/390 Security Server RACF Planning: Installation and Migration*, GC28-1920

Note: If you change any of the values in the TCP/IP profile, restart TCP/IP to pick up the changes.

```
KEEPALIVEOPTIONS INTERVAL 10 SENDGARBAGE FALSE ENDKEEPALIVEOPTIONS
GATEWAY
; * Network First hop    Linkname Packet size Subnet mask Subnet value
  9            =          BPCLAN   4096        0.255.255.0 0.99.12.0
  DEFAULTNET 9.99.12.254 BPCLAN   4096        0.255.255.0 0
```

Figure 1. Sample Parameters in the TCP/IP Profile. This example is **not** a complete TCP/IP profile.

The statements in **bold** in Figure 1 require special considerations when you are printing from PSF on TCP/IP-attached printers:

KEEPALIVEOPTIONS

The KEEPALIVEOPTIONS statement defines the interval between keep-alive transmissions. PSF relies on TCP to detect when a connection with a TCP/IP-attached printer or an i-data 7913 IPDS™ Printer LAN Attachment is no longer usable. When no data has been exchanged between PSF and its connection partner, TCP sends keep-alive probes to the connection partner periodically. These periodic probes, called keep-alive transmissions, enable TCP to discover when a connection is no longer usable even if the connection partner is abruptly powered off or is no longer accessible through the network.

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

For printing on TCP/IP-attached printers, 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 GATEWAY statement defines static routes, including the maximum packet size for each route. The *Packet_size* parameter of the GATEWAY statement defines the maximum transmission unit (MTU) for the MVS™ host. The MTU size must not exceed the maximum size that can be sent through the control unit; if it does, transmission problems will occur.

For printing on TCP/IP-attached printers, IBM recommends the following:

- An MTU size of 4,096 bytes and a dedicated LAN for high-speed printers on a token-ring network; otherwise, for printers on an Ethernet network, the MTU size must be below 1,500 bytes.
- The MTU size for the MVS host should be the same as the MTU size for the printer.

Note: For values in the GATEWAY statement other than the packet size, specify the values that are correct for your installation.

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 printer.

Here are examples of a successful ping and an unsuccessful ping.

Successful ping:

```
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.
```

Unsuccessful ping:

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

Note: If you have problems pinging a printer, refer to "Handling OS/390 Connectivity Problems" on page 128.

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: The following example shows 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
```

Notes:

1. 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.

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

JES3 Printer Definitions: The following shows an example of a 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),
```

Notes:

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

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

Define the Printer to PSF

Each TCP/IP-attached printer must be defined to PSF in the Printer Inventory component of Infoprint Server for OS/390 or with a PRINTDEV statement in the PSF startup procedure.

Note: For information about using the Printer Inventory component of Infoprint Server for OS/390, please see *Print Services Facility for OS/390: Customization*, S544-5622-01, for PSF Version 3, Release 1.0.

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

No network 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 network printers. Make sure that you specify 300-pel font
libraries. Infoprint 21 and Infoprint 45 are high resolution devices that appear
to PSF as 300-pel devices.)

```
//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
//*              X0GT15.
//*
//*
//*01* CHANGE-ACTIVITY :
//*
//**** END OF SPECIFICATIONS ***/
//STEP01   EXEC PGM=APSPPIEP,REGION=4096K
//JOBHDR OUTPUT PAGEDEF=V06483,    /* JOB SEPARATOR PAGEDEF       */
//       FORMDEF=A10110,CHARS=GT15 /* JOB SEPARATOR FORMDEF       */
//JOBTLR 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     */
//FONT300  DD   DSN=SYS1.FONT300,  /* SYSTEM FONTS - 300 PEL      */
//         DISP=SHR
//PSEG01   DD   DSN=SYS1.PSEGLIB,  /* SYSTEM PAGE SEGMENTS        */
//         DISP=SHR
//OLAY01   DD   DSN=SYS1.OVERLIB,  /* SYSTEM MEDIUM OVERLAYS      */
//         DISP=SHR                /*                             */
//PDEF01   DD   DSN=SYS1.PDEFLIB,  /* SYSTEM PAGEDEFS             */
//         DISP=SHR
//FDEF01   DD   DSN=SYS1.FDEFLIB,  /* SYSTEM FORMDEFS             */
//         DISP=SHR
//* ***********************************************************     */
//*                PRINTDEV                                         */
```

```
//* ***********************************************************        */
//PRT1      CNTL
//PRT1       PRINTDEV FONTDD=*.FONT300,/* 300 PEL FONT LIBRARY DD      */
//           OVLYDD=*.OLAY01,          /* OVERLAY  LIBRARY DD          */
//           PSEGDD=*.PSEG01,          /* SEGMENT  LIBRARY DD          */
//           PDEFDD=*.PDEF01,          /* PAGEDEF  LIBRARY DD          */
//           FDEFDD=*.FDEF01,          /* FORMDEF  LIBRARY DD          */
//           JOBHDR=*.JOBHDR,          /* JOB HEADER SEPARATOR         */
//*                                    /*   OUTPUT                     */
//           JOBTRLR=*.JOBTLR,         /* JOB TRAILER SEPARATOR        */
//*                                    /*   OUTPUT                     */
//           DSHDR=*.DSHDR,            /* DATA SET HEADER              */
//*                                    /*   SEPARATOR                  */
//           MESSAGE=*.MSGDS,          /* MESSAGE DATA SET OUTPUT      */
//           BUFNO=5,                  /* NUMBER OF WRITE DATA BUFFERS */
//           PAGEDEF=A06462,           /* DEVICE PAGEDEF DEFAULT       */
//           FORMDEF=A10110,           /* DEVICE FORMDEF DEFAULT       */
//           CHARS=(GF10,              /* DEVICE                       */
//           GS10,TU10,GU10),          /* DEFAULT FONT SET             */
//           PIMSG=YES,                /* ACCUMULATE DATA SET          */
//*                                    /*   MESSAGES                   */
//           DATACK=BLOCK,             /* REPORT ALL DATA-CHECK        */
//*                                    /*   ERRORS                     */
//           TRACE=NO,                 /* CREATE INTERNAL TRACE        */
//           FAILURE=WCONNECT,         /* PSF ACTION ON PRINTER        */
//*                                    /*   FAILURE                    */
//           TIMEOUT=REDRIVE,          /* PSF ACTION ON TIMEOUT        */
//           MGMTMODE=OUTAVAIL,        /* PRINTER MANAGEMENT MODE      */
//           DISCINTV=15,              /* DISCONNECT INTERVAL IN       */
//                                     /*   SECONDS                    */
//           IPADDR='xxx.xxx.xxx.xxx' /* IP ADDRESS FOR TCP/IP         */
//PRT1      ENDCNTL
```

Note: To specify a TCP/IP address space name other than the default, TCPIP, code the following exec statement in the writer procedure:

```
//STEP01   EXEC PGM=APSPPIEP,REGION=4096K,PARM=(,,,,tcpip_name)
```

where *tcpip_name* is the name of the TCP/IP address space. If this parameter is not coded, PSF uses the default name, TCPIP.

The IP address is the only required parameter. Other parameters may be set to facilitate printer sharing as described in "Sharing IBM Network Printers on OS/390" on page 127. For a description of the PRINTDEV statement, which is not given here, see the PSF *System Programming Guide* or *Print Services Facility for OS/390: Customization*, S544-5622-02, for PSF Version 3, Release 2.0.

IPADDR

Specifies the IP address for the printer NIC, in dotted-decimal notation. The hostname can be specified in place of the dotted-decimal address only with PSF 3.1.0 or PSF 3.2.0.

Verifying a TCP/IP-Attached Printer on OS/390

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

Starting a TCP/IP-attached Printer

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

1. Start TCP/IP.
2. Power on the printer.
3. Start the printer FSA.
   - On JES2, the command is:

     $S*printer-name*
   - On JES3, the command is:

     *VARY *printer-name*,ON

Stopping a TCP/IP-attached Printer

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

- The preferred method is to first stop the PSF FSA for the printer by entering the following command from the MVS operator panel:

  JES2:

  $P*printer-name*

  JES3:

  *VARY *printer-name*,OFF
  *CANCEL *printer-name*

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

  Then you can turn off power to the printer.

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

  MODIFY *FSSname*,FORCE,*printer-name*

Resolving IPDS Printing Problems

If you have problems printing, do the following:

- Print a network configuration page. Refer to "Accessing the Network Configuration Page" on page 7.
- Verify that the port number set for the IPDS port matches the port number specified in either the PORTNO parameter in the PRINTDEV statement or the Port number parameter in the printer inventory. You can use the printer web pages or NPM to view or change the IPDS port number.

If you are still unable to print IPDS files, contact IBM Support.

Sharing IBM Network Printers on OS/390

IBM network printers can be shared on PSF in one of two ways:

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

JES Spool Printer Sharing

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

MGMTMODE

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

FAILURE

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

TIMEOUT

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

DISCINTV

Specifies the disconnect interval in seconds. The value can range from zero to 86400. IBM suggests you set the value to **15**. When no output

is available from JES for this time period, PSF ends the session with the network printer. If the value is set to zero, PSF does not end the session because of lack of output.

Note: PSF supports another method of printer sharing, which is not applicable to IBM network printers. VTAM RELREQ is available for printer sharing under SNA, but SNA attachment is not supported by the Infoprint 21 or Infoprint 45.

Port Switching Printer Sharing

To support printer sharing, the printer automatically switches among all attached ports (parallel port and LAN port). Basically, the printer prints one job at a time, and chooses the next job from the highest priority port. If the client does not end a job, then the printer applies the timeout value set for the print port.

To change the "time out" value, update the the timeout value on the printer web page for the appropriate port.

Handling OS/390 Connectivity Problems

If you encounter problems when pinging 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 printer 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 121.

  – 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 network printer. The MTU size for the Ethernet NIC is fixed at 1400 bytes. The MTU size for the Token Ring NIC is 2120 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 *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 12. Configuring OS/390 to Print S/390 Line Data, PCL, and PostScript Files

Use this chapter to print line data, PCL data, or PostScript data on an OS/390 or z/OS system to your network printer. To print data on an OS/390 or z/OS system, order one of the following features, depending on your installation's operating system:

Operating System	Feature
OS/390 V2R8 to V2R10 z/0S V1R1 and later	Infoprint Server feature of OS/390 Infoprint Server feature of z/OS
OS/390 V2R5 to V2R7	Print Server feature of OS/390
MVS OS/390 V1R1 and later z/OS V1R1 and later	IP PrintWay feature of PSF/MVS IP PrintWay feature of PSF for OS/390 IP PrintWay feature of PSF for OS/390
OS/390 V1R3 to V2R4	IP PrintWay/NetSpool feature of OS/390

Note: When you order the Infoprint Server feature, IP PrintWay contains functional and usability enhancements. You must order the Infoprint Server feature if you want to send data to the Internet Printing Protocol (IPP) server in your printer.

Requirements

For software requirements, refer to the program directory that you receive with your order.

Configuration Checklist

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Customize the IP PrintWay feature or the IP PrintWay component of the Print Server or Infoprint Server feature. Refer to one of the following publications for information:

   • If you installed Infoprint Server, refer to *OS/390 Infoprint Server Customization*, G544-5694 or *z/OS Infoprint Server Customization*, S544–5744

- Otherwise, refer to *IBM IP PrintWay Guide*, S544-5379

__ 4. Define the printer to IP PrintWay. If you installed Infoprint Server, create a printer definition in the Printer Inventory; otherwise, create a routing entry for the printer in the IP PrintWay routing data set and create an options entry in the IP PrintWay options data set. Refer to one of the following publications for more information:

- If you installed Infoprint Server, refer to *OS/390 Infoprint Server Operation and Administration*, S544-5693 or *z/OS Infoprint Server Operation and Administration*, S544–5745
- Otherwise, refer to *IBM IP PrintWay Guide*, S544-5379

Some print-submission methods let users specify the IP address or the printer and either the print queue name or port number. If your users can specify the IP address during job submission, you need to have a print queue or port number on JCL. It is not necessary to create a printer definition or routing entry for the printer. However, to send data to the IPP server in your printer, you must create a printer definition because job submitters cannot specify the URL of the printer.

Specify the following information in either the printer definition or the routing and options entry for the printer. The information you specify differs depending on which TCP/IP protocol you want IP PrintWay to use to send data to the printer: LPR, direct-sockets, or IPP.

- To use LPR protocol to send data to the printer's LPD:
  - IP address: IP address or host name you assigned to the printer
  - Print queue name: PASS
  - Line termination control: 0D25. 0D25 is the EBCDIC representation of the carriage return and line feed controls (CRLF).

  Note: You can send S/390 data to the TEXT queue instead of the PASS queue. If you send S/390 data to the TEXT queue, you do not need to set the line termination control to 0D25.

- To use direct-sockets protocol to send data directly to a port:
  - IP address: IP address or host name you assigned to the printer Port number: 2501 or 9100
  - Line termination control: 0D25. This is the EBCDIC representation of the carriage return and line feed controls (CRLF).

- To use IPP to send data to the IPP server in the printer:
  - URL: The printer's IP address in one of the following formats:
    ```
    ipp://nnn.nnn.nnn.nnn
    ```
    or
    ```
    http://nnn.nnn.nnn.nnn:631
    ```

where: nnn.nnn.nnn.nnn is the IP address or host name you assigned to the printer. 631 is the port number. If you use the IPP format, then you do not need to specify the port number.

– Line termination control: 0D25. This is the EBCDIC representation of the carriage return and line feed controls (CRLF).

Notes:

a. You need to specify **0D25** as the line termination control only if you print OS/390 line data from batch jobs using OUTPUT JCL statements. It is not required for printing PCL or PostScript data.

b. If you print PCL data from batch jobs using OUTPUT JCL statements, you must specify one of the following:

– If you installed Infoprint Server, specify **none** in the IP PrintWay **Formatting** field of the printer definition

– Otherwise, specify **BINARY** in the IP PrintWay options entry.

__ 5. Print a file. On the OS/390 or z/OS system, you can direct an output data set to the network printer with an OUTPUT JCL statement. If you installed either the Print Server or Infoprint Server feature, and configured the NetSpool and Print Interface components, you can also print from VTAM applications such as CICS or IMS, from remote workstations (such as Windows), from OS/390 UNIX System Services, and from z/OS UNIX System Services. Refer to one of the following publications for more information about how to submit print jobs:

- If you installed Infoprint Server, refer to *OS/390 Infoprint Server User's Guide*, S544-5692 or *z/OS Infoprint Server User's Guide*, S544-5746
- Otherwise, refer to *IBM IP PrintWay Guide*, S544-5379

The following examples show the parameters you need to specify on an OUTPUT JCL statement. These examples assume that the system programmer defined the IP PrintWay functional subsystem application (FSA) to JES with a work-selection criterion of CLASS P. This means that JES directs all output data sets on the JES spool in class P to IP PrintWay.

Examples

Examples for the Infoprint Server Feature
Example 1: This example assumes that the administrator created a printer definition named MYPRINTER for the printer.

```
//OUT1 OUTPUT CLASS=P,FSSDATA='printer=MYPRINTER'
```

Example 2: This example assumes that the administrator created a printer definition in the Infoprint Server Printer Inventory and specified JCL selection criteria CLASS=P and DEST=MYPRT in the printer definition.

```
//OUT2 OUTPUT CLASS=P,DEST=MYPRT,FORMS=STND,PRTOPTNS=MYOPTS
```

Example 3, 4: In these examples, the IP address and print queue name or port number are specified directly on the OUTPUT JCL statement.

```
//OUT3  OUTPUT CLASS=P,DEST='IP:nnn.nnn.nnn.nnn',PRTQUEUE=TEXT,PRTOPTNS=MYOPTS

//OUT4  OUTPUT CLASS=P,DEST='IP:nnn.nnn.nnn.nnn',PORTNO=2501,PRTOPTNS=MYOPTS
```

where: nnn.nnn.nnn.nnn is the IP address or host name you assigned to the printer. MYOPTS is the name of a Processing component in the Infoprint Server Printer Inventory.

Examples for IP PrintWay, IP PrintWay/NetSpool, and Print Server Features
Example 2: This example assumes that the administrator created a routing entry and options entry for the printer, and that the administrator specified JCL selection criteria CLASS=P,DEST=MYPRT, and FORMS=STND in the routing entry.

```
//OUT2 OUTPUT CLASS=P,DEST=MYPRT,FORMS=STND,PRTOPTNS=MYOPTS
```

Example 3, 4: In these examples, the IP address and print queue name or port number are specified directly on the OUTPUT JCL statement.

```
//OUT3  OUTPUT CLASS=P,DEST='IP:nnn.nnn.nnn.nnn',PRTQUEUE=TEXT,PRTOPTNS=MYOPTS

//OUT4  OUTPUT CLASS=P,DEST='IP:nnn.nnn.nnn.nnn',PORTNO=2501,PRTOPTNS=MYOPTS
```

where: nnn.nnn.nnn.nnn is the IP address or host name you assigned to the printer. MYOPTS is the name of an options entry.

Chapter 13. Configuring AIX to Format and Print PCL and PostScript Files

Use this chapter to configure AIX to format PCL or PostScript files before printing them on your printer. To configure AIX to print already-formatted files, see "Chapter 14. Configuring AIX to Print Formatted PCL and PostScript Files" on page 139.

Requirements

You need:

AIX 4.1.x	AIX 4.2.x	AIX 4.3.x
APAR IX56699 and IX63248 applied on the RS/6000 server	APAR IX63260 applied on the RS/6000 server	No APAR required

To obtain the PTFs associated with these APARs, contact the IBM Support Center (see "Product Support" on page xi).

Note: The APARs are needed to create a virtual printer. Without them, you will not be able to create queues.

You also need TCP/IP with Telnet on clients or submitters.

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on the AIX server, require **root** authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Install the printer drivers and utilities on the AIX system. See "Installing AIX Printer Driver and Utilities" on page 136.

__ 4. Configure your AIX system. See "Configuring AIX to Format and Print Files" on page 137.

___ 5. Verify the configuration. See "Verifying an AIX Configuration" on page 138 .

___ 6. If you have problems, see "Chapter 26. Handling TCP/IP Problems" on page 195.

Installing AIX Printer Driver and Utilities

> **Drivers and Utilities on the Web**
>
> To obtain a current version of a printer driver, program, or utility:
>
> 1. Access the IBM Printing Systems home page:
>
>   http://www.ibm.com/printers
>
> 2. Download and install the printer driver, utility, or program you need.

1. Logon to an AIX machine as root.
2. Place the CD-ROM with the AIX printer driver and utilities into the appropriate drive.
3. Change to the directory where you want the files to be copied. IBM suggests that you change to the /tmp directory and create a directory under that, for example:

   /tmp/npdriv
4. There are two ways to continue, depending on the media you are using:
   - If you are using TAR-formatted diskettes, continue at "TAR-Formatted Files".
   - If you are using a CD-ROM, continue at "Using the CD-ROM".

TAR-Formatted Files

1. Enter the following command: tar -xf ax4aa_ml.tar
2. Select the appropriate README file to finish the installation procedures. The README file gives you up-to-date instructions on new features, hints, and tips about the printer drivers.

Using the CD-ROM

Follow the instructions below to continue installation from a CD-ROM.

1. Mount the CD-ROM with the following command (assumes the path is /dev/cd0).

   mount -o ro -v cdrfs /dev/cd0 /cdrom
2. Enter the following command to copy the CD-ROM contents:

   cp /cdrom/drivers/aix/pcl5ps/ax4aa_ml /tmp/npdriv
3. Unpack the contents of the tar file with the following disk command:

   tar -xf ax4aa_ml.tar

4. Select the appropriate README file to finish the installation procedures. The README file gives you up-to-date instructions on new features, hints, and tips about the printer drivers.

Configuring AIX to Format and Print Files

Data Requirements

Parameter	Description	Your Value
MAC Address	Shown as MAC Address on the network configuration page. It may be changed to the LAA, so check with your network administrator.	
Hostname (or IP)	Either the printer hostname or IP address.	
Gateway	Needed only if there is a gateway address.	
Subnet Mask	Needed only if there is a subnet mask.	

Configuration Procedure

1. Type `smitty mkvirprt` on the command line and press **Enter**. The **Add a Print Queue** window is displayed.
2. Select **ibmNetPrinter** (IBM Network Printer) and press **Enter**.
3. From the **Printer Type** window, select **IBM**.
4. From the refreshed **Printer Type** window, select **ibm4321** for Infoprint 21 or select **ibm4345** for Infoprint 45.
5. The **BOOTP/TFTP Server** window is displayed:
   - Select **1**, if you have not already run BOOTP. Go to step 1 of "Using BOOTP".
   - Select **2**, for non-BOOTP. Go to step 1 of "The Non-BOOTP Way" on page 138.

Using BOOTP

1. The **Add a Print Queue** window is displayed.
2. Optionally, enter AIX print queue names for PostScript and PCL.
3. Enter values for the required fields.
4. Enter the printer hostname (or IP address), for example ABC123, then press **Enter**.
5. Enter the MAC (hardware) address of the NIC and press **Enter**.
6. Use the TAB key to toggle between the two network interface types, then press **Enter**. The two network interface types are:
   - **ether** for Ethernet
   - **tr** for Token Ring

7. Type a gateway IP address and press **Enter**. (Just press **Enter** if you do not want to enter a gateway address.)

8. Type a subnet mask and press **Enter**. (Just press **Enter** if you do not want to enter a subnet mask.)

9. Turn the printer off, wait ten seconds, then turn it back on.

   Note: Make sure the BOOTP daemon is currently running. See "Using BOOTP" on page 137.

10. Exit smitty.

The Non-BOOTP Way

1. If you selected the non-BOOTP way of doing this configuration, the **Add a Print Queue** window is displayed.

2. Enter the AIX print queue name (PS or PCL) or "**!**" to bypass the configuration:

   - Press **Enter** to select the default queue name.
   - Select a different name by typing in the name, then pressing the **Enter** key.
   - Elect not to have a PS or PCL queue by pressing the "**!**" and then pressing the **Enter** key.

3. Enter **Y** if you want one of the queues (PS or PCL) to be the default queue. Otherwise, enter **N**.

4. If you entered an IP address for the hostname, you are prompted for the AIX print queue device name. Enter an AIX queue name, for example, Fred. If you used a hostname for hostname, there is no prompt.

5. Exit smitty.

Verifying an AIX Configuration

To verify the connection, send a print job to the printer using one of the following commands:

```
qprt -P queuename file
lp -d queuename file
lpr -P queuename file
enq -P queuename file
```

queuename
      For PostScript, PCL, and other files, this is the name of the AIX queue assigned to the printer

file   Name of the print file.

Chapter 14. Configuring AIX to Print Formatted PCL and PostScript Files

Use this chapter to configure AIX to print already formatted PS or PCL print files. To configure AIX to format and then print your files, see "Chapter 13. Configuring AIX to Format and Print PCL and PostScript Files" on page 135.

Requirements

You need:

AIX 4.1.x	AIX 4.2.x	AIX 4.3.x
APAR IX56699 and IX63248 applied on the RS/6000 server	APAR IX63260 applied on the RS/6000 server	No APAR required

To obtain the PTFs associated with these APARs, contact the IBM Support Center (see "Product Support" on page xi).

Note: The APARs are needed to create a virtual printer. Without them, you will not be able to create queues.

You also need TCP/IP with Telnet on clients or submitters.

Configuration Checklist

> **Authority Level Required**
> All of the following configuration steps, carried out on the AIX server, require **root** authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Configure your AIX system. See "Configure AIX to Print Formatted Files" on page 140.

__ 4. Verify the configuration. See "Verifying an AIX Configuration" on page 141.

___ 5. If you have problems, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Configure AIX to Print Formatted Files

Data Requirements

You need the following data for AIX to configure the printer:

Parameter	Description	Your Value
Name of the AIX print queue	Your name for the AIX queue assigned to the printer.	
Host name	Host name or IP address of the printer.	
Queue name of the remote printer	Set to **PASS**. (If you are printing plain text files without an IBM printer driver and experience formatting problems, try using **TEXT**.)	

Configuration Procedure

1. Type `smitty mkvirprt` on the command line and press **Enter**. The **Add a Print Queue** window is displayed.
2. Select **remote** (**Printer Attached to Remote Host**) and press **Enter**. The **Type of Remote Printing** window is displayed.
3. Select **Standard Processing** and press **Enter**. The **Add a Standard Remote Print Queue** window is displayed.
4. Complete the panel. Here are sample entries:

Table 15. Add a Standard Remote Print Queue Fields

Field	Sample Value	Source
Name of QUEUE to Add	Fred	The name can be anything you want.
HOSTNAME of remote server	NETONE	If you enter an optional host name, enter that name here. Otherwise, use the IP address of the printer.
Name of QUEUE on remote server	PASS	Obtain this value from the data requirements table.
TYPE of print spooler on remote queue	BSD	Enter exactly as shown, or press **F4** and select from the list.

5. When you complete the panel, the **Command Status** window displays.
6. Exit smitty.

Verifying an AIX Configuration

To send a print job to the printer, use one of the following commands:

```
qprt -P queuename file
lp   -d queuename file
lpr  -P queuename file
enq  -P queuename file
```

queuename

For PostScript, PCL, and other files, this is the name of the AIX queue assigned to the printer

file   Name of the print file.

Chapter 15. Configuring AIX to Print IPDS Files

Use this chapter to configure PSF for AIX to format and print IPDS files on your printer.

You need the IPDS option for the printer to print IPDS through PSF for AIX.

Requirements

You need PSF for AIX 2.1 or higher and the latest service. Supported AIX levels include 4.1.*x* and 4.2.*x*.

You need:

AIX 4.1.x	AIX 4.2.x	AIX 4.3.x
APAR IX56699 applied on the RS/6000 server	None	None

To obtain the latest service for PSF for AIX or for AIX, contact the IBM Support Center (refer to "Product Support" on page xi).

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps, carried out on the AIX server or PSF for AIX, require **root** authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Using the printer web pages or the printer operator panel, set up the printer for IPDS by setting the following parameters and values:

Menu	Item	Setting
IPDS	EMULATION	4028
IPDS	FONTSUB	ON

__ 3. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

 143

__ 4. Configure PSF for AIX. See "Configuring AIX to Print IPDS Files" .

__ 5. Configure PSF for sharing. See "Configuring PSF for AIX for Printer Sharing" on page 145.

__ 6. Verify the configuration by sending a print job to the printer using any of the commands in "Verifying an AIX Configuration for IPDS" on page 146.

__ 7. If you have problems, see "Chapter 26. Handling TCP/IP Problems" on page 195.

Configuring AIX to Print IPDS Files

Data Requirements

Parameter	Description	Your Value
IP address	IP address of the printer.	
Printer queue name	Name of the AIX queue for the printer. User-assigned.	

Configure PSF for AIX to Print IPDS Files

To configure PSF for AIX to print IPDS files:

1. Logon to AIX with root authority.
2. Type smitty at the command line and press **Enter**.
3. Select **PSF for AIX Printing and Configuration**.
4. Select **Administer PSF for AIX**.
5. Select **Manage a PSF for AIX Printer (such as Add and Remove Printers)**.
6. Select **Add a Printer or PSF Queue**.
7. Select **TCP/IP**. The **Add a TCP/IP Attached Printer** screen displays.

```
                  Add a TCP/IP Attached Printer
Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                              [Entry Fields]
* Data stream type                             IPDS
* Printer NAME                                [ ]
* Internet address                            [ ]
* PORT number                                 [5001]
* Number of QUEUE DEVICES                     [ ]
* Connection TIMEOUT (seconds)                [30]
  Description
    ⋮
```

8. Enter values for the following parameters:

   Printer NAME

   Enter a name for the printer. This is the queue name that will be

associated with the printer's IP address. PSF for AIX uses the name you specify here as the name for the printer, the printer queue name, and the name of the printer profile associated with the printer. The name can be up to eight alphanumeric characters.

Internet Address

Enter the IP address assigned to the printer. PSF for AIX does not validate this address. If the address does not exist or is invalid, PSF for AIX issues error messages to inform the user that PSF for AIX cannot link to that address when a print job is submitted to the print queue.

PORT number

Accept the default port number of 5001.

Number of QUEUE DEVICES

Enter the number of queue devices. Each queue device processes one spooled file at a time. If you want to process more than one file at a time, you need to specify additional queue devices. The value can range from 1 to 99. The default is 4. Note that the more queue devices you specify, the more memory PSF for AIX uses.

Connection TIMEOUT

Accept the recommended value of 30 seconds for the timeout value. You can adjust this value upwards to suit your environment.

Description

Enter a description of the printer, possibly including such information as its location, use, or owner.

Note: Refer to your PSF for AIX documentation for additional details.

Configuring PSF for AIX for Printer Sharing

To support printer sharing, the printer automatically switches among all attached ports (parallel port and LAN port). Basically, the printer prints one job at a time, and chooses the next job from the highest priority port. If the client does not end a job, then the printer applies the timeout value set for the print port.

To change the "time out" value, update the the timeout value on the printer web page for the appropriate port.

Setting up PSF for AIX for Printer Sharing

Printer Sharing on the AIX Server

If you are using PSF for AIX as the spooler, assign a value to the "Job Interval Shutdown Timer" on the server.

1. At the command line, enter smitty.
2. Select **Administer PSF for AIX**.
3. Select **Manage a PSF for AIX Printer (such as Add and Remove Printers)**.
4. Select **Show/Change Characteristics of a Printer**.
5. Select **Tuning Options**.
6. Select the printer name.
7. Set a value for the Job Interval Shutdown Timer. IBM recommends a value of 30. Do **not** use the default value of 9999 (infinite).
8. Press **Enter** to save the value.

Printer Sharing from PSF Direct
If you are using PSF Direct on AIX, you can share printers by setting a value for the "Inactivity Timer".

1. At the command line, enter smitty.
2. Select **Communications Applications and Services**.
3. Select **PSF Direct**.
4. Select **Show or Change Host Receiver Characteristics**.
5. Select the host receiver.
6. Set a value for the Inactivity Timer. IBM recommends a value of 30. Do **not** specify the default, 9999 (infinite).

Verifying an AIX Configuration for IPDS

1. To send a print job to the printer, use one of the following commands:

   ```
   qprt -P queuename file
   lp   -d queuename file
   lpr  -P queuename file
   enq  -P queuename file
   ```

   queuename
   　　　For IPDS, this is the printer NAME.

   file　　Name of the print file.

2. If you have problems printing, do the following:
   a. Print a network configuration page. Refer to "Accessing the Network Configuration Page" on page 7.
   b. Verify that port number 5001 is being used.
3. If you are still unable to print IPDS files, contact IBM Support.

Chapter 16. Infoprint Manager for AIX

Use this chapter to configure Infoprint Manager to print using your Infoprint 21 and Infoprint 45.

Requirements

To print to Infoprint 21 and Infoprint 45, you require Infoprint Manager Version 3.2 with APAR IY14599 (PTF V474309).

Configuration Checklist

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Define the printer to Infoprint Manager as described in the next section, "Defining Printers to Infoprint Manager".

Defining Printers to Infoprint Manager

The configuration procedure to use depends on what data stream you want to send:

- To send IPDS to the printer, configure Infoprint Manager for a PSF TCP/IP-attached printer. See "Configuring Network Printers as PSF TCP/IP-Attached Printer" on page 148.

- To send PCL to the printer, you can configure Infoprint Manager for a PSF other printer. This will allow you to submit jobs containing any data stream that PSF accepts and print them as PCL. See "Configuring Network Printers as PSF Other Printers" on page 148. You can also configure Infoprint Manager for an AIX-attached physical printer, but you will only be able to send PCL jobs to the printer if it is defined this way.

- To send PostScript to the printer, configure Infoprint Manager for an AIX-attached printer. See "Configuring the Network Printer to Infoprint as an AIX Printer" on page 150.

Note: PCL and PostScript are standard. IPDS requires the optional IBM AFP/IPDS Module feature.

Configuring Network Printers as PSF TCP/IP-Attached Printer

Create a PSF TCP/IP destination to define a printer that receives IPDS jobs using the TCP/IP protocol.

1. Complete the following worksheet:

Table 16. PSF TCP/IP Printer Worksheet

Wizard Prompt	Description	Value
Name	The name for the actual destination object (8 character limit). **Note:** This name is case-sensitive.	
Server	The Infoprint Manager server that controls this actual destination.	
Model	The printer model, such as **Infoprint60** or **4320**.	
TCP/IP address	The dotted-decimal IP address used to access this printer.	
TCP/IP port	The port used by the printer for communication. (Typically, port 5001 is used.)	
Logical destination	The logical destination that directs jobs to this actual destination.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination.	
Queue	The queue that holds jobs destined for this actual destination.	__ Default __ Other:

2. Launch the Infoprint Manager Administration GUI.
3. On the menu bar, select **Printer --> Create --> PSF --> TCP/IP** to start the Create Printer Wizard.
4. Provide the worksheet information to the wizard. For assistance, refer to the Infoprint Manager Administration GUI online help.
5. If you did not enable the printer with the Create Printer Wizard, use the Infoprint Manager Administration GUI to enable it.

Configuring Network Printers as PSF Other Printers

To configure a network printer as a PSF direct-attached physical printer:

1. Install the PCL driver on your AIX system from the CD-ROM shipped with the printer. Follow the instructions in the README file on the CD-ROM.

   Note: Drivers are also available from the IBM Printing Systems home page:
   ```
   http://www.ibm.com/printers
   ```

Be sure to create an AIX print queue. Although Infoprint will not use this queue to send jobs to the new physical printer, it will make configuration easier. It also allows you to verify that you installed the device driver and connected the printer device correctly.

Adding a PSF Other-Driver Printer

Create a PSF other-driver actual destination to represent a PCL printer that receives data streams transformed by PSF through a Windows port monitor.

Note: The Infoprint Manager Administration GUI calls a PSF other-driver actual destination or printer, a PSF other printer.

Before you create a PSF other-driver printer, complete the following worksheet

Table 17. PSF Other-Driver Work Sheet

Wizard Prompt	Description	Value
Name	The name for the actual destination object (8 character limit). **Note:** The name is case-sensitive.	
Server	The server that controls this actual destination. The server name is the same as the name of the host system where the server is installed. **Note:** This name is case-sensitive	
Model	Select the printer model from the pull-down list in the Infoprint Manager Administration GUI. If the printer you are working with is not in the pull-down list, enter the name as it appears on the printer.	
SNMP TCP/IP address	The dotted-decimal IP address used to access this printer. This value is used only for SNMP printers.	
Windows port name	The Windows port name associated with this destination.	

Table 17. PSF Other-Driver Work Sheet (continued)

Wizard Prompt	Description	Value
Data stream	The data stream expected by the printing device (for example, PCL4 or PPDS).	
Logical destination	The logical destination that directs jobs to this actual destination. **Note:** The name is case-sensitive.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination. **Note:** The name is case-sensitive.	
Queue	The queue that holds jobs destined for this actual destination. **Note:** The name is case-sensitive.	__ Default __ Other:

To create this type of printer, use the **Create Print Wizard** in the Infoprint Manager Administration GUI. (On the menu bar, click **Printers–>Create–>PSF–>Other**.) Referring to the work sheet above, provide the information as prompted by the wizard. For assistance, refer to the Infoprint Manager Administration GUI online help.

Note: If the **Create PSF Other** printer option is not shown in the **Printer** menu, you can add it to the menu using customizing options in the Infoprint Manager Administration GUI. Select the **Customize** option from the **Options** menu to open the Customize dialog.

Select the **Printer** tab and select the Menu checkbox for **Create PSF Other**. Click **OK** to apply your change and close the dialog. The **Create PSF Other** printer option displays the **Printer** menu.

If you did not enable the printer with the **Create Printer Wizard**, use Infoprint Manager Administration GUI to enable it.

Configuring the Network Printer to Infoprint as an AIX Printer

To configure a network printer to print PCL, PostScript, and ASCII, define the printer as an AIX printer:

1. Install the PostScript and PCL drivers on your AIX system from the CD-ROM shipped with the printer. Follow the instructions in the README file on the CD-ROM.

Note: Drivers are also available from the IBM Printing Systems home page:

`http://www.ibm.com/printers`

Be sure to create an AIX print queue. Although Infoprint will not use this queue to send jobs to the new physical printer, you will need it for migration. It also allows you to verify that you installed the device driver and connected the printer device correctly.

2. Use the Infoprint SMIT migration utility provided with Infoprint Manager to migrate the AIX printer to Infoprint.

Chapter 17. Configuring HP-UX to Format and Print PCL and PostScript Files

Use this chapter to configure the printer to work in the HP-UX environment.

Requirements

You need HP-UX Version 10 or 11.

Clients or submitters need TCP/IP or Telnet.

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on the HP-UX server require **root** authority.

__ 1. If you have not already done so, setup the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Install the printer driver and utilities. See "Installing the HP-UX Printer Driver" on page 154.

__ 4. Configure the host environment. See "Configuring HP-UX" on page 154.

__ 5. Verify the configuration. See "Verifying an HP-UX Configuration" on page 155.

__ 6. If you have problems, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Installing the HP-UX Printer Driver

> **Drivers and Utilities on the Web**
>
> To obtain a current version of a printer driver, program, or utility:
>
> 1. Access the IBM Printing Systems home page:
>
>   `http://www.ibm.com/printers`
>
> 2. Download and install the printer driver, utility, or program you need.

1. Logon to an HP-UX machine as root.
2. Place the CD-ROM with the HP-UX printer driver into the appropriate drive.
3. Change to the directory where you want the files to be copied. IBM suggests that you change to the /tmp directory and create a directory under that, for example:

   `/tmp/npdriv`
4. Mount the CD-ROM.
   - On HP 10.0, with a path of /dev/dsk/c0t5d0, the command is:

     `mount /dev/dsk/c0t5d0 /cdrom -o ro -F cdfs`
   - On HP 11.0, with a path of /dev/dsk/c0t5d0, the command is:

     `mount /dev/dsk/c0t5d0 /cdrom -o ro -F cdfs`
5. Copy the contents of the CD-ROM with the command:

   ```
   cp /cdrom/drivers/hpux/pcl5ps/hp0aa_ml.tar /tmp/npdriv   (for version 10.0)
   or
   cp /cdrom/drivers/hpux/pcl5ps/hp1aa_ml.tar /tmp/npdriv   (for version 11.0)
   ```
6. Unpack the tar file with the command:

   ```
   cd /tmp/npdriv
   tar xf hp0aa_ml.tar  (for version 10.0)
   or
   cd /tmp/npdriv
   tar xf hp1aa_ml.tar  (for version 11.0)
   ```
7. Select the appropriate README file to finish the installation procedures. The README file gives you up to date instructions on new features, hints, and tips about the printer drivers.

Configuring HP-UX

Data Requirements

You need the following data for HP-UX to configure the printer:

Parameter	Description	Your Value
MAC Address	Shown as MAC Address on the network configuration page. It may be changed to the LAA, so check with your network administrator.	
Hostname (or IP)	Either the printer hostname or IP address.	
Gateway	Needed only if there is a gateway address.	
Subnet Mask	Needed only if there is a subnet mask.	
Queue name	Name of the printer queue. Can be any name you want.	

Configuration Procedure

1. Change directories to:

   `/opt/ibmnp/admin`

   Note: You could also add this directory to your PATH environment variable.

2. Enter the following command:

   `./IBMnpmenu`

   Note: You can use the HP-UX SAM utility to set up the printer queues, but you will not be able to select printer-specific options such as duplex. IBM recommends that you use the IBM-provided utility to set up the queues.

3. Select option **2** to add the IBM Network Printer to the local spooler. Complete the screens to add the printer.

4. If you want to configure set defaults for such printing options as duplex or the output destination of the offset output bin, select option **4** from the menu. Select the printing option you want to configure and select the value you want used as a default by all print jobs sent on this queue.

Verifying an HP-UX Configuration

Verify an HP-UX configuration by sending a print job to the printer using the command:

`lp -d queuename file`

where *queuename* is the name specified earlier.

If you have problems printing, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Chapter 18. Configuring Linux

Use this chapter to configure the printer to work in the Linux Red Hat 6.0 and above environment. Other Linux environments may not be supported.

Requirements

Do use the IBM-supplied Linux driver, your Linux environment must have the following installed:

- Linux RedHat 6.0 or above
- Latest LPR:NG package, available from:

  http://www.astart.com/lprng/LPRng.html
- Perl 5
- GTK, available from:

  http://www.gtk.org
- Perl::GTK, available from:

  www.cpan.org
- XML::Parser Perl library, available from:

  http://wwwx.netheaven.com/~coopercc/xmlparser/intro.html
- XML::DOM Perl library, available from:

  ftp://ftp.orst.edu/pub/packages/CPAN/modules/by-authors/id/E/EN/ENNO/

Configuration Checklist

┌─ **Authority Level Required** ──────────────────────────────┐
All of the following configuration steps carried out on the Linux server require **root** authority.
└───┘

Required Steps

__ 1. If you have not already done so, setup the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Install the printer driver and utilities. See "Installing the Linux Printer Driver" on page 158.

___ 4. Verify the configuration. See "Verifying the Linux Configuration" .

___ 5. If you have problems, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Installing the Linux Printer Driver

> **Drivers and Utilities on the Web**
>
> To obtain a current version of a printer driver, program, or utility:
>
> 1. Access the IBM Printing Systems home page:
>
>   `http://www.ibm.com/printers`
>
> 2. Download and install the printer driver, utility, or program you need.

1. Logon to Linux machine as root.

2. Place the CD-ROM with the Linux printer driver into the appropriate drive.

3. Change to the directory where you want the files to be copied. IBM suggests that you change to the /tmp directory and create a directory under that, for example:

   `/tmp/npdriv`

4. Mount the CD-ROM. Enter the following command:

   `mount /dev/cdrom /mnt/cdrom`

5. Copy the contents of the CD-ROM with the command:

   `cp /mnt/cdrom/drivers/linux/pcl5ps/`*`language`*`/*`

   where *language* is English, French, Spanish, and so on.

6. Open the README file using the following command:

   `less /mnt/cdrom/drivers/linux/readme`

   .

Verifying the Linux Configuration

Verify a Linux configuration by sending a print job to the printer as follows:

1. Start Netscape Navigator.

2. Select **File** and then **Print**.

3. Select **Printer** as the destination.

4. Type `IBMpmtool` in the print command entry field.

5. Select **Print**. A dialog will be displayed to allow you to select print options such as duplex.

Chapter 19. Configuring SCO to Format and Print PCL and PostScript Files

Use this chapter to configure the printer to work in the SCO environment.

Requirements

You need one of the following SCO Versions:

- ODT 3.0
- 3.2 Version 4.1
- OpenServer 5.0

Clients or submitters need TCP/IP or Telnet.

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on the SCO server require **root** authority.

Required Steps

__ 1. If you have not already done so, setup the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Install the printer driver and utilities. See "Installing the SCO Printer Driver" on page 160.

__ 4. Configure the SCO system. See "Configuring SCO" on page 160.

__ 5. Verify the configuration. See "Verifying an SCO Configuration" on page 161.

__ 6. If you have problems, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Installing the SCO Printer Driver

> **Drivers and Utilities on the Web**
>
> To obtain a current version of a printer driver, program, or utility:
>
> 1. Access the IBM Printing Systems home page:
>
>   `http://www.ibm.com/printers`
>
> 2. Download and install the printer driver, utility, or program you need.

1. Logon to a SCO machine as root.
2. Place the CD-ROM with the SCO printer driver into the appropriate drive.
3. Change to the directory where you want the files to be copied. IBM suggests that you change to the /tmp directory and create a directory under that, for example:

   `/tmp/npdriv`
4. Assuming the path is /dev/cd0, mount the CD-ROM with the command:

   `mount /dev/cd0 /cdrom`

   Copy the contents of the CD-ROM with the command:

   `cp /cdrom/drivers/sco/pcl5ps/scoaa_ml.tar /tmp/npdriv`
5. Unpack the tar file with the command:

   ```
   cd /tmp/npdriv
   tar xf scoaa_ml.tar
   ```
6. Select the appropriate README file to finish the installation procedures. The README file gives you up-to-date instructions on new features, hints and tips about the printer drivers.

Configuring SCO

Data Requirements

You need the following data for SCO to configure the printer:

Parameter	Description	Your Value
MAC Address	Shown as MAC Address on the network configuration page. It may be changed to the LAA, so check with your network administrator.	
Hostname (or IP)	Either the printer hostname or IP address.	
Gateway	Needed only if there is a gateway address.	
Subnet Mask	Needed only if there is a subnet mask.	
Queue name	Name of the printer queue. Can be any name you want.	

Configuration Procedure

1. Change directories to:

   /opt/ibmnp/admin

   Note: You could also add this directory to your PATH environment variable.

2. Enter the following command:

   ./IBMnpmenu

3. Select option **2** to add the IBM Network Printer to the local spooler. Complete the screens to add the printer.

4. If you want to configure set defaults for such printing options as duplex or the output destination of the offset output bin, select option **4** from the menu. Select the printing option you want to configure and select the value you want used as a default by all print jobs sent on this queue.

Verifying an SCO Configuration

To verify as SCO configuration, enter this command to send a print job to the printer:

lp -d *queuename* file

where *queuename* is the name specified earlier.

If you have problems printing, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Chapter 20. Configuring SUN Solaris to Format and Print PCL and PostScript Files

Use this chapter to configure the printer to work in the SUN Solaris environment.

Requirements

- SUN Solaris 2.5, 2.6, or 7
- For clients or submitters: TCP/IP or Telnet

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on the SUN server require **root** authority.

__ 1. If you have not already done so, setup the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Install the printer driver and utilities. See "Installing the SUN Solaris Printer Driver" on page 164.

__ 4. Configure the SUN system. See "Configuring SUN Solaris" on page 165.

__ 5. Verify the configuration. See "Verifying a SUN Solaris Configuration" on page 165.

__ 6. If you have problems, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Installing the SUN Solaris Printer Driver

> **Drivers and Utilities on the Web**
>
> To obtain a current version of a printer driver, program, or utility:
>
> 1. Access the IBM Printing Systems home page:
>
>   `http://www.ibm.com/printers`
> 2. Download and install the printer driver, utility, or program you need.

1. Logon to an SUN Solaris machine as root.
2. Place the CD-ROM with the SUN Solaris printer driver into the appropriate drive.
3. Change to the directory where you want the files to be copied. IBM suggests that you change to the /tmp directory and create a directory under that, for example:

   `/tmp/npdriv`
4. Assuming the path is /dev/dsk/c0t6d0s2, mount the CD-ROM with one of the following commands:

   `mount -f hsps -o ro /dev/dsk/c0t6d0s2 /cdrom`

   OR if you are running Volume Manager:

   `volcheck`
5. Copy the contents of the CD-ROM with the command:

   `cp /cdrom/drivers/solaris/pcl5ps/solaa_ml.tar /tmp/npdriv`
6. Unpack the tar file with the command:

   ```
   cd /tmp/npdriv
   tar xf solaa_ml.tar
   ```
7. Select the appropriate README file to finish the installation procedures. The README file gives you up-to-date instructions on new features, hints, and tips about the printer drivers.

Configuring SUN Solaris

Data Requirements

You need the following data for SUN Solaris to configure the printer:

Parameter	Description	Your Value
MAC Address	Shown as MAC Address on the network configuration page. It may be changed to the LAA, so check with your network administrator.	
Hostname (or IP)	Either the printer hostname or IP address.	
Gateway	Needed only if there is a gateway address.	
Subnet Mask	Needed only if there is a subnet mask.	
Queue name	Name of the printer queue. Create any desired name.	

Configuration Procedure

1. Change directories to:

   ```
   /opt/ibmnp/admin
   ```

   Note: You can also add this directory to your PATH environment variable.

2. Enter the following command:

   ```
   ./IBMnpmenu
   ```

3. Select option **2** to add the printer to the local spooler. Complete the screens to add the printer.

4. If you want to configure set defaults for such printing options as duplex or the output destination of the offset output bin, select option **4** from the menu. Select the printing option you want to configure and select the value you want used as a default by all print jobs sent on this queue.

Verifying a SUN Solaris Configuration

Verify a SUN Solaris configuration by sending a print job to the printer using the command:

```
lp -d queuename file
```

where *queuename* is the name specified earlier.

If you have problems printing, refer to "Chapter 26. Handling TCP/IP Problems" on page 195.

Chapter 21. Configuring OS/2 TCP/IP to Print PCL and PostScript Files

WebPages

Use this chapter to configure the printer in a TCP/IP environment to print PCL or PostScript files.

Requirements

Verify that you have the required software:

LAN Server:

On the LAN Server, you need **one** of the following versions of OS/2:
- OS/2 Warp Version 3.0 or higher (including OS/2 TCP/IP Version 3.0) **and** OS/2 LAN Server Version 3.0 or 4.0
- OS/2 Warp Connect Version 3.0 (including OS/2 TCP/IP Version 3.0), which includes LAN Server Version 4.0
- OS/2 Warp Server Version 4.0 (including OS/2 TCP/IP Version 3.0), which includes LAN Server Version 5.0

Note: For Warp Server Version 4.0, you must obtain APAR IC16137 to support LPRPORTD and TCP/IP Version 3.1.

Submitters:

On each submitter workstation, you need **one** of the following:
- OS/2 Warp Version 3.0 or higher with OS/2 LAN Requester 3.0 or higher
- Some other operating system with TCP/IP or NetBIOS enabled (for example, a workstation running Windows NT or Windows 95)

Configuration Checklist

> **Authority Level Required**
>
> All of the following configuration steps carried out on OS/2 may require **administrative** authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. To configure your printer in a server-to-printer environment:

    a. Define a printer object. See "Installing the Printer Using Standard OS/2 TCP/IP".

    b. Optionally, you can create aliases for the printers. See "Sharing an OS/2 Queue by Creating a Printer Alias" on page 175.

__ 4. Configure print requesters. See "Configuring Print Requesters on OS/2" on page 177.

__ 5. Verify the configuration. See "Verifying the LAN Server Configuration" on page 170.

__ 6. If you have problems, see "Chapter 26. Handling TCP/IP Problems" on page 195.

Installing the Printer Using Standard OS/2 TCP/IP

Data Requirements

Parameter	Description	Your Value
Printer object name	User-assigned name for the printer.	
IP address	IP address assigned to the printer.	
LPD queue name	Set to PASS. (If you are printing plain text files without an IBM printer driver and experience formatting problems, try using TEXT.)	

Configuration Procedure

The following procedure is done from the LAN Server system that processes print jobs from submitters and sends them to the printer.

1. Start the LAN Server by issuing the following command from an OS/2 command line window on the LAN Server system that shares printers with other systems:

   ```
   net start server
   ```

2. Install the OS/2 printer driver.

   Note: You may install the printer driver now (as described below) or wait and install it when you do step 7 on page 169.

       a. Logon to the LAN Server with administrative authority.

       b. Obtain the printer driver for OS/2.

c. Read the README file contained on the CD-ROM for installation
      directions.
   d. Install the printer driver.

   Note: You must install a printer driver before creating a printer object.
            You can create multiple printer objects if more than one printer of
            the same type is to be accessed from the same system(s).
3. Start the LPR Port Daemon:
   a. Open the **TCP/IP** folder, which is in the **OS/2 System** folder for Warp
      3.0.
   b. Open **TCP/IP Configuration**.
   c. Select the **Autostart** tab on the notebook.
   d. In **Services to Autostart**, select **lprportd**.
   e. Set the check box for **Autostart Service**.
   f. Select **Foreground Session** and **Minimized**.
   g. Close the notebook by double-clicking the system icon (in the upper,
      left corner).
   h. Select **Save**.
   i. If prompted, respond **Yes** to save the configuration changes.
   j. At the OS/2 command prompt, enter the following to restart TCP:
      tcpstart
4. Find the **Templates** icon on the OS/2 desktop. Double-click the icon to
   open the **Templates - Icon View** window.
5. Drag and drop the **Printer** template icon to a folder/desktop. The **Create a
   Printer** window opens.
6. Type in the name of your printer object in the **Name** field.
7. Select the printer driver that you installed at step 2 on page 168 as the
   default printer driver for this printer object.

   Note: If you did not install the printer driver at step 2 on page 168, click
            the "Install new printer driver..." tab and install the driver.
8. Select an available **LPD port** icon (\PIPE\LPD*x*, where *x* is an integer
   value) from the **Output port** window.

> **What if no LPD port icons appear on the Workstation?**
>
> If no **LPD port** icons appear in the **Output port** window, follow this procedure to add the ports:
>
> a. Right click on any existing port in the **Output port** window.
>
> b. Select **Install** from the pop-up menu.
>
> c. Click **OK** when you see a message about ports already installed.
>
> d. The **Install New Port** window opens. Select **New port drivers** and type the directory name and drive, for example:
>
>   `c:\TCPIP\DLL`
>
>   in the **Directory** field and press **Enter**.
>
> e. Select all eight LPD ports that appear in the**Output port** window by dragging a rectangle over them. (The ports have names ranging from \pipe\lpd0 to lpd7.) Click the **Install** button.
>
> f. After the installation is complete, you can select one of the LPR ports in the **Create a Printer** window.

9. Double-click the icon to open the **LPD Port** icon.

10. Complete the **LPD server** section with the IP address of the printer, for example: 9.99.12.185.

11. Complete the **LPD printer** section with the default LPD queue name. Set to PASS. (If you are printing plain text files without an IBM printer driver and experience formatting problems, try using TEXT.)

12. Click **OK** to save your settings. You are returned to the **Create a Printer** window.

13. Verify your selections, then click the **Create** button. An icon (printer object) appears on your desktop with the name you have chosen.

Verifying the LAN Server Configuration

> **Using Warp Server?**
>
> If you are using OS/2 Warp Server, you must ensure that the spooler is enabled and that the PMPRINT queue driver is being used.

1. Verify that the printer is available with the commands:

   `net alias net use lpt2 \\server_name\printer_name`

2. Submit a test print job with the command:

   `copy config.sys lpt2`

3. Delete the printer connection with the command:

   ```
   net use lpt2 /d
   ```

Peer-to-Peer in the OS/2 Environment

There are two ways to configure the printer for use in a peer-to-peer network under OS/2:

- "Using Warp Connect Peer Services for Windows 95"
- "Configuring OS/2 for Printing from Native OS/2 Applications in a Peer-to-Peer Environment"

Using Warp Connect Peer Services for Windows 95

Warp Connect peer services are available in OS/2 Warp. When installing the system, you can elect to install either peer-to-peer or LAN Requester.

If you install Peer Services, you can connect Windows 95 and other workstations directly to OS/2.

Taking Windows 95 as an example, configure it as follows:

1. Make sure the Warp Connect and Windows 95 userid and passwords are the same.
2. Make sure the Warp Connect domain name and the Windows 95 workgroup names are the same.
3. Enable "share network resources" on Windows 95 so that Windows 95 will pick up the name of the Warp Connect machine and display it on the browse list. If you cannot do this, type the Warp Connect server name at a command prompt:

   ```
   \\server_name
   ```

   then press **Enter** to see a list of shared resources on Warp Connect.
4. The printer can be parallel-connected to either the OS/2 peer station or a Windows 95 station and shared with the rest of the workgroup.

Configuring OS/2 for Printing from Native OS/2 Applications in a Peer-to-Peer Environment

To configure OS/2 for printing in a peer-to-peer environment using TCP/IP:

1. Set up the printer and install the NIC using the instructions in "Chapter 1. Start Here—Installation Checklist" on page 1.
2. Assign an IP address (and maybe other TCP/IP addresses, like subnet mask and gateway) to the printer using the instructions in "Chapter 25. Setting TCP/IP and LAA Addresses" on page 187.
3. Install the printer driver for OS/2. (Refer to "Installing the Printer Driver" on page 174.)

4. Create a printer object on the OS/2 desktop. Define the Output port for that printer as port LPD *x*. (Refer to "Installing the Printer Using Standard OS/2 TCP/IP" on page 168.)

   Note: This approach uses OS/2's LPR port driver (LPRPORTD) to direct all printing (drag-and-drop as well as native OS/2 printing) to the LPD server on the printer.

5. Select the **TCP/IP Configuration** directory in the TCP/IP folder on OS/2.
6. Select the **Autostart** page.
7. Select **LPRPORTD** from the list of services.
8. Select **Autostart Service**.
9. Select the **Foreground** button.
10. Select the **Minimized** button.
11. Close the TCP/IP Configuration window, then **Save** the new settings when prompted.
12. At an OS/2 command line, enter the following to start TCP/IP:

    `tcpstart`

13. Test the configuration with a print job.

Chapter 22. OS/2 NetBIOS

WebPages

Use this chapter to configure OS/2 to use NetBIOS to print to the printer.

Requirements

LAN Server Requirements:

OS/2:

On the LAN Server, you need **one** of the following versions of OS/2:

- OS/2 Warp Version 3.0 or higher **and** LAN Server Version 3.0 or 4.0
- OS/2 Warp Connect Version 3.0 (including OS/2 TCP/IP Version 3.0), which includes LAN Server Version 4.0
- OS/2 Warp Server Version 4.0 (including OS/2 TCP/IP Version 3.0), which includes LAN Server 5.0

Submitter:

On each submitter (client) workstation, you need **one** of the following:

- OS/2 Warp Connect Version 3.0 with LAN Requester installed
- OS/2 Warp Version 4.0 with LAN Requester installed

Configuration Procedure

> **Authority Level Required**
>
> All of the following configuration steps carried out on NetBIOS require **administrative** authority.

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Install the driver for OS/2. See "Installing the Printer Driver" on page 174.

__ 3. Install the printer on OS/2. See "Installing the Printer on OS/2 using NetBIOS" on page 174.

__ 4. Create a printer alias. See "Sharing an OS/2 Queue by Creating a Printer Alias" on page 175 as an example.

  __ 5. Configure print requesters. See "Configuring Print Requesters on OS/2" on page 177.

  __ 6. Verify the configuration. See "Verifying the NetBIOS Configuration" on page 178 to print from NetBIOS.

  __ 7. If you have problems, refer to "Handling NetBIOS Problems" on page 179.

Installing the Printer Driver

> **Drivers and Utilities on the Web**
>
> To obtain a current version of a printer driver, program, or utility:
>
> 1. Access the IBM Printing Systems home page:
>
>   `http://www.ibm.com/printers`
>
> 2. Download and install the printer driver, utility, or program you need.

1. Obtain the driver from the CD-ROM or the web.
2. Read the README file for installation instructions.
3. Install the printer driver using a temporary name, such as TEMP, for the queue.
4. Select the temporary printer queue icon.
5. Delete the temporary icon.

Installing the Printer on OS/2 using NetBIOS

Data Requirements

Table 18. Data Requirements for OS/2 NetBIOS

Parameter	Description	Your Value
OS/2 queue name	A valid user-defined OS/2 queue name.	
NetBIOS machine name	On the network configuration page, this is the **NetBIOS Machine Name**. The default is **IBMT** or **IBME** plus the last six digits of the MAC address, for example IBMT9A1234.	
NetBIOS printer name	On the network configuration page, this is the **NetBIOS Printer Name**. The name is **PRINTER1**.	**PRINTER1**

Installation Procedure

To install the printer on your system:

1. Open an OS/2 command prompt.
2. Enter the following command:

   ```
   net use lptx \\nb_name\printer1
   ```

   where:

   - *x* is the lpt port number to use for this printer connection (for example, lpt2).
   - *nb_name* is the NetBIOS machine name. See Table 18 on page 174.
3. Set up a printer object or use the command line to send print data to lpt*x*, from which it is forwarded to the printer using NetBIOS.

Sharing an OS/2 Queue by Creating a Printer Alias

The following example uses LAN Server Version 4.0.

Data Requirements

Table 19. Data Requirements for NetBIOS Printer Sharing

Parameter	Description	Your Value
Domain name	Domain in which the printer alias is to be created, for example HQ.	
Alias name	User-assigned name.	
Server name	Name of the LAN Server.	
Spooler queue name	The name of the printer object. This was assigned during one of the two following procedures: • Step 3 of this section • Step 6 on page 169 of "Installing the Printer Using Standard OS/2 TCP/IP" on page 168	

Configuration Procedure

A printer alias is required if you want to share a print queue.

1. Open the **LAN Services** folder from the OS/2 desktop.
2. Open the **LAN Server Administration** object.
3. Open the domain object in which you want to create the alias. If you do not know your domain name, check with your Network Administrator.
4. Open **Resource Definitions**. If this option is not visible, you did not logon as administrator.
5. Drag and drop the **Printer Template** to a convenient location in the Resource Definitions window. The **Printer Alias - Create** window opens.

6. Fill in the fields:
   a. Type an alias name in the **Alias** field. This name must be unique to your domain.
   b. Optionally, type a description in the **Description** field.
   c. In the **Server Name** field, enter (or select) the name of the OS/2 server. This is the name of the OS/2 server where you created the printer object.
   d. Select or type a queue name in the **Spooler queue name** field. This is the name of your printer object created in step 3 on page 175.
   e. Determine when you want this printer resource to be shared on the network:
      - **At server startup** automatically shares your printer each time the server is started.
      - **By administrator action** requires your network administrator to manually issue a start sharing command.
   f. If you wish to limit the maximum concurrent connections to the printer resource, enter that number in the **Number of connections** field.
7. Select the **General** tab to continue configuring your printer alias.
8. Type in the name of your alias in the **Title** section.
9. Select **Create** to save your settings and install your alias in the **Resource Definitions** folder.
10. If an **Access Control Profile** was not created previously, you are prompted to create one now. Select **OK** and the **Access Control Profile - Settings View** window opens.
11. Select the **Permissions** tab to define access permissions for your users and groups.
12. Click the **Add...** button to select the names of the userids and groups that have access to your printer. Give each user or group **Create** authority.
13. After you have completed the permissions section, click the **Auditing** tab to open the Audit settings view.
14. Decide which level of auditing you wish to have on this printer resource.
15. Click the **Create** button to create the access control profile for your printer resource.
16. Verify that your printer resource is shared by issuing the following command in an OS/2 command line window:

    ```
    net share
    ```

Configuring Print Requesters on OS/2

Setting up a Shared Printer on an OS/2 Requester

The following steps are required to set up a printer object on an OS/2 requester:

- Set up a shared printer directory on the server.
- Set up a shared printer on a requester or copy the printer driver for each printer to each user's workstation.

Setting Up a Shared Printer Driver Directory on the Server

The following optional steps show the network administrator an example of setting up a shared printer driver directory on the server:

1. Install the printer driver for OS/2 using the directions in the README file on the CD-ROM.
2. Create a directory named C:\DRIVERS on the server. Copy the just-installed driver into this directory. This directory may be used for other OS/2 print drivers that you want to share.
3. Create a directory alias named NPMDRV for the C:\DRIVERS directory. See "Sharing an OS/2 Queue by Creating a Printer Alias" on page 175 for information on setting up an alias (or refer to the LAN Server or LAN Manager Administration Guide).
4. Create an access control profile for this alias and give users Read access.

Setting Up a Shared Printer on an OS/2 Requester

A LAN Server or LAN Manager user can now do the following steps:

1. Find the **Templates** icon on the OS/2 requester workstation desktop. Double-click (or right mouse button click and select **Open** from the pop-up menu) on the icon to open the **Templates - Icon View** window.
2. Using the right mouse button, drag and drop the **Network Printer** template icon to a folder on the desktop or right mouse click the icon and select **Install** from the pop-up menu. The **Access Another Network Printer** window opens.
3. The **Network** field is used to specify the network type where the shared printer is located. LS denotes OS/2 LAN Server. LM denotes OS/2 LAN Manager.
4. Complete the **Server** field by selecting the down arrow and choosing a LAN Server or by typing in the name of the LAN Server where your printer is installed. If the requester is not logged onto the LAN, the **LAN Logon** window appears and must be completed.
5. Complete the **Resource** field by selecting the down arrow and choosing a valid queue or by typing in the name of the queue (or printer object) where your printer is installed.

6. If the printer driver has not been installed on your workstation, a message box tells you that you need one.

7. Either install the printer driver for OS/2 (see "Installing the Printer Driver" on page 174), or point to a shared directory on the server.

8. When the driver installation is complete, a printer object is added to the desktop, and you may begin printing.

9. Verify the configuration. Refer to "Verifying the LAN Server Configuration" on page 170.

> **Problems?**
>
> If you have problems printing, refer to "Chapter 26. Handling TCP/IP Problems" on page 195 or "Handling NetBIOS Problems" on page 179.

Verifying the NetBIOS Configuration

> **Using Warp Server?**
>
> If you are using OS/2 Warp Server, you must ensure that the spooler is enabled and that the PMPRINTqueue driver is being used. **The queue processor should NOT be PMAPRINT**.

1. Logon to the LAN Server or LAN Manager domain as any user.

2. Verify that the printer is available with the command:

   ```
   net alias
   ```

3. Enable the local machine to use the network printer alias with the command:

   ```
   net use lpt2 alias
   ```

4. If you are using OS/2 Warp Server, enable the spooler.

   Note: If the spooler is disabled on OS/2 Warp Server, you may lose data from print jobs.

5. Submit a test print job with the command:

   ```
   copy config.sys lpt2
   ```

6. When finished, delete the net use LPT assignment from the spooler with the command:

   ```
   net use lpt2 alias /d
   ```

Handling NetBIOS Problems

- Make sure that NetBIOS is enabled on the printer. To do that, obtain a network configuration page (refer to "Accessing the Network Configuration Page" on page 7).
- If NetBIOS is enabled, verify that the correct data was entered during the configuration process. Make sure the NetBIOS machine name is correct.
- You can use NPM or the printer web pages to view and change NetBIOS parameters.

Chapter 23. AppleTalk

WebPages

NPM

Use this chapter to configure AppleTalk to print PostScript files on your printer.

Requirements

- AppleTalk Phase 2 with EtherTalk or TokenTalk, depending on the cabling system used on all Macintosh workstations or servers that use the printer
- Macintosh computers running System 8 or higher

Configuration Checklist

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Install the Infoprint 21 or Infoprint 45 driver. See "Installing the IBM PostScript Printer Driver".

__ 3. Configure your printer. See "Configuring AppleTalk" on page 182.

__ 4. Verify the configuration by sending a print job to the printer.

__ 5. Optionally, change the AppleTalk name of your printer. See "Changing the AppleTalk Name of the Printer" on page 184.

__ 6. Optionally, change the AppleTalk zone of your printer. See "Changing the AppleTalk Zone of the Printer" on page 184.

Installing the IBM PostScript Printer Driver

The printer driver for AppleTalk is located on the CD-ROM and on the IBM Printing Systems web site.

Installing from the Web

Read the README file to find the latest information for downloading and installing the printer driver.

Installing from the CD-ROM

Note: Macintosh drivers may not be available on some CD-ROMs. Obtain the latest driver from the web.

1. Insert the CD-ROM into the appropriate drive.
2. Double click on the drive to open it.
3. Double click on the drivers folder to open it.
4. Double click on the MAC folder to open it.
5. Double click on the PS folder to open it.
6. Double click on the folder for the language that you want to use.
7. Drag and drop the .HQX file from the CD to the desktop.
8. Drag and drop the .HQX file from the desktop to the Stuffit Expander. An icon for the IBM Network Printer Installer will appear on the desktop.
9. Select **IBM Network Printer Installer**.
10. A dialog box with the IBM logo displays. Click **Drive** to select the drive to install to. Click **Install** to install the driver and other software.
11. When done, click **Quit** to exit the Installer program.

Configuring AppleTalk

Data Requirements

You need the following data to configure the printer.

Table 20. Data Requirements for AppleTalk

Parameter	Description	Your Value
AppleTalk printer name	The default is Infoprint21_nnnnnn or Infoprint45_nnnnnn. *nnnnnn* is the last six digits of the MAC address. See the Network Configuration Page for the printer.	
AppleTalk zone	The zone in which the printer is to be found. See the Network Configuration Page for the printer. Refer to "Accessing the Network Configuration Page" on page 7.	

Configuration Procedure

1. Verify that AppleTalk is enabled.
   - If you have not changed the printer default parameters, then AppleTalk is enabled by default.
   - If you have changed default parameters, print a network configuration page and look under the "AppleTalk" section. See "Accessing the Network Configuration Page" on page 7.
2. Make sure that the printer is online and ready.
3. Select **Chooser.**
4. Make sure that AppleTalk is **Active**.
5. Select the PSPrinter printer driver icon. The right side of the Chooser window displays a list of printers with which you can associate the driver.
6. Select the zone shown on the printer's network configuration page.
7. In the list of AppleTalk printers, select the printer to associate the driver with.
8. Click the **Create** button.
9. Select the PPD with the same name as the printer.
10. In the next window, choose the installable options which match your printer's installed options. Click **OK**. The original Setup window displays; click **OK**.
11. The PPD is now compiled automatically. When completed, a small icon displays to the left of the printer name in the Chooser.
12. Set background printing on or off.
13. Quit the Chooser, and click **OK** on the Page Setup message if it appears. The printer will now appear on the desktop.

Changing the AppleTalk Name of the Printer

`WebPages`

`NPM`

As part of the printer installation process, you may change the default name of the printer to a different name. Use the IBM Printer Utility, the Macintosh LaserWriter Utility, the printer web pages, or NPM, to change the AppleTalk zone.

To change the name of the printer using the IBM Printer Utility:

1. Open the **IBM Network Printer** folder.
2. Select the **IBM Printer Utility** icon.
3. When the dialog for the utility displays, select the printer.
4. From the **Printer Options** list, select **General**.
5. At the **General Printer Options** dialog, click **Rename**.
6. Type in the new name, click **OK**, and then click **Done**.
7. The printer with its new name now shows up in the IBM Printer Utility dialog and the Chooser.

Changing the AppleTalk Zone of the Printer

`WebPages`

`NPM`

To organize AppleTalk resources, you may want to specify the zone where a printer appears. Initially, the printer's AppleTalk name will show up in the default zone of your network. Use the IBM Printer Utility, the Macintosh LaserWriter Utility, the printer web pages, or NPM, to change the AppleTalk zone.

To change the zone using the IBM Printer Utility:

1. Open the **IBM Network Printer** folder.
2. Select the **IBM Printer Utility** icon.
3. When the dialog for the utility displays, select the printer.
4. From the **Printer Options** list, select **General**.
5. At the **General Printer Options** dialog, select **Rezone**.
6. From the **Printer Type** list, select **Laser Writer**.
7. From the **Available Zones** list, select the desired zone, then click **Set Zone**.
8. Reboot the printer. The printer's AppleTalk name will now show up in the selected zone.

Chapter 24. Internet Printing Protocol (IPP)

The Internet Printing Protocol (IPP) was commissioned by the Internet Engineering Task Force (IETF) and developed under the guidance of the Printer Working Group printing industry consortium. As such, IPP is more well defined than its predecessor (lpr) and is now being adopted as a new standard for printing and job control in networks and over the Internet. Infoprint 21 and Infoprint 45 include an IPP server that can accept jobs from an IPP client using HTTP/1.1 as the transport protocol as defined in IPPv1.0.

Requirements

The printer must have the IPP protocol enabled. Check the network configuration page to ensure IPP is enabled.

An IPP/1.0-compatible client is required on any operating system from which you want to do IPP printing. For example, the Infoprint 21 and Infoprint 45 can accept jobs submitted using IPP from the IPP client that ships with Microsoft Windows 2000. IBM provides two products that offer both IPP client and server function:

- IBM Infoprint Manager for Windows NT and Windows 2000
- Infoprint Server feature of OS/390 V2R8

A list of third-party IPP clients is available from the Printer Working Group on the web at:

```
http://www.pwg.org
```

.

Configuration Checklist

__ 1. If you have not already done so, set up the printer and install the NIC. See "Chapter 1. Start Here—Installation Checklist" on page 1.

__ 2. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See "Setting TCP/IP Addresses from the Printer Operator Panel" on page 187.

__ 3. Install IPP client on your system.

__ 4. Configure the IPP client from step 3. See "Configuring the IPP Client" on page 186.

__ 5. If you have problems, see "Chapter 26. Handling TCP/IP Problems" on page 195.

Configuring the IPP Client

Use the following procedure to configure the client software:

1. On the IPP client, input one of the following into the printer URL field:

   ```
   http://<hostname or IP address>
   http://<hostname or IP address>:631
   ```

2. Optionally, specify a proxy server for the client to use in order to access the printer across a firewall.

3. Optionally, enable chunking (an HTTP/1.1 feature), if the client supports it. Chunking may improve performance. The minimum chunking size supported by Infoprint 21 or Infoprint 45 is 1024 bytes.

4. Verify the configuration by sending a print job using this IPP client.

Chapter 25. Setting TCP/IP and LAA Addresses

WebPages

NPM

This chapter includes the following procedures:
- "Setting TCP/IP Addresses from the Printer Operator Panel"
- "Setting an IP Address on a Local Segment with ARP" on page 188
- "Setting TCP/IP Addresses with DHCP" on page 190
- "Setting TCP/IP Addresses with BOOTP" on page 190
- "Setting TCP/IP Addresses using the UNIX Printer Drivers" on page 191
- "Setting the LAA on Token-Ring NICs" on page 191
- "Resetting the LAA back to the MAC Address" on page 192

Setting TCP/IP Addresses

This section includes the following procedures:
- "Setting TCP/IP Addresses from the Printer Operator Panel"
- "Setting an IP Address on a Local Segment with ARP" on page 188
- "Setting TCP/IP Addresses with DHCP" on page 190
- "Setting TCP/IP Addresses with BOOTP" on page 190

Setting TCP/IP Addresses from the Printer Operator Panel

To set an IP, subnet mask, or gateway address for the printer, perform these steps:

1. Press the **Menu** key until the operator panel displays TCP/IP MENU.
2. Press the **Item** key until the operator panel displays the address to change (IP ADDRESS, SUBNET MASK, or GATEWAY ADDRESS). This example shows how to change the IP ADDRESS.
3. Press the **Enter** key. For a new printer whose IP address has not yet been set, the operator panel displays:

   IP ADDRESS 0<0.0.0 *

   The "<" indicates the field whose value you can change at this point.
4. Press the **Value +** or **Value −** key until the desired value is displayed. The range of the address values is zero to 255. To increment or decrement the value by 10, press and hold the key.

5. When the operator panel displays the value you want, press **Enter**. The "<" moves to the next value, for example:

   `10.0<0.0`

6. Press the **Value +** or **Value −** key until the desired value is displayed, then press the **Enter** key.

7. Repeat step 6 until all four values have been set; then press the **Enter** key to set the address. The value has been set if an asterisk (*) displays to the right of the value, for example:

   `9.99.40.2 *`

8. After you change all the IP, Subnet, and Gateway addresses you want to change, press the **Online** key. You see the following prompt: REBOOT THE PRINTER? / +YES,-NO. Press **Value +** to reboot the printer with the new values. Press **Value −** to continue operating with the old values until the next time the printer is rebooted.

Setting an IP Address on a Local Segment with ARP

Use this section to set the **initial** IP address for the printer.

The following procedure will work only if you are on the same physical segment as the printer.

A Note on Examples

Adapt the following examples to your version of TCP/IP. The OS/2 examples, for instance, are for Version 3.0 of TCP/IP.

---

1. Login to the AIX, SUN Solaris, SCO, or HP-UX host as root or begin at the DOS or OS/2 command line.

2. Verify that the IP address is not already being used:

   a. Obtain an IP address from your network administrator.

   b. Enter the following command:

   `ping ip_address`

   where *ip_address* is the address you obtained in dotted decimal notation (nn.nn.nn.nn).

   You should get **no** response. If you get a response, check with the network administrator to select another IP address.

3. Assign the IP address using a command appropriate for your operating system.

> **Using the Optional temp Parameter**
>
> In the following examples, the ARP command is used to set the IP address on the printer and also create an entry in the host's ARP Table. If you do not want the entry in the host's ARP table to be permanent, then use the "temp" parameter. The IP address on the card will remain set across power cycles regardless of whether or not you use the temp parameter.

OS/2, HP-UX, SCO, and SUN Solaris:

On OS/2, HP-UX, SCO, or SUN Solaris, enter the command in the form:

```
arp -s ip_address MAC_address [temp]
```

For example:

```
arp -s  138.239.252.183  0:0:c9:0:c1:a9 [temp]
```

Note: Do not use leading zeroes in the IP address.

AIX:

In AIX, enter the command in the form:

```
arp -s interface ip_address MAC_address [temp]
```

For example:

```
arp -s ether 123.212.232.191 0:0:c9:0:c1:a9 [temp]
arp -s 802.5 123.212.232.191 0:0:c9:0:c1:a9 [temp]
```

Note: On an AIX system, you must include an additional argument that specifies the interface type. Use **ether** for Ethernet. Use **802.5** for Token Ring.

Windows NT:

On Windows NT, enter the command in the form:

```
arp -s ip_address MAC_address
```

For example:

```
arp -s 9.99.7.2 00-00-c1-00-c1-a9
```

Note: The MAC address for AIX, SUN Solaris, SCO, HP-UX, and OS/2 uses colons; for Windows NT, dashes are used.

4. Verify the newly set IP address by entering the command:

```
ping  ip_address
```

where *ip_address* is the newly set IP address of the printer. You should get a response. Cancel the display with a CTRL+C.

5. Optionally, use the printer web pages or the operator panel to set the subnet mask and default gateway addresses.

Setting TCP/IP Addresses with DHCP

The printer has three possible modes of DHCP operation, which can be set from either the operator panel or the printer web pages. On the operator panel the **DHCP** option is found under the **TCP/IP MENU**:

- **DHCP = IFNO ADDR (default)**: During bootup, the printer will issue DHCP requests only if the IP ADDRESS is set to 0.0.0.0. The printer will accept DHCP offers only if the lease duration is **permanent** (also known as **unlimited** or **infinite**). Thus, you must set your DHCP server to use a permanent type of lease duration for the scope servicing this printer.
- **DHCP = ON**: During bootup, the printer will always issue DHCP requests. The printer will accept DHCP offers of either **timed** (also known as **temporary**) or **permanent** lease durations. The minimum timed lease that the printer will accept is 10 days.
- **DHCP = OFF**: The printer will not issue any DHCP requests or accept any DHCP offers.

The printer will use IP address, subnet mask, and default gateway values from a valid DHCP server response that has the correct lease duration as described above.

The printer requests a permanent lease. IF DHCP=ON is set, the minimum timed lease that the printer will accept is 10 days. IBM recommends that you use a permanent lease for a printer IP address.

If any DHCP requests will be performed (according to the above DHCP setting), these requests will be performed before any BOOTP requests are performed. Once the printer accepts a DHCP offer, it will cease any further DHCP or BOOTP requests.

Setting TCP/IP Addresses with BOOTP

The printer has three possible modes of BOOTP operation, which can be set from either the operator panel or the printer web pages. On the operator panel, the **BOOTP** option is found under the **TCP/IP MENU**:

- **BOOTP = IFNO ADDR (default)**: During bootup, the printer will issue BOOTP requests only if the IP ADDRESS is set to 0.0.0.0.
- **BOOTP = ON**: During bootup, the printer will always issue BOOTP requests.

- **BOOTP = OFF**: The printer will not issue any BOOTP requests or accept any BOOTP replies.

The printer uses IP address, subnet mask, and default gateway values from a valid BOOTP server reply.

If any DHCP requests will be performed (according to the DHCP setting), these requests will be performed before any BOOTP requests are performed. If the printer accepts a DHCP offer, it will cease any further DHCP or BOOTP requests. If the printer accepts a BOOTP reply, it will cease any further BOOTP requests.

Setting TCP/IP Addresses using the UNIX Printer Drivers

If you are configuring your printer from an AIX, HP-UX, SCO, or Sun system, you can set the printer's IP address using the printer driver for that system. The driver uses BOOTP to send an IP address to the printer. In HP-UX, SCO, and Sun environments, if BOOTP is not installed on the system, the driver also attempts to use ARP to set the IP address. To set the IP address using the driver, perform the following steps:

1. Install the printer driver as described in the chapter pertaining to your UNIX environment.
2. Change directories to:

   `/opt/ibmnp/admin`
3. Enter the following command:

   `./IBMnpmenu`
4. Select option **1, IBM Network Printer IP Address Setup**.
5. Provide the MAC address of the NIC and the desired IP address in response to the prompts.

Setting the LAA on Token-Ring NICs

> **Notes**
>
> 1. The capability of changing a MAC address to an LAA address is implemented on Token-Ring cards only. This capability is not available on Ethernet cards.
> 2. To reset the LAA back to the NIC factory default, see "Resetting the LAA back to the MAC Address" on page 192.
> 3. See your network administrator before changing the MAC address because each LAA must be unique on the network.
> 4. See the user documentation that accompanies your printer if you are unfamiliar with using the printer operator panel.

To use the printer operator panel to change the MAC address for a Token Ring NIC to a Locally Administered Address (LAA), do the following:

1. Press the **Online** key to take the printer offline.
2. Press the **Menu** key until the operator panel displays NETWORK MENU.
3. Press the **Item** key until the operator panel displays LAA ADDRESS.
4. Press the **Enter*** key. The operator panel displays the MAC address, for example:

   ```
   LAA ADDRESS 01<
   04-AC-9A-00-00
   ```

   The "<" points to the value you can change at this point. Notice that the first pair of values (01, in this case) is shown on the same line as "LAA ADDRESS".

   Note: The range for LAA addresses is 40-00-00-00-00-00 to 40-FF-FF-FF-FF-FF.

5. Press the **Value** key until the desired value is displayed, then press **Enter** to set the new value. (Press and hold the **Value +** key to increment the value faster. Press the **Value -** key to decrement the value.)

   The "<" moves to the next value, for example:

   ```
   04<AC-9A-00-00
   ```

6. Repeat step 5 until all six value fields have been set, then press the **Enter*** key to set the LAA address. The value has been set if an asterisk (*) displays to the right of the value, for example:

   ```
   LAA ADDRESS  40-
   00-00-01-02-02 *
   ```

7. Press the **Online** key. Answer **Yes** to the reboot prompt. Wait until the printer completes its reboot and displays the READY message.

Resetting the LAA back to the MAC Address

> **Important!**
> - Do not reset the LAA unless explicitly directed to do so by your network administrator.
> - If you have problems after setting or resetting the LAA address, reset the ARP table on your TCP/IP network hosts.

1. Press the **Online** key to take the printer offline.
2. Press the **Menu** key until the operator panel displays NETWORK MENU.
3. Press the **Item** key until the operator panel displays LAA ADDRESS. The panel displays the currently assigned LAA address.

4. To reset the LAA address back to the MAC address, **do not enter the MAC address**. Instead, enter zeroes, for example 00-00-00-00-00-00, then press **Enter**.

   Note: If you enter the MAC address rather than zeroes, the printer will not revert to the MAC address. You must enter zeroes.

5. Press the **Online** key. Answer **Yes** to the reboot prompt. Wait until the printer completes its reboot and displays the READY message.

Chapter 26. Handling TCP/IP Problems

Use this chapter as a guide for finding and resolving printer and NIC printing problems on TCP/IP networks.

The following types of problems are described here:

- Hardware
- Connectivity
- Formatting
- Printing

Network Setup

Before doing anything else to try to resolve problems, you should verify that you have entered the correct configuration data. Refer to the configuration data worksheets in the configuration chapters.

Hardware Problems

When printing problems occur, the first task is to check the physical condition of the printer and related hardware.

Introduction

The hardware is where diagnosis of printer problems begins. The hardware includes the following elements:

- The printer itself
- The physical connection of the hardware to the network
- The cabling system
- The NIC

Resolving Hardware Problems

To determine whether a problem is a hardware problem or not, check the following:

1. Verify that power is going to the printer by checking the printer operator panel.
2. Verify that the printer is Ready.
3. Print a network configuration page to verify that the NIC is installed. See "Accessing the Printer Configuration Page" on page 6.
4. Verify that the printer is connected to the network. Refer to "Connecting to a LAN" on page 17.

Connectivity Problems

The network/transport level of a network provides the capability of routing packets from one device to another device on the network or to a different network on an internetwork system.

1. Verify that the printer has an IP address by printing a network configuration page (see "Accessing the Network Configuration Page" on page 7).
2. Verify that there is no duplicate IP address on the network by:
   a. Disconnecting the printer from the network.
   b. Using the **Ping** command to try to communicate with the IP address of the printer.
3. Connect the printer to the network and ping the printer to verify that there is a connection to the network.
4. Printing problems may occur if the subnet mask has not been set correctly. Verify that the subnet mask is correct either by printing a network configuration page or checking with the network administrator.
5. A related problem is that the gateway address may be incorrect. Verify the gateway address from the network configuration page printed in the previous step.

Formatting Problems

One possible problem is the value of the Personality item for the TCP/IP port. The Personality value is set for each TCP/IP port using the Data stream item on the printer's web pages. The possible values are Auto (default value), PCL, and PostScript. If the Personality value is set to PCL or PostScript, all data coming in through this port will be interpreted as that data stream (for example, PostScript data received when the Personality value is set to PCL will not print correctly). Ensure that the Personality value is set to Auto if more than one data stream will be received through this port.

LPR/LPD Printing Problems

Verify LPD Queue or Printer Names

One problem that may occur is that the LPD queue names (sometimes also called the printer name) may be specified incorrectly.

The following LPD queue names are supplied by default:

1. **PASS**: any data sent to this queue is passed to the printer without modification.
2. **TEXT**: a carriage return is inserted before a line feed character as the data is sent to the printer. This is useful for printing UNIX text files.

3. **default**: permits the user to specify any queue name for a print job. If any queue name other than PASS or TEXT is specified, the job will be processed by the default queue.

The queue names can be changed on the printer web pages. Ensure that the queue name set in the printer matches the queue name set in the client sending the job.

Verify LPRPORTD is Configured on OS/2

Another problem that may occur to create printing problems is the OS/2 "Printer offline or out of paper" error on TCP/IP queues.

Ensure the following:

1. **LPRPORTD** is auto started in TCP/IP configuration and running when you try to print.
2. The printer can be pinged.
3. The printer is online and loaded with paper.

Printing Problems with TCP/IP and NetWare on the Same Network

If you have a mixed TCP/IP and NetWare environment, you may encounter problems with your TCP/IP printing from clients that have the following Novell NetWare client software installed:

- Novell Client 3.1 for Windows 95/98
- Novell Client 4.6 for Windows NT
- Novell Client 4.7 for Windows NT/2000

The problems that have been observed in IBM tests are as follows:

- **LPR printing**: larger print jobs stay in the Windows print queue and continually restart printing the first few pages.
- **Port 2501 printing (using the IBM TCP/IP Network Port Monitor or IP PrintWay from OS/390)**: after a job is submitted, the following error message is displayed:
  ```
  Error writing to <portname> for Document <docname>:
  Unrecognized error 10004 (0x2714).
  ```

Novell has documented a fix for these problems in Novell Support Technical Information Document (TID) 10023992 on Novell's support web site.

Chapter 27. Administration

Monitoring Network Printers

This chapter describes the IBM printer management model and several different tools that can be used to monitor network printers.

Using NPM

See the NPM online help for information about monitoring using NPM.

The IBM Network Printer Management Model

Use this section if you want to install a network management system and need to understand IBM's use of network printer management capabilities with the SNMP agent.

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
- MIB, the management information database
- SNMP, the protocol used to get management information

Agent/Manager Model

The elements of a monitoring system, MIB and SNMP, are implemented in an agent/manager model:

- The **manager** is a console, workstation, or server that has a global knowledge of network devices.
- **Agents** are utilities that reside on devices that respond through SNMP to management requests for information. The information is stored in a MIB (Management Information Base).

MIB

A MIB is a management information base that contains information a device makes available to SNMP. The MIB describes information about actual objects to be managed and controlled. There are many different MIBs defined.

Standards of IBM 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 plus the extensions to hrPrinterDetectedErrorState defined in the Printer MIB document)
- Printer MIB (draft-ietf-printmib-info-04.txt of Jan 1999)

Components of the Printer MIB: The IBM Printer MIB gives the network manager access to the information that is accessible through the operator panel and printer web pages. Some objects identified by this MIB are not applicable to the NIC.

The complete definition of the Printer MIB is provided in the Printer MIBs in DOS Format and Printer MIBs in TAR Format, which are shipped with the NIC. The MIB is provided in a subset of the ASN.1 syntax. 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 IBM 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, download the files from any of the following sources:

`http://www.ietf.org`

`ftp://ftp.isi.edu/internet-drafts`

`http://www.ietf.cnri.reston.va.us/1id-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 NICs and other devices on the network. This is done through a Network Management Station (NMS), such as Tivoli NetView.

Monitoring Tools

Many tools can be used to monitor printers with SNMP agents. One of these tools is Tivoli NetView. There are also other MIB browsers, which are not described here.

Monitoring with Tivoli NetView

The Tivoli NetView program can manage any IP-addressable device with an SNMP agent.

Tivoli NetView 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. For more information, see the Tivoli website at: `www.tivoli.com`.

Monitoring Network Printers on TCP/IP Networks

This section describes how to set up monitoring on a TCP/IP system. Two steps are involved in setting up printer monitoring for IP:

1. Enabling the protocol
2. Setting the community name and trap host address

Enabling the Protocol

Verify that each NIC is installed and configured for the network. Print a network configuration page (see "Accessing the Network Configuration Page" on page 7) and verify that TCP/IP is enabled. TCP/IP is enabled by default.

Setting the Community Name and Trap Host

Use the printer web pages to set the SNMP community name and IP trap host.

Monitoring Network Printers on NetWare Networks

This section describes how to set up monitoring on a NetWare system. Two steps are involved in setting up printer monitoring for IPX/SPX:

1. Enabling the protocol
2. Setting the community name and trap host address

Enabling the IPX Protocol

Verify that the NIC is installed and configured for the network. Print a network configuration page (see "Accessing the Network Configuration Page" on page 7) and verify that IPX is enabled. IPX is enabled by default.

Setting the Community Name and Trap Host

Use the printer web pages to set the SNMP community name and IPX trap host.

IBM Network Printer Manager (NPM)

IBM Network Printer Manager (NPM) lets network administrators monitor, control, and configure IBM network printers in various environments. NPM Version 4 works with the IBM network printer family, including:

- IBM Infoprint 20, 21, 32, 40, and 45
- IBM Network Printers 12, 17, and 24
- IBM Infoprint Color 8
- IBM 6400 line matrix printers

Using NPM, administrators can perform tasks such as:

- 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
- Group and sort printers
- Update microcode in one or more printers
- View printer websites.

For detailed information on how to use NPM, see NPM online help.

NPM Environments

The following table shows the environments NPM supports:

Table 21. NPM Environments

Using this version of NPM:	You can configure these network protocols in the printers:	And use this protocol to monitor the printers:
NPM for Windows (IP version)	• TCP/IP • AppleTalk • NetBIOS • Novell NetWare	TCP/IP
NPM for Windows (IPX version)	• TCP/IP • AppleTalk • NetBIOS • Novell NetWare	NetWare IPX

Obtaining NPM

NPM is contained on the CD-ROM that ships with NIC. It is also available on the World Wide Web. To obtain the latest version of NPM:

1. Access the IBM Printing Systems Home Page at:

   http://www.ibm.com/printers

2. Navigate to IBM Network Printer Manager.
3. Follow the instructions to download NPM. Installation instructions are in the README file.

Printer Web Pages

You can use your web browser to:

- Print files directly from the Internet
- Access status information about the printer
- Display current printer settings
- Display and print the network and printer configuration pages
- Configure the printer

For more information, see "Printer-Resident Web Pages" on page 21.

Prioritizing Print Ports

Infoprint 21 and Infoprint 45 allow you to set priorities for each port from which it can receive data. The port priority is checked by the printer when it selects the next job to print. The job from the highest priority port will be processed next, even if jobs arrived at other ports first. Using these priorities, you could, for example, cause all IPDS jobs to print ahead of jobs submitted from your LAN.

You can set priorities for each of the following print ports:

Table 22. Priorities of Print Ports

Port	Where to Set Priority
AppleTalk	Printer web pages, APPLETALK MENU on operator panel, NPM
NetBIOS	Printer web pages, NETBIOS MENU on operator panel, NPM
NetWare PServer	Printer web pages, NETWARE MENU on operator panel, NPM (value set on NETWARE MENU applies to both PServer and RPrinter modes; separate priorities can be set for the two modes using the printer web pages or NPM)
NetWare RPrinter	Printer web pages, NETWARE MENU on operator panel, NPM (value set on NETWARE MENU applies to both PServer and RPrinter modes; separate priorities can be set for the two modes using the printer web pages or NPM)
Internet File Print	Printer web pages, NPM
Local File Print	Printer web pages, NPM
TCP/IP IPDS Port	Printer web pages, NPM
TCP/IP LPR	Printer web pages, NPM
TCP/IP Port 2501	Printer web pages, NPM
TCP/IP Port 9100	Printer web pages, NPM
IPP	Printer web pages, NPM
FTP	Printer web pages, NPM
Parallel Port	Printer web pages, PARALLEL MENU on operator panel, NPM

The priority for each port can be set from 1 to 9, where 1 is the highest priority. The default value for all port priorities is 5. To configure the printer to give highest priority to IPDS jobs, you can change the IPDS port priority to 1 and leave the other ports set to 5. In this case, if your printer accepts jobs from both a LAN (for example, using port 2501 from Windows NT) and IPDS

jobs from an AS/400 (IPDS port), IPDS jobs will always print before LAN jobs even if the LAN queue has multiple jobs waiting.

Note: The priority setting is not related to the Timeout setting for each port. The Timeout setting is used when the printer stops receiving data from a host system. After waiting the Timeout period to receive additional data, the printer terminates the connection with that host.

Appendix A. NIC Specifications

Physical Dimensions

Table 23. Physical Specifications of a Network Interface Card

Parameter	Range
Ethernet Compatibility	• 10 BASE-T (Unshielded Twisted-pair, UTP, RJ45, Category 3 or 5 cable) • 100 BASE Tx (Unshielded Twisted-pair, UTP, RJ45, Category 5 cable)
Token Ring Compatibility	• UTP (Unshielded Twisted-pair, RJ45) • STP (Shielded Twisted-pair, DB9)
Physical Dimensions	2.85 x 6.75 x 0.75 in. 4.17 x 4.80 x 0.73 in. 72.4 x 171.9 x 19.1 mm 106.0 x 122.0 x 18.42 mm
Power Requirements	+ 5 V dc (5% variance) @ 1 Amp minimum
Temperature	Operating: 32 to 131°F (0 to 55°C)
Humidity	Ethernet: 10% to 90% noncondensing

Agency Approval

Table 24. Agency Approval for IBM Network Interface Cards

Agency Approval	FCC Class A; UL Listed to UL 1950, TUV Certified to EN60950; EN55022, CISPR22/85,Class A; CUL Listed to CSA22.2, No.950; Licensed by BZT, VFG 523/1969, Class A.

Ethernet 10Base-T (RJ-45) Connector Pinout

Table 25. Ethernet 10Base-T Connector Pinout

Pin	Signal
1	Transmit High
2	Transmit Low
3	Receive High
4	No connection
5	No connection
6	Receive Low
7	No connection
8	No connection

Ethernet 100Base TX (RJ-45) Connector Pinout

Table 26. Ethernet 100Base-T Connector Pinout

Pin	Signal
1	Transmit High
2	Transmit Low
3	Receive High
4	No connection
5	No connection
6	Receive Low
7	No connection
8	No connection

Token Ring UTP (RJ-45) Connector Pinout

Table 27. Token Ring UTP Connector Pinout

Pin	Signal
1	No connection
2	No connection
3	Transmit/3
4	Receive/4
5	Receive/5
6	Transmit/6
7	No connection
8	No connection

Token Ring STP (DB-9) Connector Pinout

Table 28. Token Ring STP Connector Pinout

Pin	Signal
1	Receive/R1
2	No connection
3	No connection
4	No connection
5	Transmit/5
6	Receive/G6
7	No connection
8	No connection
9	Transmit/09

Appendix B. Resetting NICs

Resetting Network Parameters to Factory Defaults

NPM

WebPages

The network parameters can be reset to factory defaults using any of these methods:

- NPM
- Web Pages
- Operator Panel

Resetting Network Parameters using NPM

1. From the NPM Main Window, select a printer from the container.
2. From the menu bar, select **Network**.
3. From the **Network** pull-down menu, select **Reset to Defaults**.
4. You see a message. Select either:
   Yes: Resets the NIC
   No: Does not reset the NIC

Resetting Network Parameters from the Web Page

1. Navigate to the printer's web page.
2. Under **Access Mode**, select **Administrator**. Enter the User ID and Password.
3. Under **Printer Settings**, select **Printer Resets**.
4. Select **Reset network to factory defaults**, then click **Submit**.

Resetting Network Parameters from the Operator Panel

1. Press the **Menu** key until you see the RESET MENU.
2. Press the **Item** key until you see FACT DEF TKN RNG or FACT DEF ETHER.
3. Press the **Enter** key. You see the following prompt: REBOOT THE PRINTER? / + YES, - NO
4. Press the **+** key to reboot with the new values.

Appendix C. Related Publications

General Network Printer Publications

- *IBM Network Printers: IPDS and SCS Technical Reference*, S544-5312.
- *IBM Network Printers: Twinax/Coax Configuration Guide*, G544-5241

IBM Infoprint 21

- *IBM Infoprint 21: Quick Reference Card*, G544-5700
- *IBM Infoprint 21: Setup Poster*, G544-5699
- *IBM Infoprint 21: User's Guide*, G544-5701
- *IBM Infoprint 21: Twinax/Coax Configuration Guide*, S544-5712

IBM Infoprint 45

- *IBM Infoprint 45: Quick Reference Card*, G544-5778
- *IBM Infoprint 45: Setup Poster*, G544-5779
- *IBM Infoprint 45: User's Guide*, G544-5784
- *IBM Infoprint 45: Twinax/Coax Configuration Guide*, S544-5712

Related Documents

AS/400

- *TCP/IP Fastpath Setup*, SC41-3430
- *Client Access/400 for Windows 3.1 TCP/IP Setup*, SC41-3580
- *AS/400 TCP/IP Configuration and Reference*, SC41-3420

MVS

- *TCP/IP for MVS: Customization and Administration Guide*, SC31-7134
- *TCP/IP for MVS: Planning and Migration Guide*, SC31-7189

PSF

- *PSF/MVS MVS Download Guide*, G544-5294
- *PSF/MVS System Programming Guide*, S544-3672

Publications from Other Vendors

Publications available from Novell:

- *Novell's Guide to NetWare Printing*
- *Novell NetWare for Macintosh File and Print Services*
- *Novell Print Services*

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. The parallel cable must be IEEE Std 1454-1994

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Responsible Party:

International Business Machines, Corp.
New Orchard Road
Armonk, NY 10504
Tele: 1-919-543-2193

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This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

German Conformity Statement

Zulassungsbescheinigung Gesetz über die elektromagnetische Verträglichkeit von Geraten (EMVG) vom 30. August 1995

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen das EG-Konformitätszeichen - CE - zu führen.

Der Außteller der Konformitätserklärung ist die IBM ....(1)

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 50082-1 und EN 55022 Klasse A.

EN 55022 Klasse A Geräte bedürfen folgender Hinweise:

Nach dem EMVG: "Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesminesters für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn

keine elektromagnetischen Störungen zu erwarten sind." (Auszug aus dem EMVG, Paragraph 3, Abs.4) Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Nach der EN 55022: "Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen."

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

The United Kingdom Telecommunications Act 1984

This apparatus is approved under approval No. NS/G/1234/J/100003 for the indirect connections to the public telecommunications systems in the United Kingdom.

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A conform a la norme NMB-003 du Canada.

Statement of CISPR 22 Edition 2 Compliance

Attention:

This is a Class A Product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Japanese VCCI

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Glossary of Terms and Abbreviations

This glossary contains definitions for terms and abbreviations used in this document. Terms in common use in the LAN environment are not defined here.

A

access community. Name for that set of people allowed to view or change SNMP data.

adapter. Hardware installed on a network printer and used to connect it to a network. In this publication, the adapter is called a Network Interface Card, abbreviated as NIC.

address. Internet address, usually in dotted decimal notation.

AFP. (1) AppleTalk Filing Protocol. A protocol allowing distributed file sharing on an AppleTalk network. (2) Advanced Function Printing or Presentation. IBM all-points-addressable printing that uses an intelligent print subsystem manager (PSF for AIX, PSF/2, PSF/400, PSF/VM, PSF/VSE) to print text and illustrations.

agent. Generally, a device under SNMP that can report alarm and other management information. Specifically, a term for that portion of the printer microcode that responds to requests for management services. SNMP uses an agent/manager model to describe the relationship between devices (agents) and management stations.

AIX. Advanced Interactive Executive OS. IBM version of Unix.

alarm. An indication of a status condition on a network resource.

AppleTalk. Apple's networking protocol.

ARP. Address Resolution Protocol. A TCP/IP protocol that provides IP to MAC address resolution.

AS/400. Application System/400, an IBM computer system.

ASN.1. Abstract Syntax Notation One. Syntax used to define MIBs.

ATP. Apple Transmission Protocol.

autodiscovery. Automated method of finding resources attached to a network.

B

beaconing. A signal repeatedly displayed on a Token Ring NIC on detection of a problem.

Bindery discovery. The method used by versions of Novell's NetWare prior to version 4.0 to discover resources on a LAN by querying file server binderies.

BNC. A type of connector used on coaxial cables.

BootP. Bootstrap Protocol. A TCP/IP internetworking protocol used to configure systems across networks.

bridge. The hardware and software used to connect two technologically similar networks into one network.

C

Common Name. The name of a leaf object in the NDS tree.

Community Name. A name used to identify an administrative relationship among SNMP entities.

Complete Name. The unique path from a leaf object to the root of the NDS tree.

configuration. The activity of describing the software settings that enable devices to communicate with each other.

console. The main display station for a network operating system or resource server.

context. The position of a leaf object within an NDS tree.

D

daemon. Disk and Execution MONitor. A program that waits for specific events and acts according for its instructions for dealing with them.

DHCP. Dynamic Host Configuration Protocol. An extension of the TCP/IP boot up protocol that is used to configure systems across networks on Windows NT and other systems.

directory services. Databases that list the names of logical units and where they are located on a network.

discovery. Activity of locating all resources (perhaps of a particular kind, such as IBM NICs) attached to a network.

DNS. Domain Name System. A mechanism used on the Internet for translating names of host computers into numerical IP addresses.

domain. A server or collection of servers and all nodes attached to it logically. Each domain requires its own server.

domain name. Unique name for an internet site.

dotted decimal notation. A form of an IP address in which each byte is represented as numbers, with periods placed between the numbers (for example, 123.233.111.222).

E

Ethernet. A network cable and protocol scheme.

Ethernet Address. The MAC-layer address of a node. The physical address is recognized by the LAN controller hardware.

Ethertalk. AppleTalk packets encapsulated to run on Ethernet cables.

F

flash memory. A form of electronically erasable memory.

flow quantum. Term used in reference to AppleTalk communication parameters. Determines the rate at which data is sent over communications lines as well as the way in which different systems coordinate the flow of data between them. Also known as handshaking.

FTP. File Transfer Protocol (TCP/IP). This protocol makes it possible to transfer data among hosts.

G

gateway. The hardware and software needed to make two networks with different architectures communicate with one another.

H

hardware address. The low level address used by physical networks. Also known as the MAC address.

hop. A hop is one data link. A path to the final destination on an internetwork is a series of network hops away from the origin network.

host. Any independent computer system, such as a mainframe, that provides services to other computers.

I

IBM. International Business Machines Corporation.

ICMP. Internet Control Message Protocol.

IEEE. Institute of Electrical and Electronic Engineers.

IEEE 802.3. Standards for Ethernet cabling systems.

IEEE 802.4. Standards for Token bus cabling systems.

IEEE 802.5. Standards for Token-Ring cabling systems.

IEEE 1284. Standards for bi-directional interfaces.

internet. Any interconnected set of networks.

Internet. A collection of networks sharing the same name space.

internet address. An assigned number identifying a port on an internet. It has two or three parts: network number, optional subset (mask) number, and host number.

IP. Internet Protocol. The TCP/IP protocol that routes data from source to destination in an internet environment.

IP address. Internet Protocol Address. The notation in dotted decimal format (for example, 9.99.123.89) that uniquely identifies a node on a network. The first value represents the parent network, if any; the second represents the router or gateway, if any; the third represents the subnet name; and the fourth the specific device on the network,

IPP. Internet Printing Protocol.

IPDS. Intelligent Printer Data Stream. An IBM system-to-printer data stream for all-points-addressable printing.

IPX. Internetwork Packet Exchange. A protocol that allows the exchange of message packets on an internetwork. Used by Novell NetWare.

ISO/OSI. International Standards Organization Open Systems Interface.

J

job queue. A list of FIFO print jobs waiting to be printed.

L

LAA. Locally Administered Address. The local version of the MAC address.

lease length. Under DHCP, specifies the duration of an IP address assigned to a device from a pool of addresses. A temporary assignment is assigned for the duration of a specific session. A permanent lease assignment assigns an IP address permanently to a device.

LocalTalk. Apple's peer-to-peer cabling scheme.

LPD. Line Printer Daemon. A printing protocol server.

LPR. Line Printer Remote. A printing protocol client.

M

MAC. Medium Access Control. A unique address associated with a NIC.

MIB. Management Information Base. A database used to provide management services.

MTU. Maximum Transmission Unit. TCP/IP packet size.

N

namespace. A commonly distributed set of names in which all names are unique.

NDIS. Network Driver Interface Standard.

NDS. NetWare Directory Services. A database built into NetWare 4.x used to access and maintain information about all resources on a network. The NDS replaces the Bindery database used in pre-4.x versions of NetWare.

NDS discovery. The version of discovery used by NetWare version 4.x and higher.

NetBEUI. NetBIOS Extended User Interface.

NetBIOS. Network Basic I/O System. An application program interface typically used on workstations that are attached to a Token Ring network.

network address. The MAC address. Sometimes requested by systems like NT.

Network Management System. Programs that monitor and control network functions related to performance, resource and configuration management, and alarms and alerts from various network components.

network printer. A printer with a network interface that provides printing services to network users.

NFS. Network File System. A TCP/IP layer used to access files on Unix systems.

NIC. Network Interface Card.

NMP. Network Management Protocol.

NMS. Network Management Station. A workstation or server console set up to receive event notification from network-attached printers.

node. Any device connected on a network.

NOS. Network Operating System.

O

object. An entity, such as a printer, server, or program, that is an element on a network. Each object has four characteristics: attributes, operations, notification capabilities, and relationships with other objects.

object identifier. A sequence of integers assigned to network objects by SMI to locate their position in the tree-like topology of a network.

originator. The node that starts route determination when it needs to find a source route to a remote node on a Token Ring network. Also known as the initiator or originating station.

OS/2. Operating System 2. An IBM operating system for IBM-compatible desktop computers.

OS/400. The operating system for IBM AS/400 systems.

P

PCL. Printer Control Language. Name for Hewlett-Packard's proprietary printer control language.

PCONSOLE. Novell NetWare Print Console software used to configure and manage network printers.

peer-to-peer. In the networking environment, any device that is on the same functional level as another device.

PID. Process ID.

polling. User-initiated request to get status information from devices.

port. Connection between a NIC and a printer. (The default port is 1.)

port monitor. Software on the workstation or server that controls job submission to a printer. Some port monitors (such as the IBM TCP/IP Network Port Monitor) also allow the user to monitor bidirectional status and configuration from the printer.

POST. Power On Self Test.

PPD. PostScript Printer Driver. Used in the Macintosh environment.

printer driver. Software used to enable specific printing capabilities, such as printing output of a specific nature.

printer server. Network interface card software that controls the operation of printers on a network.

printer services. Interfaces between users requiring print services and printers.

PS. PostScript.

PServer. Novell NetWare software utility that manages the operation of printers on a network.

PSF. Print Services Facility. An IBM facility that provides inter-platform print services.

Q

queue. A list of items waiting to be processed.

R

RARP. Reverse Address Resolution Protocol. A protocol that maps 32-bit Internet addresses to 48-bit Ethernet addresses. See ARP.

RCF. Remote Control Facility.

RFC. Request for Comment.

remote printer. A printer, locally attached to a workstation, that also serves as a network printer.

responder. The node that receives a source route broadcast for source routing information from an originator.

route determination. The process of discovering a source route between nodes. Refer to " originator" and "responder".

RPrint. A Unix program that takes data from standard input, connects to a server, and transmits the data.

RPrinter. Novell NetWare remote printing protocol.

S

SAP. Service Access Point. Used to run an internet protocol over serial lines interconnecting two systems.

SCS. SNA Character String. A character string composed of EBCDIC control characters and (optionally) end-user data.

scope. Defines a range of TCP/IP addresses in a Windows NT environment that can be assigned on an as-needed basis by DHCP to devices needing a temporary IP address.

SMI. Structure of Management Information. A component of network management systems that defines the structure of management information as a tree with objects as leaves.

SNMP. Simple Network Management Protocol. One of the standard protocols used to communicate management information between manager and agents.

source routing. The forwarding of a message unit along a particular path through a network based on parameters specified by a command.

SPX. Sequenced Packet Exchange.

SSAP. Source Service Access Point. A parameter type in an AS/400 printer line description. Identifies the service access point (SAP) that originated a data unit.

STP. Shielded Twisted Pair.

subnet. A term denoting any network technology that makes all nodes connected to it appear to be one hop away.

subnet mask. A part of the internet address that designates a subnet.

syslog. A TCP/IP node designated to receive event notices.

T

TAR. A Unix file format, where multiple files are archived into one file.

TCP. Transmission Control Protocol.

10BASE-5. IEEE standard for thinwire Ethernet.

10BASE-T. IEEE standard for twisted pair Ethernet.

10BASE2. IEEE standard for thickwire coaxial Ethernet.

TFTP. Trivial FTP.

trap. An unsolicited notification to an NMS of a significant event on an SNMP agent.

trap host. Workstation designated to receive messages about events from network objects, like network-attached printers. The workstation must run SNMP.

TSR. Terminate (and) Stay Resident.

U

UDP. User Datagram Protocol.

UTP. Unshielded Twisted Pair.

Z

zone. Apple's name for a logical grouping of devices on one or more networks.

Index

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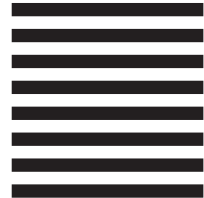Fold and Tape   **Please do not staple**   Fold and Tape

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