

**Token-Ring
Network Print Server**

Administrator's Guide

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Preface

Thank you for purchasing the IBM Network Print Server. Our goal in developing this product is to enable you to connect your printer anywhere in your network, allowing all network users access to shared printer resources.

About this manual

This manual will guide you through a simple step-by-step installation and configuration procedure. It is divided into four sections:

Introduction The IBM Network Print Server, how it works, where to use it, and its main features.

Getting started How to connect your IBM Network Print Server to your printer, and how to install it in your network.

Setup How to set up your IBM Network Print Server for the NetWare, OS/2, Windows, and Unix environments.

Advanced options An overview of unique IBM Network Print Server functions that allow you to tailor your printer resources for specific needs.

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Related Publications

Enclosed in your package is a diskette that contains the IBM Ethernet and Token-Ring Network Print Server Technical Reference manual. This manual is shipped to you in a softcopy format that can be read using Adobe's Acrobat Reader. The file name of the Technical Reference manual is NPS_TR.PDF.

To obtain Adobe's Acrobat reader, you can reach Adobe by any of the following methods:

- World-Wide-Web address is: <http://www.adobe.com>
- File transfer protocol (ftp) address is: <ftp.adobe.com>
- Bulletin board phone number is: 206-623-6984
- Customer sales phone number is: 1-800-833-6687 (US only)

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Section 1

Quick Start Guide

This guide covers the installation and basic configuration procedures for the NetWare, OS/2, and Unix environments. If you are familiar with LAN terminology and have installed products on a LAN, you can use this Quick Start guide to install the print server.

If you are not familiar with LAN terminology or have not installed a product on a LAN, you may want to skip this section and begin at Chapter 1: Introduction.

What is on the disk?

The disk contains installation, configuration and print utilities for the different printing environments. Installation instructions are given for each environment later in this guide.

Installation

1. Record your NPS server ID (you will need it during the configuration).
2. Switch off the printer.
3. Attach your NPS to the printer, either directly to the parallel port, or using the optional printer cable extension. (See *Please Read* for information on attaching the print server to an IBM 3130 Advanced Function Printer or IBM 6400 Line Matrix Printer.)
4. Set the RING SPEED switch to 4 or 16 depending on the ring speed of your network.
5. Connect your NPS to the network using a Media Type 3/UTP or Media Type 1/STP cable, as appropriate.
6. Connect the external power supply. (See *Please Read* for information on attaching the print server to an IBM 3130 Advanced Function Printer or IBM 6400 Line Matrix Printer.)

Please Read: If you are installing this print server as a feature to IBM 3130 Advanced Function Printer, you will not use an external power supply but instead you will use a power cable that is supplied with the print server. Attach the power cable to the print server and then to the IBM 3130 printer. Power to the print server is provided by the IBM 3130 printer. Once you have attached the print server to the printer, make sure the IBM 3130 is set to support parallel communications. Read *IBM 3130 Advanced Function Printer: Administrator's Guide*, for information on setting parallel communications.

If you are installing this print server as a feature to the IBM 6400 Line Matrix Printer, you will not use an external power supply but instead you will use a DC-to-DC power adapter that is supplied with the print server. Power to the print server is provided by the IBM 6400 printer. The DC-to-DC adapter is designed to be mounted onto the print server as shown in the following illustration:



The DC-to-DC adapter has two cables: a short cable that is attached to the print server; a longer cable that is attached to the printer. In the above illustration, the short cable is shown attached to the print server. The longer cable is attached to the printer. Once you have attached the print server to the printer, make sure the IBM 6400 is set to support parallel communications. Read the *IBM 6400 Setup Guide* for information on setting parallel communications.

7. Switch on the printer.
8. To print the test page, press and hold the test button until the NETWORK indicator starts to flash, then release the button.

NetWare

The procedure below applies to the NPS Print Server Mode only and is recommended only if you have a small network with just a few file servers. If you prefer to use the Remote Printer Mode or if you have a larger network, see Section 4: Setup for NetWare.

Setup and printing is done using the Novell PCONSOLE and CAPTURE applications respectively. If you need to configure your NPS beyond the PCONSOLE capabilities, refer Section 4: Setup for NetWare.

- Add a Print Server:*
1. Log in as *Supervisor* to a file server from a client work station.
 2. Start PCONSOLE. Press <F4> for *Bindery Mode* if you are using NetWare version 4.xx

3. Select *Print Server Information* (NetWare 3.xx) or *Print Servers* (NetWare 4.xx).
 4. Press <Insert> to add a new Print Server.
 5. Type the NPS name. If you have not previously changed the name using IBMCFG, then the name must be entered as **IBM<nnnnnn>** (<nnnnnn> are the last six digits of your NPS server ID).
 6. Press <Escape> to return to PCONSOLE main menu.
- Repeat this procedure for each file server using the NPS.

Link a Print Queue to the Print Server:

1. Select *Print Queue Information* (NetWare 3.xx) or *Print Queues* (NetWare 4.xx) from the PCONSOLE main menu. If you plan to use an existing queue, skip to step 4.
2. Press <Insert> to add a new print queue.
3. Type a queue name, and press <Enter>
4. Select the queue to be serviced by your NPS.
5. Select *Queue Servers* (NetWare 3.xx) or *Print Servers* (NetWare 4.xx) in the *Print Queue Information* menu.
6. Press <Insert> to display the Queue Server Candidates.
7. Select the NPS name from the list.
8. Press <Escape> to return to the main menu.

Restart your NPS (power-off/power-on) to connect your print queues.

Windows

Follow the instruction on the disk label to install the IBM Print Utility for Windows on all workstations using peer-to-peer printing.

The NPS setup for Windows comprises installing the IBM printer ports as Windows printer ports, and connecting the ports to a Windows printer driver.

Note: If you intend to operate the NPS in a multiprotocol environment, you should also proceed with the other sections of this guide as appropriate.

Peer-to-peer vs. Client-Server printing The procedures in the following sections details how to set up your NPS for peer-to-peer printing. Peer-to-peer printing is the recommended method for smaller networks (no file server required). For larger networks, or if central monitoring and priority management are required, you can set up your for client-server printing:

1. Install the IBM Print Utility on the file server.
2. Set up your NPS from the file server as described in the following sections, but check the Share box for your printer.

Your shared printers can now be used by all the Windows clients and you do not need to install the IBM Print Utility on the clients.

Windows 3.1 Windows 3.1 requires that network support such as LAN Server or LAN Manager Workstation software is installed in order to redirect a local printer port to a network device. If this is the case, proceed as described under Windows for Workgroups below.

Windows for Workgroups Follow these steps to install your NPS for peer-to-peer printing at a Windows for Workgroups workstation:

1. Double-click the IBM Print Utility icon.
2. In the Port menu, click Add.
3. In the NPS Port list, select the NPS port to be installed.
The ports appear as <name>.LP1, where <name> is IB followed by the last six digits of your print server ID, e.g. IB560B35.LP1. Alternatively, if you entered a new name when using the IBMCFG software, it will be this new name that is shown in the port list.
4. Accept the suggested Windows port name or change it using up to 8 characters, a period, and up to 3 characters. Make a note of the Windows port name (you will need it later). Type any comments in the Description field, then click OK to install the Windows port.
5. In the Port menu, click Connect to bring up the Windows Printers dialog.

6. Select a printer driver from the list of Installed Printers (or click Add>> to install a new driver), then click Connect...
7. Select the Windows port name from step 4 above (the name will be found at the bottom of the Ports list).
8. Click OK to close the Connect dialog, and Close to close Printers.

The setup is completed and you can now print through your NPS.

Important: The IBM Print Utility must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility icon into your Startup folder.

Windows 95 Follow these steps to install your NPS for peer-to-peer printing at a Windows 95 workstation:

1. Double-click the IBM Print Utility icon.
2. In the Port menu, click Add.
3. In the NPS Port list, select the NPS port to be installed.
The ports appear as <name>.LP1, where <name> is IB followed by the last six digits of your print server ID, e.g. IB560B35.LP1.
Alternatively, if you entered a new name when using the IBMCFG software, it will be this new name that is shown in the port list.
4. Accept the suggested Windows port name or change it using up to 8 characters, a period, and up to 3 characters. Make a note of the Windows port name (you will need it later). Type any comments in the Description field, then click OK to install the Windows port.
5. In the Port menu, click Connect to bring up the Printers folder.
6. Double-click the Add Printer icon. The Add Printer Wizard will guide you through the installation. Click Next to proceed.
7. Choose Local Printer, then click Next.
8. Choose Manufacturer and Printer, then click Next.
9. Select the Windows port name from step 4, then click Next.
10. Accept or change the suggested Printer Name, then click Next.
11. Click Finish to complete the installation.

The setup is completed and you can now print through your NPS.

Important: The IBM Print Utility must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility icon into your Startup folder.

Windows NT Follow these steps to install your NPS for peer-to-peer printing at a Windows NT workstation:

1. Double-click the IBM Print Utility icon.
2. In the Port menu, click Add.
3. In the NPS Port list, select the NPS port to be installed.
The ports appear as <name>.LP1, where <name> is IB followed by the last six digits of your print server ID, e.g. IB560B35.LP1.
Alternatively, if you entered a new name when using the IBMCFG software, it will be this new name that is shown in the port list.
4. Accept the suggested Windows port name or change it using up to 8 characters, a period, and up to 3 characters. Make a note of the Windows port name (you will need it later). Type any comments in the Description field, then click OK to install the Windows port.
5. In the Port menu, click Connect to bring up Print Manager.
6. In the Printer menu, click Create Printer.
7. Type a name in the Printer Name field, select a suitable printer driver from the Driver list, and select Other... in the Print to list.
8. In the Print Destinations dialog, select Local Port, then click OK.
9. In the Port Name field, type: C:\~\<port>
where C:\~ is your spool directory, and <port> is the Windows Port name from step 4. Click OK.
10. Close the Print Manager.

The setup is completed and you can now print through your NPS.

Important: The IBM Print Utility must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility icon into your Startup folder.

OS/2

The NetBEUI protocol must be active. If not, use MPTS/LAPS (LAN Server) or SETUP (LAN Manager) to activate it.

Install the NPS Manager Software and your NPS

1. Install the NPS Manager Software as described in the read.me file on the supplied NPS Installation disk.
2. When the NPS Manager is running, click **Install** to install your NPS. It will then appear in the printer port list as **IB<nnnnnn>.LP1** (<nnnnnn> are the last six digits of your NPS server ID).

Repeat this procedure for each server using the NPS.

Create a Print Queue (OS/2 version 1.x):

1. Double-click the *Print Manager* icon, click **Setup**, then select *Printers...*
2. Click **Add** to make a new printer definition, then type a name of your choice in the *Name* field using up to 8 characters, a period, and up to 3 characters.
3. Select **\PIPE\IB<nnnnnn>.LP1** from the *Device* list, and select a printer driver suitable for your printer.
4. Click **Add**, then click **OK** to confirm the printer definition.
5. Click **Setup**, then select **Queues...**
6. Click **Add** to create a print queue, and type a name in the *Name* field.
7. Click **Add**, then click **OK** to confirm the queue definition.

Create a Print Queue (OS/2 version 2.x):

1. Double-click the *Templates* folder, then drag the *Printer* icon out to the *Workplace Shell* (or into a folder) while holding the right mouse button down.
2. Type a name of your choice in the *Name* field.
3. Select **\PIPE\IB<nnnnnn>.LP1** from the *Port* list, and select a printer driver suitable for your printer from the *Standard printer* list.
4. Click **OK** to confirm the printer definition.

Print queue sharing: A print queue must be made a shared resource before it can be accessed from other computers (clients or other servers). Open an OS/2 window and issue the following command:

```
NET SHARE queue_name /PRINT
```

Queue_name is the name of the queue created above.

Unix

You will need *root* privileges for the configuration.

1. Find an unused Internet address (IP address) and choose a unique host name for your NPS.
2. Add the NPS IP address and host name to your system host table by appending the following line to the */etc/hosts* file:

```
<IP address><host name>
```

Example: (Use the IP address and host name from step 1.)

```
192.36.253.96      salesdept
```

3. Update your alias name data bases (YP/NIS).

Example: (The commands may be different on your system)

```
> cd /var/yp
> make
```

4. Send the IP address to the print server. The node address is your NPS server ID divided into six groups of two digits each, using ':' to separate the groups. (See the example below.)

```
arp -s <host name> <node address> temp
ping <host name>
```

Example: (Use the host name from step 1.)

```
arp -s salesdept 00:02:31:C8:00:61 temp
ping salesdept
```

Note: The *arp* command syntax may differ between Unix systems. You may also use *rarp* or *bootp* to set the IP address, see the User's Manual.

5. Log in to the NPS and up-load the *ibinstall* script:

```
> ftp <host name>
Name (salesdept:thomas): root
Password: pass (not visible)
ftp> get ibinstall
ftp> bye
```

Example: (Use the host name from step 1.)

```
ftp salesdept
```

6. Execute the script:

```
> sh ibinstall
```

The directions on the screen will guide you through the installation of LPD, FTP or PROS on your Unix system.

Section 2

Introduction

The IBM Network Print Server (NPS) is a plug-in network print server for the Token Ring environment. Using this server makes it possible to connect your printers anywhere in a Token Ring network, allowing all network users access to shared printer resources.

Whether you are running PC, PS/2 or Unix systems, the print server connects your printer directly to your Token Ring network. Its multiple protocol support lets you print from Novell NetWare, LAN Server, LAN Manager, Windows, and TCP/IP simultaneously.

The server plugs directly to the parallel port of any standard printer. Its powerful built-in features makes it extremely user-friendly both to install and to use.

Note: Throughout this manual the IBM Network Print Server is referred to as the NPS.

How It Works

Token Ring network print data is transmitted as *packets* using a high-speed protocol very different from the standards used by serial or parallel printers. Each packet contains information about the sender, the receiver, how to unpack the packet, and the data itself.

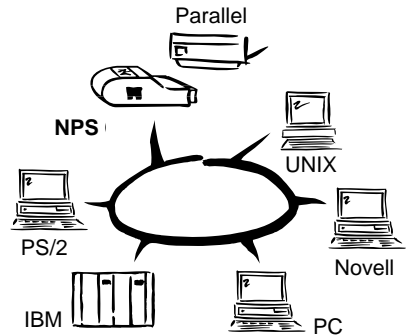
The NPS acts as a station in the Token Ring network, with its own unique address. It receives the packets addressed to it, unpacks them, and converts the print data to a format suitable for standard printers.

The only difference between the two NPS Token-Ring models is the physical network attachment. One model is attached by unshielded twisted-pair (Media Type 3/UTP) Token Ring cabling, and the other model is attached by shielded twisted-pair (Media Type 1/STP).

The print data is sent to the printer using a high-speed parallel port.

Where To Use It

The NPS can communicate with PC, PS/2, and Unix systems. It supports three different network protocols: NetWare, IBM networks, and TCP/IP. The NPS can actually handle these protocols simultaneously, making the NPS the ideal printer server solution for a mixed environment.



NetWare The NPS has two different modes in the NetWare environment – *Print Server Mode* and *Remote Printer Mode*.

In *Print Server Mode*, the NPS emulates a NetWare Print Server. At power-on it will log in to each file server in the network to find out which print queues are to be serviced. Up to 16 file servers and up to 96 print queues are supported.

In *Remote Printer Mode*, the NPS appears as a NetWare Remote Printer. At power-on it will log in and attach to up to eight specified NetWare print servers.

OS/2 The NPS is integrated to the OS/2 Spooler using the supplied *NPS Manager* software. The printers attached to the NPS will appear as connected directly to the file server, and may be used by any PC running LAN Server or LAN Manager on your network.

Windows The *NPS Manager* software is used to install and maintain print server ports as Windows printer ports. Windows 3.1, Windows for Workgroups, Windows 95, and Windows NT are all supported.

Unix systems The NPS can operate as an integrated part of your system. The printers connected to the NPS will appear as if they were connected directly to the host printer spooler.

You have several protocols and print methods to choose from. The method you should select depends on your requirements, and what system you are running. Five print methods are supported in TCP/IP: LPD, FTP, PROS A (*named pipe*) PROS B (*filter*) and Reverse Telnet.

Any host supporting the TCP/IP suite of protocols is supported by the NPS.

Main Features

Reliability The print server hardware provides high performance and reliability combined with low power consumption.

Flexibility It supports NetWare, Microsoft and IBM networks, and TCP/IP simultaneously. Five different print methods are supported for Unix systems.

Speed The sustained throughput exceeds 150 kilobytes per second. High-speed Centronics communication is supported.

Easy to Install Use *PCONSOLE* for NetWare Installation, *NPS Manager* for OS/2, and the supplied *ibinstall* script for Unix systems.

Logical Printers This unique concept allows you to perform auto ASCII to PostScript conversions, use different character sets, or select multiple bins and form sizes on the same printer.

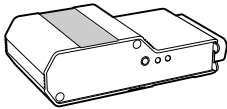
Accounting The accounting function lets you keep track of the last ten print jobs.

Security You may set up passwords for all users, restricting both log in and printer access.

Section 3

Getting started

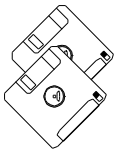
Unpack and inspect all parts for damage. Contact your point of purchase if anything is missing from the following list.



- IBM Network Print Server, (for Media Type 3/UTP), part number: 14H7306, **or**
IBM Network Print Server, (for Media Type 1/STP), part number: 14H7315



- IBM Token-Ring Network Print Server Administrator's Guide, form number, S246-0112-00



- Installation Kit, part number 14H7308, including:
 - 3.5" disk with NPS Utilities for NetWare and OS/2.
 - 3.5 inch diskette with IBM Ethernet and Token-Ring Network Print Server Technical Reference Manual (shipped on diskette). To view this manual, you will need access to Adobe's Acrobat Reader. The manual is located on the diskette and is called NPS_TR.PDF. To view the file, you will need to copy the file from your diskette onto your hard drive. Place the file in a directory where you can access the file using Adobe Acrobat Reader. To view the file, open NPS_TR.PDF from Adobe Acrobat Reader.



- Power Supply Europe, part no: 14H7320, or
Power Supply UK, part no: 14H7319, or
Power Supply USA, part no: 14H7318.

Note: For some printers, such as the IBM 3130, you will be supplied with a cable instead of a power supply. This cable attaches to the IBM 3130 to supply power to the NPS. (Refer to your printer documentation for information on attaching the NPS to the printer.)

Printer Installation

Before you begin:

Make sure that the external power supply is marked with the correct mains voltage.
--

Note: If you are installing this printer on an IBM 3130 printer, you will be supplied a cable to attach to the printer instead of a power supply unit.

Attach the NPS to your printer's parallel port and make a test printout:

1. Switch off the printer.
2. Attach the NPS to the printer, directly to the parallel printer port.
3. Connect the external power supply. The NETWORK indicator will flash during power-on and self-test. When the indicator stops flashing and remains unlit, the NPS is ready for use.
4. Switch on the printer.
5. Press and hold the test button until the NETWORK indicator starts to flash, then release the button to print a test page.

The test page shows the software revision and the basic setup of your NPS.

Note: The NPS supports high-speed Centronics communication. This function is disabled by default, since some printers support standard Centronics only. To activate high-speed Centronics, change the *Output Menu* parameter L1_CENTR to HISPEED as outlined in Appendix A.

Network Installation

Before you begin:

- Make sure that your network is ready to accept a new node.
- Any network configuration should always involve the network manager.
- **Don't** connect or disconnect the network cabling, or change the Ring Speed setting while the NPS is powered on.

1. Switch off the printer and disconnect the external power supply.
2. Record the NPS server ID. You will need this number for the setup.
3. Slide the RING SPEED switch towards 4 or 16 depending on the ring speed of your network.
4. Connect your NPS to the network using a UTP (Media Type 3) Token Ring cable, or
Connect your NPS to the network using a STP (Media Type 1) Token Ring cable.
5. Switch on the printer and connect the external power supply.

Notes: It is not recommended to use standard UTP cabling on 16 Mbit networks, but screened or foiled Media Type 3 cabling may be used.

Each NPS print server is preconfigured with a unique Node Address (identical to the server ID). You can change this to a *Locally Administrated Address*, see page 89.

The installation is now completed. Proceed with the setup sections for NetWare, OS/2 and/or Unix, as appropriate to your network.

Section 4

Setup for NetWare

The NPS can run in either *Print Server Mode*, *Remote Printer Mode* or both simultaneously. The basic configuration is done using the PCONSOLE software supplied from Novell, and if you choose a setup other than the automatic print server mode, also with IBMCFG supplied with the NPS.

The overview on the following pages explains the advantages and limitations of each mode. Select the mode that best fits your needs, then carry out the configuration as described later in this section.

Before you begin:

- Make sure that the NPS is powered on and attached to the network.
- You will need *root* privileges on the system.
- Have the server ID found on the back of the NPS available.
- Any network configuration should always involve the network manager.
- If you use NetWare 4.0 or later, you must set up your file server for *bindery emulation* by specifying the *Bindery Context* parameter. See your Novell documentation for details.

Before configuring your NetWare system, you may want to configure the NPS (e.g. logical printer definitions). This is done using the IBMCFG software on the disk supplied with the NPS.

On the disk you will find a text file called *read.me*, containing installation instructions for IBMCFG in the Novell environment.

Print Server Mode An NPS in print server mode emulates a Novell print server (a workstation running PSERVER). This is the recommended mode for medium-sized to large networks.

There are three different ways to set up the print server mode, depending on how you want the NPS to log in to the servers at power-up, and how you want to manage printer and queue configurations:

Automatic Log-In The NPS will automatically detect and log in to all NetWare servers on the network at power-on. This is the default setting, and the mode that requires the least setting up. However it becomes less practical on large networks because of the time taken for the NPS to log in to every server on the network at power-up of the NPS. With very large networks it is possible that the NPS memory will not be able to hold the information that is gathered during log in, causing the NPS operate unsatisfactorily. See page 36 for setup procedures.

Advantages	Limitations
High performance (typically 150 kilobytes/s). Easy to set up – no NPS configuration required for automatic mode.	Requires a NetWare user licence for each NPS. The NPS power-up takes a long time on large networks

Parameter Controlled Log-In The NPS will log in to only those NetWare servers specified by the NPS configuration. This overcomes the problem of long log in times at power-up, but adds more work to the configuration procedure. See page 38 for setup procedures.

Advantages	Limitations
High performance (typically 150 kilobytes/s). Avoids the prolonged NPS power-up time caused by the automatic file server login. An unavailable file server will not affect the access of the remaining specified servers.	Requires a NetWare user licence for each NPS. Requires configuration of the NPS. Difficult to manage print queues on larger networks.

*File Server
Controlled Log-In*

The NPS will first log in to the *Configuration File Server*, and then to any additional NetWare servers found in the file server configuration. This has the advantage of both a rapid log in and a fairly simple configuration of large numbers of queues. However it has the limitation that if the configuration file server is not available at the time of the NPS power-up, then the NPS will not be able to log in. See page 40 for setup procedures.

Advantages	Limitations
High performance (typically 150 kilobytes/s).	Requires a NetWare user licence for each NPS.
Avoids the prolonged NPS power-up time caused by the automatic file server login.	Requires configuration of the NPS.
Simplifies the queue and printer set-up and maintenance, especially on larger networks.	If the configuration file server is unavailable, then none of the queues will be serviced.

*Remote Printer
Mode*

An NPS in remote printer mode emulates a workstation running RPRINTER or NPRINT (the Novell remote printer software). It is attached to a NetWare print server, that is either located on the file server (PSERVER.NLM), or a dedicated workstation running PSERVER.EXE. This mode is only recommended for small networks where the number of NetWare user licences is a major issue.

The setup procedure involves adding a printer, linking the printer to one or more print queues, and finally specifying which NetWare print servers the NPS will attach to. The first two steps are carried out in PCONSOLE, and the last step is done in IBMCFG (supplied with the NPS). See page 44 for setup procedures.

Advantages	Limitations
Allows up to 8 printers per NetWare user licence.	Lower performance – 20 - 40 kilobytes/s for NLM, and 70 kilobytes/s for EXE.
	Requires configuration of the NPS.
	Higher network load.

Print Server Mode (Automatic)

The setup procedure involves adding a print server and linking it to one or more print queues. Both steps are carried out in PCONSOLE.

Add a Print Server Follow these steps to add a print server to your NetWare environment:

1. Log in to a file server from a client workstation.
2. Start PCONSOLE.
3. *NetWare 4.xx only:* Press <F4> to switch to *Bindery Mode*.
4. Select *Print Server Information* (3.xx) or *Print Servers* (4.xx).
5. Press <Insert> to add a new Print Server.
6. Type the NPS name. If you have not previously changed the name using IBMCFG, then the name must be entered as **IBM<nnnnnn>** (<nnnnnn> are the last six digits of your NPS server ID).*(see notes below)*
7. Press Escape to return to the Main Menu.

Repeat this procedure for each file server using the NPS.

- Notes:*
1. If the server ID of your NPS is 000231480061, then the default name is IBM480061. The server ID is found on the label at the back of the NPS.
 2. You may change the default name using IBMCFG, the Configuration Software. A longer name can be used if required (up to 47 characters). This must be done before running PCONSOLE.
 3. A longer name can be used if required (upto 47 characters). The print server name is case insensitive in print server mode. Both IBM480061 and ibm480061 are valid default print server names.

Link a Print Queue to the Print Server

The next step is to link a print queue to the print server:

1. Start PCONSOLE according to steps 1-3 on the previous page.
2. Select *Print Queue Information* (3.xx) or *Print Queues* (4.xx). If you plan to use an existing queue, then skip to step 5.
3. Press <Insert> to add a new queue.
4. Type a queue name, and press <Enter>.
5. Select the queue that you want the NPS to service. The *Print Queue Information* menu appears.
6. Select *Queue Servers* (3.xx) or *Print Servers* (4.xx).
7. Press <Insert> to display the *Queue Server Candidates* list.
8. Select the NPS name from the list.
9. Press <Escape> repeatedly to return to the main menu.

Repeat this procedure for every queue you want the NPS to service. The NPS supports up to 96 print queues, defined on up to 16 file servers.

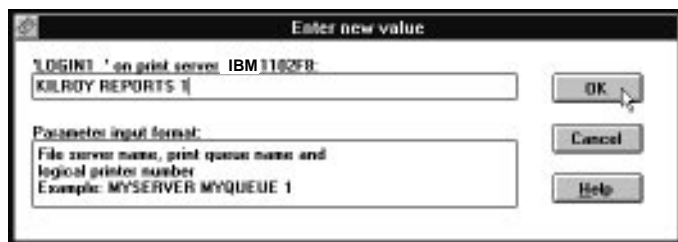
Print Server Mode (Parameter Controlled)

This is similar to the automatic print server mode, but the NPS will not automatically log in to all file servers and scan for queues to service. Instead, the file servers and print queues are specified by a set of parameters in the NPS configuration. This is the recommended method for medium-sized networks with up to around five file servers.

NetWare Configuration The NetWare configuration is identical to the one described for automatic print server mode. Follow the instructions in “*Add a Print Server*” (page 36) and “*Link a Print Queue to the Print Server*” (page 37) to add a print server and assign queues to it.

NPS Configuration The configuration involves specifying which NetWare file servers and print queues the NPS shall attach to. This is done using IBMCFG, the NPS configuration software on the disk supplied with the NPS. Follow the instructions in the *read.me* file on the disk to install the software, then proceed as follows:

1. Start IBMCFG, and select *NetWare*.
2. Select *No* at the ‘Look for old print servers’ prompt unless you are configuring an NPS with software revision prior to 4.20.
3. Choose *Select All Networks*, then select your NPS.
4. Type *root* and *pass* at the login prompt.
5. Select *NETWARE MENU*.
6. Select *LOGIN1*.
7. Type the name of the NetWare file server, the print queue, and the logical printer number. Use the file server and print queue name from the NetWare configuration above, and one of the logical printer numbers 1–8.



8. To specify more print queues, select *LOGIN2* through *LOGIN16* in consecutive order. Repeat step 7 for each print queue.
9. Select *Save*, then select *Cancel* until IBMCFG closes down.

Print Server Mode (File Server Controlled)

This method uses a NetWare file server (the *Configuration File Server*) to hold the print queue information. The NPS will not automatically log in to all file servers and scan for queues to service. Instead, the file servers and print queues are specified on the configuration file server. This is the recommended method for large networks with five or more print servers, since it simplifies the maintenance of a large number of print queues.

NetWare Configuration

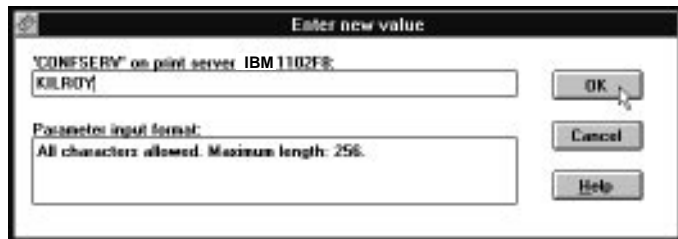
The NetWare configuration is different from the automatic and parameter controlled modes. Instead of setting up queues on several file servers, all queues are set up and maintained on the configuration file server. The configuration procedure depends on which NetWare version you are using.

- NetWare 3.xx:*
1. Log in as supervisor to the NetWare server, and start PCONSOLE.
 2. Select *Change Current File Server*, then select the file server at which you want to keep the queue and printer configurations. Make a note of the configuration file server name, you will need it during the NPS configuration.
 3. Select *Print Server Information*, then add the new print server IBM<nnnnnn>. See “*Add a Print Server*” (page 36) for details.
 4. Select IBM<nnnnnn>.
 5. Select *Print Server Configuration*, and then *File Servers to be Serviced*.
 6. Press <Insert> to see the list of Available File Servers. Add all file servers you want the NPS to log in to, then press <Esc> to get back to the *Print Server Information Menu*.
 7. Select *Printer Configuration*. A list of 16 printers marked *Not Installed* appears. The printers numbered 1–8 correspond directly to the NPS logical printers PR1–PR8. The remaining eight printers are not used by the NPS.
 8. Select the second printer (number 1). The printer is, by default, named ‘Printer 1’. The printer names are not used by the NPS.
 9. Select *Queues Serviced By Printer*, then select *Printer 1*.
 10. Press <Insert> to see the list of *Available Queues*, then select the queues you want the printer to service. Repeat steps 9 – 10 if you have installed more than one printer.
 11. Exit PCONSOLE.

- NetWare 4.xx:*
1. Log in as supervisor to the NetWare server, and start PCONSOLE.
 2. Press <F4> to switch to *Bindery Mode*.
 3. Select *Change Current NetWare Server*, then select the file server at which you want to keep the queue and printer configurations. Make a note of the configuration file server name, you will need it during the NPS configuration.
 4. Select *Print Servers*, then add the new print server IBM<nnnnnn>. See “*Add a Print Server*” (page 36) for details.
 5. Select IBM<nnnnnn>.
 6. Select *Serviced NetWare Servers*.
 7. Press <Insert> to see the list of *Available NetWare Servers*. Add all file servers you want the NPS to log in to, then press <Esc> to get back to the *Print Server Information* menu.
 8. Select *Printers*. An empty list of *Defined Printers* appears. Printers are numbered from 0 to 255 in the order that they are defined. The printers numbered 1–8 correspond directly to the NPS logical printers PR1–PR8. No other printer numbers are used by the NPS.
 9. Press <Insert> to define printer number 0. Name it ‘DUMMY’, ‘UNUSED’ or similar to indicate that this printer is not used.
 10. Press <Insert> to define printer number 1. Name it ‘PRINTER_1’ or whichever name you prefer. The printer names are not used by the NPS.
 11. Select printer number 1. The printer is, by default, named ‘Printer 1’.
 12. Select *Print Queues Assigned* and press <Insert> to see the list of *Available Print Queues*.
 13. Select the queues you want printer number 1 to service. Repeat steps 10 – 13 for each additional printer number you want to define.
 14. Exit PCONSOLE.

NPS Configuration The configuration involves specifying the configuration file server. This is done using IBMCFG, the NPS installation software on the disk supplied with the NPS. Follow the instructions in the *read.me* file on the disk to install the software, then proceed as follows:

1. Start IBMCFG, and select *NetWare*.
2. Select No at the 'Look for old print servers' prompt unless you are configuring an NPS with software revision prior to 4.20.
3. Choose *Select All Networks*, then select your NPS.
4. Type *root* and *pass* at the login prompt.
5. Select *NETWARE MENU*.
6. Select *CONFSERV*.
7. Type the name of the NetWare file server dedicated as the configuration file server, then select *OK*.



Example: Use KILROY as configuration file server

8. Select *Save*, then select *Cancel* until IBMCFG closes down.

Remote Printer Mode

The configuration for remote printer mode comprises the following steps:

1. Add a Print Server
2. Create a Print Queue
3. Link a Remote Printer to the Print Queue
4. Configure the NPS

Add a Print Server The NetWare print server software is either installed on a file server (PSEVER.NLM), or a dedicated workstation (PSEVER.EXE). If you don't already have a Novell print server installed, please refer to the Novell documentation for installation procedures.

Create a Print Queue Print queues are created in the same way as for print server mode. If you do not need any new queues, skip to “*Link a Remote Printer...*” below.

1. Log in to a file server from a client workstation.
2. Start PCONSOLE.
3. Select *Print Queue Information* (3.xx) or *Print Queues* (4.xx).
4. Press <Insert> to add a new queue.
5. Type a queue name, and press <Enter>. Select a print queue volume (4.xx only). Repeat steps 4 – 5 for each queue you want to create.
6. Press <Esc> to return to the Main Menu.

Link a Remote Printer to the Print Queue The procedures are slightly different depending on which NetWare version you are using. In either case, begin with starting PCONSOLE according to steps 1–3 in “*Create a Print Queue*” above if you have

not already done so.

- NetWare 3.xx:*
1. Select *Print Server Information* from the PCONSOLE Main Menu.
 2. Select the NetWare Print Server to which you want to link your NPS.
 3. Select *Print Server Configuration*, and then *Printer Configuration*.
 4. Select the first free slot in the *Configured Printers* list.
 5. Make a note of the NetWare print server name and the Printer number; you will need it later during the configuration.
 6. Type the NPS name. If you have not previously changed the name using IBMCFG, then the name must be entered as **IBM<nnnnnn>!n** (<nnnnnn> are the last six digits of your NPS server ID, and *n* is the logical printer number 1–8).*(see notes below)*
 7. Change *Type* to Remote Other/Unknown.
 8. Press <Esc>, and select *Yes* at the *Save Changes* prompt.
 9. Select *Queues Serviced by Printer* in the Print Server Configuration Menu.
 10. Select the NPS name in the Defined Printers list.
 11. Press <Insert>, then select the queue you want to use from the Available Queues list. Repeat this step if you want more than one queue.
 12. Press <Esc> to get back to the Main Menu, then exit PCONSOLE.

Repeat this procedure for each file server and print server using the NPS.

- Notes:*
1. If the server ID of your NPS is 000231480061, then the default name is IBM480061. The server ID is found on the label on the back of the NPS.
 2. You may change the default name using IBMCFG, the Configuration Software. A longer name can be used if required (up to 47 characters). This must be done before running PCONSOLE.
 3. You may define up to eight remote printers, each attached to its own NPS logical printer. Each remote printer must have a unique

name distinguished by the */n* extension, where !1 indicates logical printer 1, !2 indicates logical printer 2, etc.

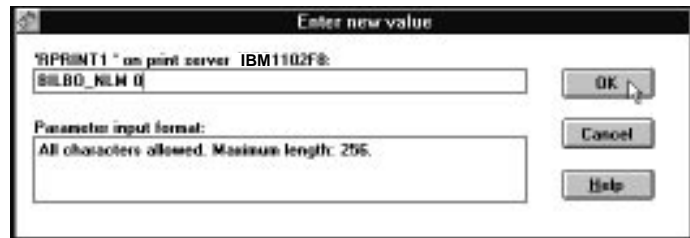
- NetWare 4.xx:*
1. Select *Print Servers* from the PCONSOLE Main Menu.
 2. Select the NetWare Print Server to which you want to link your NPS.
 3. Select *Printers*.
 4. Press <Insert> to add a remote printer to the Defined Printers list.
 5. Type the NPS name. If you have not previously changed the name using IBMCFG, then the name must be entered as **IBM<nnnnnn>!n** (<nnnnnn> are the last six digits of your NPS server ID, and *n* is the logical printer number 1–8).*(see notes below)*
 6. Select the NPS name.
 7. Make a note of the NetWare print server name and the Printer number; you will need it later during the configuration.
 8. Select *Printer type:*, and change to **Other/Unknown**.
 9. Select *Print Queues Assigned*, then press <Insert>
 10. Press <Insert>, then select the queue you want to use from the Available Print Queues list. Repeat this step if you want more than one queue.
 11. Press <F10> to save the changes, then press <Esc>.
 12. Press <Esc> to get back to the Main Menu, then exit PCONSOLE.

Repeat this procedure for each file server and print server using the NPS.

- Notes:*
1. If the server ID of your NPS is 000231480061, then the default name is IBM480061. The server ID is found on the label at the back of the NPS.
 2. You may change the default name using IBMCFG, the Configuration Software. A longer name can be used if required (up to 47 characters). This must be done before running PCONSOLE.
 3. You may define up to eight remote printers, each attached to its own NPS logical printer. Each remote printer must have a unique name distinguished by the *!n* extension, where !1 indicates logical printer 1, !2 indicates logical printer 2, etc.

NPS Configuration The configuration involves specifying which NetWare print servers and printer numbers the NPS shall attach to. This is done using IBMCFG, the NPS installation software on the disk supplied with the NPS. Follow the instructions in the *read.me* file on the disk to install the software, then proceed as follows:

1. Start IBMCFG, and select *NetWare*.
2. Select *No* at the 'Look for old print servers' prompt.
3. Choose *Select All Networks*, then select your NPS.
4. Type *root* and *pass* at the login prompt.
5. Select *NETWARE MENU*.
6. Select *RPRINT1*.
7. Type the name of the NetWare print server and the printer number (4.xx: Use printer numbers 1 and higher). Use the name and number from the NetWare configuration earlier.



Example: Use printer 0 at BILBO_NLM as remote printer

8. To specify more print servers, select RPRINT2 through RPRINT8 in consecutive order. Repeat step 7 for each print server.
9. Select *Save*, then select *Cancel* until IBMCFG closes down.

Verify the Communication

To verify communication by making a test printout, just send a job to one of the print queues that the NPS will service. Use CAPTURE, NPRINT, or PCONSOLE.

Example: Use CAPTURE from the DOS command line when you are logged into the network, to print out the *autoexec.bat* file from the root of drive C:

```
CAPTURE /L=1 /Q=DESKTOP /NOTIFY /TI=30 /NT /FF /NB  
COPY C:\AUTOEXEC.BAT LPT1:
```

The CAPTURE switches have the following meanings: /L=1 captures the printouts sent to the PC LPT1 port, /Q=DESKTOP specifies the print queue, /NOTIFY enables user messages, /TI=30 sets the time-out to 30 seconds, /NT specifies no tab expansion, /FF ends the printout with a Form Feed, and /NB disables the banner page.

Section 5

Setup for Windows

The following Windows platforms are supported:

- Windows 3.1 (requires add-on network support)
- Windows for Workgroups
- Windows 95
- Windows NT

The setup is done using IBM Print Utility for Windows which is supplied on the installation disk and called 'IBMPUW'. You should install the utility now if you haven't already done so - see the instructions on the installation disk. However if you are using client-server mode the IBM Print Utility is not needed on the client platforms.

Before configuring your Windows system, you may want to configure the NPS (e.g. logical printer definitions). This is done using the IBMCFG software on the disk supplied with the NPS.

On the disk you will find a text file called *read.me*, containing installation instructions for IBMCFG in the Windows environment.

Before you begin:

- Make sure that the NPS is powered on and attached to the network.
- Have the server ID found on the back of the NPS available.
- Any network configuration should always involve the network manager.

*IBM Print Utility
for Windows*

IBM Print Utility is a dual purpose application for network printing in the Windows environment. It's two purposes are:

1. Install and maintain NPS printer ports as Windows printer ports.

2. Capture and monitor print jobs directed to NPS ports.
Print jobs are directed through a spool directory, either at your local hard disk (peer-to-peer mode) or at the file server (Client-Server mode). All NPS printer ports can be monitored, and you get a pop-up notification message when your print job is finished or there is a problem.

For more information about IBM Print Utility, see the on-line help.

- Notes:*
1. Microsoft Network (NetBIOS/NetBEUI) must be running when using IBM Print Utility.
 2. IBM Print Utility must be running whenever you want to print to your network printer.

*Peer-to-Peer vs.
Client-Server
Printing*

Peer-to-peer mode means that each user who wants access to the network printer installs the IBM Print Utility software on their workstation. Each user then adds the network printer to their systems, and uses the printer as if it were their own.

- You can monitor the printer status at all times, and you will be notified when your print job is completed.
- You don't have to rely on a server.

Client-server mode means that one user installs the IBM Print Utility software and adds the printer to his or her workstation (the Server). That user then shares the printer with other users. The other users (the Clients) connect to the printer through the server using Print Manager.

The client-server mode provides a way of maintaining queue ordering and job priority, but at a price:

- You cannot receive printer status or print job notification.
- The workstation set up as server must be available at all times, and must have the capacity to handle the print jobs that may pass through it.

Note: When using the client-server mode, other users may still install the IBM Print Utility software to print directly to the network printer in peer-to-peer mode.

Windows 3.1

Windows 3.1 requires that network support such as LAN Server or LAN Manager Workstation software is installed in order to print to a network printer. If this is the case, proceed as described under Windows for Workgroups below.

Windows for Workgroups

*Setup for
Peer-to-Peer
Printing*

Follow these steps to install your NPS for peer-to-peer printing at a Windows for Workgroups workstation:

1. Double-click the IBM Print Utility icon.
2. In the *Port* menu, click *Add*.
3. In the NPS Port list, select the NPS port to be installed.
The ports appear as *<name>.LPI*, where *<name>* is IB followed by the last six digits of the print server ID, e.g. *IB560B35.LPI*. Alternatively, if you entered a new name when using the IBMCFG configuration software, it will be this new name that is shown in the port list.
4. Accept the suggested Windows port name or change it using up to 8 characters, a period, and up to 3 characters. Make a note of the Windows port name (you will need it later). Type any comments in the Description field, then click OK to install the Windows port.
5. In the *Port* menu, click *Connect* to bring up the Windows Printers dialog.
6. Select a printer driver from the list of Installed Printers (or click *Add>>* to install a new driver), then click *Connect...*
7. Select the Windows port name from step 4 above (the name will be found at the bottom of the Ports list).
8. Click *OK* to close the Connect dialog, and *Close* to close Printers.

The setup is completed and you can now print through your NPS.

Note: IBM Print Utility must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility icon into your Start-up folder.

- Client-Server Printing: Server Setup* Follow these steps to install your NPS for client-server printing at a Windows for Workgroups server:
1. Choose a workstation that you want to use as server for network printing. The server must be available at all times, and must have sufficient hard disk space for spooling print jobs.
 2. Make sure that the printer sharing option is enabled. (Open Network Setup, click *Sharing...*, check the '*I want to be able to allow others to print to my printer(s)*' box).
 3. Install IBM Print Utility on the server.
 4. Set up your NPS as described under "*Setup for Peer-to-Peer Printing*" (page 51).
 5. Open Print Manager and select your printer.
 6. In the Printer menu, select *Share Printer As...*
 7. Type a printer name in the *Share As* field (this is the printer name seen by the clients, see Client Setup below). Check the *Re-share at Startup* box, then click *OK*.

The server setup is now completed. Set up the clients as described below.

Note: Both IBM Print Utility and Print Manager must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility icon into your Start-up folder.

*Client-Server
Printing: Client
Setup*

Follow these steps to use your NPS for client-server printing at a Windows for Workgroups client:

1. In the Control Panel, select *Printers*.
2. Select a printer driver from the list of Installed Printers (or click *Add>>* to install a new driver), then click *Connect...*
3. Select *Network...*
4. In the *Device Name* list, select a local port (LPT1 - LPT3) to redirect to your network printer.
5. In the *Show Shared Printers on* list, select the server from Server Setup above.
6. In the *Shared Printers* list, select the printer you want to use.
7. Click *OK*, *OK* and *Close*, then exit Control Panel.

The client setup is completed and you can now print through your NPS.

Windows 95

Setup for Peer-to-Peer Printing

Follow these steps to install your NPS for peer-to-peer printing at a Windows 95 workstation:

1. Double-click the IBM Print Utility icon.
2. In the *Port* menu, click *Add*.
3. In the NPS Port list, select the NPS port to be installed.
The ports appear as *<name>.LPI*, where *<name>* is IB followed by the last six digits of the print server ID, e.g. *IB560B35.LPI*.
Alternatively, if you entered a new name when using the IBMCFG configuration software, it will be this new name that is shown in the port list.
4. Accept the suggested Windows port name or change it using up to 8 characters, a period, and up to 3 characters. Make a note of the Windows port name (you will need it later). Type any comments in the Description field, then click OK to install the Windows port.
5. In the *Port* menu, click *Connect* to bring up the Printers folder.
6. Double-click the *Add Printer* icon. The Add Printer Wizard will guide you through the installation. Click *Next* to proceed.
7. Choose Local Printer, then click *Next*.
8. Choose Manufacturer and Printer, then click *Next*.
9. Select the Windows port name from step 4, then click *Next*.
10. Accept or change the suggested Printer Name, then click *Next*.
11. Click *Finish* to complete the installation.

The setup is completed and you can now print through your NPS.

Note: IBM Print Utility must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility icon into your Start-up folder.

*Client-Server
Printing: Server
Setup*

Follow these steps to install your NPS for client-server printing at a Windows 95 server:

1. Choose a workstation that you want to use as server for network printing. The server must be available at all times, and must have sufficient hard disk space for spooling print jobs.
2. Install IBM Print Utility on the server.
3. Set up your NPS as described under “*Setup for Peer-to-Peer Printing*” (page 54).
4. In the Printers folder, double-click your new printer.
5. Check the *Share this Printer on the Network* box, then click *OK*.

The server setup is now completed. Set up the clients as described below.

Note: Both IBM Print Utility and Print Manager must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility and Print Manager icons into your Start-up folder.

*Client-Server
Printing: Client
Setup*

Follow these steps to use your NPS for client-server printing at a Windows 95 client:

1. Open Print Manager.
2. In the *Printer* menu, select *Connect to Printer...*
3. In the *Shared Printers* list, select the printer you want to use. Click *OK*.

The client setup is completed and you can now print through your NPS.

Windows NT

Setup for Peer-to-Peer Printing

Follow these steps to install your NPS for peer-to-peer printing at a Windows NT workstation:

1. Double-click the *IBM Print Utility* icon.
2. In the *Port* menu, click *Add*.
3. In the NPS Port list, select the NPS port to be installed.
The ports appear as *<name>.LPI*, where *<name>* is IB followed by the last six digits of the print server ID, e.g. *IB560B35.LPI*.
Alternatively, if you entered a new name when using the IBMCFG configuration software, it will be this new name that is shown in the port list.
4. Accept the suggested Windows port name or change it using up to 8 characters, a period, and up to 3 characters. Make a note of the Windows port name (you will need it later). Type any comments in the Description field, then click OK to install the Windows port.
5. In the *Port* menu, click *Connect* to bring up Print Manager.
6. In the Printer menu, click *Create Printer*.
7. Type a name in the *Printer Name* field, select a suitable printer driver from the Driver list, and select *Other..* in the *Print to* list.
8. In the *Print Destinations* dialog, select *Local Port*, then click *OK*.
9. In the *Port Name* field, type: *C:\~\<port>*
where *C:\~* is your spool directory, and *<port>* is the Windows Port name from step 4. Click *OK*.
10. Close the Print Manager.

The setup is completed and you can now print through your NPS.

Note: IBM Print Utility must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility icon into your Start-up folder.

*Client-Server
Printing: Server
Setup*

Follow these steps to install your NPS for client-server printing at a Windows NT server:

1. Choose a workstation that you want to use as server for network printing. The server must be available at all times, and must have sufficient hard disk space for spooling print jobs.
2. Install IBM Print Utility on the server.
3. Set up your NPS following steps 1 - 9 under “*Setup for Peer-to-Peer Printing*” (page 56) (do not close Print Manager).
4. In the Printer menu, select *Properties...*
5. Check the *Share this Printer on the Network* box, then click *OK*.

The server setup is now completed. Set up the clients as described below.

Note: Both IBM Print Utility and Print Manager must be running when you print through your NPS. We strongly recommend that you copy the IBM Print Utility and Print Manager icons into your Start-up folder.

*Client-Server
Printing: Client
Setup*

Follow these steps to use your NPS for client-server printing at a Windows NT client:

1. Open Print Manager.
2. In the *Printer* menu, select *Connect to Printer...*
3. In the *Shared Printers* list, select the printer you want to use. Click *OK*.

The client setup is completed and you can now print through your NPS.

Windows NT - LPD Printing over the TCP/IP Protocol

This section describes how to set up a Windows NT Server (ver. 3.5 or later) for LPD printing over the TCP/IP protocol.

Install the TCP/IP Protocol Stack

In the *Control Panel*, click the *Network* icon. If the Microsoft **TCP/IP Printing** entry appears, then TCP/IP is already installed. Close the *Network* icon and skip to *Installing a Printer* below.

Follow these steps to install the TCP/IP protocol stack:

1. In the *Control Panel*, select **Network**.
2. Click **Add Software**, select **TCP/IP Protocol and related components** and click **Continue**.
3. Check the **TCP/IP Network Printing Support** and click **Continue**.
4. Select path and then click **Continue**.
5. Click **OK** in the *Network Settings* dialog box

Installing a Printer

1. In the *Control Panel*, click the *Printers*.
2. In the *Printer* menu, select **Create Printer**.
3. In the *Printer Name* field, type a name for your printer.
4. Choose a printer driver suitable for your printer.
5. In the *Print to* field, select **Other...**
6. In the *Print Destinations* dialog, choose **LPR Port**, then click **OK**. The *Add LPR Compatible Printer* dialog now appears.
7. In the *Name or Address* field, type the IP address or the alias name of your NPS.

Note: If you use an alias name, this must be defined in the *hosts* file on your server prior to the installation. This file is normally located in `/winnt35/system32/drivers/etc/hosts`.

8. In the *Name of Printer on the Machine* field, type the logical printer number you want to use (e.g. **pr1**), then click **OK**.
9. Click **OK** to complete the installation.

Section 6

Setup for OS/2

The basic configuration in the OS/2 environment is done using the *NPS Manager software* included on the disk supplied with the NPS. It comprises four steps:

1. Activate the NetBEUI protocol (if not already activated).
2. Install the *NPS Manager software*.
3. Install the NPS using the NPS Manager software.
4. Create print queues to be serviced by the NPS.

Before configuring your LAN Server/LAN Manager system, you may want to configure the NPS (e.g. logical printer definitions). This is done using the IBMCFG software on the disk supplied with the NPS.

On the disk you will find a text file called *read.me*, containing installation instructions for IBMCFG in the IBM OS/2 environment.

Before you begin:

- Make sure that the NPS is powered on and attached to the network.
- Have the server ID found on the back of the NPS available.
- Any network configuration should always involve the network manager.

Activate the NetBEUI Protocol

Activating the NetBEUI protocol is done using the LAN Server/LAN Manager Setup:

- LAN Server

Use MPTS/LAPS to activate NetBEUI (see the MPTS/LAPS documentation for details).

- LAN Manager

Use SETUP to activate NetBEUI (see the LAN Manager SETUP documentation for details).

Install the NPS Manager software

The *NPS Manager software* is included on the disk supplied with the NPS. Start the installation according to the description in the *read.me* file on the same disk. Follow the instructions on the screen to complete the installation. The NPS Manager software will start automatically when the installation process is completed.

When the NPS Manager software is running, an *action bar* and a *list of available IBM print server ports* (initially empty) will be displayed. The action bar contains the following commands: *Status*, *Install*, *Remove*, *Logfile*, and *Help*. The *Install* command is used for installing new IBM print servers. The *Help* command gives detailed descriptions of the actions that can be performed by the NPS Manager software.

Install the NPS

Once the NPS Manager software is installed and running, you can install the NPS by clicking the *Install* entry on the action bar. The *Install* command initiates a search for IBM print servers on the network. Your new NPS will appear in the list (together with any other print servers) as a printer port:

```
IB480061.LP1
```

The digits following IB are the six last digits of the NPS server ID (480061 in this example). LP1 is the NPS printer port (LPT1).

The IBM print server ports appearing in the list can now be assigned as print queue destinations as described below.

Note: If the server ID of your NPS is 000231480061, then the default port name is IB480061.LP1. The server ID is found on the label at the back of the NPS. You may change the default names by editing parameters LPRINT_1, LPRINT_2, etc. in the *config* file as described in Appendix A. If you want to change the default port names, you must do that before installing the NPS using the NPS Manager software. The port names can be up to 8 characters, a period, and up to 3 characters.

Create a Print Queue

Each IBM print server port will be seen as a *print queue destination* by the OS/2 Print Manager. Print queue destinations are referred to as *devices* in OS/2 version 1.x and *ports* in version 2.x. They appear as *pipe names*, e.g. \PIPE\IB480061.LP1, etc. Assigning IBM print server ports as print queue destinations follow the standard procedures under OS/2. The procedures are identical for LAN Server and LAN Manager, but differ between OS/2 versions 1.x and 2.x as shown below.

The examples below demonstrate how to create a new print queue and assign it to an NPS printer port. Alternatively, you may re-direct an existing queue to an NPS port.

- OS/2 Version 1.x* The print queue assignment under OS/2 version 1.x requires two operations – the definition of a printer, and the definition of one or more print queues for that printer. Follow these steps to create a print queue and assign it to an NPS printer port:
1. Double-click the *Print Manager* icon.
 2. Click the Setup menu option, then select Printers...
 3. Click Add to make a new printer definition.
 4. Type a printer name in the *Name* field using up to 8 characters, a period, and up to 3 characters.
 5. Select a *Device* (a pipe name, e.g. \PIPE\IB480061.LP1).
 6. Select a *printer driver* suitable for the printer attached to the NPS.
 7. Click Add, then click OK to confirm the new printer definition.
 8. Click the Setup menu option, then select Queues...
 9. Click Add to make a new print queue definition.
 10. Type a queue name in the *Name* field (preferably the printer name assigned above).
 11. Select the previously defined printer.
 12. Click Add, then click OK to confirm the new queue definition.

OS/2 Version 2.x The print queue assignment procedure under OS/2 version 2.x is done in one operation – the definition of a printer will automatically create a queue. Follow these steps to create a print queue and assign it to an NPS printer port:

1. Double-click the *Templates* folder.
2. Drag the *Printer* icon out to the *Workplace Shell* (or into a folder), while holding the *right* mouse button down.
3. Type a name in *Printer Name* field using up to 8 characters, a period, and up to 3 characters.
4. Select a printer driver from the *Standard printer* list suitable for the attached printer.
5. Select a *pipe name* (e.g. \PIPE\IB480061.LP1) from the Port list.
6. Click OK to confirm the new printer definition.

Sharing Print Queues

To access a print queue from other computers in the network (either clients or other servers), the queue must be made a *shared resource*. Open an OS/2 window and issue the following command (you will need administrator privileges to do this):

```
NET SHARE <queue name> /PRINT
```

<*Queue name*> is the queue created above. Note that the queue name equals the printer name for OS/2 version 2.x, while queue and printer names may differ for version 1.x.

For further information on queue sharing, please refer to your LAN Server or LAN Manager documentation.

Verify the Communication

To verify communication by making a test printout, use the NET COPY command (or any other print method such as drag-and-drop, etc.) to send a job to one of the print queues that NPS will service.

Example: Use NET COPY from the OS/2 or DOS command line when you are logged into the network, to print a file:

```
NET COPY <file name> \\<server name>\<queue name>
```

For further information on printing to print queues, refer to the appropriate OS/2, LAN Server and LAN Manager documentation.

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Section 7

Setup for Unix Systems

This section covers the setup for TCP/IP in a Unix environment. The steps described on the following pages are:

1. Prepare your system for a new TCP/IP node.

Procedures: Find an unused Internet (IP) address and choose a unique host name for your NPS. Update your host table and alias name data bases.

2. Set up the NPS as a TCP/IP node.

Procedures: Down-load the IP address to your NPS using the *arp*, *rarp* or *bootp* method.

3. Set up and attach a print queue at your Unix workstation.

Procedures: Use the automatic *ibinstall* script to complete the setup. Up-load and run the script, then follow the instructions on your screen.

At the end of this section there is a description of how to set up a Windows NT Server (ver. 3.5 or later) for LPD printing over the TCP/IP protocol.

Before you begin:

- Make sure that the NPS is powered on and attached to the network.
- You will need *root* privileges on the system.
- Have the server ID found on the back of the NPS available.
- Any network configuration should always involve the network manager.

Prepare your System

Each node in a TCP/IP network must have a unique *Internet (IP) address*, and also a unique *host name* to be used as an alias for the IP address. Before you add your NPS to a TCP/IP network, you must prepare your system for a new node.

Find an unused IP address The IP addresses used in your network are listed in the system host table (*/etc/hosts* on most Unix systems). Find an unused IP address, and choose a unique host name for your NPS.

Important:

Don't use the default or example IP address when installing your NPS. Always consult your network manager before assigning an Internet Address.

Update your system host table Open the system host table using a text editor (e.g. *vi /etc/hosts*), and add a line containing the IP address and host name for your NPS:

Example:

```
192.36.253.96          salesdept
```

Update your alias name data bases If your system uses alias name data bases such as Yellow Pages (YP) or Network Information Services (NIS), update these using the commands below. If you intend to use the *arp* or *bootp* method, update the YP or NIS now. If you intend to use the *rarp* method, you must first update the *node address table*, see “*The rarp method*” (page 71).

Commands:

```
cd /var/yp
make
```

Note: These commands may vary between different systems. When in doubt, consult your system documentation for the proper commands.

Set Up your NPS

When you have prepared your system to accept a new TCP/IP node, you are ready to set up your NPS as a node on your network. This is done by down-loading the new IP address to the NPS using one of these three methods:

- *arp* – the easiest method, but requires down-loading of the Internet address to each new device individually.
- *rarp* – down-loads the Internet address to each device automatically. Requires a rarp daemon on your system, and operates within a single network segment only.
- *bootp* – similar to rarp, but operates on the entire network. Requires a bootp daemon on your system.

Note: NPS has an auto-sensing router facility that automatically adapts to the network topology. However, if you do run into problems in a complex network, we recommend that you specify the default router and net mask parameters manually. Refer to the *Technical Reference Manual* for details.

The arp method The *arp* command associates your NPS node address with an IP address. The IP address is then down-loaded by the *ping* command. The *arp* command syntax depends on your Unix system (see examples below). This is the syntax for IBM AIX systems:

```
arp -s 802.5 <host name> <node address> temp  
ping <host name>
```

The node address is the server ID found at the back of the NPS. Each pair of digits must be separated by colons as in examples below.

Examples: The *arp* command differs between different Unix systems. The ‘802.5’ argument is only required for IBM AIX systems, and some BSD-type systems expect the host name and node address in reversed order.

IBM AIX Systems:

```
arp -s 802.5 salesdept 00:02:31:C8:00:61 temp  
ping salesdept
```

BSD-Type Unix Systems:

```
arp -s 00:02:31:C8:00:61 salesdept temp  
ping salesdept
```

System V Unix Systems:

```
arp -s salesdept 00:02:31:C8:00:61 temp  
ping salesdept
```

The host will return ‘*salesdept is alive*’ or similar indicating that the IP address has been set, and that communication is established.

Note: When you execute the ping command for the first time, you should expect a response time significantly longer than usual.

The rarp method The *rarp* method uses a daemon to establish and maintain communication between the hosts listed in a *node address table* (*/etc/ethers* on most systems). Rarp daemons are normally only used on BSD-type and System V Unix systems. If you are an IBM AIX user, use the *arp* or *bootp* methods instead.

Follow these steps to use the *rarp* method:

1. Open the node address table using a text editor (e.g. *vi /etc/ethers*), and add a line containing the node address and host name for your NPS.

Example:

```
00:02:31:C8:00:61 salesdept
```

2. Update your alias name data bases (see page 68).
3. Start the *rarp* daemon (if not already running) by the command *rarpd -a*.
4. Restart the NPS to down-load the IP address.

The bootp method The *bootp* method uses a daemon to establish and maintain communication between the hosts listed in a *boot table* (*/etc/bootptab* on most systems). Follow these steps to use the bootp method:

1. Open the boot table using a text editor (e.g. `vi /etc/bootptab`), and add the following entry for your NPS:

```
<host name>:ht=<hardware type>:vm=<vendor magic>:\
:ha=<hardware address>:ip=<internet address>:\
:sm=<subnet mask>:gw=<gateway field>
```

Example:

```
salesdept:ht=tr:vm=rfc1048:\
:ha=000231C80061:ip=192.36.253.96:\
:sm=255.255.255.0:gw=192.36.253.254
```

2. Start the bootp daemon (if not already running) by the command `bootpd`.
3. Restart the NPS to down-load the IP address, default router address, and net mask.

- Notes:*
1. The *ht* and *vm* fields must be entered exactly as in the example.
 2. The *ha* and *ip* fields are the Node and IP Addresses respectively.
 3. The *sm* and *gw* fields correspond to the default router address and net mask (*TCP/IP Menu* parameters `DEF_ROUT` and `NET_MASK`, see Appendix A).

Set Up and Attach a Print Queue

The final step is done using the *ibinstall* script, which is up-loaded from the NPS to your host using FTP. You don't need any technical knowledge about your Unix system; *ibinstall* will automatically detect your system's characteristics, and guide you through the setup procedure.

Below is a list of Unix systems that are supported by *ibinstall*:

* BSD (Berkley Unix)	IRIX (Silicon Graphica, SGI)
SunOS 4 (Sun BSD, Solaris 1.x)	BOS (BULL DPX 2)
ULTRIX (Digital Equipment, DEC)	* SYS V R4 (UNIX System V Release 4)
DEC OSF/1 (Digital Equipment, Alpha)	SunOS 5 (Sun SYS V, Solaris 2.x)
FreeBSD (Berkley Unix)	HP-UX (HP 9000)
* SYS V R3 (Unix System V Release 3)	AIX (IBM RS/6000, BULL DPX 20)
SCO (Santa Cruz Operation)	

If your particular system isn't listed, *ibinstall* tries to use one of the generic Unix systems (BSD, SYS V R3 or SYS V R4). If *ibinstall* fails to recognize your system, complete the setup manually as described in the *Technical Reference Manual*.

- Up-load
ibinstall*
1. Log in to the NPS with the command `ftp <host name>`, where *host name* is the name assigned in your system host table (e.g. *sales-dept*). You will be prompted for user id and password. Enter *root* as user id, and *pass* as password.
 2. Up-load the script using the command `get ibinstall`.
 3. Log out using `quit`, `bye` or `exit` (depending on your FTP version).

Example: Below is a sample FTP session showing how to up-load *ibinstall* (user entries appear in bold):

```
> ftp salesdept
Connected to salesdept.
220 NPS FTP Print Server ready.
Name (salesdept:thomas): root
331 User name ok, need password
Password: pass (not visible)
230 User logged in
ftp> get ibinstall
200 PORT command successful.
150 Opening data connection for ibinstall (192,36,253,4,13,223)
226 Transfer complete.
local: ibinstall remote: ibinstall
27545 bytes received in 4.1 seconds (6.5 Kbytes/s)
ftp> bye
221 Goodbye.
>
```

The *ibinstall* script has now been up-loaded to your host.

Run ibinstall Type the command `sh ibinstall` to run the script.

You will be guided through the setup by a step-by-step procedure. *Ibinstall* will first detect what kind of Unix system you are using, and then suggest a suitable print method. The suggested print method will be sufficient in most cases, but you can also choose one of the PROS methods for more advanced print capabilities. See page 75 for a brief overview of the different print methods. For more detailed information, please refer to the NPS Technical Reference.

After you have selected a print method, *ibinstall* will automatically set up the necessary print queues, filters, etc. You will then be offered to make a test printout, and after that the setup is completed.

Print Methods

The NPS supports several different print methods for printing under TCP/IP. *Ibinstall* will suggest a print method suitable for your particular Unix system, but you might want to use another method depending on your printing requirements (banner pages, status logging, etc.) Use the overview below to determine which method to use:

LPD The recommended method where available.

Advantages: Easy to set up – install the NPS as a remote queue in *SMIT* (AIX), or add a remote printer to */etc/printcap* using the *rm* and *rp* fields (BSD).

Limitations: Spooler features (AIX), and *printcap* or *lpr* options (BSD) such as multiple copies are not available.

FTP The recommended method when LPD is not available.

Advantages: Uses industry standard network software on the host.

Limitations: No printer status logging. *BSD:* May conflict with other input or output filters. Doesn't allow both input and output filters. *System V:* No filters or interface programs can be used.

PROS A protocol developed at Axis. Comes in two versions; PROS A (*named pipe*), and PROS B (*filter*).

Advantages: The NPS appears as a device to the system. Print traffic (including printer status and readback) is logged to file. *BSD:* All *printcap* options are available.

Limitations: A C compiler is required to build the PROS A drivers.

Reverse Telnet Often used for printing via a terminal server printer port. Only recommended if you already have a Reverse Telnet driver installed (not available for AIX).

Advantages: Easy to set up with previously installed Reverse Telnet drivers.

Limitations: No status logging. Drivers are not supplied with the NPS. Existing drivers may be slow.

Windows NT - LPD Printing over the TCP/IP Protocol

This section describes how to set up a Windows NT Server (ver. 3.5 or later) for LPD printing over the TCP/IP protocol.

Install the TCP/IP Protocol Stack

In the *Control Panel*, click the *Network* icon. If the Microsoft **TCP/IP Printing** entry appears, then TCP/IP is already installed. Close the *Network* icon and skip to *Installing a Printer* below.

Follow these steps to install the TCP/IP protocol stack:

1. In the *Control Panel*, select **Network**.
2. Click **Add Software**, select **TCP/IP Protocol and related components** and click **Continue**.
3. Check the **TCP/IP Network Printing Support** and click **Continue**.
4. Select path and then click **Continue**.
5. Click **OK** in the *Network Settings* dialog box

Installing a Printer

1. In the *Control Panel*, click the *Printers*.
2. In the *Printer* menu, select **Create Printer**.
3. In the *Printer Name* field, type a name for your printer.
4. Choose a printer driver suitable for your printer.
5. In the *Print to* field, select **Other...**
6. In the *Print Destinations* dialog, choose **LPR Port**, then click **OK**. The *Add LPR Compatible Printer* dialog now appears.
7. In the *Name or Address* field, type the IP address or the alias name of your NPS.

Note: If you use an alias name, this must be defined in the *hosts* file on your server prior to the installation. This file is normally located in `/winnt35/system32/drivers/etc/hosts`.

8. In the *Name of Printer on the Machine* field, type the logical printer number you want to use (e.g. **pr1**), then click **OK**.
9. Click **OK** to complete the installation.

Section 8

Advanced Options

This section takes you beyond the “plug-and-print” concept and into the area of *Print Server Configuration* and *Print Management*.

This section provides an overview of the unique functions that make the NPS more than ‘just another print server’. For a complete description of these functions, please refer to the NPS Print Server Technical Reference.

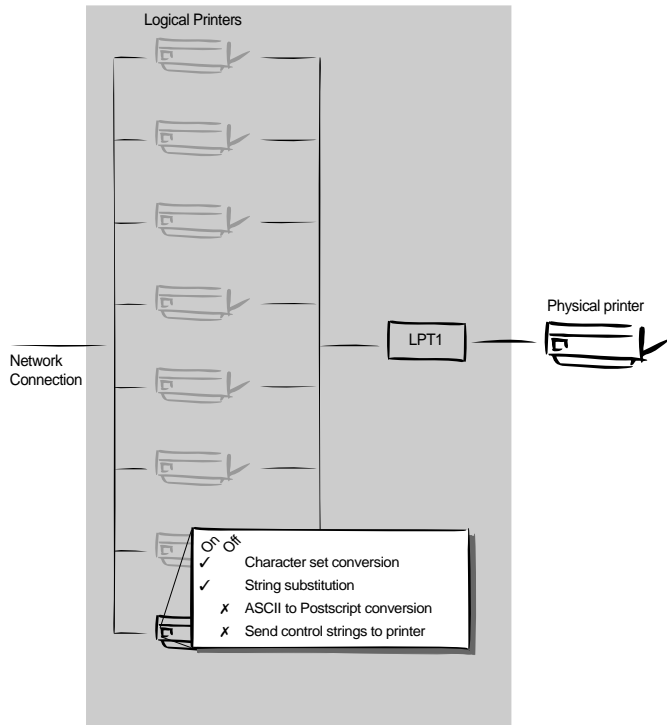
Print Server Configuration How to solve printout related problems by tailoring your NPS configuration to meet specific needs. The key feature is the *Logical Printer Concept*, which will be discussed in the following pages.

Print Management The NPS has a number of built-in tools and features to help you to manage and monitor your printing environment. This section covers the following topics:

- Telnet Login – how to log in to the NPS (page 86).
- Accounting – keep track of the last ten print jobs (page 87).
- Status Logging – display the current status of the logical printers (page 88).
- Locally Administrated Address – change the preconfigured node address (page 89).
- SNMP – monitor the NPS using the Simple Network Management Protocol (page 90).

Logical Printers

One of the most powerful features of the NPS is the *Logical Printers*. A logical printer is a configurable device driver acting as an interface between the network and the physical printer. You may specify up to eight logical printers, each with different properties.



The following properties can be configured individually for each logical printer:

- Character Set Conversion (page 80)
- Strings Before and After Print Jobs (page 81)
- String Substitutions (page 82)
- PostScript Functions (page 83)
- Hex Dump Mode (page 85)

Logical printers are configured by editing a number of parameters in the *config* file. There is a menu for each logical printer (PRINTER1 - PRINTER8), see Appendix A.

Character Set Conversion

A common problem in a multiple host environment is that different hosts use different ASCII character sets. As a result of this, language specific characters (such as å ü ô ñ) are sometimes printed incorrectly.

The NPS solution to this problem is to assign a character set conversion filter to a logical printer, and link that logical printer to the host causing the problem.

There are several different filters to choose from, see *Printer1 Menu* parameter PR1_CSET in Appendix A. The output from the conversion filter is always IBM PC Set 2 (Code Page 437), and that is the character set the printer must be set up for.

Example: Your network contains three hosts using the character sets IBM PC Set 2, ISO 8859-2, and DEC. In order to direct their print jobs to the same printer, for instance LPT1, you should assign each host to a separate logical printer, and install character set conversion filters. Edit the following entries in your *config* file:

```
PR1_OUT.      : LPT1
PR1_CSET.     : NONE
PR2_OUT.      : LPT1
PR2_CSET.     : ISO>IBM
PR3_OUT.      : LPT1
PR3_CSET.     : DEC>IBM
```

The logical printer PR1 prints data transparently without conversion, PR2 converts ISO 8859-2 data to IBM PC Set 2, and PR3 converts DEC data to IBM PC Set 2. This will produce correct printouts for all language specific characters.

Strings Before and After Print Jobs

These string functions provide a way to send printer control commands before and after each print job. They may be specified individually for each logical printer.

All strings are entered as hexadecimal byte values.

Example 1: Assume that the logical printer PR5 is configured as a PostScript printer. To append the PostScript End of File character (ctrl-D, hex 04) after each print job, edit the following entry in your *config* file:

```
PR5_AFT.      : 04
```

Example 2: You have a Laser printer with dual input bins, and want to print on pre-printed forms when using the logical printer PR4. The standard forms are taken from bin 1, and the pre-printed forms are taken from bin 2. The strings before and after print jobs should then contain commands to select bin 2 ($E_c&14H$) and bin 1 ($E_c&11H$) respectively. Edit the following entries in your *config* file:

```
PR4_BEF.      : 1B 26 6C 34 48
PR4_AFT.      : 1B 26 6C 31 48
```

String Substitutions

The string substitution function performs search-and-replace operations on the print data. The primary application is to replace printer control commands. Up to 20 string substitutions may be specified individually for each logical printer.

All strings must be entered as hexadecimal byte values, and each match and substitute string must be preceded by a count byte.

Example 1: To replace the Unix New Line (hex 0A) with an ASCII NewLine (hex 0D 0A) for logical printer PR1, edit the following entry in your *config* file:

```
PR1_STR.      : 01 0A 02 0D 0A
```

'01' is the match string count byte (length of the match string), '0A' is the match string, '02' is the substitute count byte, and '0D 0A' is the substitute string (This is the default setting for logical printers PR5 through PR8).

Example 2: To replace the Unix New Line (hex 0A) with an ASCII NewLine (hex 0D 0A), and the printer command $\text{E}_c\text{G1}$ (hex 1B 47 31) with E_cY (hex 1B 59) for logical printer PR2, edit the following entry in your *config* file:

```
PR2_STR.      : 01 0A 02 0D 0A 03 1B 47 31 02 1B 59
```

Note: Extensive use of string substitutions may decrease the throughput rate of the NPS.

PostScript Functions

The NPS can translate standard ASCII print data into PostScript format. This makes it possible to print with a PostScript printer from a host that doesn't support PostScript. The PostScript functions are controlled by a number of parameters described below.

ASCII to PostScript Conversion The conversion is selected by activating a filter that converts ASCII data into PostScript. This filter may be activated individually for each logical printer.

Example: The following entries in your *config* file will activate pass-through (no filter) for PR1, ASCII to PostScript conversion for PR2. On PR3 the incoming data will be searched, ASCII data will be converted to PostScript, PostScript data will pass-through without conversion:

```
PR1_FILT.      : NONE
PR2_FILT.      : POSTSCR
PR3_FILT.      : AUTO_PS
```

Use this configuration when print jobs directed to PR1 are already in PostScript format, print jobs directed to PR2 are in ASCII format and direct print jobs to PR3 when you are not sure if it is ASCII or PostScript format.

PostScript Page Size When the ASCII to PostScript filter is active, a page size must be specified. The default page size is A4, and may be specified individually for each logical printer. See the example on the next page on how to change the page size.

The page size setting is ignored when the ASCII to PostScript filter is inactive.

PostScript Page Orientation When the ASCII to PostScript filter is active, a page orientation must be specified. The default page orientation is Portrait, and may be specified individually for each logical printer. See the example below on how to change the page orientation.

The page orientation setting is ignored when the ASCII to PostScript filter is inactive.

PostScript Page Format When the ASCII to PostScript filter is active, a page format must be specified. The page format is defined by six byte values: Lines per Page, Characters per Line, Characters per Inch, Lines per Inch, Left Margin, and Top Margin (see also PR1_FORM, *Printer1 Menu* in Appendix A).

The page format settings are ignored when the ASCII to PostScript filter is inactive.

Example: The following entries in your *config* file will activate the ASCII to PostScript conversion for PR2, set the page size to *Letter*, the page orientation to *Landscape*, and the page format to 48 lines per page, 0 characters per line (equal to *disable line wrap*), 12 CPI, 6 LPI, 3 mm left margin and 5 mm top margin:

```
PR2_FILT.      : POSTSCR
PR2_SIZE.      : LETTER
PR2_ORNT.      : LANDS
PR2_FORM.      : 48 0 120 60 30 50
```

PostScript Font You may specify a PostScript font to be used when the ASCII to PostScript filter is active. The specified font must be available in the attached PostScript printer. An invalid font name may cause a PostScript error and terminate the printout.

If no font name is specified, Courier (fixed pitch) will be used.

The font settings are ignored when the ASCII to PostScript filter is inactive.

Example: The following entry in your *config* file will select the Helvetica proportional font as the PR2 PostScript font:

```
PR2_FONT.      : Helvetica
```

Hex Dump Mode

When hex dump mode is activated, the print data will be printed as hexadecimal byte values rather than characters. Printer control commands are also printed as hex values. This function is used for debugging purposes.

Example: The following entry in your *config* file will activate the hex dump mode for PR3:

```
PR3_DUMP.      : YES
```

Note: The page length for hex dump printouts is determined by the *Lines per Page* value of the *PostScript Page Format* parameter.

Telnet Login

The Telnet support makes it possible to log in to the NPS and execute various commands as shown in the example below. Use the telnet <hostname> command to log in.

Example: This sample telnet session illustrates the help command:

```
> telnet salesdept
Trying 192.36.253.96 ...
Connected to salesdept.
Escape character is '^]'.

NPS TELNET Print Server

NPS network login: root
Password: pass (not visible)

NPS TELNET Print Server

Root> help
Commands may be abbreviated:
logout      logout from TELNET
version     print current software version
help        print this list
status      show current printing status
account     show current account file
softreset   protocol restart of NPS
hardreset   reboot of NPS
defaults    set default parameters in NPS
Root> logout
Goodbye!
Connection closed by foreign host.
>
```

The *account* and *status* commands are shown on the following pages.

Accounting

The accounting file contains data concerning the ten last print jobs. It specifies an internal job number, the user that initiated the job, the protocol and logical printer that was used, current status (Completed, Offline, or Printing), number of bytes printed, elapsed time and off-line time. The file can be accessed using FTP, Telnet, or IBMCFG.

Example: This sample telnet session illustrates the account command:

```
> telnet salesdept
Trying 192.36.253.96 ...
Connected to salesdept.
Escape character is '^]'.

NPS TELNET Print Server

NPS network login: root
Password: pass (not visible)

NPS TELNET Print Server

Root> account
Current account file:
JOB      USER      PROT      LPR  S   BYTES      ETIME      OTIME
-----
1       thomas    FTP       pr2  C   1885       2          0
2       bengt     LPD       pr1  C   23074      4          0
3       RICARD    NETWARE  pr2  C   43004      5          0
4       LSLM_user NetBIOS  pr1  C   6717       2          0
5       thomas    FTP       pr2  C   36955      3          0
6       patrik    PROS      pr5  P   832081     9          0
Root>
```

Status Logging

The status command shows which printer port the logical printers are assigned to, and their current status.

Example: This sample telnet session illustrates the status command:

```
> telnet salesdept
Trying 192.36.253.96 ...
Connected to salesdept.
Escape character is '^]'.

NPS TELNET Print Server

NPS network login: root
Password: pass (not visible)

NPS TELNET Print Server

Root> status
Current printout status:
Printer  Port    Status    Bytes printed  Comments
pr1      LPT1   Printing  20916          Ready
pr2      LPT1   Occupied                Ready
pr3      LPT1   Occupied                Ready
pr4      LPT1   Occupied                Ready
pr5      LPT1   Occupied                Ready
pr6      LPT1   Occupied                Ready
pr7      LPT1   Occupied                Ready
pr8      LPT1   Occupied                Ready

Root>
```

Locally Administrated Address

Each NPS is preconfigured with a unique Node Address (identical to the server ID). You may change the node address to a *Locally Administrated Address* by editing the Node Address entry in your *config* file.

Important:

Always consult your network manager before changing the Node Address.

The Node Address consists of six hexadecimal numbers in the range 00 - FF. The numbers are separated by spaces.

Example 1: The following *config* entry shows an example of a preconfigured Node Address:

```
NODE_ADDR.      : 00 02 31 C8 00 61
```

A locally administrated address must begin with one of the hexadecimal numbers 4x, 5x, 6x, or 7x (01xx xxxx in binary format). Examples: 4B, 50, 6F and 77 are valid leading numbers. No restrictions apply to the five remaining numbers.

Example 2: The following *config* entry shows an example of a locally administrated address:

```
NODE_ADDR.      : 4B CF 08 74 04 D0
```

If you enter an invalid address, the current Node Address will remain unchanged. It is not possible to set an address other than a valid locally administrated address or the preconfigured Node Address.

You can restore the preconfigured Node Address by entering the NPS server ID, or an address consisting of all 0's.

Example 3: The following *config* entry restores the Node Address to the preconfigured setting:

```
NODE_ADDR.      : 00 00 00 00 00 00
```

SNMP

You may use SNMP (Simple Network Management Protocol) for remote monitoring of the NPS. All major functions applicable to print servers are supported.

SNMP actually refers to a set of standards for network management, including a protocol, a database structure specification, and a set of data objects. The NPS SNMP implementation runs in the TCP/IP environment.

The actual management is handled by an NMS (Network Management System) software running on a host on your network. The NMS software communicates with network devices by the means of messages, which are references to one or more objects.

An object can be a question or an instruction to a device, or an alarm triggered by a specific event. Objects are contained in data bases called MIBs (Management Information Base), where MIB-II is a standard database.

The NPS supports all relevant parts of MIB-II. It also includes a private enterprise MIB (the IBM MIB) supporting the following functions: Configuration of the NPS under SNMP, print job monitoring, and alarms at error conditions.

Please refer to the Technical Reference for a detailed description of the SNMP support.

Appendix A

The Parameter List

This appendix contains an overview of the NPS parameters and how to edit them. Please refer to the NPS Print Server Technical Reference for a complete description of the parameters.

The current parameter settings are stored in the NPS *config* file. Editing parameter values involve three steps: Up-load the *config* file to your system, edit the parameter values, and down-load the modified file to the NPS. There are a number of methods for doing this depending on the environment you work in.

NetWare, OS/2, Windows and DOS

The disk supplied with the NPS contains IBMCFG, a menu-driven configuration utility that performs the tasks mentioned above. Follow the instructions given in the *read.me* file to install and use IBMCFG.

Unix (TCP/IP)

Use FTP to change the *config* file:

1. Log in to the NPS.
Command: ftp <host name>
Enter root as user id and pass as password.
2. Up-load the config file. Command: get config
3. Edit the file using your favorite text editor.
4. Down-load the config file. Command: put config CONFIG

The NPS will automatically activate the new settings.

Factory Default Settings

If you should need to reset the NPS to factory default conditions, the best way to do this is to use the TEST button. This procedure involves switching the NPS off and on. If you use an external power supply, unplug the power cord to switch off the NPS, otherwise use the printer's power switch.

1. Switch off the NPS.
2. Press and hold the TEST button while you switch on the NPS. Keep the TEST button pressed for at least 20 seconds until the NETWORK flashes with one second intervals.
3. Release the TEST button and wait at least five seconds (five indicator flashes).
4. Press and hold the TEST button for at least five seconds until the NETWORK indicator remains constantly lit.
5. Restart the NPS (power-off/power-on).

The NPS is now reset to factory default conditions.

Note: The Node and Internet Addresses (NODE_ADDR and INT_ADDR) remain unchanged, but all other parameters are reset to factory default values.

The Config File

The remainder of this appendix contains the complete NPS parameter list. The left column shows the parameters and their default values as they appear in the config file, and the right column contains brief descriptions of the parameters. For a full description of the parameters, please refer to the NPS Print Server Technical Reference.

--- CONFIG MENU	
NODE_ADDR. : 00 02 31 C8 00 61	Node Address
ROOT_PWD. : pass	Root Password
USERS. :	User Authority and Printer Access
S_ROUTE : auto(OFF SINGLE ALL AUTO)	Token Ring Source Routing Mode
--- TCP/IP MENU	
TCP_ENB. : YES	TCP/IP Protocol Enabled
INT_ADDR. : 192 36 253 80	Internet Address
DEF_ROUT. : 0 0 0 0	Default Router Address (0.0.0.0 for no router)
NET_MASK. : 0 0 0 0	Net Mask (e.g. 255.255.255.0 for class C, 0.0.0.0 for auto-sense)
PROS_PWD. : netprinter	PROS Protocol Password
PROS_PRT. : 35	PROS TCP Port Number
LPD_BANN. : YES	LPD Banner Page Enabled
BOOTP_ENB. : YES	BOOTP Protocol Enabled
RARP_ENB. : YES	RARP Protocol Enabled
RTN_OPT. : YES	Reverse Telnet Options Enabled
RTEL_PR1. : 0	PR1 Reverse Telnet TCP Port Number (0 for Disabled)
RTEL_PR2. : 0	PR2 Reverse Telnet TCP Port Number (0 for Disabled)
RTEL_PR3. : 0	PR3 Reverse Telnet TCP Port Number (0 for Disabled)
RTEL_PR4. : 0	PR4 Reverse Telnet TCP Port Number (0 for Disabled)
RTEL_PR5. : 0	PR5 Reverse Telnet TCP Port Number (0 for Disabled)
RTEL_PR6. : 0	PR6 Reverse Telnet TCP Port Number (0 for Disabled)
RTEL_PR7. : 0	PR7 Reverse Telnet TCP Port Number (0 for Disabled)
RTEL_PR8. : 0	PR8 Reverse Telnet TCP Port Number (0 for Disabled)
--- SNMP MENU	
READ_COM. : public	Read-Only Community Name
WRT_COM. : pass	Read-Write Community Name
TRAPADDR. : 0 0 0 0	SNMP Trap Internet Address
TRAP_COM. : public	SNMP Trap Community Name
SYS_CONT. :	System Contact
SYS_NAME. :	System Name
SYS_LOC. :	System Location
SNMP_AUT. : DISABLED	Authentication Failure Traps
TRAP_PRT. : DISABLED	Printer Traps

--- NETWARE MENU

```

NETW_ENB.      : YES
PS_NAME.      : IBM480061
CONFSERV.     :
PS_POLL.      : 5
AUTO_SCAN.    : BOTH (OFF PSERVER RPRINTER BOTH)
FR_802_2.     : YES
FR_SNAP.      : YES
LOGIN1.       :
LOGIN2.       :
LOGIN3.       :
LOGIN4.       :
LOGIN5.       :
LOGIN6.       :
LOGIN7.       :
LOGIN8.       :
LOGIN9.       :
LOGIN10.      :
LOGIN11.      :
LOGIN12.      :
LOGIN13.      :
LOGIN14.      :
LOGIN15.      :
LOGIN16.      :
RPRINT1.     :
RPRINT2.     :
RPRINT3.     :
RPRINT4.     :
RPRINT5.     :
RPRINT6.     :
RPRINT7.     :
RPRINT8.     :
    
```

NetWare Protocol Enabled
Print Server Name (<i>480061 are the last six digits of the server ID</i>)
Configuration File Server Name
Print Server Poll Interval
Automatic NetWare Print Server/Remote Printer Login
IEEE 802.2 Frame Type Enabled
SNAP Frame Type Enabled
Print Server Queue Attachment 1
Print Server Queue Attachment 2
Print Server Queue Attachment 3
Print Server Queue Attachment 4
Print Server Queue Attachment 5
Print Server Queue Attachment 6
Print Server Queue Attachment 7
Print Server Queue Attachment 8
Print Server Queue Attachment 9
Print Server Queue Attachment 10
Print Server Queue Attachment 11
Print Server Queue Attachment 12
Print Server Queue Attachment 13
Print Server Queue Attachment 14
Print Server Queue Attachment 15
Print Server Queue Attachment 16
Remote Printer Attachment 1
Remote Printer Attachment 2
Remote Printer Attachment 3
Remote Printer Attachment 4
Remote Printer Attachment 5
Remote Printer Attachment 6
Remote Printer Attachment 7
Remote Printer Attachment 8

--- LAN SERVER/LAN MANAGER MENU

```

LSLM_ENB.      : YES
NB_FR_TYPE.    : FR_AUTO (FR_AUTO, FR_802_2, FR_DIX)
LPRINT_1.     : IB480061.LP1
LLOGIC_1.     : PR1
LPRINT_2.     :
LLOGIC_2.     : PR2
LPRINT_3.     :
LLOGIC_3.     : PR3
LPRINT_4.     :
LLOGIC_4.     : PR4
    
```

LAN Server/LAN Manager Protocol Enabled
Frame Type
Printer 1 Name (<i>480061 are the last six digits of the server ID</i>)
Printer 1 Logical Printer
Printer 2 Name
Printer 2 Logical Printer
Printer 3 Name
Printer 3 Logical Printer
Printer 4 Name
Printer 4 Logical Printer

Appendix A: The Parameter List

--- PRINTER1 MENU

```

PR1_WAIT.      : YES
PR1_BEF.       :
PR1_STR.       :
PR1_CSET.      : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                          7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR1_FILT.     : NONE      (NONE POSTSCR AUTO_PS)
PR1_AFT.       :
PR1_DUMP.     : NO
PR1_SIZE.     : A4        (A4 LETTER LEGAL EXECUT)
PR1_ORNT.     : PORTR    (PORTR LANDS R_PORTR R_LANDS)
PR1_FORM.     : 66 0 100 60 30 50
PR1_FONT.     :
  
```

```

PR1 Wait on Busy
PR1 String Before Print Job
PR1 String Substitutions
PR1 Character Set Conversion

PR1 Printer Language Translation
PR1 String After Print Job
PR1 Hex Dump Mode
PR1 PostScript Page Size
PR1 PostScript Page Orientation
PR1 PostScript Page Format (MPL, MPP, CPI, LPI, LM, TM)
PR1 PostScript Font (Courier when not specified)
  
```

--- PRINTER2 MENU

```

PR2_WAIT.      : YES
PR2_BEF.       :
PR2_STR.       :
PR2_CSET.      : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                          7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR2_FILT.     : NONE      (NONE POSTSCR AUTO_PS)
PR2_AFT.       :
PR2_DUMP.     : NO
PR2_SIZE.     : A4        (A4 LETTER LEGAL EXECUT)
PR2_ORNT.     : PORTR    (PORTR LANDS R_PORTR R_LANDS)
PR2_FORM.     : 66 0 100 60 30 50
PR2_FONT.     :
  
```

```

PR2 Wait on Busy
PR2 String Before Print Job
PR2 String Substitutions
PR2 Character Set Conversion

PR2 Printer Language Translation
PR2 String After Print Job
PR2 Hex Dump Mode
PR2 PostScript Page Size
PR2 PostScript Page Orientation
PR2 PostScript Page Format (MPL, MPP, CPI, LPI, LM, TM)
PR2 PostScript Font (Courier when not specified)
  
```

--- PRINTER3 MENU

```

PR3_WAIT.      : YES
PR3_BEF.       :
PR3_STR.       :
PR3_CSET.      : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                          7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR3_FILT.     : NONE      (NONE POSTSCR AUTO_PS)
PR3_AFT.       :
PR3_DUMP.     : NO
PR3_SIZE.     : A4        (A4 LETTER LEGAL EXECUT)
PR3_ORNT.     : PORTR    (PORTR LANDS R_PORTR R_LANDS)
PR3_FORM.     : 66 0 100 60 30 50
PR3_FONT.     :
  
```

```

PR3 Wait on Busy
PR3 String Before Print Job
PR3 String Substitutions
PR3 Character Set Conversion

PR3 Printer Language Translation
PR3 String After Print Job
PR3 Hex Dump Mode
PR3 PostScript Page Size
PR3 PostScript Page Orientation
PR3 PostScript Page Format (MPL, MPP, CPI, LPI, LM, TM)
PR3 PostScript Font (Courier when not specified)
  
```

```

--- PRINTER4 MENU
PR4_WAIT. : YES
PR4_BEF.  :
PR4_STR.  :
PR4_CSET. : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                       7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR4_FILT. : NONE      (NONE POSTSCR AUTO_PS)
PR4_AFT.  :
PR4_DUMP. : NO
PR4_SIZE. : A4        (A4 LETTER LEGAL EXECUT)
PR4_ORNT. : PORTR     (PORTR LANDS R_PORTR R_LANDS)
PR4_FORM. : 66 0 100 60 30 50
PR4_FONT. :

```

PR4 Wait on Busy
PR4 String Before Print Job
PR4 String Substitutions
PR4 Character Set Conversion
PR4 Printer Language Translation
PR4 String After Print Job
PR4 Hex Dump Mode
PR4 PostScript Page Size
PR4 PostScript Page Orientation
PR4 PostScript Page Format (<i>MPL, MPP, CPI, LPI, LM, TM</i>)
PR4 PostScript Font (<i>Courier when not specified</i>)

```

--- PRINTER5 MENU
PR5_WAIT. : YES
PR5_BEF.  :
PR5_STR.  : 010A020D0A
PR5_CSET. : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                       7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR5_FILT. : NONE      (NONE POSTSCR AUTO_PS)
PR5_AFT.  :
PR5_DUMP. : NO
PR5_SIZE. : A4        (A4 LETTER LEGAL EXECUT)
PR5_ORNT. : PORTR     (PORTR LANDS R_PORTR R_LANDS)
PR5_FORM. : 66 0 100 60 30 50
PR5_FONT. :

```

PR5 Wait on Busy
PR5 String Before Print Job
PR5 String Substitutions
PR5 Character Set Conversion
PR5 Printer Language Translation
PR5 String After Print Job
PR5 Hex Dump Mode
PR5 PostScript Page Size
PR5 PostScript Page Orientation
PR5 PostScript Page Format (<i>MPL, MPP, CPI, LPI, LM, TM</i>)
PR5 PostScript Font (<i>Courier when not specified</i>)

```

--- PRINTER6 MENU
PR6_WAIT. : YES
PR6_BEF.  :
PR6_STR.  : 010A020D0A
PR6_CSET. : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                       7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR6_FILT. : NONE      (NONE POSTSCR AUTO_PS)
PR6_AFT.  :
PR6_DUMP. : NO
PR6_SIZE. : A4        (A4 LETTER LEGAL EXECUT)
PR6_ORNT. : PORTR     (PORTR LANDS R_PORTR R_LANDS)
PR6_FORM. : 66 0 100 60 30 50
PR6_FONT. :

```

PR6 Wait on Busy
PR6 String Before Print Job
PR6 String Substitutions
PR6 Character Set Conversion
PR6 Printer Language Translation
PR6 String After Print Job
PR6 Hex Dump Mode
PR6 PostScript Page Size
PR6 PostScript Page Orientation
PR6 PostScript Page Format (<i>MPL, MPP, CPI, LPI, LM, TM</i>)
PR6 PostScript Font (<i>Courier when not specified</i>)

```

--- PRINTER7 MENU
PR7_WAIT. : YES
PR7_BEF.  :
PR7_STR.  : 010A020D0A
PR7_CSET. : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                       7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR7_FILT. : NONE      (NONE POSTSCR AUTO_PS)
PR7_AFT.  :
PR7_DUMP. : NO
PR7_SIZE. : A4        (A4 LETTER LEGAL EXECUT)
PR7_ORNT. : PORTR     (PORTR LANDS R_PORTR R_LANDS)
PR7_FORM. : 66 0 100 60 30 50
PR7_FONT. :

```

PR7 Wait on Busy
PR7 String Before Print Job
PR7 String Substitutions
PR7 Character Set Conversion
PR7 Printer Language Translation
PR7 String After Print Job
PR7 Hex Dump Mode
PR7 PostScript Page Size
PR7 PostScript Page Orientation
PR7 PostScript Page Format (<i>MPL, MPP, CPI, LPI, LM, TM</i>)
PR7 PostScript Font (<i>Courier when not specified</i>)

Appendix A: The Parameter List

--- PRINTER8 MENU

```

PR8_WAIT.      : YES
PR8_BEF.       :
PR8_STR.       : 010A020D0A
PR8_CSET.      : NONE      (NONE ISO>IBM 7UK>IBM 7SW>IBM
                          7GE>IBM 7FR>IBM 7ND>IBM DEC>IBM)
PR8_FILT.     : POSTSCR   (NONE POSTSCR AUTO_PS)
PR8_AFT.       :
PR8_DUMP.     : NO
PR8_SIZE.     : A4        (A4 LETTER LEGAL EXECUT)
PR8_ORNT.     : PORTR    (PORTR LANDS R_PORTR R_LANDS)
PR8_FORM.     : 66 0 100 60 30 50
PR8_FONT.     :
    
```

```

PR8 Wait on Busy
PR8 String Before Print Job
PR8 String Substitutions
PR8 Character Set Conversion
PR8 Printer Language Translation
PR8 String After Print Job
PR8 Hex Dump Mode
PR8 PostScript Page Size
PR8 PostScript Page Orientation
PR8 PostScript Page Format (MPL, MPP, CPI, LPI, LM, TM)
PR8 PostScript Font (Courier when not specified)
    
```

--- OUTPUT MENU

```

L1_CENTR.     : STNDRD   (IBM_PC STNDRD FAST HISPEED)
L1_BSYTM.    : 60
    
```

```

LPT1 Centronics Interface Timing
LPT1 Busy Status Time-Out
    
```

--- PANEL MENU

```

DEF_OUT.      : PR1      (PR1 PR2 PR3 PR4
                          PR5 PR6 PR7 PR8)
LOCK_KEY.     : NO
    
```

```

Internal Printout Destination
Lock Test Button
    
```

Appendix B

Internal Printouts

There are three different internal printouts that can be printed using the TEST button on the NPS front panel:

The Test Page The test page shows the software revision and the basic configuration of the NPS.

To print the test page, press the TEST button until the STATUS indicator starts to flash, then release the button.

The Parameter List The parameter list (or the *config* file) shows the complete NPS configuration. See Appendix A for a sample parameter list.

To print the parameter list, press the TEST button until the STATUS indicator starts to flash, release the button, and press it once.

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Appendix C

Technical Specifications

Network environments

- NetWare 3.11, 3.12, 4.0x and 4.10 using bindery emulation
- LAN Server 1.3 and above
- LAN Manager 2.0c and above
- Any system with TCP/IP support

Network attachments

- STP (Media Type 1) via 9-pin D-sub connector, 4 and 16 Mbps networks, OR
- UTP (Media Type 3) via RJ-45 connector, 4 and 16 Mbps networks

Supported protocols

- Netware: IPX, RIP, NCP, SAP, SPX
- TCP/IP: LPD, FTP, Reverse Telnet, PROS, BOOTP, ARP, ICMP, IP, RARP, TCP, Telnet, UDP
- OS/2: NetBIOS/NetBEUI
- Windows NetBIOS/NetBEUI

General features

- Easy installation
- High-speed printing (>150 kilobytes/s)
- Eight logical printers (featuring Physical Printer Port, Character Set Conversion, Strings Before and After Print Jobs, String Substitutions, PostScript Functions, and Hex Dump Mode)
- Security functions
- Printout statistics logging
- Use of IEEE802.2 and SNAP frame types simultaneously

NetWare features

- Standard installation using PCONSOLE
- Print Server Mode for high-speed printing
- Remote Printer Mode for up to 16 printers per NetWare user licence
- Up to 96 print queues on 16 file servers
- Port Status monitoring

Windows and OS/2 features

- Automatic installation software (NPS Manager software)
- Printing through OS/2 Print Manager
- Port Status monitoring

Unix features

- SNMP support: IBM private enterprise MIB and MIB-II

Printer attachments

- Connects to the printer's Centronics port (throughput exceeding 150 kbytes/s, burst 250 kbytes/s)

Hardware specifications

- Size: 1.2 × 2.2 × 8.5 inches / 29 × 55 × 100 mm
- Weight: 0.3 lb / 0.15 kg
- Power: 12-15 VDC or VAC, min 500 mA by external power supply

Approvals

- EMC: Limit A of FCC Rules and Regulations part 15 subpart B, class A (US).
Limit B of EN 55022/1987, EN 50082-1/1992 (Europe).
- Safety: EN 60950, UL



Operating environments

- Temperature: 40 - 105 °F / 5 - 40 °C
- Humidity: 10 - 95% non-condensing

All specifications are subject to change without prior notice

Appendix D

Solving Problems

This section contains guidelines to help you to solve problems that might arise when installing and using your NPS print server.

There are two major areas of difficulty:

- Printer communication
- Network communication

Use the check lists provided under each section to pinpoint the fault. If your problems should continue, please contact your IBM Service Representative.

Before Continuing

Before continuing with the communications trouble-shooting you should make sure that your NPS print server functions properly:

- The POWER indicator should be lit. Make sure that the power adapter is properly connected and functional.
- The PACKET or NETWORK indicator is used for power-up self test flashing (lasting as long as 30 seconds). This indicator should stop flashing after the power-up self test, only occasionally flashing afterward as an indicator of network traffic. If the PACKET/NETWORK indicator continues to flash, an internal error has occurred. Contact your IBM Service Representative.
- The PACKET/NETWORK indicator should flash occasionally, reflecting the network traffic. Make sure that the NPS print server is properly connected to the network. Make sure that the RING SPEED switch (4/16 Mbit/s) is set in the correct position.

Printer Communication

Printer communication problems can result in either missing or corrupted printouts.

Missing Printouts If you don't get any printouts, you should start with verifying the printer communication by printing the NPS print server test page. Press the TEST button on the NPS print server front panel until the PACKET/NETWORK indicator starts to flash. If no printout appears, check the following:

- Make sure that the printer is properly connected.
- Make sure that the printer is on-line (ready).

For PostScript printers:

- Sending ASCII data to a PostScript data may result in lost print jobs. You can use the ASCII-to-PostScript filter to convert your print data, see ASCII to PostScript Conversion in the Technical Reference Manual. Note that the test page prints correctly on both ASCII and PostScript printers.
- For parallel printers: the Centronics Interface Timing (parameters 020 or 040) may be set to a value not supported by your printer. Change to a slower mode and restart the NPS print server, then print the test page again. If the test page prints correctly and you still don't get any network print
- outs, continue trouble-shooting with Network Communication below.

Corrupted Printouts There are four major types of corrupted printouts:

- PostScript data is printed: You cannot print PostScript jobs on a ASCII printer using the NPS print server. Make your host application print in ASCII format, or use your PostScript printer.
- Characters are missing or garbled: The Centronics Interface Timing (parameters 020 or 040) may be set to a value not supported by your printer. Change to a slower mode and restart the NPS print server, then print the test page again.
- `Staircase' printouts: (the second line starts at the end of the first line rather than at the left margin) A UNIX New Line is interpreted as a Line Feed by ASCII printers. You can substitute UNIX New Lines with ASCII New Lines as described in Technical Reference Manual, (this is default for logical printers PR5 - PR8).
- Language-specific characters are printed incorrectly: This happens when host uses a different character set than your printer. You can solve this problem by using a character set conversion filter as described in the Technical Reference Manual.

Network Communication

The network communication trouble-shooting procedures depend on the network environment:

Novell NetWare

If Novell NetWare printing fails, check the following:

- Make sure that the NPS print server and the print queue are defined on the file server, that they are linked together, and that the NPS print server is attached to the file sever. Use PCONSOLE to verify this. Refer to the Novell NetWare section of your User's Manual for details.
- Make sure that the NPS print server parameters concerning NetWare have the correct settings.
- If you have more than one printer connected to the NPS print server, make sure that the printer names end with !1, !2, etc.
- If your network contains sections using different frame types, you might have to disable the support for one or more of these types. See Theory of Operation: The Frame Handler in the Technical Reference Manual.
- Use the IBMCFG Diagnose option to get further information about possible error causes.

LAN Server/LAN Manager

If LAN Server/LAN Manager printing fails, check the following:

- Make sure that there is communication between the NPS print server and NPS Manager. NetBIOS must be activated, and the Requester service must be running.
- Make sure that the NPS print server ports appear in the NPS Manager list. Use the NPS Manager Install option to install the NPS print server.
- Make sure that NPS print server parameters concerning LAN Server/LAN Manager have the correct settings.
- Check the NPS Manager Logfile.

TCP/IP If TCP/IP printing fails, start with verifying the communication by the ping <unit> or telnet <unit> command, where <unit> is the NPS print server Internet address or the alias specified in your host table. If you don't get a positive response from ping, or if the Telnet log in fails, check the following:

- Make sure that you have specified a unique NPS print server Internet address. See Chapter 5: Configuration - TCP/IP or consult your network manager. Note that down-loading the config file from another NPS print server changes the Internet address.
- If you are using an alias instead of the Internet address, make sure that your host table (/etc/hosts) and Yellow Pages (YP/NIS) are updated.
- If your network has routers, make sure that the NPS print server attached to the correct network segment, and that the Default Router Address (003) and Net Mask (004) parameters are set to proper values.

When communication is established, and printing in integrated mode still doesn't work, the next thing to do is try interactive printing using FTP. Log in to the NPS print server using FTP, and print a file by the put <file> pr1 command. If this works, the NPS print server might not be properly integrated to the spooler. Verify the integration for your selected print method, see the Network Printing: TCP/IP section in the Technical Reference Manual.

Reporting Problems

If you run into problems that you can't solve on your own, it is important that you report the problem to your IBM Service Representative. This report should include:

- The model and software revision of your NPS print server
- The type of network attachment you are using
- The operating environment (Novell NetWare, LAN Server/LAN Manager, or TCP/IP.)
- A printout of the parameter list (the config file)
- A detailed description of the problem
- A description of your network topology (preferably a diagram) including all relevant components such as network segments, routers, bridges, etc.

Additional information for Novell NetWare (when applicable):

- The PCONSOLE version
- The NetWare version
- A printout from IBMCFG Status and Account
- The print method (CAPTURE, NPRINT) including all parameters

Additional information for LAN Server/LAN Manager (when applicable):

- The OS/2 version
- The LAN Server/LAN Manager version
- The printer driver and print method
- A printout from IBMCFG Diagnostics, Status and Account
- A printout from the NPS Manager log file (NPSMAN.LOG)

Additional information for TCP/IP (when applicable):

- The host type/types, operating systems, and applications
- The print method (LPD, FTP, PROS, Reverse Telnet, etc.)
- The printer driver type and version
- The print method (spooler mode, printer mode)
- The applications you are trying to print from

Error Messages

If the PACKET/NETWORK indicator continues to flash after the power-up self test, an internal error has occurred (with one exception, see below).

- Restart the NPS print server. If the problem doesn't appear again, the parameter list has been updated according to the default settings of your new software revision.
- If problem appears again after restarting, an error has occurred. Contact your IBM service representative.

NPS: If the NETWORK indicator continues to flash rapidly after the self test, an incorrect ring speed setting has been detected. Change the RING SPEED switch position and restart the print server.

Printed Messages

Error messages will be printed on the test page. See Appendix B: Internal Printouts for how to print the test page and a list of possible error messages.

Appendix E

IBM Service Procedures

General Information

Important: This information is intended for use by IBM Customer Engineers.

This print server enables the printer to communicate on a Token Ring using network protocols such as Novell.

The unit is not field serviceable and is replaced as a Field Replacement Unit (FRU). The intent of these procedures is to assist in determining when the unit is at fault and should be replaced.

Tests with Communication Line Disconnected

Symptom	Probable cause	Action
Power light not on	No power	<ol style="list-style-type: none"> 1. Check for +12 VDC at power connector. 2. If +12 VDC is missing, check cable back to system board. 3. If +12 VDC is present, replace the unit.
Network or packet light continues to flash after power on.	Internal error occurred.	<ol style="list-style-type: none"> 1. Disconnect power cable at the unit. 2. Wait 10 seconds and reconnect. 3. If problem continues, replace the unit.
Test page will not print		<ol style="list-style-type: none"> 1. Check printer configuration. 2. Unplug unit at parallel port and reseal. 3. Press and hold the test button until the 'Network' or 'Packet' light flashes, then release. 4. If test page still does not print, perform the parallel port wrap test on the control unit. 5. If the wrap test passes, replace the unit. If wrap test fails, replace the control unit system board

Symptom	Probable cause	Action
Test page prints with error messages	Internal errors	<ol style="list-style-type: none">1. NVRAM E1 or NVRAM E2<ol style="list-style-type: none">a. Disconnect power cable at the unit.b. Wait 10 seconds and reconnect.c. If problem continues, replace the unit.2. NVRAM E3<ol style="list-style-type: none">a. Replace the unit3. NVRAM E4<ol style="list-style-type: none">a. Disconnect power cable at the unit.b. Wait 10 seconds and reconnect.c. If problem continues, replace the unit.4. ETHER E6, ERROR E6, COMM E8<ol style="list-style-type: none">a. Replace the unit5. COMM E9<ol style="list-style-type: none">a. Wrong token ring speed.b. Change the ring speed, power off the unit and try again.

F.2 Tests with Communication Line Connected

Symptom	Probable cause	Action
Network light flashes rapidly after power on self test.	Incorrect ring speed selected.	Select correct ring speed.
Server will not communicate with host.	Network problem.	<ol style="list-style-type: none"> 1. Have customer check host and print server configuration. 2. Have customer check physical network cabling.
Server communicates with host, but printer does not print.	Data stream problem.	<ol style="list-style-type: none"> 1. Have customer check print job stream. 2. Take attachment data trace and contact support.

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