

COMPAQ

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Printing in SCO UNIX and NetWare Integrated Environments

Compaq TechNote

Includes information on:

- Printinng from SCO UNIX to a NetWare printer
- Printing from SCO UNIX to a network-attached Compaq Pagemarq Printer

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Contents

Chapter

Overview

NetWare Server-Attached Configuration	1-1
Network-Attached COMPAQ PagemarQ Configuration	1-2
Protocols and Print Job Transmission	1-3
COMPAQ PagemarQ Configuration Concepts	1-4
SCO UNIX Printing Model.....	1-4
NetWare Printing Model	1-5
Comparing the Two Models	1-5
COMPAQ PagemarQ Configuration.....	1-6

Chapter 2

Printing From SCO UNIX to a NetWare Printer

Prerequisites.....	2-2
Configuration Overview	2-2
Configuring NetWare Printing.....	2-5
Creating a Print Queue	2-6
Defining a Print Server Configuration	2-7
Defining the Printer and Printer Connection	2-7
Associating the Print Server, Printer, and Print Queue	2-8
Validating NetWare Printing	2-9
Starting Print Server	2-9
Redirecting Workstation Print Jobs.....	2-9
Printing from the Workstation	2-10
Installing Novell FLeX/IP	2-10
Adding the NET\$PRN.DAT File	2-11
Installing FLeX/IP	2-12
Configuring UNIX-to-NetWare Print Services	2-14
Configuring FLeX/IP.....	2-14
Starting the LPD Protocol.....	2-15

PRINTING FROM SCO UNIX TO A NETWARE PRINTER *Continued*

Configuring the SCO UNIX Host/Server for LPD Communications	2-16
Configuring the Remote Printing Daemon.....	2-17
Configuring a Remote Printer.....	2-17
Editing PRINTCAP to Correct the NetWare Queue name	2-18
Validating SCO UNIX to NetWare Printing	2-19

Chapter 3

Printing From SCO UNIX

to a Network-Attached Compaq Pagemark

Prerequisites.....	3-2
Configuration Overview	3-2
Configuring the Compaq Pagemark Printer	3-5
Installing the NICPrint Utility	3-6
Creating a Print Queue	3-7
Defining a Print Server Configuration	3-8
Defining the Printer and Printer Connection	3-8
Associating the Print Server, Printer, and Print Queue	3-9
Validating Network Printing.....	3-10
Resetting the Printer NIC	3-10
Redirecting Workstation Print Jobs.....	3-11
Printing from the Workstation	3-11
Installing Novell FLeX/IP	3-12
Adding the NET\$PRN.DAT File	3-12
Installing FLeX/IP	3-13
Configuring UNIX-to-NetWare Print Services	3-15
Configuring FLeX/IP.....	3-15
Starting the LPD Protocol.....	3-16
Configuring the SCO UNIX Host/Server for LPD Communications	3-17
Configuring the Remote Printing Daemon.....	3-18
Configuring a Remote Printer.....	3-18
Editing PRINTCAP to Correct the NetWare Queue Name.....	3-19
Validating SCO UNIX to Network Printing.....	3-20

INDEX

Chapter 1

Overview

This TechNote explains how to install and configure UNIX to NetWare printing in an SCO UNIX and NetWare integrated environment. It discusses two different printing configurations:

- NetWare server-attached printer (Compaq Pagemark or other printer)
- Network-attached Compaq Pagemark printer

NetWare Server-Attached Configuration

In the NetWare printer configuration, the printer is attached to the NetWare server parallel/serial port. The instructions in Chapter 2 apply to any NetWare-supported printer. The following figure illustrates the SCO UNIX to NetWare printer configuration:

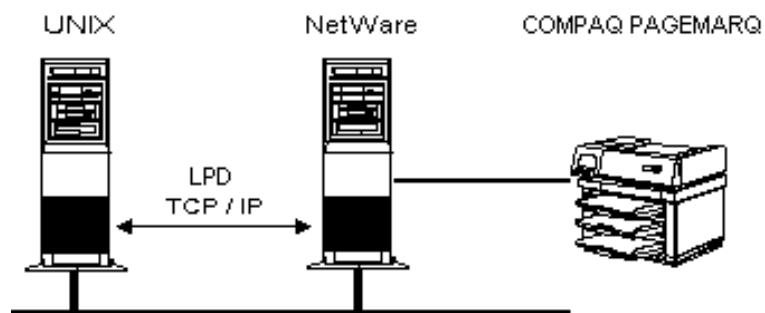


Figure 1-1. SCO UNIX to NetWare Printer Configuration

Network-Attached Compaq Pagemarq Configuration

In the network-attached Compaq Pagemarq configuration, the Compaq Pagemarq connects directly to the network with its network interface card. This configuration uses the ability of the Compaq Pagemarq to be able to attach anywhere on a network without requiring a physical connection to a server or workstation. Therefore, the instructions in Chapter 3 are specific for the Compaq Pagemarq. The following figure illustrates the SCO UNIX to network-attached Compaq Pagemarq configuration:

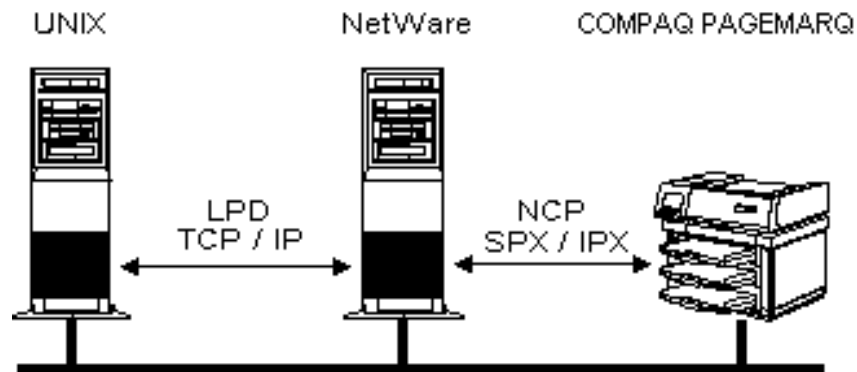


Figure 1-2. SCO UNIX to Network-Attached Compaq Pagemarq Configuration

Protocols and Print Job Transmission

Both configurations have two transmission phases. The following table describes the routes taken and routing methods used:

Table 1-1 Protocols and Print Job Transmission		
Printer Configuration	SCO UNIX Server to NetWare Server	NetWare Server to Printer
NetWare Server-Attached	LPD and TCP/IP	Parallel Port
Network-Attached	LPD and TCP/IP	NCP and SPX/IPX

In the network-attached Compaq Pagemark configuration we must route all print jobs through the NetWare server rather than transmit them directly to the printer. Currently, the only network protocol stack supported in the Compaq Pagemark is SPX/IPX. Even though an SPX/IPX protocol stack is available for SCO UNIX, it does not provide higher-level NCP services protocols required for NetWare printing. Therefore, SCO UNIX can only use TCP/IP with LPD for remote printing. Because the NetWare server can run both LPD with TCP/IP as well as NCP with SPX/IPX, it can serve as the intermediary between the UNIX host/server and the Compaq Pagemark.

Compaq PAGEMARQ Configuration Concepts

It is easier to understand configuring the networking features of the Compaq PAGEMARQ if we first examine the models for Novell NetWare and SCO UNIX printing.

SCO UNIX Printing Model

Basic UNIX printing involves four components. The following table lists these components and their functions:

Table 1-2 UNIX Printing Components	
Components	Function
UNIX Host/server	Disk and file management system
UNIX Spool Directory <i>/usr/spool/lp/temp</i>	Subdirectory for temporary storage of print jobs
UNIX Scheduling Program: lpsched	Schedules print jobs from multiple users and delivers them to the printer in the proper order
Printer	Prints the print jobs

NetWare Printing Model

Basic NetWare printing involves the same four components but with different names. The following table describes those components:

Table 1-3
NetWare Printing Components

Components	Function
NetWare Server	Disk and file management system
NetWare Print Queue	Subdirectory that temporarily stores print jobs
NetWare Scheduling Program: Print Server	Schedules print jobs and delivers them to the printer in the proper order
Printer	Prints the print jobs

Comparing the Two Models

The basic differences between UNIX and NetWare printing involve the scheduling programs and the configuration processes.

NetWare print servers support multiple file servers on a network whereas the SCO UNIX scheduler supports a single host. The NetWare print server polls all assigned queues, both local and remote, to schedule the print jobs.

NetWare configuration programs install from both the server and a workstation. SCO UNIX configuration programs install on a single host/server. In the NetWare case, you must remember which machine is used for what part of the configuration process.

Compaq Pagemarq Configuration

When using the Compaq Pagemarq in a NetWare environment, the print server no longer has to run on the NetWare file server. Instead, the print server runs directly on the printer. This program polls all attached NetWare queues on remote file servers to schedule and print queued jobs.

Additionally, Compaq Pagemarq printers have onboard processors that execute SPX/IPX and a subset of the NCP service protocols used for printing. A Compaq Pagemarq can function as a standalone print server and printer. Because the Compaq Pagemarq does not yet support TCP/IP and LPD, all network communications to the printer must be through SPX/IPX and NCP.

The following table describes the Compaq Pagemarq configuration components:

Table 1-4 Compaq Pagemarq Configuration Components	
Components	Function
NetWare Server	Disk and file management system
NetWare Print Queue	Subdirectory that temporarily stores print jobs
Pagemarq Scheduling Program: Print Server	Schedules print jobs from multiple users and delivers them to the printer in the proper order

Configuring the Compaq Pagemarq is different than configuring a server-attached printer. To configure the printer, you use the NetWare workstation utility, NICPrint.

The following chapters contain complete instruction for both the SCO UNIX to NetWare printer and SCO UNIX to network-attached Compaq Pagemarq configurations.

Chapter 2

Printing From SCO UNIX to a NetWare Printer

This chapter describes a configuration for printing from an SCO UNIX host/server to a printer attached to a NetWare server. The following figure illustrates the SCO UNIX to NetWare printer configuration:

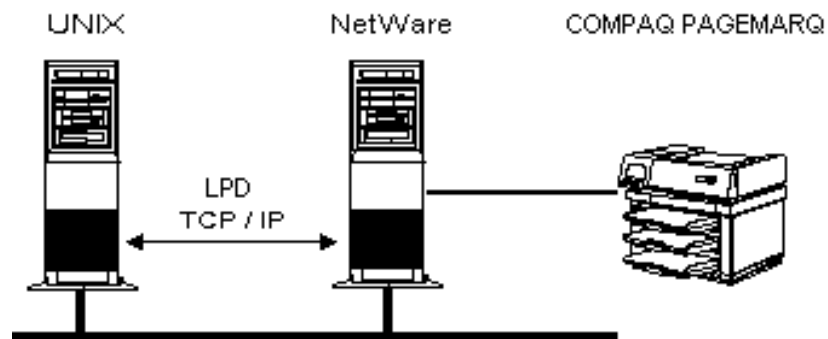


Figure 2-1. SCO UNIX to NetWare Printer Configuration

This method routes the print job first to a spool directory on the SCO UNIX host/server. Next, the UNIX scheduling program, **lpsched**, sends the print job from the UNIX spool directory to the NetWare print queue across a TCP/IP connection using the line printer daemon, LPD. Finally, the NetWare **print server** program retrieves the print job from the NetWare queue and transmits it to the printer.

Prerequisites

This configuration assumes the following:

- NetWare server with a minimum of 4 megabytes of system memory, running NetWare Version 3.11
- TCP/IP is running on the NetWare server (Ethernet II frame type is bound to TCP/IP.)
- SCO UNIX server running SCO UNIX System V 3.2 v.4 with TCP/IP Version 1.2
- DOS is resident in file-server memory (in other words, do not include the command, REMOVE DOS, in *autoexec.ncf*.)

Configuration Overview

Procedures for configuring SCO UNIX to NetWare printing include the following:

- Configuring NetWare printing
 - Validating NetWare printing
 - Installing NetWare FLeX/IP on the NetWare server
 - Configuring UNIX to NetWare Print Services on the NetWare server
 - Configuring the SCO UNIX host/server for LPD communications
 - Validating SCO UNIX to NetWare printing
-

The following figure illustrates the configuration programs used:

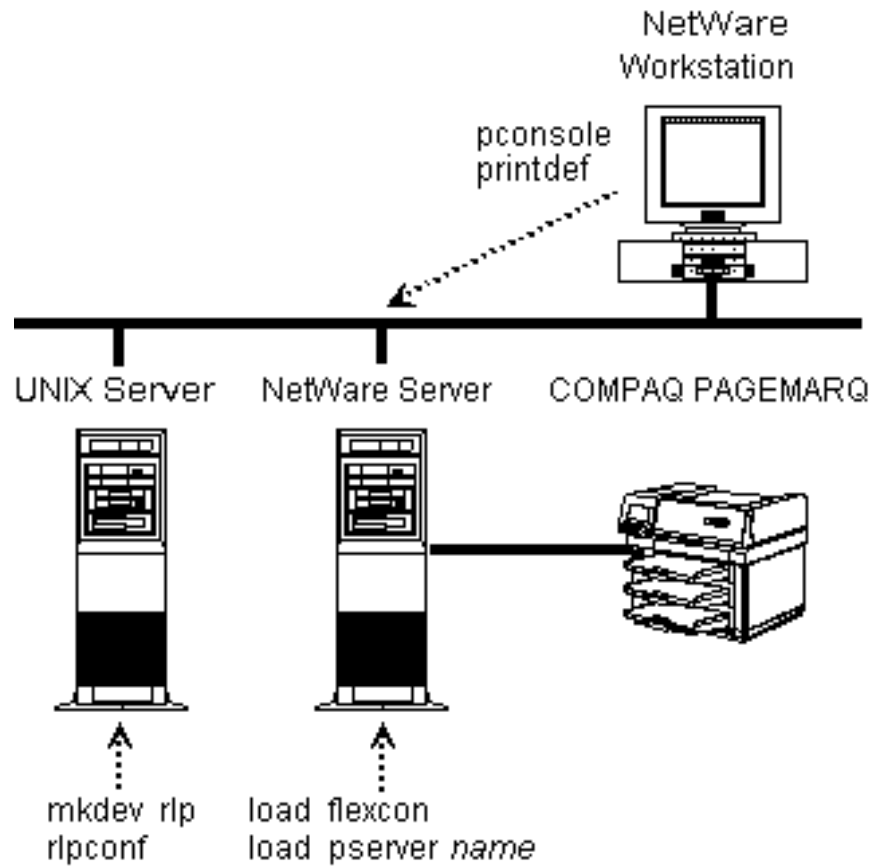


Figure 2-2. Configuration Programs SCO UNIX to a NetWare Printer

.....

2-4 Printing From SCO UNIX to a NetWare Printer

The following table lists the configuration programs and describes their functions:

Table 2-1 Configuration Programs		
Configuration Program	Executes From	Description
mkdev rlp	UNIX host/server	Configures remote printing
rlpconf	UNIX host/server	Configures remote printers
printdef.exe	NetWare Workstation	Creates the file: sys:\public\net\$prn.dat which speeds printing
pconsole.exe	NetWare Workstation	Configures file servers, queues, printers, and print servers
flexcon.nlm	NetWare Server	Configures UNIX to NetWare printing
pserver.nlm	NetWare Server	Executes the print server program on the NetWare server with LPD protocols

Configuring NetWare Printing

The first task is to configure NetWare printing for the parallel/serial port of the NetWare server. This task involves using **pconsole** to:

- Create a queue
- Create a print server
- Define the printer and printer connection
- Associate the print server, printer, and print queue

We use the following names for our examples:

Table 2-2
Naming Conventions for
SCO UNIX to NetWare Printer Configuration

Table subhead	Table subhead
NetWare server	nwserv
NetWare print queue	nw_queue
NetWare print server	nw_pserver
NetWare printer (Printer connected to the NetWare server LPT1 port)	nw_printer

To establish NetWare printing, begin by completing these steps:

1. Boot the NetWare server with the following commands:

```
cd /netware
server
```

2. Login from a NetWare workstation. For example:

```
f:
login supervisor
```

```
c:
```

3. Start **pconsole** from the NetWare workstation by entering

```
pconsole
```

4. Continue with the next section, "Creating a Print Queue."

Creating a Print Queue

To create a print queue on the NetWare server, complete the following steps:

1. From the Available Options menu, select *Print Queue Information*. The Print Queues list box appears on the screen with no contents.
2. To create a queue, press **INSERT**.
3. In the New Print Queue Name: dialog box, enter a name for the queue. For example:

```
nw_queue
```

4. The queue name displays in the list box. Exit the list box by pressing **ESC** and continue with the next section, "Defining a Print Server Configuration."
-

Defining a Print Server Configuration

To create a print server, follow these steps:

1. From the Available Options menu, select *Print Server Information*.
2. The Print Servers list box displays on the screen with no contents. To add the print server, press **INSERT**.
3. In the New Print Server Name: dialogue box, enter a name for the print server. For example:

nw_pserver

4. Select the new print server (already highlighted) from the list box by pressing **ENTER**. The Print Server Information menu appears on the screen.

The print server name displays in the list box. To configure the print server, select it (already highlighted) by pressing **ENTER**.

5. From the Print Server Information menu, select *Print Server Configuration → Printer Configuration*.
6. The Configured Printers list box displays on the screen showing no printers installed. Select *Not Installed 0*.

Defining the Printer and Printer Connection

The following steps define the printer and printer connection.

1. Once you select *Not Installed 0* from the Configured Printers list box, the Printer 0 Configuration dialogue box displays on the screen. In the Name: field, enter the name of the printer to define. For example:

nw_printer

2. At the Type: field, press **ENTER**. The Printer Types list box displays on the screen.
3. Select the appropriate printer connection. For example: *Parallel, LPT1*.
4. Exit the Printer 0 Configuration dialogue box by pressing **ESC**.

Validating NetWare Printing

Validating the NetWare printing involves:

- Starting the print server from the NetWare server
- Redirecting the workstation print jobs
- Printing from the workstation

Starting Print Server

Start the print server from the NetWare server. Use the **load pserver** command followed by the print server name. For example:

```
load pserver nw_pserver
```

Novell NetWare Print server screen shows the name of the print server running, and the name of the printer, and the message, "Waiting for a job."

Redirecting Workstation Print Jobs

To print from the NetWare workstation to the printer connected to the NetWare server, you must redirect the workstation print jobs from the local parallel/serial port to the network.

At the NetWare workstation, capture the workstation printer port LPT1 and redirect it to the printer attached to the NetWare server by entering

```
capture q=nw_queue
```

You see the following message:

Device LPT1: re-routed to queue NW_QUEUE on server NWSERV

Now anything printed to LPT1 on the workstation will print out on the printer attached to the server, *NWSERV*.

Printing from the Workstation

Test the NetWare printing by printing a copy of the *autoexec.bat* file from the NetWare workstation.

To print a copy of the *autoexec.bat* file, enter

```
copy c:\autoexec.bat lpt1
```

A message stating "1 file(s) copied" displays on the NetWare workstation. A message briefly displays on the NetWare server. This display is so brief you may not be able to read it. The *autoexec.bat* file of the workstation prints out on the NetWare printer.

Installing Novell FLeX/IP

After configuring NetWare printing for the parallel/serial port of the NetWare server, the next task is to install Novell FLeX/IP to supply the NetWare server with the LPD protocol. The following procedures include:

- Adding the *net\$prn.dat* file
 - Installing FLeX/IP Version 1.2
-

Adding the NET\$PRN.DAT File

To speed printing, you need to add the *net\$prn.dat* file to the *f:\public* directory before installing FLeX/IP. To add the file, complete the following steps from the NetWare workstation:

1. From the NetWare workstation, enter

```
printdef
```
2. From the PrintDef Options menu, select *Print Devices → Edit Print Devices*. The Defined Print Devices list box displays on the screen with no contents.
3. To add the print device, press **INSERT**.
4. In the New Device Name dialogue box, enter

```
net$prn
```
5. The Defined Print Devices list box now lists *net\$prn.dat*. Exit the list box by pressing **ESC**.
6. At the Print Device Options menu, press **ESC**.
7. At the PrintDef Options menu, press **ESC**.
8. Verify the exit by selecting *Yes* at the dialog box.
9. From the Exit Options menu, select *Save Data Base, then EXIT*.
10. To verify that the file is added, enter

```
dir f:\public\net$prn.dat
```

A message appears on the screen listing the file and the number of bytes.

Installing FleX/IP

To install FLeX/IP on the NetWare server, complete the following steps:

1. With the NetWare server running, insert the FleX/IP diskette into a diskette drive.
2. At the colon (:) prompt, enter

load install

3. At the Installation Options menu, select *Product Options*.
4. Currently Installed Products list box displays with no contents. To install a new product, press **INSERT**.
5. A dialog box prompts you to enter the drive and or path to the new product source media. Enter the appropriate drive indicator or press **ENTER** to select the default, a:

As files transfer their filenames display on the screen.

6. A dialog box prompts you for the drive or path for booting NetWare and provides a: as the default. Backspace over the a: and enter the appropriate path. For example:

c:\netware

7. From the NetWare FLeX/IP Installation Options menu, select *Install*.
-

8. After a message informs you that the serial number is being checked, a number of dialog boxes display requiring yes or no answers. The following table lists the prompts and appropriate responses.

Table 2-3
NetWare FLeX/IP Installation Options

Prompt	Response
SYS:\ETC\HOSTS EXISTS Overwrite Existing File?	No
SYS:\ETC\SERVICES EXISTS. Overwrite Existing File?	No
Automatic startup for Unix-to-Netware Printing?	Yes
Automatic startup for Netware-to-Unix Printing?	No
Automatic startup of the Remote Console for Unix?	No
Automatic Startup for FTP Server?	No

9. Once you respond to all the option prompts, the NetWare FLeX/IP Installation Options menu displays on the screen. Select *Exit*.
10. A dialog box prompts for verification. Select *Yes*.
11. The Currently Installed Products list box displays with FLEXCON, NFSPRINT, and NWPRINT now listed. Exit this menu by pressing **ESC**.
12. At the Installation Options menu, select *Exit*.
13. A dialog box prompts for verification. Select *Yes*.
- NetWare module screen now shows the FLeX/IP NLMs.

Configuring UNIX-to-NetWare Print Services

The following procedures configure UNIX to NetWare print services on the NetWare server. These procedures include:

- Configuring FLeX/IP
- Starting the LPD protocol

Configuring FLeX/IP

To configure FLeX/IP, complete the following steps:

1. the colon (:) prompt on the NetWare server, enter
load flexcon
 2. At the Configuration menu, select *Workstation IP Address*. The Workstation IP Address list box appears.
 3. Verify that both the NetWare and SCO UNIX servers are listed and exit by pressing **ESC**.
 4. At the Configuration menu, select *UNIX-To-Netware Print Service*.
 5. At the Main menu, select *Select Print Queues for use by LPD*.
 6. The Print Queues Selected list box displays on the screen with no contents. To add a queue, press **INSERT**.
 7. The Available Print Queues list box appears on the screen. Select the queue you are adding from this list. For example: *nw_queue*.
 8. The Print Queues Selected list box now displays *nw_queue* as the selected queue. Exit the list box by pressing **ESC**.
 9. Save changes by selecting *Yes* at the dialogue box.
-

10. At the Main menu, select *Select Trusted Hosts*.
11. The Trusted Hosts List list box appears with no contents. To add a host, press **INSERT**.
12. From the Available Hosts list, select the name of the SCO UNIX host/server. For example: *unxserv*.
13. The host name now appears on the Trusted Hosts List. Press **ESC** to exit.
14. Save changes by selecting *Yes* at the dialogue box.
15. At the main menu, select *Select Username Mapping Mode*.
16. At the menu, Current Mode is SINGLE ACCOUNT, select *All Clients use the same Netware Account*.
17. When prompted for the Selected Username, press **INSERT**.
18. From the Available Usernames list box, select *Guest*.
19. The Selected Username dialogue box now displays Guest. Exit by pressing **ESC**.
20. To save changes, select *Yes*.
21. At the menu, Current Mode is SINGLE ACCOUNT, press **ESC**.
22. At the Main menu, select *Exit*.
23. Verify the exit by selecting *Yes* at the dialogue box.
24. At the Configuration menu, select *Quit*.
25. Verify the exit by selecting *Yes* at the dialogue box.

Starting the LPD Protocol

Next, start the LPD protocol from the NetWare server by entering

```
load plpd
```

Configuring the SCO UNIX Host/Server for LPD Communications



IMPORTANT: Do not follow the SCO-specific instructions provided in the Novell FLeX/IP file, *\public\sysvpr.doc*. This information does not apply to SCO TCP/IP Version 1.2.

Before you begin the following procedures, it is a good idea to make back-up copies of *lp*, *lpstat*, and *cancel* in */usr/bin*.

NOTE: The **mkdev rlp** procedure used in the following section, "Configuring the Remote Printing Daemon," moves the local versions of these files to a different directory and replaces them with remote versions. It is important that both sets of files are correct. If the **mkdev rlp** procedure is accidentally executed twice, the current remote versions are copied over the local versions and new remote versions added. Local versions are then lost making local printing unreliable. Saving an extra copy of the local versions makes recovery possible.

To make copies of these files, enter the following commands:

1. Log in as *root*.
 2. Change directories to */usr/bin* by entering

```
cd /usr/bin
```
 3. Make back-up copies of the *lp*, *lpstat*, and *cancel* files by entering the following commands:

```
cp lp lp.local
cp lpstat lpstat.local
cp cancel cancel.local
```
-

Configuring the Remote Printing Daemon

To configure the remote printing daemon, complete the following steps:

1. Enter

```
mkdev rlp
```

2. A number of prompts display. The following table lists the prompts and the appropriate responses:

Table 2-4 mkdev rlp Prompts	
Prompt	Response
Do you want to install or delete remote printing (i/d/q)?	i
Do you want to change the remote printer description file /etc/printcap (y/n)?	n
Do you want to start remote daemon now?	n

Configuring a Remote Printer

The following procedure configures the remote printer.

1. From the *root* prompt, enter

```
rlpconf
```

2. The following message displays on the screen:

```
Please enter the printer name: (q to quit)
```

When communicating with a NetWare server, the */etc/printcap* file must contain the NetWare queue name. However, a more descriptive logical local printer name could be more informative. For this example, we chose to enter a more descriptive printer name and later edit the *printcap* file to correctly identify the NetWare queue. For example:

```
ux2nw_printer
```

3. A number of additional prompts display. The following table lists the prompts and the appropriate responses:

Table 2-5 rlpconf Prompts	
Prompt	Response
Is ux2nw_printer a remote or local printer?	r
Please enter the name of the remote host that ux2nw_printer is attached to:	<i>NetWare servername</i> For example: nwserv
ux2nw_printer is connect to host nwserv. Is this information correct?	y
Be the system default printer (y/n)?	y
Please enter the printer name (q to quit)	q

Editing PRINTCAP to Correct the NetWare Queue name

To have the system understand that the printer named *ux2nw_printer* is really the NetWare print queue (*nw_queue*) you must edit the *printcap* file. The following procedure uses **vi** to edit the file.

1. Enter the following command:

```
vi /etc/printcap
```

The following displays all on one line:

```
:lp=:rm=nwserv:rp=ux2nw_printer:sd=/usr/spool/lpd/ux2nw_printer:
```

2. Edit the line changing `rp=ux2nw_printer` (remote printer = `ux2nw_printer`) to `rp=nw_queue`.
 - a. To move the cursor to the line, press the **DOWN** arrow key twice.
 - b. Move the cursor to the "u" in `ux2nw_printer` by pressing the **RIGHT** arrow key.
 - c. With the cursor on the "u," type `cw`.
 - d. Type `nw_queue`.
 - e. Press **ESC**.
3. Once you edit the line, exit **vi** by entering


```
:wq
```
4. Start LPD by entering


```
lpd start
```

Validating SCO UNIX to NetWare Printing

To validate SCO UNIX to NetWare printing, you first set up the NetWare workstation so you can monitor whether or not the print job makes it to the NetWare queue. Then you send the print job from the SCO UNIX host/server and monitor the results.

1. At the NetWare workstation, enter


```
pconsole
```
2. From the Available Options menu, select *Print Queue Information*.
3. From the Print Queues list box, select `nw_queue`.
4. At the Print Queue Information menu, select *Current Print Job Entries*.

A blank screen displays with the column headings Sequence, Banner, Name, Description, Form, Status, and Job. Any print job from the SCO UNIX host/server sent to the NetWare queue will appear on this screen before being sent on to the printer.

5. Then enter

`lp /etc/hosts`

When the job is accepted on the UNIX side, the request id message appears on the screen.

Next the NetWare Workstation screen shows print job information.

Then, the *hosts* file prints out on the NetWare printer.

Chapter 3

Printing From SCO UNIX to a Network-Attached Compaq Pagemarq

This chapter describes a configuration for printing from an SCO UNIX host/server to a Compaq Pagemarq printer attached to a NetWare network. The following figure illustrates the SCO UNIX to network-attached Compaq Pagemarq configuration:

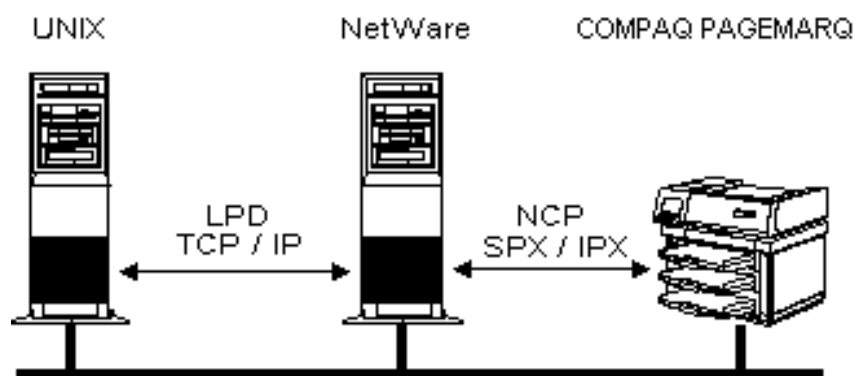


Figure 3-1. SCO UNIX to Network-Attached Compaq Pagemarq Configuration

This method routes the print job first to a spool directory on the SCO UNIX server. Next, the UNIX scheduling program, **lpsched**, sends the print job from the spool directory to the NetWare print queue across a TCP/IP connection using LPD (line printer daemon). Finally, the **print server** program (which, in this case, runs on the Compaq Pagemarq) retrieves the print job from the NetWare queue by way of an SPX/IPX connection.

Prerequisites

This configuration assumes the following:

- NetWare server with a minimum of 4 megabytes of system memory, running NetWare Version 3.11
- TCP/IP is running on the NetWare server (Ethernet II frame type is bound to TCP/IP.)
- SCO UNIX server running SCO UNIX System V 3.2 v.4 with TCP/IP Version 1.2
- DOS is resident in file-server memory (in other words, do not include the command, REMOVE DOS, in *autoexec.ncf*.)

Configuration Overview

Procedures for configuring SCO UNIX to NetWare printing include the following:

- Configuring the Compaq Pagemark printer
 - Validating network printing
 - Installing NetWare FLeX/IP Version 1.2 on the NetWare server
 - Configuring UNIX to NetWare Print Services on the NetWare server
 - Configuring the SCO UNIX host/server for LPD communications
 - Validating printing from SCO UNIX to the network-attached Compaq Pagemark
-

The following figure illustrates the configuration programs used:

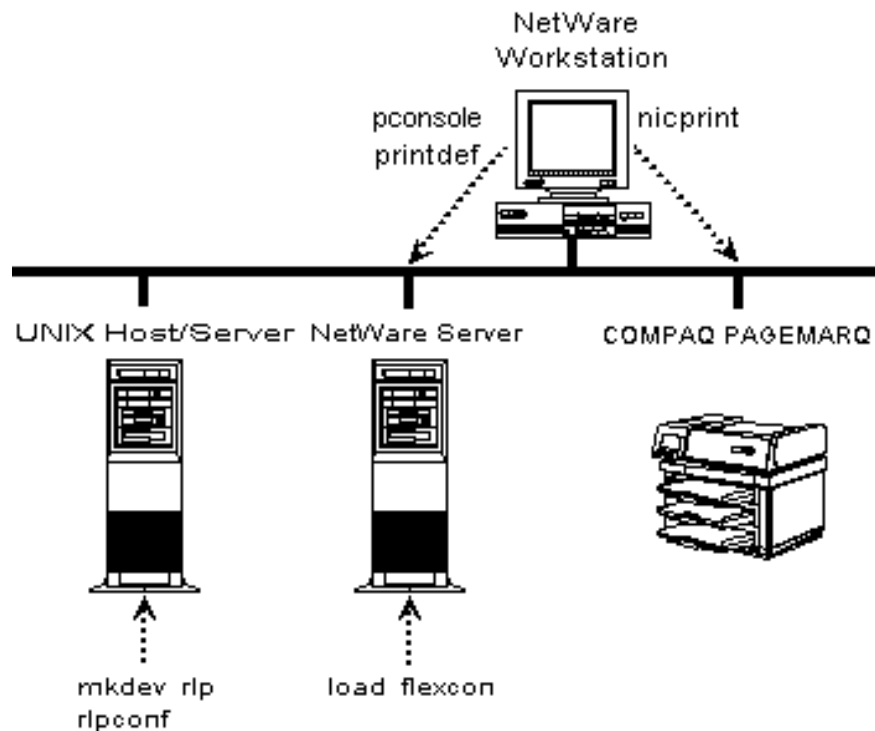


Figure 3-2. Configuration Programs SCO UNIX to a NetWork-Attached Printer

.....

3-4 *Printing From SCO UNIX to a Network-Attached Compaq*

The following table lists the configuration programs and describes their functions:

Table 3-1 Configuration Programs		
Configuration Program	Executes From	Description
mkdev rlp	UNIX host/server	Configures remote printing
rlpconf	UNIX host/server	Configures remote printers
printdef.exe	NetWare Workstation	Creates the file: sys:\public\net\$prn.dat which speeds printing
nicprint.exe	NetWare Workstation	Configures and starts the print server that executes on the Compaq Pagemark
pconsole.exe	NetWare Workstation	Configures file servers, queues, printers, and print servers
flexcon.nlm	NetWare Server	Configures UNIX to NetWare printing with LPD protocols

Configuring the Compaq Pagemark Printer

Configuring the printer for network printing involves the following procedures on the NetWare server:

- Installing the NICPrint utility
- Creating a queue
- Creating a print server
- Defining the printer and printer connection
- Associating the print server, printer, and print queue

We use the following names for our examples:

Table 3-2
Naming Conventions for
SCO UNIX to NetWare Printer Configuration

NetWare server	nwserv
NetWare print queue	pgmq_queue
NetWare print server	pgmq_pserver
NetWare printer (Printer connected to the NetWare server LPT1 port)	pgmq_printer

Installing the NICPrint Utility

The NICPrint utility configures the printer network interface card (NIC) and manages the Compaq PagemarQ printer from a personal computer on the network. To install the utility, complete the following steps:

1. Boot the NetWare server with the following commands:

```
cd /netware
server
```

2. Login from a NetWare workstation. For example:

```
f:
login supervisor
c:
```

3. Insert the NICPrint Software Utility diskette into a diskette drive of the NetWare workstation.

4. Make the diskette drive the current drive by entering the drive designator. For example:

```
a:
```

5. Enter

```
install
```

6. A message appears indicating where NICPrint will be installed. The default path listed is *C:\PAGEMARQ\NICPRINT*. Accept the default by pressing **ENTER**.

7. After copying the files, a dialogue box asks if you want your *autoexec.bat* file updated with the path statement for the **NICPrint** utility. Select *Yes*.

8. A dialogue box informs you that the **NICPrint** utility is successfully installed and asks if you want to start the utility now. Select *Start NICPrint*.
-

9. The Network Printers list box displays. Note that the logical name and the physical name of the printer is the same at this point. To configure the highlighted printer, select it by pressing **ENTER**.
10. From the Configuration Options menu, select *Configure Printer* → *Print Server*.
11. The Configure Print Server dialogue box displays with the name of the NetWare server in the Login Server field. Press the **DOWN** arrow to move the cursor to the Print Server Logical Name field.
12. In the Print Server Logical Name field, type a name for the print server and press **ENTER**. For example:

pgmq_pserver
13. Exit the dialogue box by pressing **ESC**.
14. To save changes, select *Yes*.
15. To exit to **pconsole**, select *Yes* and continue with the following section, "Creating a Print Queue."

Creating a Print Queue

To create a print queue on the NetWare server, complete the following steps:

1. From the Available Options menu, select *Print Queue Information*. The Print Queues list box displays on the screen with no contents.
2. To add the print queue, press **INSERT**.
3. In the New Print Queue Name: dialog box, enter a name for the queue. For example:

pgmq_queue
4. The queue name displays in the list box. Exit the list box by pressing **ESC** and continue with the next section, "Creating a Print Server."

Defining a Print Server Configuration

To create a printer server, follow these steps:

1. From the Available Options menu, select *Print Server Information*.
2. The Print Servers list box displays on the screen with no contents. To add the print server, press **INSERT**.
3. In the New Print Server Name: dialogue box, enter a name for the print server. For example:

pgmq_pserver
4. The print server name displays in the list box. To configure the print server, select it (already highlighted) by pressing **ENTER**.
5. From the Print Server Information menu, select *Print Server Configuration* → *Printer Configuration*.
6. The Configured Printers list box displays on the screen showing no printers installed. Select *Not Installed 0*.

Defining the Printer and Printer Connection

The following steps define the printer and printer connection.

1. Once you select *Not Installed 0* from the Configured Printers list box, the Printer 0 Configuration dialogue box displays on the screen. In the Name: field, type the name of the printer to define. For example:

pgmq_printer
 2. Exit the dialog box by pressing **ESC**.
 3. Save changes by selecting *Yes*.
 4. The Configured Printers list box appears on the screen displaying the new printer. Press **ESC**. The Print Server Configuration menu returns to the screen. Continue with the next section, "Associating the Print Server, Printer, and Print Queue."
-

Associating the Print Server, Printer, and Print Queue

Next you need to associate the print server, printer, and print queue.

1. From the Print Server Configuration menu, select *Queues Serviced by Printer*.
2. The Defined Printers list box shows the printer name. Select the printer by pressing **ENTER**.
3. A list box displays fields for File Server, Queue, and Priority. To add a queue, press **INSERT**.
4. The Available Queues list box appears on the screen. Select the newly created print queue name. For example: *pgmq_queue*
5. Select priority 1 (default) by pressing **ENTER**. A screen now lists the defined file server, queue, and priority.
6. Exit **pconsole** by pressing **ESC** at each screen.
7. After pressing **ESC** at the Available Options menu, verify the exit by selecting *Yes* in the dialogue box.

Validating Network Printing

Validating the NetWare printing involves:

- Resetting the printer NIC
- Starting the print server from the NetWare server.
- Redirecting the workstation print jobs
- Printing from the workstation

Resetting the Printer NIC

Before printing, reset the printer NIC by following these steps:

1. From the NetWare workstation, enter
`nicprint`
 2. At the Network Printers list box, select the network printer.
 3. From the Configuration Options PGMQ_PSERVER menu, select *Network Interface Controller (NIC) Management* → *Reset NIC*.
 4. A message appears warning of the possibility of losing data when resetting. Press **ENTER** to select *OK*.
 5. Exit from the NIC Management screen by pressing **ESC**.
 6. Exit from the Configuration Options menu by pressing **ESC**.
 7. At the Network Printers list box, press **F2** to regenerate the list. The list box now shows the status as running.
 8. Exit the list box by pressing **ESC**.
 9. Verify the exit by selecting *Yes*.
-

Redirecting Workstation Print Jobs

To print from the NetWare workstation to the printer connected to the network, you must redirect the workstation print jobs from the local serial/parallel port to the network.

At the NetWare workstation, capture the workstation printer port LPT1 and redirect it to the printer attached to the network by entering

```
capture q=pgmq_queue
```

You see the following message:

```
Device LPT1: re-routed to queue PGMQ_QUEUE on server NWSERV
```

Now anything printed to LPT1 on the workstation will print out on the printer attached to the network.

Printing from the Workstation

Test the NetWare printing by printing a copy of the *autoexec.bat* file from the NetWare workstation.

To print a copy of the *autoexec.bat* file, enter

```
copy c:\autoexec.bat lpt1
```

A message stating "1 file(s) copied" displays on the NetWare workstation. The *autoexec.bat* file of the workstation prints out on the network printer.

Installing Novell FLeX/IP

After configuring network printing for the serial/parallel port of the NetWare server, the next task is to install Novell FLeX/IP to supply the NetWare server with the LPD protocol. The following procedures include:

- Adding the *net\$prn.dat* file
- Installing FLeX/IP Version 1.2

Adding the NET\$PRN.DAT File

To speed printing, you need to add the *net\$prn.dat* file to the *f:\public* directory before installing FLeX/IP. To add the file, complete the following steps from the NetWare workstation:

1. From the NetWare workstation, enter

```
printdef
```
 2. From the PrintDef Options menu, select *Print Devices → Edit Print Devices*. The Defined Print Devices list box displays on the screen with no contents.
 3. To add the print device, press **INSERT**.
 4. In the New Device Name dialogue box, enter

```
net$prn
```
 5. The Defined Print Devices list box now lists *net\$prn.dat*. Exit the list box by pressing **ESC**.
 6. At the Print Device Options menu, press **ESC**.
 7. At the PrintDef Options menu, press **ESC**.
 8. Verify the exit by selecting *Yes* at the dialog box.
-

9. From the Exit Options menu, select *Save Data Base*, then *EXIT*.

10. To verify that the file is added, enter

```
dir f:\public\net$prn.dat
```

A message appears on the screen listing the file and the number of bytes.

Installing FLeX/IP

To install FLeX/IP on the NetWare server, complete the following steps:

1. With the NetWare server running, insert the FLeX/IP diskette into a diskette drive.

2. At the colon (:) prompt, enter

```
load install
```

3. At the Installation Options menu, select *Product Options*.

4. Currently Installed Products list box displays with no contents. To install a new product, press **INSERT**.

5. A dialog box prompts you to enter the drive and or path to the new product source media. Enter the appropriate drive indicator or press **ENTER** to select the default, a:

As files transfer their filenames display on the screen.

6. A dialog box prompts you for the drive or path for booting NetWare and provides a: as the default. Backspace over the a: and enter the appropriate path. For example:

```
c:\netware
```

7. From the NetWare FLeX/IP Installation Options menu, select *Install*.

8. After a message informs you that the serial number is being checked, a number of dialog boxes display requiring yes or no answers. The following table lists the prompts and appropriate responses.

Table 3-3
NetWare FLeX/IP Installation Options

Prompt	Response
SYS:\ETC\HOSTS EXISTS Overwrite Existing File?	No
SYS:\ETC\SERVICES EXISTS. Overwrite Existing File?	No
Automatic startup for Unix-to-Netware Printing?	Yes
Automatic startup for Netware-to-Unix Printing?	No
Automatic startup of the Remote Console for Unix?	No
Automatic Startup for FTP Server?	No

9. Once you respond to all the option prompts, the NetWare FLeX/IP Installation Options menu displays on the screen. Select *Exit*.
10. A dialog box prompts for verification. Select *Yes*.
11. The Currently Installed Products list box displays with FLEXCON, NFSPRINT, and NWPRINT now listed. Exit this menu by pressing **ESC**.
12. At the Installation Options menu, select *Exit*.
13. A dialog box prompts for verification. Select *Yes*.
- NetWare module screen now shows the FLeX/IP NLMs.
-

Configuring UNIX-to-NetWare Print Services

The following procedures configure UNIX to NetWare print services on the NetWare server. These procedures include:

- FLeX/IP
- Starting the LPD protocol

Configuring FLeX/IP

To configure FLeX/IP, complete the following steps:

1. From the colon (:) prompt on the NetWare server, enter

load flexcon
2. At the Configuration menu, select *Workstation IP Address*. The Workstation IP Address list box appears.
3. Verify that both the NetWare and SCO UNIX servers are listed and exit by pressing **ESC**.
4. At the Configuration menu, select *UNIX-To-Netware Print Service*
5. At the Main menu, select *Select Print Queues for use by LPD*.
6. The Print Queues Selected list box displays on the screen with no contents. To add a queue, press **INSERT**.
7. The Available Print Queues list box appears on the screen. Select the queue you are adding from this list. For example: *pgmq_queue*.
8. The Print Queues Selected list box now displays *pgmq_queue* as the selected queue. Exit the list box by pressing **ESC**.

9. Save the changes by selecting *Yes* at the dialogue box.
10. At the Main menu, select *Select Trusted Hosts*.
11. The Trusted Hosts List list box appears with no contents. To add a host, press **INSERT**.
12. From the Available Hosts list, select the name of the SCO UNIX host/server. For example: *unxserv*.
13. The host name now appears on the Trusted Hosts List. Press **ESC** to exit.
14. Save changes by selecting *Yes* at the dialogue box.
15. At the main menu, select *Select Username Mapping Mode*.
16. At the menu, Current Mode is SINGLE ACCOUNT, select *All Clients use the same Netware Account*.
17. When prompted for the Selected Username, press **INSERT**.
18. From the Available Usernames list box, select *Guest*.
19. The Selected Username dialogue box now displays Guest. Exit by pressing **ESC**.
20. To save changes, select *Yes*.
21. At the menu, Current Mode is SINGLE ACCOUNT, press **ESC**.
22. At the Main menu, select *Exit*.
23. Verify the exit by selecting *Yes* at the dialogue box.
24. At the Configuration menu, select *Quit*.
25. Verify the exit by selecting *Yes* at the dialogue box.

Starting the LPD Protocol

Next, start the LPD protocol from the NetWare server by entering

```
load plpd
```

Configuring the SCO UNIX Host/Server for LPD Communications



IMPORTANT: Do not follow the SCO-specific instructions provided in the Novell FLeX/IP file, *\public\sysvpr.doc*. This information does not apply to SCO TCP/IP Version 1.2.

Before you begin the following procedures, it is a good idea to make back-up copies of *lp*, *lpstat*, and *cancel* in */usr/bin*.

NOTE: The **mkdev rlp** procedure used in the following section, "Configuring the Remote Printing Daemon," moves the local versions of these files to a different directory and replaces them with remote versions of these files. It is important that both sets of files are correct. If the **mkdev rlp** procedure is accidentally executed twice, the current remote versions are copied over the local versions and new remote versions added. Local versions are then lost making local printing unreliable. Saving an extra copy of the local versions makes recovery possible.

To make copies of these files, enter the following commands:

1. Log in as *root*.
2. Change directories to */usr/bin* by entering
3. Make back-up copies of the *lp*, *lpstat*, and *cancel* files into */usr/bin* by entering the following commands:

```
cp lp lp.local
cp lpstat lpstat.local
cp cancel cancel.local
```

Configuring the Remote Printing Daemon

To configure the remote printing daemon, complete the following steps:

1. Enter

```
mkdev rlp
```

2. A number of prompts display. The following table lists the prompts and the appropriate responses:

Table 3-4
mkdev rlp Prompts

Prompt	Response
Do you want to install or delete remote printing (i/d/q)?	i
Do you want to change the remote printer description file /etc/printcap (y/n)?	n
Do you want to start remote daemon now?	n

Configuring a Remote Printer

The following procedure configures the remote printer.

1. From the *root* prompt, enter

```
rlpconf
```

The following message displays on the screen:

```
Please enter the printer name: (q to quit)
```

The value needed here is actually the NetWare queue name (in our example, *pgmq_queue*.) However, a more descriptive logical local printer name could be more informative. For this example we chose to enter a more descriptive printer name and later edit the *printcap* file to correctly identify the NetWare queue. For example:

```
pgmq_network
```


3. number of additional prompts display. The following table lists the prompts and the appropriate responses:

Table 3-5 rlpconf Prompts	
Prompt	Response
Is pgmq_network a remote or local printer?	r
Please enter the name of the remote host that pgmq_network is attached to:	<i>NetWare servername</i> For example: nwserv
pgmq_network is connected to host nwserv. Is this information correct?	y
Be the system default printer (y/n)?	y
Please enter the printer name (q to quit)	q

Editing PRINTCAP to Correct the NetWare Queue Name

To have the system understand that the "printer name" pgmq_network is really the NetWare print queue (pgmq_queue) you must edit the *printcap* file. The following procedure uses **vi** to edit the file.

1. Enter the following command:

```
vi /etc/printcap
```

The following displays all on one line:

```
:lp=:rm=nwserv:rp=pgmq_network:sd=/usr/spool/lpd/pgmq_network:
```

2. Edit the line changing `rp=pgmq_network` (remote printer = `pgmq_network`) to `rp=pgmq_queue`.
 - a. To move the cursor to the line, press the **DOWN** arrow key twice.
 - b. Move the cursor to the "n" in `pgmq_network` by pressing the **RIGHT** arrow key.
 - c. With the cursor on the "n," type **ew**.
 - d. Type **queue**.
 - e. Press **ESC**.
3. Once you edit the line, exit **vi** by entering
`:wq`
4. Start LPD by entering
`lpd start`

Validating SCO UNIX to Network Printing

To validate SCO UNIX to Network printing, you first set up the NetWare workstation so you can monitor whether or not the print job makes it to the NetWare queue. Then you send the print job from the SCO UNIX host/server and monitor the results.

1. At the NetWare workstation, enter
`pconsole`
2. From the Available Options menu, select *Print Queue Information*.
3. From the Print Queues list box, select *pgmq_queue*.
4. At the Print Queue Information menu, select *Current Print Job Entries*.

A blank screen displays with the column headings Sequence, Banner, Name, Description, Form, Status, and Job. Any print job from the SCO UNIX host/server sent to the NetWare queue will appear on this screen before being sent on to the printer.

5. Then enter

```
lp /etc/hosts
```

When the job is accepted on the UNIX side, the request id message appears on the screen.

Next the NetWare Workstation screen shows print job information.

Then, the *hosts* file prints out on the NetWare printer.

Index

/

/usr/spool/lp/temp, UNIX spool
directory 1-4

C

COMPAQ PAGEMARQ
 See also PAGEMARQ
 configuration components 1-6
 configuring 3-5
Configuration
 NetWare server-attached 1-1
 Network-attached COMPAQ
 PAGEMARQ 1-2
 programs
 described 2-4, 3-4
 illustrated 2-3, 3-3
 UNIX to Netware Printing,
 illustrated 2-1
 UNIX to network-attached
 COMPAQ PAGEMARQ,
 illustrated 3-1
Connection, printer, defining 2-7, 3-8

F

FLeX/IP
 configuring 2-14, 3-15
 installing 2-12, 3-13
flexcon.nlm 2-4, 3-4

L

Line printer daemon *See LPD*
LPD, line printer daemon 1-3, 2-1,
 3-2
 communication, configuring
 host/server for 2-16, 3-17
 starting 2-15, 3-16
lpsched, UNIX scheduling program
 1-4, 2-1, 3-2

M

mkdev rlp 2-4, 3-4

N

NCP services 1-3
net\$prn.dat, adding 2-11, 3-12
NetWare
 print queue 1-5
 printing
 components 1-5
 configuring 2-5
 validating 2-9
 queue name, correcting 2-18, 3-
 19
 scheduling program 1-5
NetWare and UNIX printing,
 differences 1-5
NetWare server-attached
 configuration 1-1

- Network printing, validating 3-10
- Network-attached COMPAQ
 - PAGEMARQ configuration 1-2
- NIC, printer, resetting 3-10
- NICPrint
 - installing 3-6
 - introduced 1-6
- nicprint.exe 3-4

P

- PAGEMARQ
 - See also COMPAQ PAGEMARQ*
 - scheduling program 1-6
- pconsole.exe 2-4, 3-4
- Prerequisites
 - UNIX to NetWare printer
 - configuration 2-2
 - UNIX to network-attached
 - printer configuration 3-2
- Print
 - job
 - redirecting 2-9, 3-11
 - transmission 1-3
 - queue
 - associating with the print
 - server 2-8, 3-9
 - creating 2-6, 3-7
 - server
 - associating with print
 - queue 2-8, 3-9
 - configuring 2-7, 3-8
 - starting 2-9
 - services
 - configuring for UNIX-to-
 - NetWare configuration
 - 2-14, 3-15

- Print Server
 - NetWare scheduling
 - program 1-5, 2-1, 3-2
 - PAGEMARQ scheduling
 - program 1-6
- PRINTCAP, editing 2-18, 3-19
- printdef.exe 2-4, 3-4
- Printer
 - connection 2-7, 3-8
 - defining 2-7, 3-8
 - NIC, resetting 3-10
- Printing
 - adding net\$prn.dat for
 - speed 2-11, 3-12
 - from the workstation 2-10, 3-11
- Protocol stacks 1-3
- Protocols 1-3
- pserver.nlm 2-4

R

- Redirecting, workstation print
 - jobs 2-9, 3-11
- Remote printer, configuring 2-17, 3-18
- Remote printing daemon,
 - configuring 2-17, 3-18
- rlpconf 2-4, 3-4
- Routing methods 1-3

S

- SPX/IPX 1-3
- System memory requirements
 - UNIX to NetWare printer
 - configuration 2-2
 - UNIX to network-attached
 - printer configuration 3-2

T

TCP/IP 1-3

U**UNIX**

- printing components 1-4

- scheduling program 1-4

- spool directory 1-4

UNIX and NetWare printing,
differences 1-5

UNIX to NetWare

- printer configuration

 - illustrated 2-1

 - prerequisites 2-2

- printer, illustrated 1-1

- printing, validating 2-19

UNIX to network printing, validating
3-20

UNIX to network-attached COMPAQ

- PAGEMARQ, illustrated 1-2

UNIX to network-attached printer

- configuration

 - illustrated 3-1

 - prerequisites 3-2