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**Digital Laser Printer LN15**

**Ethernet Interface**

**User Manual**

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# 1 - Introduction

## 1.1 Overview

The Digital Laser Printer LN15 Ethernet interfaces are multiprotocol interfaces which provide shared network access to the Digital Laser Printer LN15 for a variety of network protocols and operating systems. There are two kind of interfaces: the LN15X-NA interface provides a thinwire (10-BASE-2) connector for network connections. The LN15X-NB interface provides a twisted pair (10-BASE-T) connector. Both the LN15X-NA and the LN15X-NB queue multiple pending jobs and service those jobs in the order in which they are received from the hosts. Throughout this manual, the DIGITAL Laser Printer LN15 Ethernet interfaces are referred to as RP600 (RapidPrint 600).

**NOTE:** *The interfaces do not allow outgoing connections to hosts. It is intended solely to service requests from network hosts.*

### 1.1.1 Protocols

A network protocol is a method of communicating over the Ethernet. Each protocol specifies a certain arrangement of data in the Ethernet packets, and provides different services for its users. The interfaces support the LAN Manager, Local Area Transport (LAT), TCP/IP and NetWare (IPX) protocols.

The interface can use and interpret all 3 protocols at once, and can queue print requests from hosts using any of the 3 protocols simultaneously.

## 1.1.2 Configuration

The installation configuration software is shipped with the DIGITAL Laser Printer LN15 CD-ROM.

Although this software is the recommended way to configure the interface, the unit may also be configured using any of the following methods:

- By logging into the interface over the network via LAT, NCP/TSM, NetWare or Telnet/Rlogin
- Via BOOTP replies from a TCP/IP network host; these replies may be used to define the IP address, loadhost, and download filename
- Via RARP replies from a TCP/IP host; these replies may be used to define the IP address
- By downloading a configuration file containing the interface commands from a LAT, NetWare, or TCP/IP host at boot time

## 1.1.3 Software

The RP600 interface stores its executable code in Flash (rewritable) ROM, meaning that it does not need to download software from a host each time it boots. Downloading host software is necessary only when updating the code in the Flash ROM with a new version of the software.

The interface requires no additional software to print jobs when using in most environments (NetWare or UNIX with LPR, LAN Manager, and LAT). (Configuration may involve configuration software, shipped with the interface.)

## 1.2 RP600 components

The DIGITAL Laser Printer LN15 Ethernet Interface comes in two versions:

- a. The DIGITAL Laser Printer LN15N-A is equipped with a 10-Base-2 interface, the DIGITAL LN15X-NA and
- b. The DIGITAL Laser Printer LN15N-B is equipped with a 10-Base-T interface, the DIGITAL LN15X-NB.

The panel of the interface has 2 LEDs, a Test button and a network connector.

**NOTE:** *Throughout this manual, the green LED is referred to as the PWR/LINK LED. The other LED is referred to as the ACT LED.*

The green LED indicates a good network connection (on the LN15N-A) or power (on the LN15N-B). The other LED gives information about what the interface is doing; for example, when code is downloaded as the unit boots, the LED blinks green quickly.

The Test button serves two functions; to print a test/status page, and to force the interface to return to the factory default configuration. To print a test page, press the button briefly. To return to the factory default configuration, power down the printer, press the test button. Then switch the printer on and hold down the Test button for 5 seconds.

### 1.2.1 Power-up Diagnostics

The RP600 boot-up procedure consists of four steps, listed below. In normal operation, these four steps require approximately 45 seconds to complete.

1. The RP600 runs through a set of power-up diagnostics for approximately 10 seconds. The PWR/LINK LED remains solid green, the ACT LED shows varying patterns corresponding to the test being run.
2. It tries to obtain TCP/IP configuration information via BOOTP and RARP. This takes approximately 10 seconds if no hosts answer the requests. During this step, the ACT LED blinks yellow approximately 3 times per second as network requests are transmitted.

**NOTE:** *For more information about BOOTP and RARP, refer to your operating system's documentation.*

3. The RP600 then determines if the code in the Flash ROMs is valid. If so, it will load that code and begin normal execution. This takes approximately 20 seconds.
4. When the unit is running normally, the ACT LED blinks once every 2 seconds. (If data is being transmitted, the LED blinks yellow, rather than green.)

At this point, the server is running normally.

## 1.3 Was the Installation Successful?

If the RP600 appears to be working (the ACT LED is blinking once every two seconds) and the unit is connected to the network, there are various ways to confirm that the unit is working correctly:

- Print a test page by pressing the Test button.
- If the RP600 was configured with an IP address, telnet to the console port from a TCP/IP host.
- The Digital RapidPrint 600 software utility (provided on the enclosed DIGITAL Laser Printer LN15 CD-ROM) can be used to show available print servers.

**NOTE :** Throughout this manual, this software is referred to as RP600 software.

- From a VMS host, the RP600 will be accessible from NCP or TSM.
- From Windows NT, the RP600 will reply to NT machines that scan for DLC printers.

## 2 - Getting Started

### 2.1 Overview

This chapter covers the steps needed to get the RP600 interface on-line and running. There are two ways to log into the interface:

1. Incoming (Remote) Logins: Digital RapidPrint 600 software utility (RP600 software) is the preferred method of login and configuration.
2. Remote Console Logins: Connections to port 7000 can be made by LAT users and TCP/IP users via a Telnet connection.

**NOTE:** *Windows NT users must use TCP/IP. It is the only way to log into the unit.*

It is important to consider the following points before logging into and configuring the interface:

- The RP600 interface's IP address must be configured before any TCP/IP functionality is available.
- Only one person at a time may be logged into the remote console port regardless of the protocol being used. This eliminates the possibility of several people simultaneously attempting to configure the interface.
- Although all other login sessions may be disabled, remote console logins cannot be disabled. The system manager will always have access to the unit.
- Logging into the remote console port does not automatically create privileged user status. You must use the **Set Privileged** command to configure the unit.

The remote console port is password protected.

Default login password: **access**

Default privileged password: **system**

## 2.2 Command Syntax

### 2.2.1 Set/Define Commands

Set/Define commands appear frequently in this manual; therefore, it is important to note the difference between them. Set makes an immediate change, but is not permanent. Conversely, Define makes a permanent change, but doesn't take effect until the interface is rebooted or until the affected port is logged out.

### 2.2.2 Command Format

The commands in this manual and the Reference Manual appear in the following format. Optional parameters are enclosed in brackets []. Curly braces {} indicate that one and only one of the enclosed items must be used. User supplied parameters, such as a particular *port number* or *host name*, are shown in *italics*. Commands can be entered in upper, lower, or mixed case.

The interface's command completion feature will complete partially-typed commands for you. This can save time and reduce errors if you're entering a number of commands. To use command completion, type part of a command, then press the space bar; the interface will automatically "type" the remainder of the command. To enable command completion, use the **Set/Define Port Command Completion** command.



## 2.3 IP Address Configuration

The RP600 IP address must be configured before any TCP/IP functionality is available. To set the IP address, the following methods can be used: a directed Ping packet, a BOOTP or RARP reply, or commands entered at the command line (Local>) interface from the RP600 software login. All methods of setting the IP address are discussed in the following sections; choose the method that is most convenient for you.

To access the interface, hosts must know the RP600 IP address. This is typically configured in the host's `/etc/hosts` file (UNIX) or via a nameserver. For configuration instructions, refer to the host's documentation.

### 2.3.1 Using a Directed Ping Packet

If the RP600 has no IP address, it sets its address from the first directed IP ICMP (ping) packet it receives. To generate such a packet, create an entry in the host's ARP table. The following figure shows how to create an entry in the host's ARP table. Note that this requires superuser privileges.

**Figure 2-1:** Adding to the ARP Table

```
arp -s 192.0.1.228 00:80:a3:xx:xx:xx
```

Substitute the intended IP address and the hardware address of the server. Then ping the server:

**Figure 2-2:** Ping Command

```
ping 192.0.1.228
```

**NOTE:** *If a router is between the server and the ARP host, this procedure won't work.*

When the server receives the ping packet, it notices that its own IP address is not currently set and sends out broadcasts to see if anyone else is using this address. If no duplicates are found, the server uses this IP address and responds to the ping packet. The interface will **not** save the IP address permanently; it is set temporarily to enable RP600 software to communicate with the server, or to allow an administrator to telnet into the interface **remote console port**.

To telnet to this port, use the **Telnet** command. Specify the RP600 IP address and 7000 as the port number.

The interface will display the remote console port prompt (#). In order to successfully log into the port, the login password must be entered at this prompt. The default login password is **access**. To make the IP address permanent, use the **Define Server IPaddress** command.

**Figure 2-3:** Telnetting to the Console Port

```
% telnet xxx.xxx.xxx.xxx 7000
Trying xxx.xxx.xxx.xxx
Connected to xxx.xxx.xxx.xxx
Escape character is '^]'
# access (not echoed)
Digital RapidPrint 600 Version n.n/n (yymmdd)
Type Help at the 'Local_>' prompt for assistance.
Enter Username> xxxx
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> DEFINE SERVER IPADDRESS xxx.xxx.xxx.xxx
```

## 2.3.2 Using a BOOTP or RARP Reply

At boot time a host-based BOOTP or RARP server can respond to an interface request for an available IP address. For information about configuring the BOOTP or RARP servers, see the host documentation. Keep in mind that many BOOTP daemons will not reply to a BOOTP request if the download filename in the configuration file does not exist. If this is the case, create a file with the same pathname specified in the configuration file.

By default, the interface attempts BOOTP and RARP queries. You can disable these queries by doing either of the following:

- Within the RP600 software, use the **Maintenance:Server Boot Parameters** menu.
- At the Local> prompt (accessible via the RP600 software or a Telnet/Rlogin, enter the **Define Server BOOTP Disabled** and **Define Server RARP Disabled** commands.

## 2.3.3 Using the Command Line Interface

To define the IP address at the local prompt (Local>), log into the interface via the RP600 software and press Return.

A Username> prompt will be displayed. After you enter a username, you will get the Local> prompt. To set the IP address at this prompt, you need to be the privileged user. Once you've obtained privileged access, use the **Set/Define Server Ippaddress** command:

**Figure 2-4:** Set/Define Server IPaddress

```
DEFINE SERVER IPADDRESS 192.0.1.228
```

## 2.4 RP600 software Logins and Configuration

The RP600 software, shipped on the DIGITAL Laser Printer LN15 CD-ROM, is the easiest way to log into and configure the interface. The RP600 software guides you through configuration using a point-and-click interface.

**NOTE:** *NetWare users must be running Windows version 3.1 or later with the NetWare VLM or a Winsock compliant TCP/IP stack.*

NetWare, and TCP/IP versions of the RP600 software are shipped with on the CD-ROM. To use the CD-ROM, refer to the instructions on the CD-ROM. To install the RP600 software, refer to the appropriate RP600 software README file.

**NOTE :** On-line help through internet is provided.

## 2.5 Remote Console Logins

Remote console logins are supported from LAT, NCP/TSM, NetWare, and TCP/IP. All remote console login methods are discussed in the following sections.

### 2.5.1 NetWare Console Connections

NetWare users can make remote console connections via the RP600 software. Instructions for using RP600 software are included with the CD-ROM.

## 2.5.2 TCP/IP Console Connections

The RP600 enables a TCP/IP user to configure the server via a single Telnet or rlogin connection to the remote console port. The remote console port is designated as port **7000**.

To make a connection to this port, use the **Telnet** or **rlogin** command.

**Figure 2-5:** Connecting to Console Port

```
% telnet xxx.xxx.xxx.xxx 7000
Trying xxx.xxx.xxx.xxx
Connected to xxx.xxx.xxx.xxx
Escape character is '^]'

# access (not echoed)

Digital RapidPrint 600 Version n.n/n (yymmdd)
Type Help at the 'Local>' prompt for assistance

Enter Username> xxxx
```

Note that the # prompt requires that the login password be entered before the connection can be made. The default login password is **access**.

## 2.5.3 VMS Console Connections

From a VMS host machine, a connection to the remote console port can be established using NCP or TSM.

**NOTE:** *The NCP name cannot exceed six characters.*

First, the node must be configured in the NCP database. Once the node has been created in the database, the **Connect** command can be used to establish a session.

**Figure 2-6:** Configuring the Node and Establishing a Connection

```

$ RUN SYS$SYSTEM:NCP
NCP> SHOW KNOWN CIRCUIT

Known Circuit Volatile Summary as of <date time>

Circuit          State
QNA-0            on

NCP>
NCP> SET NODE server_name
Node Address      (1.1-63.1023):      13.141
Node Name        (1-6 characters): server_name
NCP> SET NODE server_name SERVICE CIRCUIT QNA-0
NCP> SET NODE server_name HARDWARE ADDRESS 00-80-A3-xx-xx-xx
NCP> EXIT

$ RUN SYS$SYSTEM:NCP
NCP> CONNECT NODE server_name

# access (not echoed)

Digital RapidPrint 600 Version n.n/n (yymmdd)
Type Help at the 'Local>' prompt for assistance.
Enter Username> xxxx

```

**NOTE:** *For more information on configuring the NCP database and establishing a remote console connection, see the NCP and TSM documentation.*

This creates the node only in the temporary database; Define commands must be used in order to make a permanent entry in the database.

## 2.6 Controlling Incoming logins

By default, incoming LAT connections are **disabled**. To change these settings, use the **Set/Define Server Incoming** command.

Incoming logins do not require that the user enter a login password; therefore, you may wish to disable incoming logins as a security measure. If it is undesirable to disable incoming logins, the RP600 can be configured to require a login password for incoming connections with the **Set/Define Server Incoming Password** command.

The Set/Define Server Incoming command can be used with the following parameters:

**Figure 2-7:** Set/Define Server Incoming Parameters

Parameter	Function
Telnet	Enables Telnet logins
LAT	Enables LAT logins
Both	Enables both Telnet and LAT logins
None	Disables both Telnet and LAT logins

Enabling LAT logins automatically creates a service, a resource on the host which will allow LAT users to connect to the RP600 using the **Connect** command. The default name of this service will be **LPS\_XXXXXX**. (The *XXXXXX* notation represents the last six numbers of the RP600 service address.) This service is created automatically when the unit boots if incoming LAT connections are enabled. To change the service name, change the RP600 name.

If outgoing LAT connections on a VMS host are enabled, use the following command to connect to the RP600:

**Figure 2-8:** Connecting to the RP600 from a VMS Host

```
set host /LAT LPS_XXXXXX
```

## 3 - Services

### 3.1 Overview

With few exceptions, setting up a print queue on the RP600 requires the use of a **service**. A service is a resource accessible to network hosts; for example, a Novell user may queue print jobs to a service.

The RP600 has 3 default services for use with the parallel port. These services will be sufficient for most users. Default services cannot be edited; therefore, if you cannot use the default services, you will need to configure custom services.

Once you have either enabled or created the appropriate services for your system, you can use these services to connect to the RP600 and queue print jobs.

### 3.2 Default Services

**NOTE:** *Default services cannot be changed, they can only be enabled or disabled. The DLC characteristic is an exception.*

The RP600 comes equipped with 3 default services which reference the parallel port:

LPS_XXXXXX_TEXT:	All text print jobs should be queued to this service.
LPS_XXXXXX_PCL:	All binary print jobs (for example, plotter or PCL files) should be queued to this service.
LPS_XXXXXX_PS:	All PostScript print jobs should be queued to this service.

**NOTE:** *The default service names are based on the server name; therefore, if you change the server name, the new name must be no more than 12 characters.*



When the RP600 boots, all default services are available. To disable (or later enable) a service, use the **Set/Define Service Default** command. Figure 3-1 displays the syntax for this command.

**Figure 3-1:** Disabling PostScript Default Service

```
DEFINE SERVICE DEFAULT POSTSCRIPT DISABLED
```

Each default service has a list of service characteristics enabled on it. The list of service characteristics can not be changed on default services. If you need to use a service which has different characteristics, you must configure a custom service.

The following characteristics are enabled on the default services:

LPS_XXXXXX_TEXT	Banner, Connections, FormFeed, LAN Manager, NetWare, Queueing, RTEL
LPS_XXXXXX_PCL	Binary, Connections, LAN Manager, NetWare, Queueing, RTEL
LPS_XXXXXX_PS	Connections, LAN Manager, NetWare, PostScript, Queueing, RTEL

## 3.3 Custom Services

A custom service consists of three primary “building blocks”; these “blocks” are attributes, characteristics, and protocols. Since the default services cannot be edited, you may need to create a custom service. For example, if you are using the NetWare protocol, and the FormFeed attribute prevents you from using a default service, you will need to configure a custom service with FormFeed disabled.

### 3.3.1 Attributes

Attributes describe global properties of the service. Listed below are the possible attributes for a custom service:

#### 3.3.1.1 Service Name

Each service must have a name with no more than 12 alphanumeric or underscore characters.

#### 3.3.1.2 EOJ (End-of-Job) or SOJ (Start-of-Job) String

**NOTE:** *The commands that you may need to enter in EOJ and SOJ strings are printer-specific and are not covered in this manual.*

Each service may have an End-of-Job or Start-of-Job string (or both). EOJ strings are sent to the printer after every print job; SOJ strings are sent to the printer before each print job. These strings are typically used to force the printer into a particular mode (such as PostScript or PCL). When specifying a string, use the following syntax:

**Figure 3-2:** EOJ and SOJ Syntax

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \left\{ \begin{array}{c} \text{SOJ} \\ \text{EOJ} \end{array} \right\} \left\{ \begin{array}{c} \textit{string} \\ \text{NONE} \end{array} \right\}$
--

The keyword **None** clears any string already in place. A string may consist of alphanumeric characters, or of hexadecimal character pairs preceded by a backslash.

**Figure 3-3:** Examples of EOJ and SOJ Strings

```
Local>> DEFINE SERVICE LPS_PRT SOJ "startchar"  
Local>> DEFINE SERVICE LPS_PRT EOJ  
"\23\4e\9atext"
```

Strings are converted to all uppercase, unless they are enclosed in quotes. If you need to add any character other than a letter (A-Z, a-z), you must locate the character on a ASCII chart and enter that number as a hexadecimal value.

The **Show Service Local Characteristics** command displays any current End-of-Job or Start-of-Job strings associated with a particular service.

**Figure 3-4:** Show Service Local Characteristics

```
Local> SHOW SERVICE LOCAL CHARACTERISTICS  
Service: LPS_PRT          Ident:  
Rating: 255              Ports: 1  
Characteristics: Banner Rtel PostScript Formfeed NetWare  
SOJ: startchar           EOJ: endchar
```

**NOTE:** *If you are using PostScript printing on an auto-sensing printer, you may not need to enter EOJ or SOJ strings to force the printer into PostScript mode; enabling the PostScript characteristic should do this. For more details, refer to your printer's documentation.*

### 3.3.1.3 Ident String

Each service may have an identification string. This string typically contains a more verbose description of the service and will be displayed by LAT when a Show Services command is issued. It is ignored by all other protocols.

### 3.3.1.4 Ports

The port list shows which port(s) the service is associated with.

### 3.3.1.5 Rating

The rating describes the current state of the service; the RP600 determines the rating based upon whether or not the port associated with the service is in use. A non-zero value means that the service is available. A rating of zero means that the service is either in use or not available.

## 3.3.2 Characteristics

These parameters specify how the RP600 appears to network hosts and how it treats print data. All possible characteristics and their default states (enabled or disabled) are listed below. When a custom service is created, it has a list of characteristics which are enabled on it; however, unlike default services, these services can be changed.

**NOTE:** *The default state of these characteristics applies to custom services, not necessarily to the RP600 default services.*

### 3.3.2.1 Banner

This characteristic only affects banner pages that the RP600 generates when printing via LPD or NetWare. If a host generates its own banner, the RP600 treats it as print data. Banner is enabled by default.

**NOTE:** *Users should disable the Banner and FormFeed characteristics for PostScript queues.*

### 3.3.2.2 Binary

If the Binary characteristic is enabled, the RP600 does not perform character processing on the data. When Binary is disabled, the RP600 expands linefeeds into carriage return/linefeeds and performs tab expansion for LPD jobs. This characteristic is typically enabled for printing graphics jobs (PCL or plotter files). Binary is disabled by default.

### 3.3.2.3 FormFeed

If Formfeed is enabled, the server appends a formfeed to the end of LPD and NetWare jobs. FormFeed is enabled by default.

**NOTE:** *Users should disable the Banner and FormFeed characteristics for PostScript queues.*

#### **3.3.2.4 Password**

Specifies a 1 to 6 character service access password that the user must supply in order to connect to the service. This characteristic is disabled by default.

#### **3.3.2.5 PostScript**

If enabled, the RP600 sends a small PostScript job to the printer before the user's print data to force auto-selection printers into PostScript mode. It also attempts to confirm that the printer finished a job before starting the next one. If the printer attached to this service is to be used only for PostScript, this option must be enabled. PostScript is disabled by default.

#### **3.3.2.6 PSConvert**

This characteristic allows a PostScript printer attached to the RP600 to print non-PostScript jobs. When a file is queued to a service with the PSConvert attribute enabled, the file is encapsulated within a PostScript job. When printed, the file looks as if it was printed on a line printer. PSConvert is disabled by default.

#### **3.3.2.7 TCP Port**

Associates a numeric TCP socket (between 4000 and 4999) with the service. Connections to this socket are accepted only if the service is currently available. This is an 8-bit clean connection.

#### **3.3.2.8 Telnet Port**

Associates a numeric TCP socket (between 4000 and 4999) with the service. Telnet IAC interpretation will be done on the connection. Connections to this socket are accepted only if the service is currently available.

### 3.3.3 Protocols

Each service has a protocol list associated with it; this list controls which protocols can access the service. Protocol parameters include the following:

#### 3.3.3.1 DLC

Sets the service as the handler for Windows NT DLC print connections. DLC is **disabled** by default.

#### 3.3.3.2 LAN Manager

Enables or disables LAN Manager (NetBIOS/NetBEUI) access to the service. LAN Manager is **enabled** by default.

#### 3.3.3.3 LAT

Enables or disables LAT access to the service. LAT is **disabled** by default.

#### 3.3.3.4 NetWare

Enables or disables NetWare (IPX) access to the service. NetWare is enabled by default.

#### 3.3.3.5 RTEL

Enables or disables RTEL access to the service. RTEL is enabled by default.

### 3.3.4 Service Command Format

To create a new service, use a unique service name with the **Set/Define Service** command.

**NOTE:** *All Set/Define Service commands require being the privileged user on the server.*

The format for Set/Define Service commands is shown in Figure 3-5.

**Figure 3-5:** Set/Define Command Format

```
{ SET }
{ DEFINE } SERVICE ServiceName option [option]
```

Figure 3-6 displays an example of the Set/Define Service command format.

**Figure 3-6:** Creating a Service with LAT Enabled

```
DEFINE SERVICE backupprinter LATENABLED
```

The command in Figure 3-6 created a service named **BACKUPPRINTER**. This service has LAT enabled.

The command below creates a service named **LPS\_PRT**; this service has PostScript and PSConvert enabled.

**Figure 3-7:** Creating a Service with PostScript and PSConvert Enabled

```
DEFINE SERVICE LPS_PRT POSTSCRIPT ENABLED PS CONVERT ENABLED
```

## 4 - LAN Manager Configuration

### 4.1 Overview

The RP600 software configuration software is the easiest way to send print jobs to the RP600.

If you are unable to use the RP600 software, the best way to configure the RP600 is to use the IP protocol and the Berkeley remote LPR software.

**NOTE:** *Windows for PCs cannot reliably print jobs to the RP600 via LAN Manager. It is recommended that Windows for Workgroups users spool their print jobs to a Windows NT host and print from that machine.*

The following sections covers DLC and NetBIOS configuration for LAN Manager hosts. These instructions are designed for Windows NT.

### 4.2 Windows NT Users

To send print jobs from a Windows NT host to the RP600, the RP600 must be added as a Windows NT printer. Windows NT users can print using either the DLC protocol or the NetBIOS protocol. DLC configuration is simpler than NetBIOS configuration; however, NetBIOS is more flexible. Both methods are discussed in the following sections.

**NOTE:** *The RP600 does not support NetBIOS over TCP/IP.*

#### 4.2.1 DLC Configuration

The default text service (LPS\_XXXXXX\_TEXT) can be used without any further configuration; DLC is automatically enabled on this service. To use the default PostScript or binary services; however, Windows NT users must associate the **DLC** characteristic with the desired service.



**NOTE:** *DLC can only be associated with one service at a time. If DLC was previously enabled on another service, it will become disabled on that service.*

To do this, use the **Set/Define Service DLC** command. For example, if you'd like to use the binary (PCL) service, the DLC characteristic can be associated with this service by entering the following commands:

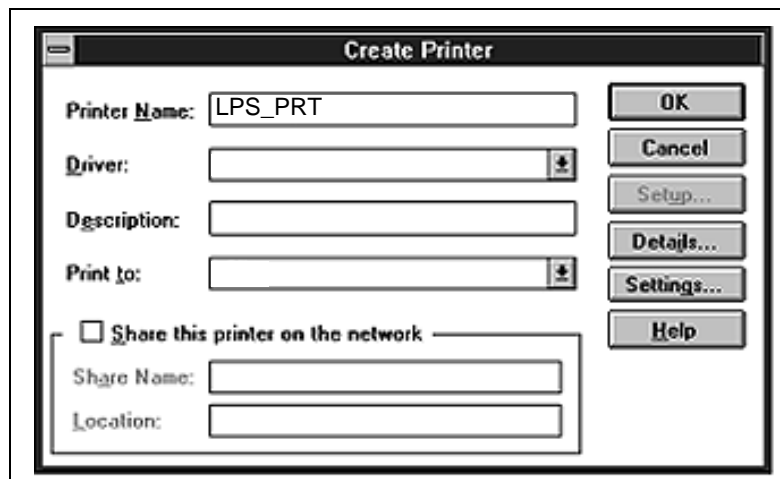
**Figure 4-1:** Associating DLC With PCL Service

```
DEFINE SERVICE DEFAULT DLC PCL
```

In Figure 4-1, **DLC PCL** associated the DLC characteristic with the LPS\_XXXXXX\_PCL service.

Open the NT Print Manager; its icon is located in the Main window. Choose **Create Printer** from the Printer menu.

**Figure 4-2:** Create Printer Dialog Box



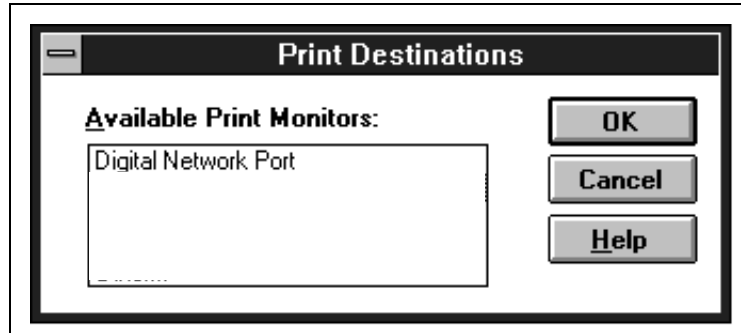
**NOTE:** *If the printer driver isn't already installed, you'll need the Windows NT installation disks.*

In the **Printer Name** box, enter the name of the queue on the NT host. Click the **Driver** menu arrow; select the required printer driver from the pull-down menu. Enter a description string in the **Description** box.

If applicable, choose the **Share this printer on the network** option. (This is not recommended until the print queue is confirmed to be running properly.)

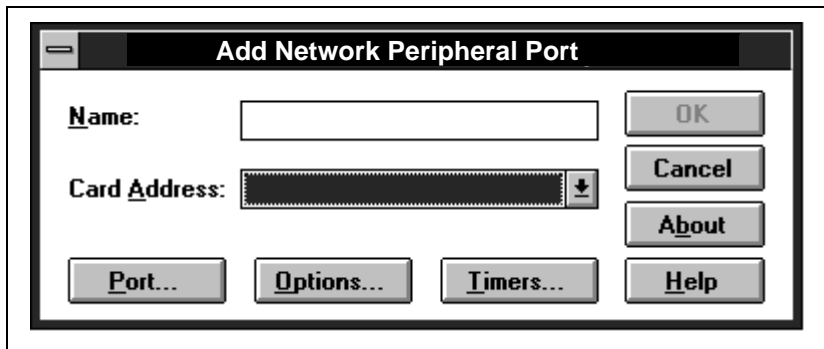
Click the **Print To** menu arrow to view its pull-down menu. Scroll to the **Other** option. The following dialog box will appear:

**Figure 6-1: Print Destinations Dialog Box**



Choose the desired **Network Port** and click the **OK** button. The following dialog box will appear:

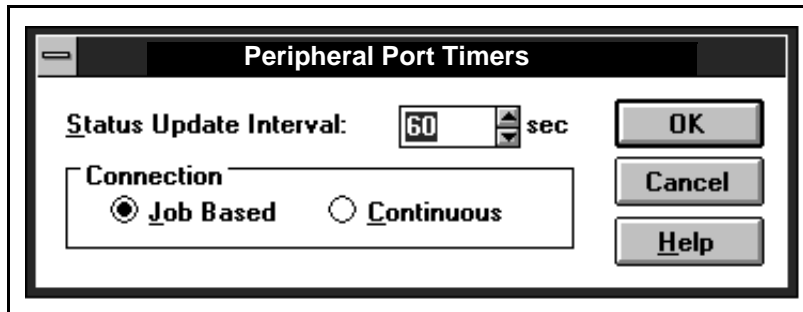
**Figure 4-3: Network Port Dialog Box**



All known DLC nodes will be listed in the Card Address box. Select the RP600 hardware address. Enter a name to be associated with this address at the prompt.

Click the **Timers** button. The following dialog box will appear:

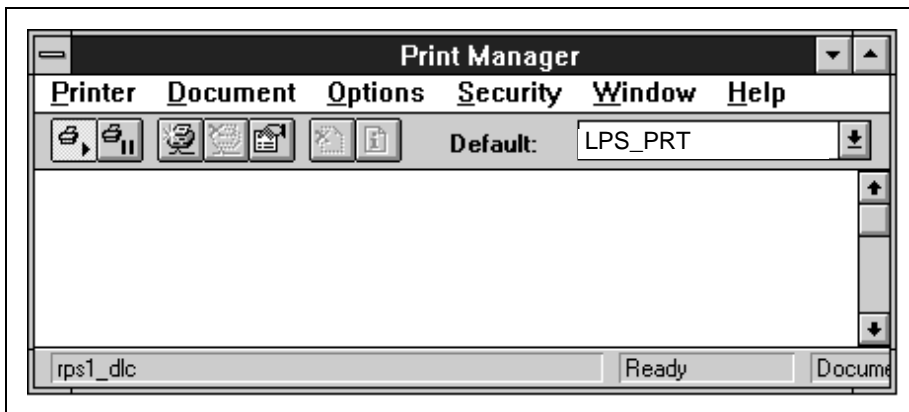
**Figure 4-4:** Timers Dialog Box



Click the **Job Based** radio button. Click the **OK** button in the remaining print dialog boxes.

If you'd like this printer to be the default printer, click the **Default** menu arrow on the title bar of the Print Manager window and scroll to the printer's name.

**Figure 4-5:** Print Manager Window



## 4.2.2 NetBIOS Configuration

All default services can be used for NetBIOS printing. If you're using a custom service, ensure that the LAN Manager characteristic is enabled.

To print from NetBIOS, you will need to redirect a port. Redirecting allows the user to use a service on the RP600 as if it were on the host machine. Choose one of the lpt ports to redirect (typically the ports to choose from will be lpt1, lpt2, lpt3, or lpt4). Before you select a port to redirect, ensure that it doesn't currently have a printer connected to it.

Double-click the DOS Command Prompt icon to open a DOS session. At the DOS prompt, use the **NET USE** command to indicate that the lpt port will be redirected to the RP600 service.

**Figure 4-6:** Net Use Command

```
C:> NET USE LPTn:  
\\LPS_XXXXXXX\LPS_XXXXXXX_TEXT
```

The Windows NT node will attempt to connect to the RP600. (If it cannot connect to the RP600, it will inform you of the problem.) At this point, all references to lptn (the port specified with the NET USE command in Figure 4-4) will go to the service that you created. For testing purposes, you can try to use a copy command, if the RP600 is ready to accept data.

To make the lpt redirect permanent, use the following command [Figure 4-7]. When the host is rebooted, the lpt redirect will be remembered; the host will automatically attempt to connect to the RP600.

**Figure 4-7:** Making Redirect Permanent

```
C:> NET USE /PERSISTENT:YES
```

Exit the MS/DOS shell. Open the NT Print Manager; its icon is located in the Main window on the desktop. Choose **Create Printer** from the Printer menu [Figure 4-2, page 4-2].

**NOTE:** *If the printer driver isn't already installed, you'll need the Windows NT installation disks.*

In the **Printer Name** box, enter the name of the queue on the NT host. Click the **Driver** menu arrow; select the required printer driver from the pull-down menu. Enter a description string in the **Description** box.

Click the **Print To** menu arrow to view its pull-down menu, and select the lpt port you wish to redirect. Click the **OK** button in each print dialog displayed.

If you'd like this printer to be the default printer, click the **Default** menu arrow on the Print Manager's title bar and scroll to the printer's name [Figure 4-5, page 4-4].

### 4.2.3 Potential Windows NT Problems

If you've followed the setup instructions listed in this section, Windows NT printing should run smoothly. However, two potential problems are listed below:

- When Windows NT determines that insufficient progress is being made on a print job, it will automatically time out (force you to abort or retry) print jobs. By default, the timeout period is set to 45 seconds. If you have a slow printer, this timeout period may not be long enough; Windows NT may time out your print job when it's queued to the RP600. To change the timeout period, see the Settings dialog box in Windows NT. (On some versions of Windows NT editing the timeout period does not actually change the 45 second timeout period.)

**NOTE:** *When a timeout occurs, Windows NT will try to restart the entire job. If you are unable to change your timeout period, using LPR is suggested.*

## 5 - LAT Configuration

### 5.1 Overview

The RP600 software configuration software is the easiest way to configure LAT print queues on the RP600. NetWare, and TCP/IP versions of the RP600 software are shipped with the RP600 on the DIGITAL Laser Printer LN15 CD-ROM. All instructions for using the RP600 software are listed in each README file.

Creating a LAT print queue can be done by printing directly to the RP600, or printing to a service. Printing directly to a port is the simplest method of creating a LAT print queue because it requires no configuration of the RP600. Printing using a service requires some RP600 configuration, however, it allows you to have multiple printers service the same VMS queue. The LAT characteristic must be enabled on the service being used. To print PostScript jobs from VMS, a service must be used.

### 5.2 Printing Directly to a Port

This is a two-step process. First, a LAT application port that references the RP600 parallel port must be created on the LAT host. The LAT application port is a device that allows programs to treat a LAT connection as a physical port for input and output. For example, a printer might be configured to use port LTA3419, which might be connected ("mapped") to port 1 of the RP600. The LAT port can be mapped to either a service or an exact port on the ETS.

Second, a print queue that uses the LAT application port must be created.

Use the following commands to create a LAT application port and then set it to the appropriate node and port:

**Figure 5-1:** Creating LAT Application Port

```
$ RUN SYS$SYSTEM:LATCP
LATCP> CREATE PORT LTAnnn/APPLICATION
LATCP> SET PORT LTAnnn/NODE=LPS_XXXXXX/PORT=Port_1
LATCP> EXIT
```

The *nnnn* is any unused LAT port number (use the Show Ports command to see which port numbers are in use). VMS users can then use port *LTAnnnn* as a port to the RP600.

LATCP ports are not permanently configured on a host. Add the commands necessary to create required LAT devices to the SYS\$MANAGER:LAT\$STARTUP.COM file so that they will be recreated after each host reboot.

**NOTE:** See the VMS documentation for more information about terminal characteristics.

Note that LAT terminal device characteristics may have to be changed to correctly print some files. For example, by default the VMS terminal driver will change form feeds into an equivalent number of line feeds. To disable this behavior, enter the following command:

**Figure 5-2:** Disabling Line Feeds

```
$ SET TERMINAL/PERM/FORM
LTAnnn:
```

To create and start a LAT queue on the host that uses this LAT application port, enter the following:

**Figure 5-3:** Creating and Starting the Queue

```
$ INITIALIZE/QUEUE/START/ON=LTAnnn:/PROCESSOR=LATSYM
/RETAIN=ERROR queue_name
```

A print request would then look like the following:

**Figure 5-4:** Creating a Print Request

```
$ PRINT/QUEUE=queue_name filename.txt
```

## 5.3 Printing Using LAT Services

Printing using a LAT service requires the creation of three items:

- A LAT service on the RP600
- The LAT application port that references the RP600 print resource
- A print queue that uses the LAT application port

**NOTE:** *LAT is disabled on all of the RP600 default services because many network managers object to the frequent LAT service announcements. If LAT connections to a service are desired, a service must be created; the default PostScript, Binary, and Text services cannot be used.*

LAT services can be created and connected to using the **Set/Define Service** command. An example is displayed below:

**Figure 5-5:** Creating LAT Service

```
Local>> DEFINE SERVICE LPS_PRT LAT ENABLED
```

A LAT device can then be created using the following commands:

**Figure 5-6:** Creating LAT Device

```
$ RUN SYS$ SYSTEM:LATCP
LATCP> CREATE PORT LTAnn/APPLICATION
LATCP> SET PORT LTAnn/NODE=LPS_XXXXXX/service=LPS_PRT
LATCP> EXIT
```



The rest of the procedure for creating the print queue is the same as discussed in Figure 5-2 through Figure 5-4.

## 5.4 PostScript Printing

To print PostScript jobs from a VMS host, an RP600 service must be used. The service used must have the PostScript characteristic enabled:

**Figure 5-7:** Enabling PostScript Attribute

```
Local>> DEFINE SERVICE LPS_PRT POSTSCRIPT ENABLED
```

Using PostScript printers with LAT queues adds two extra steps to the host queue setup. An application LAT port still needs to be created via LATCP. In addition, a PostScript form and a reset module need to be created on the host. The reset module will contain the Ctrl-D that the printer needs to see to finish and eject the job. To create the form, use the following commands:

**Figure 5-8:** Creating a PostScript Form

```
$ DEF/FORM POSTFORM formnum /STOCK/=DEFAULT/WIDTH=4096/WRAP
```

**formnum** is any unused form number (use **Show Queue/Form/All** to see the form numbers that are currently in use). The longer width prevents the spooler from truncating long (and legal) PostScript command lines.

To create the reset module, use an editor to create a file named EOJ.TXT. Place a Ctrl-D (ASCII 0x4) in this file and insert it into the system device control library.

**Figure 5-9:** Creating Reset Module

```
$ LIBRARY/REPLACE SYS$LIBRARY:SYSDEVCTL.TLB  
EOJ.TXT
```

If the library does not exist, it must be created using the following command:

**Figure 5-10:** Creating a Control Library

```
LIBRARY/CREATE/TEXT SYS$LIBRARY:SYSDEVCTL.TLB
```

Finally, use the INIT/QUEUE command to create the queue. Note the addition of the form specification and the reset module.

**Figure 5-11:** Creating a Queue

```
$INIT/QUEUE/START/DEFAULT=(NOFEED,NOFLAG,FORM=POSTFORM)/ON=LTAnn:  
/PROCESSOR=LATSYM/RETAIN=ERROR/SEPARATE=(RESET=EOJ)LPS_POST
```

A print request will look like the following:

**Figure 5-12:** Print Request

```
$ PRINT/QUEUE=LPS_POST filename.ps
```

## 6 - NetWare Configuration

### 6.1 Overview

The following sections cover print configuration for NetWare hosts. The easiest way to configure print queues is to use the RP600 software point-and-click interface.

The examples in this chapter show how to configure the RP600 using commands entered at the command line interface (Local> prompt). Instructions for configuring NDS print queues on the RP600 are outlined in the *Creating NDS Print Queues* section. To create NDS print queues, you must be running NetWare version 4.0 or greater. If you are running versions 2.x, 3.x, or version 4.0 with bindery emulation, see the section titled *Creating Bindery Print Queues*. Bindery print queues may be configured using either the RP600 software, PCONSOLE, or QINST.

## 6.2 NetWare Access List

By default, the RP600 only scans local file servers (file servers one hop away) for print queues to service. File servers on non-local Ethernets (for example, with a IPX router between them and the RP600) can be enabled using the following commands:

**Figure 6-1:** Enabling Non-Local File Servers

```
Local>> DEFINE PROTOCOL NETWARE ACCESS fileserver
Local>> INIT DELAY 0
```

The **Set/Define Protocol NetWare Access** command configures a list of file servers that the RP600 contacts for print jobs. The **Init Delay 0** command reboots the box.

To enable scanning for jobs on all file servers in the extended network, replace the file server name with the keyword **All**. However, on an extended (wide or local-area) network with many file servers, specifying **All** can severely impact the time between jobs and the overall printing and network performance.

NetWare traffic can be minimized by removing unused file servers from the access list. To remove a file server from the list, use the **Clear** and **Purge** commands. Clear removes an entry from the list immediately, but does not remove it permanently. Purge removes an entry from the list permanently, however, the entry is not removed until the server is rebooted. Examples of the Clear and Purge commands are given below:

**NOTE:** *A single asterisk (\*) can be used to represent a string of characters in the Clear and Purge commands.*

**Figure 6-2:** Removing File Server From Access List

```
Local>> CLEAR PROTOCOL NETWARE ACCESS fileserver
Local>> PURGE PROTOCOL NETWARE ACCESS fileserver
```

## 6.3 Creating NDS Print Queues

If you are using NDS, the Quick Set-Up option is the easiest way to create print queues with PCONSOLE with NetWare v4.x or greater.

The following steps must be done on each file server that will need access to the RP600 queues.

### 1. NDS Registration

- A. To register to use NDS, you must read and complete an NDS registration form through the software.

**NOTE:** *This registration is free of charge but must be completed for every print server to be used.*

- B. Once you have completed the form, click **Submit** on the web page.
- C. To allow NDS on the RP600, enter the **Define Protocol NetWare DSLicense** command using the string that you have received following the registration.

**Figure 6-3:** Enabling NDS on the RP600

```
Local>> DEFINE PROTOCOL NETWARE DSLICENSE  
string
```

### 2. PCONSOLE Print Queue Set-Up

- A. Log in as Admin on the file server you will be changing and type PCONSOLE at the F: prompt to start the utility.
- B. From the main menu choose **Quick Set-Up**.
- C. The Quick Set-Up window will appear. Enter the fol-

lowing information and the window will look like this:

**Figure 6-4:** The Quick Set-Up Window

```
Print Server: server name
New Printer: service name
New Print Queue: queue name

Print Queue Volume: file server
Banner Type:

Printer Type:
Location:
Interrupt:
Port:
```

The print server name (LPS\_XXXXXX) is the name of your RP600. The new printer name (LPS\_XXXXXX\_TEXT) is the service name. The new print queue can be any name. The print queue volume is the name of the file server from which the printer receives print request. The remaining fields can be left in their default settings.

- D. Once you have entered all of the fields in the Quick Set-Up Window, press F10 to save the print queue information.
3. Print Server Configuration
    - A. Use the **Define Protocol NetWare DSTree** command to define which directory service tree that the print server is located on.

**Figure 6-5:** Defining the Directory Services Tree

```
Local>> DEFINE PROTOCOL NETWARE DSTREE food
```

- B. Use the **Define Protocol NetWare DSContext** command to define the directory services context where the

print server is located.

**Figure 6-6:** Defining the Directory Services Context

```
Local>> DEFINE PROTOCOL NETWARE DSCONTEXT ou=kiwi.ou=exotic.o=fruit
```

**NOTE:** *For an explanation of how the NetWare Directory Service tree is structured, see your host documentation.*

- C. Enter the **Show Protocol NetWare Access** command to ensure that at least one of the file servers in the directory services tree is in the access list.

By default the access list is set to Local which includes all file servers which are not across a router. To add to this list, enter the **Define Protocol NetWare Access** command.

**Figure 6-7:** Adding to the Access List

```
Local>> DEFINE PROTOCOL NETWARE ACCESS fileserver
```

- D. Reboot the RP600 using the **Init Delay 0** command.

**Figure 6-8:** Rebooting the Server

```
Local>> INIT DELAY 0
```

4. It may take up to two minutes for the print server to attach to the queue.
5. Enter the **NETSTAT** command. This will display information about file servers, printers, and queues that the print server has found. If a queue is in JobPoll then the print server has successfully attached to the queue.

## 6.4 Creating Bindery Print Queues

### 6.4.1 Using QINST

The QINST utility requires being logged into the **Supervisor** (NetWare 2.2/3.11) or **Admin** (NetWare 4.0) account on the target file server. To use the utility, copy the QINST.EXE file from the DIGITAL Laser Printer LN15 CD-ROM into the **Public** directory on the file server, ensure that it is in the executable path, and type **QINST**.

When using NetWare version 4.0 and greater, the QINST program requires access to UNICODE tables to provide character translation. To ensure the utility runs properly, copy it into the NetWare **Public** directory or ensure that the PATH variable includes the required UNICODE tables.

**NOTE:** *If you wish to enable Bindery emulation, refer to your NetWare documentation.*

**NOTE:** *If you experience problems using QINST, use the PCONSOLE instructions on page 6-8 to install the print queue.*



The following example shows creating a Novell print queue named **LPS\_PRT**.

**Figure 6-9:** Creating Novell Print Queue

```
F:\> \Public\QINST
Q-Install Ver. n.m.
Logged in as ADMIN
Installing on GONZO, NetWare V3.xx
Volume number:0 <CR>
Enter the name of the print server.
: LPS_xxxxxxx <CR>
Enter the name of the queue to create.
: LPS_PRT <CR>
Adding print queue LPS_PRT on volume GONZO_SYS
Enter the service name on LPS_xxxxxxx which will service this
queue.
: LPS_xxxxxxx_TEXT
Adding print server LPS_xxxxxxx. Please wait...
Attaching LPS_xxxxxxx to LPS_PRT
Adding print server LPS_xxxxxxx_TEXT. Please wait...
Attaching LPS_xxxxxxx_TEXT to LPS_PRT

Print queue installed successfully. Resetting LPS_xxxxxxx.
Resetting print server.

Install another queue [y/n]? n
F:\>
```

Use the NPRINT command to print a job to the RP600.

**Figure 6-10:** NPRINT Command

```
F:\> NPRINT C:\AUTOEXEC.BAT /
QUEUE=LPS_PRT
```

## 6.4.2 Using PCONSOLE

The QINST utility is the preferred method for creating Bindery print queues. However, the PCONSOLE utility may also be used. To create a print queue using PCONSOLE, three major steps must be completed:

- The RP600 must be installed as a print server on the NetWare file server
- Print queues must be created on the file server and must be attached to the RP600
- The RP600 must be told to re-poll the file servers for the updated queue information

These steps must be performed on each file server that will need access to the RP600 queues.

**NOTE:** *The following steps refer to NetWare v3.11, but are similar for v4.x and v2.x.*

To create a print queue, complete the following steps.

1. Log in as the privileged user on the file server you will be changing and type PCONSOLE at the F: prompt to start the utility.
2. Create an entry for the Print Server on the Novell file server.
  - A. Select **Print Server Information** from the **Available Options** menu (use the cursor keys to move to it and press Enter). A list of current print servers will be shown.
  - B. Press Insert to create a new entry, add the RP600 and press Enter. This is the name that the RP600 will log in as when querying the file server's print queues. Note that if the RP600 name is changed, the file server(s) will need to be updated.

**NOTE:** *If the login password on the RP600 is changed, a new password will have to be entered for the server. Highlight the RP600 name and press Enter to show the Print Server Information menu. Select the Change Password option and enter the RP600 new login password.*

- C. Use the **Insert** key to add the name of the service which will service the queue, (either **LPS\_XXXXXX\_TEXT**, **LPS\_XXXXXX\_PCL**, or **LPS\_XXXXXX\_PS**) and press Enter.
  - D. Return to the main Available Options menu by pressing Escape.
3. Create a print queue on the file server and associate it with the RP600 service.

- A. Select the **Print Queue Information** menu option under Available Options and press Enter.

This shows a list of any existing print queues on the file server. Press Insert to create a new queue on the file server, type the new queue name and press Enter. The name does not have to be related to the name of the RP600 resources, but should be short and convenient for users to remember.

- B. Highlight the name of the queue just entered and press Enter to configure the queue itself. Select **Queue Servers** (NetWare 4.0 users, select **Print Servers** in the Print Queue Info box) and press Enter to specify which network print servers can print jobs from this print queue. The list will be empty, as none have been selected yet.

Press Insert. The LPS\_XXXXXX, LPS\_XXXXXX\_TEXT, LPS\_XXXXXX\_PCL, or LPS\_XXXXXX\_PS resource entered above should appear in a selection list.

Add the RP600 name (LPS\_XXXXXX). (The RP600 name is used to log in.) Highlight the LPS\_XXXXXX name and press Enter.

- C. Press Insert again. Select either the text (LPS\_XXXXXX\_TEXT), binary (LPS\_XXXXXX\_PCL), or PostScript (LPS\_XXXXXX\_PS) service name and press Enter again.

- D. Press Escape to return to the list of print queues.
- E. Press Escape to return to the Available Options menu.
- 4. Press Escape repeatedly to exit the PCONSOLE utility.
- 5. At the Local> prompt, become the superuser on the RP600 and reset your print server using the **Set Server NetWare Reset** command.

## 6.5 NetWare Queue Password

The default login password (**access**) on the RP600 is also used to log the RP600 into NetWare file servers. If the login password on the RP600 is changed, NetWare print queue setups must also be changed to reflect the new password.

## 7 - TCP/IP Configuration

### 7.1 Overview

The following sections cover print configuration for TCP/IP hosts.

The RP600 provides two major TCP/IP printing methods: Berkeley remote LPR and RTEL host software. Both methods provide queuing of jobs if the RP600 is busy with another job. Instructions for host configuration for LPR and RTEL are described in the following sections.

The remote LPR software allows the RP600 to look like a host that can print files. The Digital-supplied RTEL software, which requires installation and configuration on the host, provides more functionality than remote LPR. It allows the host's lp or lpr printing system to transparently use the RP600 print devices, and allows the creation of named pipe devices on the host that map to the RP600 parallel port. See the documentation included with the distribution CD-ROM for a full discussion of RTEL functionality and configuration.

Raw TCP/IP socket connections can be used with custom queuing software to create queues on the RP600.

## 7.2 LPR on Generic UNIX Hosts

The Berkeley remote printing system is supported on many machines, and is simple to configure for the RP600.

Add the host print queue name into **/etc/printcap**, and then specify the remote node name (the host name of the RP600) and the service name on the RP600.

**NOTE:** *There are slight variations in LPR configuration for AIX, HP, SCO, Solaris, ULTRIX, UNIX, and Windows NT hosts; after reading this section, refer to the following sections for configuration information.*

**NOTE:** *Windows 95 does not support LPR directly, however, there are third party solutions available.*

To add a print queue for an RP600 interface, add the RP600 name and IP address to the **/etc/hosts** file:

**Figure 7-1:** Adding Name and IP Address

```
xxx.xxx.xxx.xxx      LPS_XXXXXXX
```

Edit the **/etc/printcap** file and add an entry of the following form:

**Figure 7-2:** Editing /etc/printcap File

```
lps|Printer on LAB LPS:\
      :rm=LPS_XXXXXXX:\
      :rp=LPS_XXXXXXX_TEXT:\
      :sd=/usr/spool/lpd/lps_prt:
```

Note that the punctuation shown is required, and that no extra spaces should be added. This creates a host queue named **lps\_prt**. The **rm** parameter is the name of the RP600 in the host's address file, the **rp** parameter is the name of the service as it exists on the RP600, and the **sd** parameter specifies the name of a directory used to hold temporary spooling files.

The spooling directory must be created using the **mkdir** command and should be world writable.

**Figure 7-3:** Creating Spooling Directory

```
# mkdir /usr/spool/lpd/lps_prt
# chmod 777 /usr/spool/lpd/lps_prt
```

In addition, the **mx** option allows unlimited size files to be printed and the **sh** option prevents header pages from being generated. See the host's documentation or man pages for more information on the format of the printcap file and how to create the spool directory.

After adding the queue entry to the printcap file, use the **lpc status** command to display the queue:

**Figure 7-4:** lpc Status Command

```
% lpc status
lps_prt:
    queuing is enabled
    printing is enabled
    no entries
    no daemon present
```

Print to the queue using normal lpr commands:

**Figure 7-5:** Printing to Queue

```
% lpr -Plps_prt /etc/hosts
```

## 7.3 Notes About LPR

There are five important things to note about the LPR printing method:

- Because of the way the LPR protocol is typically implemented on the host, the processing options and the banner page are sent after the job data itself. **Because of this, the RP600 prints banner pages at the end of a job, and cannot support most of the LPR options.** If it is necessary to have the banner page at the beginning of the printout, install and use the RTEL software.
- The RP600 cannot print multiple copies of the print job when the “-#x” lpr option is used.
- If banners are not needed, they can be disabled on custom services using the following RP600 commands:

**Figure 7-6:** Disabling Banners

```
Local>> DEFINE SERVICE service_name BANNER DISABLED
```

**NOTE:** *Banners cannot be disabled on default services (for example, the default text service, LPS\_XXXXXX\_TEXT.)*

- Many LPR spoolers are not intelligent about using multiple queues on one host. If two queues on the print host refer to two services on the same RP600, they must use separate spooling directories. If only the default directory is used, data from the 2 queues can be intermixed or sent to the wrong RP600 service.
- No special purpose input or output filters can be used when printing via LPR. If this functionality is necessary, use the named pipe interface program in the RTEL software.



## 7.3.1 LPR on AIX Hosts

LPR is available on machines running IBM's AIX operating system versions 3.2 and higher. Print queues on AIX hosts can be configured using either UNIX commands or the SMIT application.

### 7.3.1.1 Using UNIX Commands

Using LPR on AIX hosts involves a slightly different configuration procedure. The queue configuration file is `/etc/qconfig` and the format of the entry is different. Note the lack of colons (:) and the required white space.

**Figure 7-7:** Adding to Printcap Entry

```
lps_prt:
  device = lps_prtd
  up = TRUE
  host = LPS_XXXXXX
  s_statfilter = /usr/lpd/aixshort
  l_statfilter = /usr/lpd/aixlong
  rq = LPS_XXXXXX_TEXT
lps_prtd:
  backend = /usr/lpd/rembak
```

Note that the device name is simply the queue name with a “d” appended.

### 7.3.1.2 Using SMIT

The System Management Interface Tool (SMIT) allows you to enable LPD printing and create print queues.

1. At the host prompt type *smit*.
2. From the main window in the application choose **Print Spooling**.
3. Then choose **Manage Print Server** and **Start the Print Server Subsystem (lpd daemon)**.
4. In the Start the Print Server Subsystem dialog box, type *both* in the first field. Click **OK**.

‘The lpd subsystem has been started’ will appear in the Output section of the next window. Click **Done**.

To add a print queue use the following instructions.

1. From the main window choose **Print Spooling**.
2. Then choose **Manage Print Server** and **Manage Print Queues**.
3. Next, choose **Add a print queue**.
4. From the dialog box that appears choose **remote**.
5. From the next dialog box choose the type of remote printing.
6. Add the following information to the Add a Standard Remote Print queue dialog box:

**Figure 7-8:** Adding a Print Queue

```
Name of QUEUE to add: queue_name
HOSTNAME of remote server: LPS_XXXXXX
Name of QUEUE on remote server: LPS_XXXXXX_PCL
TYPE of print spooler on remote server: BSD
DESCRIPTION of printer on remote server:
```

A dialog box will appear with the message “Added print queue.”

To print, the normal lp syntax is used:

**Figure 7-9:** Printing to Queue

```
% lp -dlps_prt filename
```

## 7.3.2 LPR on HP Hosts

LPR is supported in HP/UX Version 9.0 and greater. Print queues on HP hosts can be configured using either UNIX commands or the SAM application.

### 7.3.2.1 Using UNIX Commands

To configure a print queue using LPR, become the superuser on your host and issue the following commands:

**Figure 7-10:** Configuring a Print Queue Using UNIX Commands

```
# /usr/lib/lpshut
# /usr/lib/lpadmin -plps_prt -v/dev/null -mrmodel \
  -ocmrcmodel -osmrsmodel -ormLPS_XXXXXXX -orpLPS_XXXXXXX_PCL
# /usr/lib/accept lps_prt
# /usr/bin/enable lps_prt
# /usr/lib/lpsched
```

**NOTE:** *Note that the remote printer name can only be 14 characters so the default text service name will not work.*

Note that issuing the **lpshut** command stops the HP spooling system, so this command should not be performed when print jobs are active. The **lpadmin** command adds the print queue. The **accept** command tells the queuing system that the queue is accepting requests and the **enable** command enables the print queue so it can start printing. Finally, the **lpsched** command restarts the queuing system. To print to this queue, normal lp syntax is used:

**Figure 7-11:** Printing to Queue

```
# lp -dlps_prt filename
```

### 7.3.2.2 Using SAM

The System Administration Manager (SAM) allows you to create print queues.

1. At the HP prompt type *sam*.
2. From the main application window choose **Printers and Plotters**. Click **Open**.
3. Choose **Printers/Plotters** from the Printers and Plotters window.
4. In the **Actions** pull-down menu select **Add Remote Printer/Plotter**.
5. Enter the following information:

**Figure 7-12:** Configuring a Print Queue

```
Printer name: queue_name
Remote system name: LPS_XXXXXXX
Remote printer name: LPS_XXXXXXX_PCL
Remote cancel model: rcmode1
Remote status model: rsmode1
```

### 7.3.3 LPR on SCO UNIX Hosts

LPR is supported in SCO V3.2 release 4 with TCP/IP Version 1.2 and greater. To configure a print queue using LPR, issue the following command:

**Figure 7-13:** Installing Print Files

```
# mkdev rlp
```

This installs the Berkeley remote printing files and executable programs.

**NOTE:** *The `mkdev rlp` command should only be done once. If the command is used repeatedly, serious problems will result with the machine. If this occurs, contact SCO technical support.*

To create a remote printer, use the following command:

**Figure 7-14:** Creating Remote Printer

```
# rlpconf
```

This command asks the following questions and creates a printcap entry for the specified queue:

**Figure 7-15:** Configuring the Remote Printer

```
Remote Printing Configuration
Enter information for remote printers or local printers ac-
cepting remote printing requests
Please enter the printer name (q to quit): lps_XXXXXX_text
Is printer lps_XXXXXX_text a remote printer or a local print-
er? (r/l) r
Please enter the name of the remote host that lps_XXXXXX_text
is attached to: lps_XXXXXX
    The lps_XXXXXX_text is connected to host lps_XXXXXX
Is this correct? (y/n)
Would you like this to be the sys.default printer? (y/n) n
Make sure your hostname appears in lps_XXXXXX's
/etc/hosts.equiv or /etc/hosts:lpd file.
Make sure lps_XXXXXX_text appears in /etc/printcap (in BSD
format).
Make sure lps_XXXXXX_text has a spool directory on
lps_XXXXXX.
Putting lps_XXXXXX_text in printer description file and cre-
ating spool directory... done
Updating LP information... done
```

Keep in mind that the printer name must be the same as the service name on the RP600. If you'd like to change the printer name at a later point, it can be changed by manually editing the printcap file.

To print to this queue, normal lp syntax is used:

**Figure 7-16:** Printing to Queue

```
# lp -dlps_XXXXXX_text filename
```

### 7.3.4 LPR on Solaris Hosts

The following commands configure a BSD print queue on a Solaris 2.3 system. These commands require that you are the superuser and in the bourne shell.

**Figure 7-17:** Creating a BSD Print Queue

```
# /usr/lib/lpsystem -t bsd lps_XXXXXX
# /usr/lib/lpadmin -p lps_prt -s
  lps_XXXXXX|lps_XXXXXX_text /usr/lib/accept
  lps_prt
# enable lps_prt
```

**NOTE:** *LPR is not reliable on Solaris machines. Users with Solaris hosts should use the Digital-supplied RTEL software instead.*

### 7.3.5 LPR on ULTRIX Hosts

ULTRIX hosts need the following additional information added to the printcap entry:

**Figure 7-18:** Adding to Printcap Entry

```
lps_prt|Printer on LAB LPS:\
:lp=:ct=remote:\
:rm=LPS_XXXXXX:\
:rp=LPS_XXXXXX_TEXT:\
:sd=/usr/spool/lpd/lps_prt:
```

These additional options show that there is no physical device for this queue and tell the host that this is a remote connection.

To print to this queue, normal lp syntax is used:

**Figure 7-19:** Printing to Queue

```
# lp -dlps_prt filename
```

### 7.3.6 LPR on Windows NT

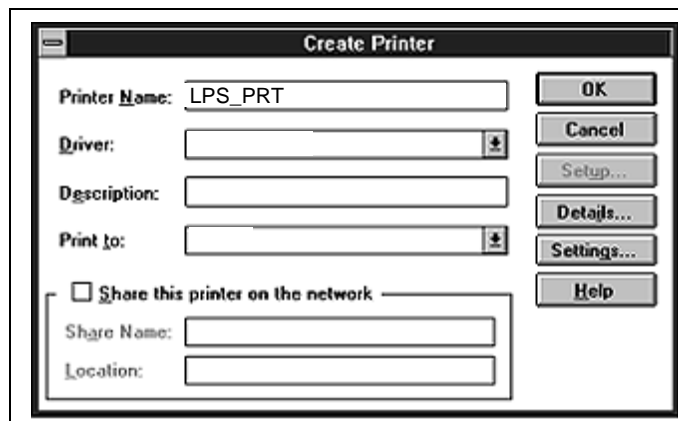
The following procedure configures an lpr print queue.

**NOTE:** *This installation assumes that the TCP/IP protocol, Simple TCP/IP services, and Microsoft TCP/IP printing have been installed in Windows NT.*

Open the NT PrintManager; its icon is located in the Main window on the desktop. Choose **Create Printer** from the Printer menu.

**Figure 7-20:** Create Printer Dialog Box

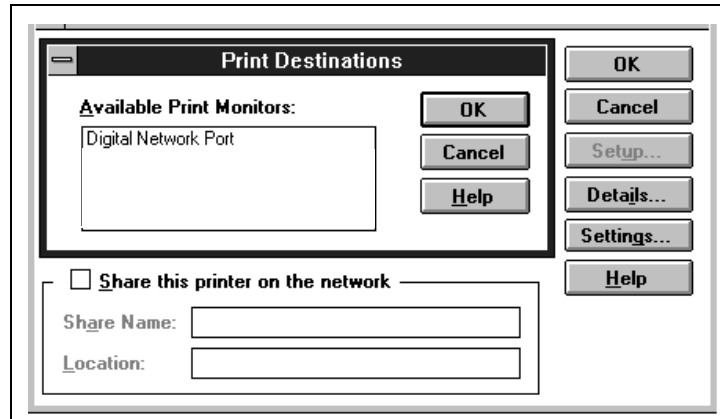
**NOTE:** *If the printer driver isn't already installed, you'll need the Windows NT installation disks.*



In the **Printer Name** box, enter the name of the queue on the NT host. Click the **Driver** menu arrow; select the required printer driver from the pull-down menu. Enter a description string in the **Description** box. If applicable, choose the **Share this printer on the network** option. (This is not recommended until the print queue is confirmed to be running properly.)

Click the **Print To** menu arrow to view its pull-down menu. Scroll to the **OTHER** option. The following dialog box appears:

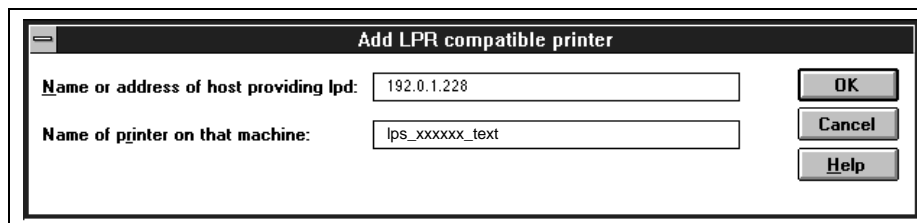
**Figure 7-21:** Print Destinations Dialog Box



Choose **LPR Port** and click the **OK** button.

In the next dialog box, provide the following information and click **OK**:

**Figure 7-22:** LPR Dialog Box



A printer specific dialog box appears next. Fill out the information in the box and click OK.

If you'd like this printer to be the default printer, click the Default menu arrow on the Printer Manager's title bar and scroll to the printer's name.



## 7.4 RTEL Functionality

If the LPR method of printing is not adequate for an application, (banners needed before jobs, more flexibility needed in printing, etc.). RTEL software can be configured on the host. After installing the software and configuring connections to the RP600, normal UNIX print commands can be used and normal queue utilities (lpc, lpstat, etc.) will be usable.

**NOTE:** *RTEL Binaries are provided for many systems as well as source code for use on non-supported systems.*

To print to the RP600 using special formatting or using third-party software packages it may be necessary to create “print pipes” on the host. The RTEL software provides this functionality by providing a UNIX named-pipe interface.

To recreate the RTEL source files, copy the file RTEL\_SRC.TAR from the distribution media to the UNIX host. Ensure that a binary copy is performed. Untar the archive using the following command:

**Figure 7-23:** Untarring the Archive

```
# tar xvf
rtel_src.tar
```

There will be README files in the created directories that describe the contents of the RTEL distribution and various man pages that describe the actual software functionality.

## 7.5 TCP Socket Connections

If custom queuing software has been designed on a host, raw TCP/IP (or Telnet) connections can be made directly to the RP600 parallel port. Opening a TCP session to port 3001 will form a direct connection to the parallel port on the RP600. If Telnet IAC interpretation is needed, form a connection to port 2001. If the port is in use, the connection will be refused.

## 8 - Additional Configuration

### 8.1 Overview

This chapter discusses some additional configurable attributes on the RP600. These aspects include system passwords, server name, service names, and port characteristics.

### 8.2 System Passwords

There are two important passwords on the RP600: the privileged password and the login password.

**NOTE:** *If you choose to change either password, the new password must be no more than 6 alphanumeric characters. For security purposes, you should use a mix of letters and numbers in each password.*

#### 8.2.1 Privileged Password

Changing any server, site, or port setting requires privileged user status. The RP600 software will prompt you for the privileged password when it is needed. If you are not using the RP600 software, you will need to enter the **Set Privileged** command at the Local> prompt to become the privileged user. The default privileged password on RP600 is **system**.

**Figure 8-1:** Set Privileged Command

```
Local> SET PRIVILEGED
Password> system (not echoed)
Local>>
```

The prompt will change to reflect privileged user status. Only one user can be the privileged user at a time. If another user is currently logged into the RP600 as the privileged user, use the Set Privileged Override command to forcibly become the privileged user.

To change the privileged password, use the **Set/Define Server Privileged Password** command. The following figure displays an example of this command.

**Figure 8-2:** Changing Privileged Password

```
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> DEFINE SERVER PRIVILEGED PASSWORD "walrus"
```

## 8.2.2 Login Password

The login password is required for remote console logins. The default login password is **access**. To change the login password, use the **Set/Define Server Login Password** command. The following is an example.

**Figure 8-3:** Changing Login Password

```
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> DEFINE SERVER LOGIN PASSWORD "badger"
```

The login password is also used to log the RP600 into NetWare file servers. If the login password is changed, NetWare print queue setups must also be changed to reflect the new password.

## 8.3 Server and Service Names

The default server name (LPS\_XXXXXX) can be changed using the following commands:

**Figure 8-4:** Changing Server Name

```
Local>> SET SERVER NAME biolab
Local>> DEFINE SERVER NAME biolab
```

Changing the server name automatically changes the names of the default services. In the example above, the server name is changed to **BIOLAB** and the default service names will automatically be changed to **BIOLAB\_TEXT**, **BIOLAB\_PCL**, and **BIOLAB\_PS**. Because the default service names are based on the server name, the server name can not be more than 12 characters.

Note that host queues may have to be reconfigured if the server and service names are changed.

## 8.4 Autosensing Printers

The DIGITAL Laser Printer LN15 (and many other printers) support autoselection of job types. When autoselection is supported, print jobs can be queued to the LPS\_XXXXXX\_PS and LPS\_XXXXXX\_TEXT services in any order; the printer will automatically change its mode to fit the service being used.

**NOTE:** *Refer to your printer's documentation to determine if your printer supports autoselection of job types.*

# A - Troubleshooting

## A.1 Overview

This appendix discusses how to overcome a number of problems. If after reading this section you can't solve your problem, contact Digital.

## A.2 Power-Up Troubleshooting

There are several possible error situations if the unit does not display the welcome message or the LEDs do not flash:

**Table A-1:** Error Messages

Power/ Error Message	Error	Diagnosis/Remedy
Power-up diagnostic failure	Usually a hardware failure. The ACT LED will be solid red for 3 seconds, then another color for one second.	Note which LED is blinking and its color, then contact your dealer or Digital.
Power-up error detected	If the error is non-fatal, the RP600 will boot but not try to load the Flash ROM code.	Briefly press the Test button on the RP600 panel. A configuration page will be printed.
	Network Error. The ACT LED will blink yellow 2-3 times per second.	A boot failure has occurred. Once booted and running normally, the ACT LED will blink once every 2 seconds.
Attempts to download new code from a network host.	The ACT LED will blink yellow 2-3 times per second.	You will need to reload Flash ROM.

## A.3 Printing Problems

The procedures discussed in this section begin at the most basic troubleshooting level.

**Table A-2:** Printing Problems

Area to Check	Explanation
Verify that the IP address is unique to the unit	<p>There is a duplicate IP address on the network if:</p> <p>Telnet/Rlogin connections fail soon after connecting, or ARP requests do not resolve a host known to be working.</p> <p>The server either loses its IP address when booting or will not allow a new IP address to be configured.</p>
Monitor RP600 Queue Status and Port Counters	<p>Use the <b>Show/Monitor Queue</b> command to see if a queue entry appears in the job list. If a queue entry does not appear on the RP600, refer to the appropriate host section in this Appendix.</p> <p>If an active queue entry appears, use the <b>Monitor Port 1 Counters</b> command. If the output byte counter is not incrementing, verify the connection between the RP600 and the printer.</p>

### A.3.1 LPD Host Troubleshooting

**Table A-3:** LPD Host Troubleshooting VMS Host Troubleshooting

Area to Check	Explanation
Verify that the RP600 IP address and name were entered properly in the host file.	<p>Telnet to the RP600 using the name in the host file and verify that the RP600 name is resolvable and that the RP600 is reachable via the network.</p>

Area to Check	Explanation
Verify that jobs which appear in the host queue reach the RP600.	<p>From within the LPC administrative utility, enter the following commands:</p> <p>Become superuser on the host, and clear and reset the host queue using the following commands: <b>abort queue_name</b>, <b>clean queue_name</b>, <b>enable queue_name</b>, and <b>start queue_name</b>.</p> <p>These commands will kill the currently executing daemon, remove all old entries in the queue, enable the queue to accept new entries, and restart job processing.</p>

By default, the LAT error message codes on the host are not translated into text error messages. If a LAT job fails and appears in the queue with an eight-digit hex result code, the code can be translated by issuing the following commands:

**Figure A-1:** Translating LAT Error Codes

```
$ SHOW QUEUE/FULL/ALL queue_name
(note the error code nnnnnnnn)
$ SET MESSAGE SYS$MESSAGE:NETWRKMSG.EXE
$ EXIT %Xnnnnnnnn
```

When configuring a LAT device on a VMS host using a port name:

Area to check	Explanation
Verify that the specified node name matches the server's node name.	Use the <b>Show Server</b> command on the RP600.

When configuring a LAT device on a VMS host using a service:

Area to check	Explanation
Verify that the specified node name matches the server's node name.	Use the <b>Show Server</b> command on the RP600.
Verify that the service name used matches the service name.	Use the <b>Show Service Local Characteristics</b> command on the RP600.
Verify that the desired service is available.	Use the <b>Show Service Local Characteristics</b> command from a network login. If the service rating is zero, the parallel port is in use.
Verify that the LAT characteristic has been enabled on the service.	Use the <b>Show Service Local Characteristics</b> command from a network login.
Verify that the LAT symbiont is specified as the queue process on the VMS host.	Use the VMS command <b>Show Queue/Full queue_name</b> to see the queue characteristics.

If a connection attempt has been unsuccessful when initially configuring a LTA device, the LAT host software may become confused. Deleting and re-creating the LTA port is often required to successfully connect to the RP600.



### A.3.2 NetWare Host Troubleshooting

If the queue was created manually using PCONSOLE, delete the queue and re-create it using QINST or verify the steps used to create the queue; these are listed in *Using PCONSOLE*.

**Table A-4:** NetWare Host Troubleshooting

Area to Check	Explanation
Verify that the server and queue names appear and match the server and service name.	Use PCONSOLE.
Verify that the NetWare access table will allow access to the specified file server.	By default, only local (non-routed) file servers are scanned for queues.
Verify that the login password on the RP600 and the queue password on the file server match.	If the passwords do not match, the RP600 will not be able to log into the file servers to scan for jobs.
Scanning too many file servers can cause a delay between jobs.	Configure the access list to only scan for jobs on the file servers of interest.

The following section assumes that the Novell queue was created using PCONSOLE's Quick Set-Up option. If you experience NDS printing problems, try the following steps:

Area to Check	Explanation
Verify that the print server has successfully attached to the queue.	Type <b>NETSTAT</b> at the Local> prompt. This will display information about file servers, printers, and queues that the print server has found. If a queue is in JobPoll then the print server has successfully attached to the queue.
Verify that the DSTree, DSContext, and DSLicensed are correct.	Type <b>Show Protocol NetWare NDS</b> . This command shows the tree and the context that you have configured, a failure code, and an NDS error code for each NDS server.  DSTree is the directory service tree on which the print server is located. DSContext is the context where the print server is located. DSLicensed should be <i>yes</i> .  Table A-5 and Table A-6 show the failure codes and the NDS error codes that may appear.
Verify that the printer and queue changes that you have made propagate through the NDS tree.	It may take a few minutes for the changes to propagate through the NDS tree. If you type <b>Set Protocol NetWare Reset</b> at the Local> prompt and all the queues don't show up, wait a few minutes and try it again.

**Table A-5: NDS Printing Errors**

Failure Code	Failure Code Meaning	Remedy
0	Success	
1	Print server ran out of memory.	Cycle power on the printer. If the problem persists, disable the unused protocols and change the NetWare access list to only include file servers which have print queues associated with them.
2	Unexpected response from fileserver.	Report the problem to Digital Technical Support.
3	Unexpected response from fileserver.	Report the problem to Digital Technical Support.
4	No printers found for the print server.	Check to make sure that there are printers for the print server and the printer names match the service names on the print server.
5	No queue found for the printer.	Check to make sure that the printers have associated queues.
6	Login failed.	Check to make sure there is a print server object configured with the same name as the print server.
7	Authentication failed.	Check that the login password on the print server is the same as the password for the print server object. If the login password on the print server is the default (access) then there should be no password for the print server object.
8	Print server can not attach to queue.	Check the directory services partitions, replicas, and volumes to make sure that the file server where the queue actually lives has the information about the print server and printers.

**Table A-6:** NDS Errors from the File Server

Failure code	Failure code meaning	Remedy
0	Success	
ffffda7	Object could not be found in the given context.	Check the print server name, dscontext, and dstree to make sure that the printer server is set up correctly with PCONSOLE.
ffffda5	The requested attribute could not be found.	Use PCONSOLE to make sure that the print server has associated printers and that the printers have associated queues.
ffffd69	DS Database is locked.	An administrator is probably updating the database. Wait a few minutes and issue the <b>Set Protocol NetWare Reset</b> command.
ffffd63	The password is invalid.	Make sure the password for the print server object under PCONSOLE is the same as the login password for the print server. If the login password on the print server is the default (access) then there should be no password for the print server object. If the login password is something other than the default, then the password for the print server object should match.
ffffd54	Secure NCP violation.	The file server is probably requiring NCP packet signature or IPX checksumming, neither of which is currently supported.

## A.4 BOOTP Troubleshooting

If the BOOTP request is failing and you have configured your host to respond to the request, there are a few areas you can quickly check:

**Table A-7:** BOOTP Troubleshooting

Area to Check	Explanation
Is BOOTP in your system's /etc/services file?	BOOTP must be an uncommented line in the /etc/services file as a real TCP/IP service.
Is the RP600 in the loadhost's /etc/hosts file?	The RP600 must be in this file for the host to answer a BOOTP or TFTP request.
Is the download file in the correct directory? Is it world-readable?	The download file has to be in the correct directory and must be world-readable. Specify the complete pathname for the download file in the BOOTP configuration file or, a default pathname may be added to the download filename.
Are the RP600 and the host in the same IP network?	Some hosts will not allow BOOTP replies across IP networks. Either use a host running a different operating system, or change the RP600 to be in the same IP network as the host.

## A.5 RARP Troubleshooting

**Table A-8:** RARP Troubleshooting

Area to Check	Explanation
Are the RP600 name and hardware address in the host's /etc/ethers file?	The RP600 and it's hardware address must be in this file for the host to answer a RARP request.
Are the RP600 and its IP address in the /etc/hosts file?	The RP600 and it's IP address must be in this file for the host to answer a RARP request.
Does your operating system start a RARP server at boot time?	Many do not. Check the host's RARPD documentation for details, or use the <b>ps</b> command to see if there is a RARPD process running.

## A.6 PostScript Problems

PostScript printers can create problems, as they will silently abort jobs if they detect an error.

The following procedures start at the most basic troubleshooting level and progressively work up to printing from the host system.

**Table A-9:** PostScript Troubleshooting

Area to Check	Explanation
Verify that the RP600 is communicating with the printer.	<p>To test a PostScript printer use the <b>Test Port 1 PostScript Count 2</b>. This command will process 2 pages of PostScript data. Watch the indicators on the printer to verify that the RP600 is communicating with the printer.</p> <p>Because the printer is capable of bidirectional communication, use the command <b>Test Service RP600_XXXXXX_PS PostScript Count 5</b>. This will transfer data both to and from the printer. Autoselection must be disabled and the printer must be configured as a PostScript printer for this test to succeed.</p>
Verifying Service Characteristics	To display service characteristics, use the <b>Show Service Characteristics</b> command. If the service rating is zero, the internal port is in use. Verify that the PostScript characteristic has been enabled on the service being used. Also, verify that the appropriate protocols for the service are enabled.

Area to Check	Explanation
Monitor Port Counters	<p>If PostScript jobs appear to print but nothing comes out of the printer, verify the amount of data sent from the host.</p> <p>Then use the <b>Zero Counter All</b> command to zero the counters.</p> <p>Issue the appropriate print command from the host system. After the job has completed, issue the <b>Show Port 1 Counters</b> command.</p> <p>The <i>bytes output</i> value should be approximately 171 bytes greater than the size of the file on the host system. These numbers are only approximate, but will show that data is flowing to the printer.</p>

## B - Specifications

### B.1 Temperature Limitations

**NOTE:** *Rapid temperature changes may affect operation. Therefore, do not operate the RP600 near heating or cooling devices, large windows, or doors that open to the outside.*

Operating range:	5° to 50°C (41° to 122°F)
Storage range:	-40° to 66°C (-40° to 151°F)
Maximum temperature change per hour:	20°C (36°F)

### B.2 Altitude Limitations

Operating:	2.4 km (8000 ft)
Storage:	9.1 km (30,000 ft)

If you are operating the RP600 above 2.4 km (8000 ft), decrease the operating temperature rating by 1.8°C for each 1000 m (1°F for each 1000 ft).

### B.3 Relative Humidity Limitations

Operating:	10% to 90% (noncondensing) (40% to 60% recommended)
Storage:	10% to 90% (noncondensing)



## **C - Updating Software**

### **C.1 Overview**

The latest version of the RP600 software and its associated release notes can be downloaded directly from the Digital development systems in one of two ways, via dial-in modem or using anonymous ftp through the Internet.

## C.2 Reloading RP600 Software

The RP600 stores its software in Flash ROM. This software controls the initialization process, the operation of the RP600, and the processing of commands. The contents of Flash ROM can be updated by downloading a new version of the operational software.

The RP600 can be reloaded from network hosts using NetWare, TCP/IP, or MOP. Reloading instructions are given beginning on the following page. Regardless of which protocol is used to update Flash ROM, the following points are important:

- The Flash ROM software is contained in a file called LPS.SYS (a copy of this file is provided with the RP600 on the DIGITAL Laser Printer LN15 CD-ROM). This file must be accessible when updating Flash ROM.
- The LPS.SYS download file should be world-readable on the host, regardless of which download method is being used. In addition, there is a fifteen character length limit for the pathname and an eleven character limit for the filename.

**NOTE:** *It is very important to check the RP600 settings before using the Initialize Reload command; ensure that you are reloading the correct software file.*

- Define commands are used because configuration done with Set commands are cleared when the RP600 boots. Use the **List Server Boot** command to check the RP600 settings before using the Initialize Reload command.

The reloading sequence is as follows:

1. If BOOTP or RARP is enabled on the RP600 it will request assistance from a BOOTP or RARP server before starting the download attempts. The RP600 will then try TFTP, NetWare, and MOP booting, in that order, provided that it has enough information to try each download method.
2. Downloading and rewriting the Flash-ROM will take approximately two minutes from the time the Initialize command is issued. If more than two minutes has elapsed and the server has not successfully booted, press the button on the front panel of the RP600. A brief page will be queued to the parallel port and printed, describing the problem.
3. If the download file could not be found or accessed, the RP600 can still be booted with the code in Flash ROM. As noted in Chapter 2, the OK/Activity LED will blink quickly while the RP600 is booting (and reloading code) and then slowly when it returns to normal operation.

**NOTE:** *If you experience problems reloading Flash ROM, refer to **Troubleshooting Flash ROM Updates** on page 5.*

## C.2.1 NetWare

The LPS.SYS file should be placed in the login directory on the NetWare file server. The RP600 cannot actually log into the file server (since it knows no user-name/password); it can only access files in the login directory itself. On the RP600, specify the file server name, filename and path:

**Figure B-1:** Reloading Flash ROM From NetWare

```
Local>> DEFINE SERVER NETWARE LOADHOST fileserver
Local>> DEFINE SERVER SOFTWARE "sys:\login\lps.sys"
Local>> LIST SERVER BOOT
Local>> INITIALIZE RELOAD
```

## C.2.2 TCP/IP

Downloading uses the TFTP (Trivial File Transfer Protocol) and optionally BOOTP. The RP600 will do a BOOTP query each time it boots. If a host provides BOOTP support, it can be used to set the RP600's IP address and loadhost information. Add the RP600's name, IP address, hardware address, and download path and filename to the BOOTP file (usually **/etc/bootptab**).

Some BOOTP and TFTP implementations require a specific directory for the LPS.SYS file; in this case the path should not be specified in the bootptab file and the file must be placed in that directory. See your host's documentation for instructions on how to configure the LPS.SYS file in the directory.

If BOOTP cannot be used to configure the RP600's IP parameters, configure them by hand using the following commands listed below.

**NOTE:** *For instructions on how to log into the RP600 and enter these commands, refer to Chapter 7, TCP/IP Configuration.*

**Figure B-2:** Reloading Flash ROM From TCP/IP

```
Local>> DEFINE SERVER IPADDRESS xxx.xxx.xxx.xxx
Local>> DEFINE SERVER SOFTWARE "/tftpboot/LPS.SYS"
Local>> DEFINE SERVER LOADHOST xxx.xxx.xxx.xxx
Local>> LIST SERVER BOOT
Local>> INITIALIZE RELOAD
```

The path and filename are case-sensitive and must be enclosed by quotation marks (" "). If attempting to boot across an IP router, the router must be configured to perform proxy ARPing for the RP600.

### C.2.3 MOP

Copy the LPS.SYS file to the MOM\$LOAD directory. The LPS.SYS filename is the only parameter that the RP600 needs to reload via MOP. Make sure the service characteristic is enabled on the host's Ethernet circuit, and then reload the server using the following commands:

**Figure B-3:** Reloading Flash ROM From VMS

```
Local>> INITIALIZE RE-
LOAD
```

**NOTE:** *If the error message “xxx byte record too large,” is displayed on the VAX console the LPS.SYS file was not transferred in binary mode.*

## C.3 Troubleshooting Flash ROM Updates

Many of the problems that occur when updating Flash ROM can be solved by completing the following steps:

NetWare	Make sure the file is in the login directory. Since the RP600 cannot actually log into the file server, it has very limited access to the server directories.
TFTP	Check the file and directory permissions. Make sure the loadhost name and address are specified correctly and that their case matches the case of the filenames on the host system. Ensure that the host has TFTP enabled; several major UNIX vendors ship their systems with TFTP disabled by default.
MOP	The Ethernet circuit must have the <b>service</b> characteristic enabled. Verify that the MOM\$LOAD search path includes the directory containing the LPS.SYS file.