

DEClaser 5100 Printer

Ethernet Card User's Guide
Addendum

Part Number: EK-DL5NW-AD. A01

Digital Equipment Corporation
Maynard, Massachusetts

March 1995

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About This Addendum

This addendum provides additional and corrected information for the *DEClaser 5000 Series Ethernet Card User's Guide* (Part Number: EK-DL51C-UG. A01).

Digital recommends that you keep this addendum together with the documentation that comes with your DEClaser 5100 printer and its options.

This addendum provides information on the following:

- Corrections and additional information for the *Ethernet Card User's Guide*
- Documentation for new features of the NIC firmware Version 3.05:
 - Using the lpd and bootp utilities in TCP/IP environments
 - Resetting both the printer and the NIC to their factory defaults from the Control Panel
 - Disabling/enabling the printer's and NIC's status pages
 - Setting up the NIC for use in LAT-only environments

The instructions in this document assume that you have installed the upgrade to the printer and to the NIC, as described in the *DEClaser 5100 Printer Ethernet Card Upgrade Installation Guide*, and are now running Version 2.53 of the printer firmware and Version 3.05 of the NIC firmware. Use the utilities for Version 3.05 of the NIC; older versions do not support new features.

This addendum uses the same terms as the *DEClaser 5000 Series Ethernet Card User's Guide* with the following exceptions:

- The phrases “Ethernet card”, “Network Interface Card”, and “NIC” all refer to the same item, the network interface controller that you insert into the printer.
- The page printed each time the printer is turned on (unless this has been disabled) is called the Start-Up page. This page shows the name of the printer and the Digital logo. The *Ethernet Card User's Guide* called this page the Power-On Report.
- The page printed each time a printer with a NIC installed is turned on (unless this has been disabled) is called the NIC Status page. The page shows the names of protocols. The *Ethernet Card User's Guide* called this the Status/Configuration Report.

Corrections

Documentation Errata

This section contains notes on the *DEClaser 5000 Series Ethernet Card User's Guide*. The following information should have been included in the User's Guide.

In section	Include the following information:
Section 1.3	The PSprinter program is on the diskettes that come with the printer, not with the NIC.
Page 2-5	The wrist strap shown in Step 3 is optional. To discharge static electricity during an operation, touch a metal part of the printer.
Page 2-6	When you use a BNC T-connector to connect the NIC to the end of the network, use a terminator on the remaining side of the T-connector.
Page 2-6	The NIC shown in Step 4 should include the daughter card.
Chapter 3	When you use the nsconfig or NPmanage utilities to change values, the changes are made to NVRAM and take effect when the printer is powered off and on again or when the NIC is reset using the NPmanage utility.
Section 4.1	The illustration shows an icon for the PSprinter that may not be the current one.

Continued

In section:	Correct the following information
Section 4.3.2	<p>The NPmanage utility provides the ability to change the printer name used by the EtherTalk protocol. The change does not effect the name used by LocalTalk, if you are using both. The default name is DEClaser 5100.</p> <p>If you have more than one printer, Digital recommends that you change the name to something of your own choice rather than relying on the NIC to make the names unique. The NIC adds a number to the default name, in the order in which the printers are turned on. However, in the normal course of managing printers, you turn printers off and on as necessary, with the result that the NIC may assign a name again but to a different printer. To avoid confusion, give each printer its own name.</p> <p>When you change the name of a printer, be careful not to leave the name blank. The NPmanage utility accepts a null name as an authentic name but it would be difficult to identify and manage this printer.</p>
Section 4.3.2	<p>In Step 2, the documentation describes a list of available AppleTalk Zones. However, if you do not have multiple zones, you do not see a list of zones. Your zone is already selected.</p>
Section 6.1	<p>The reference to Appendix E should refer to Appendix C.1.3.</p>
Section 6.2	<p>The reference to Appendix E should refer to Appendix C.2.</p>

Known Limitations

The following items are not supported in this version of the product:

- The NPmanage utility for the Apple platform does not include balloon help.
- In a NetWare environment, the banner page cancels a PCL context because the banner invokes the PostScript interpreter. This means that if you downloaded any PCL fonts, they are lost when a print job uses a banner page. The workaround is to print without banner pages.

New Information

Additional Information

This section provides more information on some of the features and functions described in the *Ethernet Card User's Guide*.

In this section	Add the following information:
Section 1.3	<p>The diskette labeled “Novell NPmanage Program” contains the Windows NT driver needed when you use this product with Intel PCs running Windows NT 3.5 Intel (build 807). You do not need to use this driver if you have a non-Intel Windows NT device, such as a Digital Alpha system, or if you are using Digital’s Network Printing Software for Windows NT, Version 5.0-19 or later.</p> <p>The Windows NT driver is located in the WINNT subdirectory of the diskette. The subdirectory also contains a README.1ST file that provides instructions for installing and using the driver.</p>
Section 3.3	<p>The NPmanage utility contains the following functions:</p> <ul style="list-style-type: none">Troubleshoot<ul style="list-style-type: none">Test PrinterRead error logReport print server statusGeneral Setup Options<ul style="list-style-type: none">Setup Power-On Status Report (the NIC Status page)Setup protocolsReset Unit to Factory Default SettingsNovell Print Server Setup<ul style="list-style-type: none">Set Print Server NameSet Password to File ServerTCP/IP Setup<ul style="list-style-type: none">Specify the IP address, subnet mask, and gateway address

Continued

In this section	Add the following information:
Section 3.3 and Section 4.3.1	<p>Use the NPmanage utility's Reset function to perform the same procedure as occurs when you turn the printer off and on again. The NIC disconnects from the printer, runs its start-up procedure and then reconnects to the printer.</p> <p>If you attempt other NPmanage functions before the procedure is finished, you may get a message that the utility is unable to communicate with the NIC. Wait for the Reset function to finish before issuing new commands.</p>
Section 7.3	<p>If the printer is on and the NIC's LED is not showing an error state, use more than one network tool (for example, NPmanage and ping) to look for the NIC. The card can be working properly on one protocol but not others.</p>
Section 7.4.2.2	<p>If the NIC is not communicating with the NetWare network, check the frame type shown on the NIC Status page. All NetWare clients and servers must use the same frame type. The NIC can use only one frame type for each protocol so if the NIC's type is not the same as the one being used by your host system, the NIC can not communicate.</p> <p>If your network includes a bridge or router that does not pass all frame types, the difficulty in diagnosing the problem increases. For example, you may be able to see the NIC from one side of the a bridge but not from the other side. The solution is to bind both frame types to the NetWare file server's NIC, or to reconfigure the bridge or router to pass the appropriate frame type, or both.</p>
Appendix B	<p>Jumper 2, Link, works when Jumper 1 is set to TP mode. The Link jumper has two positions: DI (Disabled) and EN (Enabled). The default position is EN, suitable for most 10BaseT concentrator hubs. However, if you have older equipment that does not support the Link signal, change the Link jumper (JP2) to DI.</p> <p>Jumper 4, Automatic/Manual is not supported. Leave this jumper in its factory position, Manual.</p>

The Cold Reset Procedure

The Cold Reset function is a procedure that performs the following actions:

- Sets both the printer's and the NIC's settings to their factory default values by clearing their non-volatile RAM (NVRAM). This action also clears any NIC information set by a user, such as the AppleTalk name and zone, the IP address, subnet mask, and gateway address, and the NetWare print server name.
- Switches the NIC's default state to the alternate set of protocols. The default state is either "Enable only LAT protocol" or "Enable all protocols". Each time you perform the procedure, the NIC's state toggles between these two states. The NIC Status page shows you the NIC's current state.

Because the Cold Reset procedure has such a widespread effect, use it when you are planning to reconfigure both the printer and the NIC. For example, you might use the procedure when you move the printer to a new site.

1. Turn the printer off and then on again to print the status pages. If the pages have been disabled, you must enable and print them before you continue.

Note

Always print a NIC Status page and a printer Start-Up page before you perform the Cold Reset procedure. Also, print a PCL Menus page if you use PCL. These pages are your only record of the custom values.

2. Turn the printer off.
3. Press the On-Line button on the Control Panel and turn on the printer at the same time. Keep pressing the On-Line button until the display reads COLD RESET. Then release the button.
The printer prints a new NIC Status page. Notice that the NIC's set of enabled protocols has changed. For example, if your first NIC Status page shows that all protocols enabled, the new NIC Status page now shows that only the LAT protocol is enabled.
4. If you want to return to the original set of protocols, turn off the printer and then perform the Cold Reset function again: turn on the printer while holding the On-Line button until the display reads COLD RESET.
5. Follow the instructions in the manual as if the NIC were a new card being installed for the first time. Use the information on the status pages from Step 1 to configure the NIC to the same settings, if desired.

Moving a Printer

If the move is to a different location on the same portion of the network, just power off the printer, disconnect it from the network, move it to its new location, and reconnect it to the network.

If the move is to a different IP address, IP subnet, or AppleTalk zone, Digital recommends that you reset the NIC to its factory default state so that it searches for a new IP address. You then need to configure the NIC for its new location.

Before the Move

Because the Cold Reset procedure sets **both** the printer's **and** NIC's custom settings to their factory default values, print a NIC Status page and a printer Start-Up page as a record of the custom settings. Also, print a PCL Menus page if you are using PCL. The pages are your only record of the custom settings.

Note

The Cold Reset function also changes the NIC's enabled protocols. Each time you perform a Cold Reset operation, the NIC toggles to its alternate set of protocols: "Enable only LAT protocol" or "Enable all protocols".

At the New Site

After you have moved the printer, use the following procedure to set it up:

1. Make sure the NIC is connected to the right Ethernet connector (10BaseT or ThinWire) and check the NIC Status page to see which connection type is selected. If the connection type at the new location is different from the one used at the previous location, change the jumper on the card using the instructions on page 2-6 of the *DEClaser 5000 Series Ethernet Card User's Guide*.
2. Perform the Cold Reset procedure: turn on the printer while holding the On-Line button until the display reads COLD RESET. Then release the button.
3. Use the NIC Status page from the old location to recreate the old settings, if desired. If you want to use the same set of protocols as used at the original site, perform the Cold Reset procedure a second time.

Frame Types In the NetWare Environment

The NetWare V3.x file servers use the Novell IEEE 802.3 frame type by default. In a NetWare environment, the NIC first checks for this frame type. If the NIC finds a frame of this type, it uses that frame type for its NetWare communication.

If the NIC does not detect a Novell IEEE 802.3 frame type, it looks for other frame types in the following order:

1. Ethernet_II
2. IEEE 802.2 SNAP on 802.3
3. IEEE 802.2

When the NIC succeeds in finding a frame of the type it is searching for, it uses that frame type for all of its communication on that network protocol.

If you are using more than one protocol, Digital recommends that you do not set up file servers to use the Novell IEEE 802.3 frame type. Also, Digital recommends that you select and use only one type of frame type for the NetWare protocol.

Using the Control Panel to Enable Status Pages

In previous versions of the NIC firmware, you used the NPmanage utility to enable/disable the NIC Status page. In the current version, you can also use the printer's Control Panel to disable the NIC Status page. The Control Panel function **Do Start Page** (on the Miscellaneous menu) now controls both the printer's Start-Up page and the NIC Status page. When you disable the printer's Start-Up page, you also disable the NIC Status page. You can also enable a disabled page from the Control Panel.

Review of Resetting Operations

Both the printer documentation and the NIC documentation describe several operations that include a reset procedure. The following table summarizes these operations and their effects on the NIC and on the printer.

	Location	NIC	Printer
Reset Printer	Control Panel	No effect	Purges job information
Reset to Factory Defaults	Control Panel	No effect	Resets NVRAM
Reset	NPmanage: NetWare, Macintosh	Same action as powering the printer off and on, but allows you to do so remotely.	No effect
Reset Unit to Factory Default	NPmanage: NetWare	Resets NVRAM	No effect
Cold Reset	Control Panel	Resets NVRAM	Resets NVRAM

Replacement Documentation

This section provides information that you substitute for the existing documentation in the *Ethernet Card User's Guide*. The following table summarizes the changes.

Section 3.1.8	This section has been expanded to describe the NIC's search pattern.
Page 2-10 and Section 7.2	In Step 8, the appearance of the NIC Status page has changed. This section describes how to read the new NIC Status page.
Chapter 5	This chapter has been rewritten to include discussion of the lpd and bootp utilities and options for installing the NIC in this environment.

Section 3.1.8: NetWare File Servers in a WAN

How the NIC Searches for File Servers

When you turn on the printer, the NIC checks all file servers within a 4-hop area to determine if the NIC is identified as the file server's print server device. The file servers must have an assigned print queue and printer identified.

If there are no file servers on which the NIC is listed as a print server device within a 4-hop area, the NIC continues the search on the entire network.

As soon as the NIC reaches the 4-hop limit, it prints the NIC Status page (if this page is enabled), regardless of whether it has completed its search for file servers. The NIC Status page is a snapshot of the state of the NIC at the instant the NIC reaches the 4-hop limit. For example, the NIC Status page says "Novell inactive" when the actual case is that the NIC is still searching for the Novell file server. Use the NPmanage utility's Show Attached File Servers function to monitor the NIC's progress in attaching to file servers beyond the 4-hop limit.

One consequence of the 4-hop limit is that if a file server within the limit were off-line when the NIC was searching for it, the NIC may have already started searching the entire network when the file server comes back on line. The NIC may not find the file server immediately because it completes the search of the network before returning to the 4-hop locus. You may want to interrupt the search and begin again by turning the printer off and on again.

If your network has a file server within the 4-hop limit but the NIC does not attach to it, check that the file server is configured completely and running properly. Then power the printer off and on again. The NIC begins the search again.

Using a Primary File Server

In a large or complex network, the NIC could search a long time for its file servers. To search more efficiently, designate a "primary file server". The primary file server contains a list of all file servers that recognize the NIC as a print server device.

Using a primary file server changes the NIC's search. Instead of logging into and checking every file server it finds, the NIC searches in that manner until it finds the primary file server and then uses primary file server's list to find and attach to the other file servers. As long as the primary file server is within 4 hops, the file servers on the list can be anywhere else on the network.

The list is exclusive; if a file server is not on the list, the NIC can not attach to it. If the NIC has already attached to a file server and it is not on the list, the NIC logs out of that file server.

Section 7.2: NIC Status Page

If the NIC Status page has not been disabled, it prints after the printer is turned on. However, when NetWare is enabled, the NIC Status page is delayed until the NIC attaches to the primary file server or exceeds the 4-hop limit. This section explains how to read the NIC Status Page. The following example of a NIC Status page shows the information as it appears for a NIC with all protocols enabled.

Unit Serial No: 188365 ③	Version: 03.05 ①
Network Address: 00:40:af:16:fe:68 ④	
Network Topology: Ethernet ⑤	Connector: Thinnet ②
Network Speed: 10 Mega Bits	
Novell Network Information ⑥	enabled
Novell Print Server Name: DEC_188365	Password Defined: No
Frame Type: Ethernet II	
AppleTalk Network Information ⑦	enabled
Frame Type: 802.2 SNAP On 802.3	
Protocol Address: Net Number 189	Node Number 19 Socket Number 129
Preferred AppleTalk Zone: Default Zone	
TCP/IP Network Information ⑧	enabled
Frame Type: Unknown FT	Protocol Address:
Subnet Mask: 255.0.0.0	Default Gateway: 0.0.0.0
LAT Network Information ⑨	enabled
Frame Type: Ethernet II	

Novell Connection Information ①	
Printer Name: finance	
File Server: TRASHY	
Queue: FINAN_Q	Priority: 1 Attached: Yes
Notify: SUPERVISOR	First: 1 Repeat: 30
AppleTalk Connection Information ②	
③ AppleTalk Printer Name: DEClaser 5100 2	
TCP Connection Information ④	
Port Number: 10001	
LAT Connection Information ⑤	
Node name: LAT_0040af16fe68	
Port name: PORT_1	

The NIC Status page is divided into two sections. The top section is static; it shows how the NIC has been configured. The bottom section is dynamic; it is a snapshot of the NIC's status at the time the page is generated. The order of the protocols is Novell (NetWare), AppleTalk, TCP/IP, and LAT.

❶ **Version number:** Version of the NIC firmware.

❷ **Connector:** The default is Thinnet, that is, the NIC uses the ThinWire port. If you need 10BaseT, perform the procedure described on Page 2-6 of the User's Guide.

❸ **Unit Serial Number:** Identification number for this NIC.

❹ **Network Address:** Physical hardware address of the NIC. Use this number to install and configure the NIC in the TCP/IP environment and to identify the unit in Ethernet traces.

❺ **Network Topology:** Ethernet

Network Speed: 10 MegaBits

The position of these items changes depending on which protocols are enabled. They are listed immediately before the first enabled protocol.

To determine the NIC's current set of enabled protocols, check the information to the right of each protocol name. Each protocol is either enabled or disabled. If a protocol is disabled, you can not communicate with the NIC on that protocol. If the protocol is enabled, the report includes additional items of information.

❻ **Novell Network Information**

Novell Print Server Name: The default is DEC_ *number* where *number* is the Unit Serial Number ❸. All file servers must be set up to use this name. If not, the NIC can not attach to the file server.

Frame Type: The NIC's frame type. The value is "Unknown FT" if the NIC did not locate a file server when the NIC Status page was printed. The NIC can only attach to file servers that share the same type. See the discussion of frame types on Page 7.

❼ **AppleTalk Network Information**

Frame Type: 802.2 SNAP on 802.3

Protocol Address: Net Number, Node Number, and Socket Number,

Preferred AppleTalk Zone: If the NIC cannot find the Preferred Zone, it uses the Default Zone. You set the Preferred Zone using NPmanage.

❸ **TCP/IP Network Information**

Frame Type: Unknown FT, when IP address is not assigned

Subnet Mask: Default value is 255.0.0.0

Protocol Address: Default is blank, that is, IP address is not assigned.

Default Gateway: Default is 0.0.0.0

❹ **LAT Network Information:**

Frame Type: Ethernet II

If a protocol is disabled, the bottom section of the NIC status page lists the protocol followed by the word *inactive*. If a protocol is enabled, the report includes additional items. If the NetWare protocol is enabled but listed as inactive, it can mean that the protocol has been configured improperly, or the NIC has not yet connected to a file server.

① **Novell Connection Information:** Information on each file server and each queue that the NIC has located, and the queue's set up information:

Printer Name
File Server
Queue
Notify

② **AppleTalk Connection Information:**

③ **AppleTalk Printer Name:** Default name is DEClaser 5100. When you have more than one printer, Digital recommends you change the name of the printer to something of your own choice rather than relying on the NIC to create unique numbers.

④ **TCP Connection Information:**

Port Number: 10001

⑤ **LAT Connection Information:**

Node Name: LAT_ *address* where *address* is ④ **Network Address**

Port Number: PORT_1

Chapter 5: TCP/IP Configuration

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5. TCP/IP Configuration

If you will be printing from a UNIX system, use this section to configure the network interface card for use with TCP/IP. After the NIC is configured, it provides standard UNIX printing services so you can use the same filters and commands that you use now. The NIC contains installation software for the following platforms:

- DEC ULTRIX RISC 4.3 and 4.4
- DEC OSF/1 2.0 and 3.0
- Solaris 1.1.3 (SunOS 4.1.3) and 2.3 (SunOS 5.3)
- HP-UX Series 700 and 800 9.01
- IBM AIX 3.2.5
- SCO UNIX 3.2

The NIC also contains source code that you can recompile for configuring the card for other System V platforms.

The following general procedure enables TCP/IP printing:

1. Load the NIC software.
2. Configure the IP address.
3. Run the appropriate installation script.
4. Complete the configuration for your operating system.
5. Run the *nsconfig* utility.

5.1 Loading the Software

1. Log in as *superuser* to the system that spools directly to the NIC.
2. Insert the NIC's diskette for TCP/IP in the host drive.
3. Go to or create the directory in which you want to install the software.

Note

If you already have a NIC printer at your site and you are now installing another one, verify that the previous installer deleted the files in the installation directory (not */usr/nic*). If these files remain, they can prevent the installation of a subsequent NIC or, in some cases, overwrite existing files.

4. Use the *tar* command to load the software from the diskette.

5.2 Configuring the IP Address

You can configure the IP address for the card in one of the following ways:

- Use NPmanage for NetWare, as described in the *Ethernet Card User's Guide*.
- Use NPmanage for EtherTalk, as described in the *Ethernet Card User's Guide*.
- Use the Internet Boot Protocol (*bootp*).
- Use the reverse ARP (*rarp*) capability (Ethernet II frame type only).
- Use a reverse *ping* capability.

For each method, you provide the Ethernet address of the network interface card. The Ethernet address is the 12-character code that you recorded at installation and is also printed on the configuration status report each time the printer is turned on.

You can use the *bootp*, *rarp*, or *ping* procedures only when the NIC is in its factory default state when it has no IP address. After the NIC has an IP address, you must use the *nsconfig* utility or, for NetWare and EtherTalk, the NPmanage utility to change an IP address.

5.2.1 Using *bootp*

The *bootp* daemon is a native TCP/IP option for configuring the IP address of a diskless network device. To store the IP address, use the following procedure:

1. Turn off the DEClaser 5100 printer.
2. Log in as *superuser* on a host on the same subnet as the NIC. However, if the server resides on another subnet, complete this procedure to store the IP address in the NIC, reconnect the NIC anywhere on the network, and then use the *nsconfig* utility to change the IP address. See Section 5.5 for instructions on using *nsconfig*.
3. Find the Ethernet address of the network interface card. The address is printed on the configuration status report each time you turn the printer on.
4. Edit the *hosts* file (usually */etc/hosts*) or use NIS or DIS to add the IP address and network interface card's node name. See the network administrator for the IP address. For example, a network interface card named *printfast* with an IP address of 192.9.200.200 has the following entry:

```
192.9.200.200      printfast
```

5. Stop the *bootp* daemon if it is running.
6. Edit the */etc/bootptab* file and add the following information:

```
nic_host:\
:ht = hardware type:\
:ha = ethernet address:\
:ip = IP address:\
:sm = subnet mask:\
:gw = gateway address:
```

For example, for an RFC 1048 system:

```
printfast:\
:ht = ether:\
:ha= 0040AF03AF6E:\
:ip = 192.9.200.200:\
:sm = 255.0.0.0:\
:gw =192.9.200.10:
```

The same information uses the following format on an RFC 951 system:

host	htype	haddr	iaddr	bootfile
printfast	1	00:40:af:03:af:6	192.9.200.200	defaultboot

6. Start the *bootp* daemon by typing:
bootpd -s
7. Check the printer to verify that the network interface card is connected to the network. Turn on the printer.

TCP/IP Configuration

8. Wait until the printer powers up and finishes initializing to allow enough time for the IP address to become known and to be saved in non-volatile memory. After the printer has powered up fully, turn the printer off.
9. Turn the printer back on again and send a *ping* command to verify that the NIC obtained its IP address. For example:

ping 192.9.200.200

If the NIC has the address, the result is a confirmation message:

```
192.9.200.200 is alive
```

10. Remove, or comment out, your changes to the */etc/bootptab* file.
11. Stop the *bootp* daemon and, if you want it to run, restart it.

5.2.2 Using *rarp*

The Reverse Address Resolution Protocol (*rarp*) allows network devices to query a server for their IP addresses on startup. To store the IP address, use the following procedure:

1. Turn off the DEClaser 5100 printer.
2. Log in as *superuser* on the *rarpd* server. However, if the server resides on another subnet, complete this procedure to store the IP address in the NIC, reconnect the NIC anywhere on the network, and then use the *nsconfig* utility to change the IP address. See Section 5.5 for instructions on using *nsconfig*.
3. Find the Ethernet address of the network interface card. The address is printed on the configuration status report when you power on the printer.
4. Edit the *hosts* file (usually */etc/hosts*) or use NIS or DIS to add the IP Address and network interface card's node name. See the network administrator for the IP address. For example, a NIC with the name of *printfast* has the following entry:

```
192.9.200.200      printfast
```

5. Edit the */etc/ethers* file or use NIS or DIS to add the Ethernet address. To continue the example, for the *printfast* card with an Ethernet address of 00:40:c8:00:00:ff, make the following entry:

```
00:40:c8:00:00:ff  printfast
```

6. If the *rarp* daemon is running, stop it and restart it. Verify that the daemon is running.
7. Check the printer to see that the NIC is connected to the network. Turn on the printer.
8. Wait until the printer powers up and finishes initializing to allow enough time for the IP address to become known and to be saved in non-volatile memory. After the printer has powered up fully, turn the printer off.
9. Turn the printer back on again and send a ping command to verify that the NIC obtained its IP address. For example:

```
ping 192.9.200.200
```

10. If the NIC has the address, the result is a confirmation message:

```
192.9.200.200 is alive
```

11. Remove, or comment out, your changes to the */etc/ethers* file.
12. Stop the *rarp* daemon and, if you want it to run, restart it.

TCP/IP Configuration

5.2.3 Using *ping*

Use the following procedure to enter the IP Address:

1. Turn off the DEClaser 5100 printer.
2. Log in as *superuser* on a host on the same subnet as the NIC. However, if the server resides on another subnet, complete this procedure to store the IP address in the NIC, reconnect the NIC anywhere on the network, and then use the *nsconfig* utility to change the IP address. See Section 5.5 for instructions on using *nsconfig*.
3. Find the Ethernet address of the network interface card. The address is printed on the configuration status report each time you turn the printer on.
4. Edit the *hosts* file (usually */etc/hosts*) or use NIS or DIS to add the IP address and NIC's node name. See the network administrator for the IP address. For example, a NIC with a name of *printfast* and an IP address of 192.9.200.200 has the following entry:

```
192.9.200.200          printfast
```

5. Add an entry to the *arp* cache for the NIC's IP address and Ethernet address. For example:
6. Check the printer to see that the NIC is connected to the network. Turn on the printer.
7. Send a *ping* command the network interface card to verify it is running on the network. For example:

```
arp -s 192.9.200.200 0:40:c8:0:0:ff
```

```
ping 192.9.200.200  
ping printfast
```

Although the network interface card cannot respond to the *ping* command, it can read its own address from the packets.

8. Turn the printer off and back on again and then send the *ping* command again to verify that the NIC obtained its IP address. If the NIC has the address, the result is a confirmation message:

```
192.9.200.200 is alive
```

5. Remove the entry from the *arp* cache using the following command. Specify the NIC either by its IP address or by its name. For example:

```
arp -d printfast
```

5.3 Choosing the Type of Installation

For most operating systems, you have the option of using host-resident printing or NIC-resident printing which uses the line printer daemon. Choose a method that is appropriate for your site, based on the following differences:

- The host-resident method can report the status of the print queue; the NIC-resident method does not.
- The host-resident method can print the user name and file name on its banner page; the NIC-resident method prints a banner page with the host's name.
- The host-resident method requires you to repeat the configuration procedure on every host that you want to be able to print jobs. The NIC-resident method requires you to configure the printer one time, when you install the NIC.

After choosing a method, issue one of the following commands:

To perform a host-resident installation: **nicinst**

To perform a NIC-resident installation: **lpdinst**

5.4 Completing the Configuration

Go to the subsection for your operating system and follow the instructions for the type of installation you chose.

5.4.1 DEC ULTRIX and DEC OSF/1

These systems can use host-resident or NIC-resident installation.

NIC-Resident Installation

The **lpdinst** command creates the */usr/nic* directory and copies some files. You then run the *lprsetup* utility to make changes to the contents of the */etc/printcap* file.

1. Enter the following command:

lprsetup

2. Select **add** and press Enter.
3. Enter a name for your printer and press Enter.
4. Press Enter at the prompt to see a list of supported printers.
5. Enter **remote** as the printer type and press Enter.
6. Either press Enter at the prompt to accept the default spooler directory or enter the name of your directory and press Enter.

OSF/1 systems: At this point, the script prompts for an error log. Either press Enter at the prompt to accept the default location and file name or enter the name of your file location and name and press Enter.

7. Enter the name of the remote system and press Enter.
8. Enter **PORT1** as the name of the printer on the remote system and press Enter.
9. Enter Q and press Enter. The system displays its print configuration, based on your responses. For example:

```
Printer_name
Symbol Type Value
lp          STR
rm          STR    some_name
rp          STR    PORT1
sd          STR    /usr/spool/some_dir
```

OSF/1 systems: The list also includes the lf symbol and the file specification for the error log.

10. Either enter **Y** at the prompt to confirm the configuration or press Enter to cancel the changes.
11. You have the option of adding some text to further identify the printer. Press Enter.
12. Select **exit** to save the configuration and press Enter.

TCP/IP Configuration

Go to Section 5.5 for instructions on running the *nsconfig* utility.

Host-Resident Installation

The **nicinst** command creates the */usr/nic* directory and copies some files. It then starts a script that prompts you for information. Your responses change the contents of the */etc/printcap* file.

1. At the prompt, enter the IP node name of the NIC and press Enter.
2. Enter a name for your printer and press Enter.
The system displays your responses and inquires if you want to accept this configuration, based on your responses.
3. Either enter **Y** at the prompt to confirm the configuration or enter **N** to cancel the changes.
The system displays a printcap entry based on your responses and inquires if you want to append the entry to the *etc/printcap* file.
4. Either enter **Y** at the prompt to confirm or enter **N** to cancel the change.

The script creates a spool directory in */usr/spool* for your printer.

Repeat the procedure on each system that you want to have access to the printer.

If you want to use a different filter than the one provided by the installation script, edit the *etc/printcap* file. For example, to use the *ln03rof* filter on an Ultrix 4.3 system, change the lines:

```
:if=/usr/nic/infilter|/usr/nic/nicfilter nodename 10001:\
:of=/usr/nic/outfilter:\
to
:if=/usr/lib/lpfilters/ln03rof|/usr/nic/nicfilter nodename 10001:\
:of=/usr/lib/lpfilters/ln03rof:\
```

where *nodename* is the IP node name of the NIC.

Go to Section 5.5 for instructions on running the *nsconfig* utility.

TCP/IP Configuration

5.4.2 Solaris 1.1.3 (SunOS 4.1.3)

The **lpdinst** command creates the */usr/nic* directory and copies some files. You then edit the */etc/printcap* file to include the printer and its spooler directory. The printcap entry causes the file to be printed on the printer that contains the NIC.

1. Edit the */etc/printcap* file and locate the entry for your printer at the end of the file.
2. Add the capability codes for remote host and remote printer, **rm** and **rp**, respectively. Specify the NIC as the remote host and PORT1 as the remote printer. For example:
3.

```
your_printername|NICprinter:\
:lp=\
:rm=your_nic:\
:rp=PORT1:\
:sd=/usr/spool/your_dir/your_printername:
```
4. Exit from the file.
5. Create the spooling directory. For example:

mkdir /usr/spool/your_dir/your_dir

Go to Section 5.5 for instructions on running the *nsconfig* utility.

5.4.3 Solaris 2.3 (SunOS 5.3) and SVR4

The **nicinst** command creates the */usr/nic* directory, copies some files, and starts a command procedure. When it is completed, make the information available to the *lp* utility by editing an interface program, usually a shell script. The default interface file is called *standard*, but you can use an interface file customized for a particular type of printer.

1. Make a copy of the interface file in the directory */usr/nic* for PORT1. For example:

```
cp /usr/spool/lp/model/standard /usr/nic/port1_interface
```

2. Go to the directory */usr/nic* and edit the interface file.
3. Change the shell variable *FILTER* to invoke *nicfilter*. To accomplish this, search for the line `FILTER='${LPCAT} 0'` and replace it with the following:

```
FILTER="/usr/nic/infilter | /usr/nic/nicfilter \  
printer_name printer_port ${nobanner} \  
${user_name} ${request_id} ${files}"
```

where *printer_name* and *printer_port* are the names specified in the file */etc/hosts*. The remaining arguments are optional and are used to create a banner that includes sender name, job number, and filename. Omit the last four arguments to use the default banner.

4. If your interface file does not have the *FILTER* shell variable defined, you can enclose the entire *standard* file in parentheses and piping it to *nicfilter*.
5. Use the *lpadmin* command by typing the following commands:

```
lpadmin -p printer_name -v /dev/null -i interface_file  
enable printer_name  
accept printer_name
```

Repeat the procedure on each system that you want to have access to the printer.

Go to Section 5.5 for instructions on running the *nsconfig* utility.

TCP/IP Configuration

5.4.4 HP-UX

The **nicinst** command creates the */usr/nic* directory and copies some files. It then starts a script that prompts you for information. After you complete the script, you add the information to the *lp* utility.

1. Use the *kill* command to stop the scheduler process.
2. Enter the following commands:

```
lpadmin -p printer_name -v/dev/nic/printer_name -mlaserjet  
enable printer_name  
accept printer_name
```

where *printer_name* is the name specified during the *nicinst* procedure. You can also use the other options for the *lpadmin* command.

3. Restart the scheduler with the following command:

```
/usr/lib/lpsched
```

Repeat the procedure on each system that you want to have access to the printer.

Go to Section 5.5 for instructions on running the *nsconfig* utility.

5.4.5 AIX RISC System/6000

This operating systems can use either host-resident or NIC-resident installation.

The AIX operating system uses the *qdaemon* program and configuration information stored in the */usr/lpd/qconfig* file to handle printing services. The configuration information includes entries for each virtual printer and physical device known to the system.

You configure the NIC in a similar manner to configuring a local printer. The only difference is the physical printer device must be a named pipe used by the NIC's print daemon to route data.

NIC-Resident Installation

The **lpdinst** command creates the */usr/nic* directory and copies some files. Then use the following procedure:

1. Enter the following at the system prompt:
smit spooler
2. Select **Manage Remote Printer System** from the menu.
3. Select **Client Services** from the menu.
4. Select **Remote Printer Queues** from the menu.
5. Select **Add a remote queue** from the menu. A form to be fill out is displayed, as shown in the example.
6. Change the values displayed on the screen. You must replace the **short form filter** and **long form filter** values.
7. When you are finished, press Enter.

Go to Section 5.5 for instructions on running the *nsconfig* utility.

TCP/IP Configuration

Host-Resident Installation

The **nicinst** command creates the */usr/nic* directory and copies some files. It then starts a script that prompts you for information. Your responses change the contents of the */etc/qconfig* file.

1. Shut down *qdaemon* using the command:
stopsrc -s qdaemon
2. Invoke SMIT with the following command:
smit spooler
3. Select **Manage Local Printer Subsystem** from the menu.
4. Select **Virtual Printers** from the menu.
5. Select **Add a Virtual Printer** from the menu.
6. At the entry for **printer type**, type **1** and press Enter.
7. At the entry for **device name**, type the name for the printer that you used during the **nicinst** program and press Enter.
8. From the list of printer models, find the model number of your printer. Enter the list number (**not** the model number).
9. At the prompts for header pages and trailer pages, type **Y** to enable these pages or **N** to disable them.
10. Enter the queue name for your printer and the prompt and press Enter.
11. If you want this printer queue to be the default one, type **Y** at the prompt; otherwise, type **N**. Press Enter.
12. Press Enter and then press Enter again to exit SMIT.
13. Edit the */etc/qconfig* file. To search for your printer's name, type **/printer_name** and press Enter. The command locates the following line:

```
printer_name      :      file = /dev/printer_name
```
14. Replace */dev* with */dev/nic*
15. Exit from the editor and save the file.
16. Restart the *qdaemon* process with the following command:
startsrc -s qdaemon

Repeat the procedure on each system that you want to have access to the printer.

Go to Section 5.5 for instructions on running the *nsconfig* utility.

5.4.6 SCO UNIX

The **nicinst** command creates the */usr/nic* directory and copies some files. It then starts a script that prompts you for information. After you complete the script, you add the information to the *lp* utility.

Enter the following commands:

```
lpadmin -P printer_name -v /dev/nic/printer_name  
enable printer_name  
accept printer_name
```

where *printer_name* is the name specified during the **nicinst** procedure. You can also use the other options for the *lpadmin* command.

Repeat the procedure on each system that you want to have access to the printer.

Go to Section 5.5 for instructions on running the *nsconfig* utility.

5.5 Running NSCONFIG

The *nsconfig* utility sends the *nicprint.conf* file to the NIC to define or update the information stored in the card's NVRAM. Use the following procedure to run *nsconfig*:

1. Change the current directory to */usr/nic*.
2. Copy the original *nicprint.conf* file to a safe location for future use. A sample file is shown in this section. Because this file is used by several different Digital products, not every parameter is relevant to the NIC. Also, the warning at the beginning of the file does not apply to this NIC.
3. Edit the *nicprint.conf* file with the information you want for your NIC. This section contains a table that shows all the parameters and values. The entries that you can change are in bold type. However, check all entries to make sure they are correct for the NIC because if you are using a copy of a *nicprint.conf* that contains, for example, the IP address of some other NIC, running your file affects the other NIC.
4. Change the parameters to your new values. All fields must be filled, even if a parameter does not apply to your NIC. The parameters are separated from the values by the tab character.
5. Exit from the editor and save the file.
6. Run *nsconfig* with the NIC's IP address or its name (as entered in */etc/hosts*). For example:
nsconfig 192.9.200.212
or
nsconfig printfast
7. Turn the printer off and then on again.

You are now ready to print.

TCP/IP Configuration

```
#####  
###  
### NICPRINT.CONF :  
###  
### This file contains the configurable parameters to be used when  
### initiating a communication with the N.I.C.  
### This file can be altered manually. Remember to leave a tab  
### between the description and the parameter.  
###  
#####  
###  
### WARNING!  
### This file includes protocol enable/disable parameters for Novell,  
### Apple, and DEC LAT. Note that some units cannot support more than  
### two active protocols in addition to TCP/IP. Ensure that, if you  
### are configuring such a unit, no more than two of the three  
### additional protocols are assigned "Y" parameter values. If more  
### than the allowable number of protocols are enabled, the unit will  
### revert to the protocols normally enabled on factory default.  
###  
#####  
#####
```

#Description	Parameter
Internet-Address	0.0.0.0
Netmask	255.0.0.0
Forwarding	N
Base-Port-Number	10000
Keepalive	Y
Max-Transmission-Unit	1500
Broadcast	0
SNMP-System-Description	Network printer
SNMP-System-ID	1.3.6.1.4.1.24
Ethernet	Y
Default-Router-IP	0.0.0.0
Serial-Direction	OUT
Serial-Baud-Rate	19200
Serial-Data-Bits	8
Serial-Stop-Bits-Fixed	1
Serial-Parity	None
Serial-DTR/DSR	Enabled
Serial-XOn/XOff	Enabled
Novell-Protocol	Y
Apple-Protocol	Y
Banners-ON/OFF	OFF
Parallel-port1-data-format	PCL PS OTHER
Serial-port2-data-format	PCL PS OTHER
Parallel-port-data-format	UNUSED
Parallel-port-data-format	UNUSED
LAT-Protocol	Y
Powerup-Status-Page	ON

TCP/IP Configuration

Parameter	Description
Internet-Address	The TCP/IP address for the NIC
Netmask	The packet class on the network
Forwarding	Reference only. Do not change. Set to N
Base-Port-Number	Reference only. Do not change. Set to 1000
Keepalive	Reference only. Do not change. Set to Y.
Max-Transmission-Unit	Reference only. Do not change. Set to 1500.
Broadcast	Reference only. Do not change. Set to 0
SNMP-System-Description	Reference only. Do not change. Set to Network Printer
SNMP-System-ID	Reference only. Do not change. Set to 1.3.6.1.4.1.24
Ethernet	Reference only. Do not change. Set to Y.
Default-Router-IP	Router's IP address; must be on the same subnet as the NIC's IP address. If no network router, keep the default of 0.0.0.0.
Serial-Direction	Reference only. Do not change. Set to OUT
Serial-Baud-Rate	Reference only. Do not change. Set to 19200
Serial-Data-Bits	Reference only. Do not change. Set to 8
Serial-Stop-Bits	Reference only. Do not change. Set to 1
Serial-Parity	Reference only. Do not change. Set to None
Serial-DTR/DSR	Reference only. Do not change. Set to Enabled
Serial-XOn/XOff	Reference only. Do not change. Set to Enabled
Novell-Protocol	Enables/disables the IPX protocol. Use Y to enable or N to disable the protocol.
Apple-Protocol	Enables/disables the EtherTalk protocol. Use Y to enable or N to disable the protocol.
Banners ON/OFF	Enables/disables the page at the start of each print job. Use On or Off. This field affects NIC-resident printers. In host-resident printers, use the -h option or its equivalent.
Parallel-port1-data-format Serial-port2-data-format	Specifies the lpd filters used by the printer attached to the port. Reference only. Do not change. Set to PCL PS OTHER. Do not attempt to disallow data formats by editing this field. The printer can distinguish data formats (auto-sensing) so there is no danger of a file being misdirected.
Parallel-port-data-format Parallel-port-data-format	Reference only. Do not change. Set to UNUSED.
LAT-Protocol	Enables/disables the LAT protocol. Use Y to enable or N to disable the protocol.
Powerup Status Page	Enables/disables the printer's Start-Up page. Use Y to enable or N to disable the page.

5.6 After the Configuration

Go to the directory from which you ran the **nicinst** or **lpdinst** procedure and delete the NIC files. If you do not, these files might interfere with the configuration of any subsequent NIC that you install.

Whenever you make changes to the configuration information, run the *nsconfig* utility and then turn the printer off and on again.

If you have more than one NIC printer in your network, edit the *nicprint.conf* file each time you use the *nsconfig* utility to specify the particular NIC you intend to modify. Or, make a copy of the *nicprint.conf* file for each NIC printer, giving each copy a unique name. When you use *nsconfig*, copy the unique file to the file name *nicprint.conf*.

5.7 Error Messages From NSCONFIG

The *nsconfig* command uses the *nicprint.conf* file. The following errors cause the command to quit.

Message: “usage: [-?] [-h] <internet address>”

This string is printed if the command line options are missing or invalid. Type in the correct command line options.

Message: “Unable to open file.”

nicprint.conf file/directory permission not granted, file missing, or corrupted. Verify permissions and status of *nicprint.conf*.

Message: “Invalid IP Address!”

An invalid IP address was supplied. Supply the correct IP address for *nicprint.conf*.

Message: “Reading in Internet Address from configuration file. Ensure that the parameter is in the format A.B.C.D where A, B, C, and D are all numerical values between and inclusive of 0-255.

An invalid IP address was supplied. Supply the correct IP address.

Message: “Reading in Netmask from configuration file. Ensure that the parameter is one of the following: FF.0.0.0 or FF.FF.0.0 or FF.FF.FF.0.”

An invalid Netmask (subnet mask) parameter was supplied. Supply the correct Netmask value for *nicprint.conf*.

Message: “Reading in Forwarding from configuration file. Ensure that the parameter is one of the following : Y or y or N or N.”

An invalid Forwarding parameter was supplied. Use the correct Forwarding value in *nicprint.conf*.

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Message: "Reading in Trailers from configuration file. Ensure that the parameter is one of the following: Y or y or N or n."

An invalid Trailers parameter was supplied. Supply the correct value in *nicprint.conf*.

Message: "Reading in Base Port Number from configuration file. Ensure that the parameter contains only numerical [0-9] values in its entry."

An invalid Base Port Number parameter was supplied. Supply the correct Base Port Number for *nicprint.conf*. Digital recommends that you do not change the default parameter.

Message: "Reading in Keepalive from configuration file. Ensure that the parameter is one of the following : Y or y or N or n."

An invalid Keepalive parameter was supplied. Supply the correct value.

Message: "Reading in Max. Transmission Unit from configuration file. Ensure that the parameter contains only numerical [0-9] values in its entry."

An invalid Max. Transmission Unit parameter was supplied. Type only numerical values for *nicprint.conf*.

Message: "Reading in Broadcast from configuration file. Ensure that the parameter is one of the following: 1 or 0."

An invalid Broadcast parameter was supplied. Type only 1 or 0 in *nicprint.conf*.

Message: "Reading in SNMP System Description from configuration file. Ensure that the parameter has less than 80 characters (including white space)."

An invalid SNMP System Description parameter was supplied. Type less than 80 characters (including spaces) for *nicprint.conf*. Digital recommends that you do not change the default parameter.

Message: "Reading in SNMP System ID from configuration file. Ensure that the parameter is in the format: XX.XX.XX.XX."

An invalid SNMP System ID parameter was supplied. Supply the correct format of SNMP System ID for *nicprint.conf*. Digital recommends that you do not change the default parameter.

Message: "Reading in Ethernet from configuration file. Ensure that the parameter is one of the following: Y or y or N or n."

An invalid Ethernet parameter was supplied. Type only Y or N (upper or lowercase is accepted).

TCP/IP Configuration

Message “Can't connect with the server.”

This error message has two possible causes:

- The NIC's IP address has changed but the entry in the *arp* cache has not been updated. Delete the entry in the *arp* cache and then run *nsconfig*.
- A connection was aborted without closing the channel. When you start a new session, you get this message because the channel is still busy. Turn the printer off and then on again to deallocate the channel.

Message: “Nsconfig: Couldn't write Subnet Mask to socket.”

This error message has four possible causes:

- Broken or unplugged cable. Inspect cable and plug in or replace.
- The NIC is either hung, has crashed, or is slow. Reset the card.
- Packets are being corrupted by an intervening node (between the network interface card and the workstation). Check for any failing intervening hosts.
- An attempt to communicate with the NIC is unsuccessful because TCP/IP has been disabled or TCP/IP on the NIC has crashed but other installed protocols are up and running.

Take the following steps:

1. Ensure that the NIC is actually running TCP/IP.
2. Ping to determine if the NIC can be reached via IP.
3. Determine if other NIC protocols are working.
4. Reset the NIC.

Message: “Nsconfig: Couldn't read Acknowledgment from socket.”

The handshake from the NIC was never received. Supply the correct Netmask value, FF.0.0.0 or FF.FF.0.0 or FF.FF.FF0, for *nicprint.conf*.

Message: “Nsconfig: Error on server end.”

The receiver handshake was not acknowledged. Supply the correct Netmask value, FF.0.0.0 or FF.FF.0.0 or FF.FF.FF0, for *nicprint.conf*.

Message: “Nsconfig: Error reading Acknowledgment from server.”

The host cannot accept the server handshake, that is, the host received a response from the NIC but the value is unexpected.