Configuring Systems for Terminals, Printers, and Other Serial Devices

HP e3000 MPE/iX Computer Systems

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Preface

This manual documents functionality for the MPE/iX 7.5 release, as well as later releases, for HP e3000 Series 900 systems.

This manual describes how terminals, printers, and other serial devices are connected to the HP e3000 Series 900 computer. It includes an explanation of how terminal, printer, and other serial device input/output (I/O) is controlled by the MPE/iX operating system, and presents an overview of both the hardware and software needed to accomplish communications in an asynchronous serial mode.

Step-wise configuration for the HP e3000 and the Datacommunications and Terminal Subsystem (DTS) is presented in this manual.

Printer and terminal type files are discussed, as well as various other topics that impact how communications take place between an asynchronous device and the computer.

PAD configuration is discussed in this manual. If you are configuring system-to-system X.25 or PAD configuration networking capabilities on a HP e3000 Series 900 computer using host-based network management, use *Configuring and Managing Host-Based X.25 Links* instead of this manual to configure DTCs and DTC connections.

This manual may still be needed for some DTS related tasks that are outside the scope of X.25 and PAD connections configuration. This manual contains information on such tasks as: the details on Creating and Modifying Profiles in Chapter 7, “Terminal and Printer Profiles,” in Chapter 8, “Additional DTC Configuration,” and Appendix A, “Using NMMGR in Maintenance Mode.”

Skills and Tasks

Configuring Systems for Terminals, Printers, and Other Serial Devices will be of greatest value to the person responsible for the overall operation and reliability of an MPE/iX computer. This person is usually called the system administrator or system manager, and needs to be able to prepare devices for operation and to configure the computer to recognize asynchronous devices. This person also needs to configure the computer for either host-based network management or PC-based network management.

Guide to This Manual

This manual is divided into the following chapters and appendices:

- Chapter 1, “Introduction,” introduces Asynchronous Serial Communications (ASC) and the organization of the hardware and software used by the Datacommunications and Terminal Subsystem (DTS).
- Chapter 2, “Preparing to Configure DTCs,” explains how to prepare to configure communications between the HP e3000 computer and serial devices, such as terminals and printers. This chapter also provides worksheets to help you in configuration.
- Chapter 3, “Automatic Configuration of DTCs,” describes how to add and configure a new host-based managed DTC to the HP e3000 system without needing to specify detailed configuration information such as DTC cards/boards and ldevs.
- Chapter 4, “Dynamic Configuration and DTS Shutdown/Restart,” describes how to dynamically configure DTS as well as how to shut down and restart DTS without rebooting the HP 3000 host. Detailed DTS configuration steps are described in Chapters 5 and 6.
- Chapter 5, “Configuring Serial Devices (for Host-Based Management),” lists steps to configure terminal, printer, and other serial device connections, when your DTCs are managed by the HP 3000 computer.
- Chapter 6, “Configuring Serial Devices (for PC-Based Management),” lists steps to configure communications between the HP e3000 computer and serial devices, when your DTCs are managed by an OpenView Windows Workstation (PC).
- Chapter 7, “Terminal and Printer Profiles,” explains what are terminal and printer profiles, and how to create and modify your own terminal and printer profiles to suit your environment.
- Chapter 8, “Additional DTC Configuration,” describes how to configure additional configuration parameters that are available from the DTC Configuration screen.
- Chapter 9, “Describing Asynchronous Devices,” describes how devices are viewed by the MPE/iX operating system and how their functionality is affected by the operating system. It also explains how asynchronous serial communications (ASC) controls devices and the flow of information between the system and devices.
- Appendix A, “Using NMMGR in Maintenance Mode,” describes NMMGR’s maintenance mode interface used to manage network directory and configuration files as well as to generate job streams to update remote network directory and configuration files. A special discussion of the `SUMMARYCONF` command is also included
- Appendix B, “Migrating from Previous Releases,” describes the steps to migrate network configuration files from previous MPE/iX and MPE V releases to the current release format.
- Appendix C, “DTC User Interface,” describes how to use the interface and what commands are available.
- Appendix D, “RAFCP Theory of Operation,” describes the use of routable AFCP packets to provide support of terminal and printers with the DTC and HP e3000 series 900 over a routed IP network.

- Appendix E, “Error Messages,” lists error messages and causes and actions for each message.
- Glossary, provides definition of commonly used terms and concepts.

Helpful Manuals

When using *Configuring Systems for Terminals, Printers, and Other Serial Devices*, these manuals should be available for reference:

- *Configuring and Managing Host-Based X.25 Links*. This manual explains how to configure X.25 networking capabilities on a HP e3000 Series 900 system using host-based network management. Host-based X.25 links allow communications over an X.25 network through the DTC/X.25 Network Access card.
- *Troubleshooting Terminal, Printer, and Serial Device Connections*. Use this manual to troubleshoot device connections when the host-based network management option is used. This manual lists TermDSM commands and suggests a strategy for problem resolution.
- *Using the Node Management Services (NMS) Utilities*. This is a reference manual that has detailed information about the NMS Utilities, including NMMGR.
- *Asynchronous Serial Communications Programmer's Reference Manual*. This manual documents a subset of the system-supplied intrinsics available through the native mode of MPE/iX. The intrinsics are those that are particularly useful for the programmatic control of asynchronous devices.
- *Using HP OpenView DTC Manager*. This manual explains how to configure the Datacommunications and Terminal Controller (DTC) with OpenView DTC Manager. OpenView DTC Manager is the software used to configure, monitor, and control the DTC when the PC-based network management option is used.
- *DTC OpenView Manager/Planning Guide*. This manual gives an overview of the DTC family, the management platforms, and the connections possible.
- *HP OpenView DTC Manager Installation & Upgrade Guide*. This manual describes the installation and upgrade of the DTC Manager and related software, when the DTC is managed by an OpenView Workstation.
- *OpenView DTC Technical Reference Manual*. This manual covers the technical detail of the DTC, including protocol implementations and limitations, explanation of how connections are established, and information on event logging. It is intended for experienced DTC users and programmers.

Configuration At a Glance

Before configuring your HP e3000 to use the DTC terminal servers, you must have completed the following tasks. These tasks are not covered in this manual:

1. Set up your HP e3000 and make sure it is operational. Refer to your HP e3000 installation manual.
2. Install the DTC terminal servers on your LAN and connect the serial devices to the DTC terminal servers. Refer to your *DTC Hardware Installation Guide*.

Configuration Overview

Using New Configuration File

The following steps summarize the procedure for configuring your H P3000 systems to use DTC terminal servers if you are using a *new* network configuration file. For detailed information on these steps, refer to Chapter 5, "Configuring Serial Devices (for Host-Based Management)," and Chapter 6, "Configuring Serial Devices (for PC-Based Management)."

1. Create your network configuration file `NMCONFIG.PUB.SYS`.
2. Run `NMMGR.PUB.SYS`.
3. Enter your HP e3000 node name, link name, and LANIC slot number.
4. Define each DTC to be connected with the HP e3000.
5. Configure each board in the DTC.
6. Validate your network configuration. (SYSGEN cross-validation is done automatically within NMMGR.)
7. Exit NMMGR.
8. Perform a DTS shutdown and restart (or reboot your HP e3000).

Dynamic Configuration

You can also make many DTS changes dynamically without rebooting the system or performing a DTS shutdown/restart if you *already* have a valid network configuration file and there were no DCC errors reported during the last system reboot. These steps summarize the procedure for dynamically configuring DTS. Refer to Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for more information on dynamic configuration. For detailed information on these steps, see Chapter 5, "Configuring Serial Devices (for Host-Based Management)," and Chapter 6, "Configuring Serial Devices (for PC-Based Management).".

1. Run `NMMGR.PUB.SYS`.
2. Modify your existing DTS configuration as necessary.
3. Validate your network configuration. (SYSGEN cross-validation is done automatically within NMMGR.)
4. At the prompt seen after cross-validation is complete, select to have DTS changes take effect dynamically.
5. Exit NMMGR.
6. Complete any additional actions as appropriate (such as rebooting the DTC) for changes to become active.

Automatic Configuration

If you are using host-based management to manage your DTCs, you can also add and configure a new DTC automatically without needing to specify detailed configuration information such as DTC cards/boards and ldevs. This can be done either within the NMMGR utility or without running NMMGR. Refer to Chapter 3, "Automatic Configuration of DTCs."

NOTE

If you are using the HP OpenView DTC Manager on the PC to manage the DTCs, you must also configure the OpenView DTC Manager. For more information, refer to *Using HP OpenView DTC Manager*.

1 Introduction

This chapter provides an overview of communications between a HP 3000 Series 900 computer and its asynchronous devices, including the following:

- The types of devices that communicate in an asynchronous serial fashion.
- How devices communicate once they are connected to the Datacommunications and Terminal Controller (DTC).
- Typical configurations for both host-based network management and PC-based network management.

Devices that Communicate Asynchronously

Asynchronous Serial Communications (ASC) is the term used to describe the specific manner in which communications occur between a HP 3000 Series 900 computer and some of its associated devices. Asynchronous refers to the protocol used to inform the receiving end of a communications link that data is being sent and when the data transmission has completed. Each character is preceded by a special bit, called a start bit, which signals its arrival. The character is then followed by at least one stop bit, (a second special bit) that signals transmission of that character is complete.

The types of devices that communicate asynchronously include the following:

- Terminals
- Personal computers (PCs) in terminal emulation mode.
- Serial printers
- Plotters
- Modems and other devices that use modem signals.
- HP PowerTrust UPSs (Uninterruptible Power Supplies) (herein referred to as UPSs).

  This asynchronous communication scheme supports the following device functionality:

- Device control capabilities provided through the `FCONTROL` and `FDEVICECONTROL` file system intrinsics.
- Typeahead facility, which allows terminal users to enter data before a read is posted.
- Block mode applications.
- Customized terminal and printer type files created with the workstation configurator utility.
- Datacommunications and Terminal Controller (DTC) switching capabilities.
- Powerfail session recovery for sessions in character mode (that is, switched, non-switched, nailed, and non-nailed sessions).

NOTE For more information about these device functionalities, refer to Chapter 9, “Describing Asynchronous Devices.”

How Devices Communicate Once They Are Connected

With the exception of the system console (and, for certain HP e3000 Serie s900 models), the remote support modem and the first UPS on the system), which has its own access port, asynchronous devices are connected to a HP 3000 Series 900 computer through the Datacommunications and Terminal Subsystem (DTS). DTS includes all of the Datacommunications and Terminal Controllers (DTCs) connected to the local area network (LAN), a LAN interface card (LANIC) connecting each host to the LAN, the LAN cable, and the software that controls all of the DTS hardware. This software resides on the HP 3000 and on the DTC.

During configuration, a relationship is specified between the system's LANIC and each DTC through which asynchronous device connections will be made. A link for the LANIC is defined using the Node Management Configuration Manager (NMMGR) utility. This link provides the asynchronous devices with an entry point to the DTS.

Typical Network Configurations

NOTE

If you are configuring X.25 networking capabilities on a HP e3000 Series 900 computer using host-based network management, use *Configuring and Managing Host-Based X.25 Links* instead of this manual to configure DTCs and DTC connections.

Use this manual for directions on how to perform Dynamic/Automatic Configuration or to execute a DTS shutdown or restart.

The DTC makes communication possible across a wide variety of network configurations. The DTC provides the following:

- Asynchronous connections to HP 9000s and third-party ARPA nodes via Telnet.
- Access to X.25 networks.
- Access to HP e3000s via Telnet from HP9000's or third party ARPA nodes.

The networking environment dictates not only the connection options, but also the type of network management used.

When an HP e3000 computer is set up so that it can configure and manage DTCs, the system is configured for **Host-Based Management**. This method can be used to allow you access to HP e3000 computers or access from the DTC ports to HP 9000s and third-party ARPA nodes.

When an OpenView Windows Workstation is used to configure and manage DTCs, the HP e3000 system is using **PC-Based Management**. This method can also be used to allow you access to HP e3000 computers or access from the DTC port to HP 9000s and third-party ARPA nodes. This method provides the additional capability to the DTCs to allow other ARPA nodes to communicate with the HPe3000 via the DTC's Telnet Access Card.

If you have installed the latest Release 7.0 or 7.5 DTS patches, both **Host-Based** and **PC-Based Management** provide all of the network connections described in the following pages, with the exception that Telnet/IX Access described below is available only when using **PC-Based Management**.

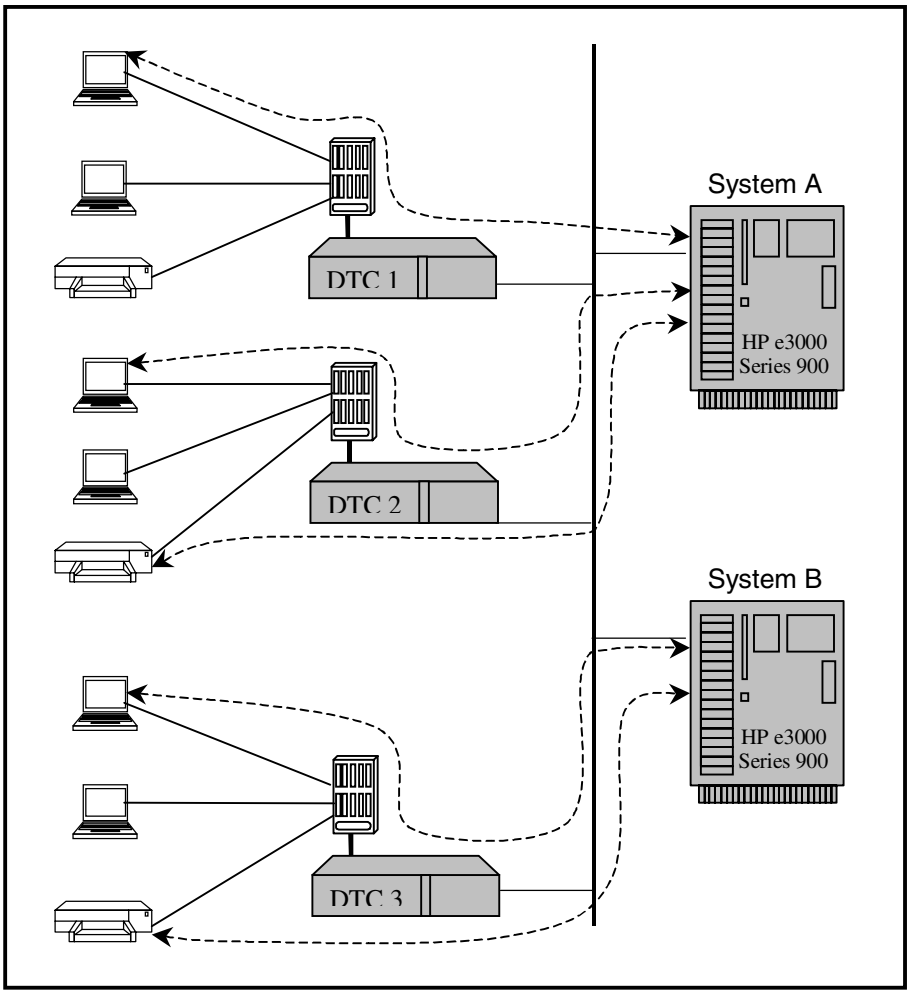
If X.25 communications is required, then either **PC-based Management** or **Host-based X.25 Manager** can be used.

Host-Based Management

When an HP e3000 computer is using Host-Based Management, configuration and control information is maintained on the host, and downloaded from the host to each of the DTCs controlled by the host. The host system is also used to perform any maintance functions such as Resets, Uploads, and to gather connection information from the DTC. The HPe3000 host must reside on the same LAN segment as the DTCs which it manages, ie., no routers are allowed between the Management host and the DTCs the host is managing.

In the simplest configuration, devices connected through a DTC function as though a single cable were connecting the device and a logical device on one of the computers configured to recognize the device. A sample network configuration in which host-based management is used in its simplest configuration, is shown in Figure 1-1. System A manages DTC 1 and DTC 2, while System B manages DTC 3. If the correct configuration is entered on System A and System B, then terminals connected to any of the DTCs can communicate with ether of the systems. It is also possible to configure any DTC port so that access is restricted to only one of the systems.

Figure 1-1 LAN with Host-Based Management



Host-based management also has the capability to provide the following types of network connections. These connections are described later in this section.

- PAD access from terminals connected to PADs to the system that is managing the DTC.
- X.25 Network Access from other systems connected to a PSN to the system that is managing the DTC.
- Telnet access from terminals connected to the DTC ports to systems running ARPA standard Telnet services.

- Multi-System Access to other HP e3000 systems on the LAN.
- Back-to-Back Access from one DTC port to another.

PC-Based Management

When PC-Based Management is used, configuration and control information for the DTCs is maintained on the OpenView Windows Workstation running the OpenView DTC Manager software. This information is downloaded from the workstation to each of the DTCs being managed. The OpenView Windows Workstation must reside on the same LAN segment as the DTCs which it manages, ie., no routers are allowed between the Management PC and the DTCs the PC is managing.

The DTCs are able to function as datacommunication servers for multiple computers on the LAN. These systems can be HP e3000s, HP 9000s, HP 1000s or third-party nodes, which run the ARPA standard Telnet service using the Telnet Access Card (TAC) in the DTCs.

Managed and Non-Managed DTCs

When a DTC is configured in a Host-Based environment the DTC is managed by the management platform that downloads the DTC configuration and performs all the other management functions such as DTC resets, uploads and controls the operation of all DTC functions. It is possible to configure the same DTC on another HP e3000 system so that it is a non-managed DTC on the system where the configuration is entered. A DTC would be configured as a non-managed DTC on a system in order to configure nailed devices that can be accessed from a shared DTC. In this way a terminal, printer or PAD device can be shared as a nailed device on multiple systems. This sharing of serial devices uses the Host-Based Switching features of the DTS subsystem.

The DTC is managed by the management platform that has the proper DTC LAN Station Address defined. To configure the same DTC as a non-managed DTC on another HP e3000, you create a DTC configuration with the same DTC Node Name and configure the DTC LAN station address as 00-00-00-00-00-00.

CAUTION

The DTC MUST be defined as being managed by one and only one management platform. If a configuration for a DTC with the same LAN Station address is configured on more than one management platform, it is a race condition as to which platform will actually respond and download the DTC when the DTC is powered on. Usage of the management features such as reset on the other platform may have unpredictable affects on the DTC's operations.

The procedures for defining a DTC as a managed or non-managed DTC are provided in Chapter 5, "Configuring Serial Devices (for Host-Based Management)," of this manual.

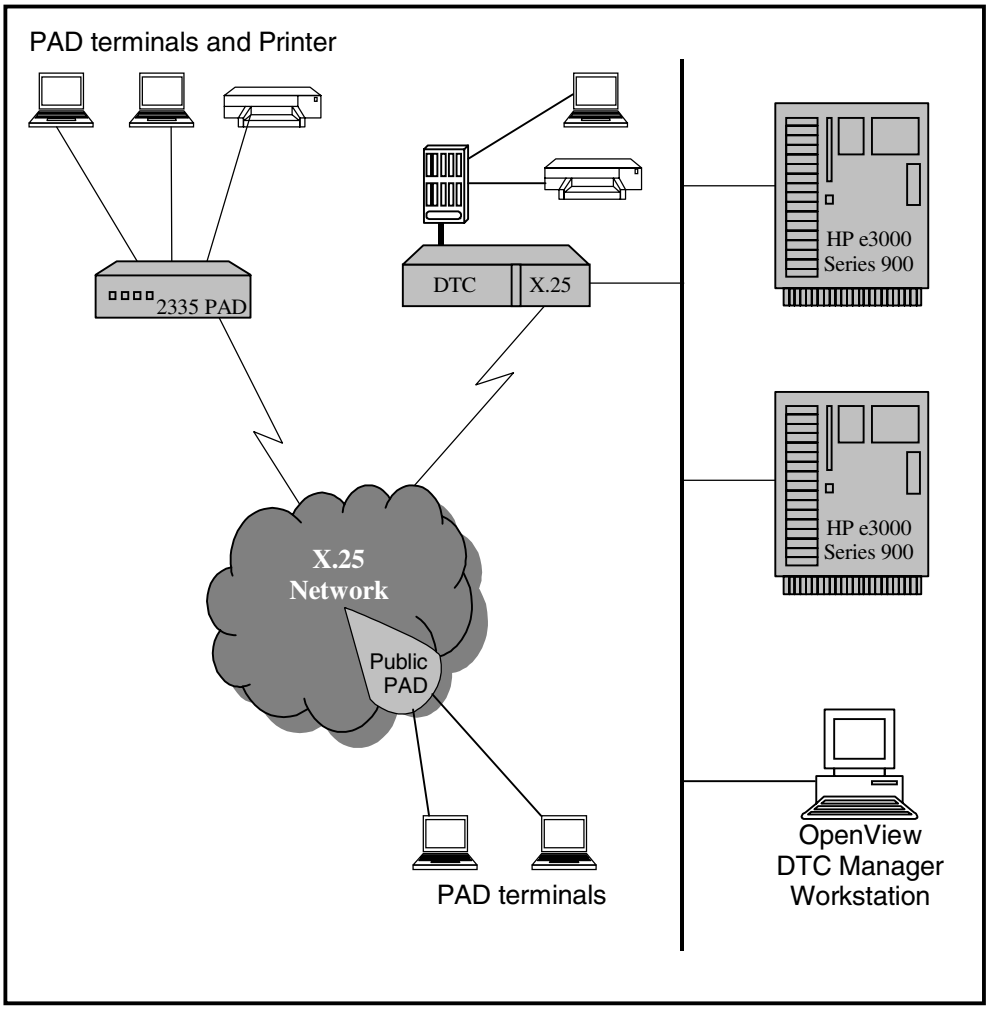
PAD Access

DTCs can optionally contain up to three DTC/X.25 Network Access cards. DTC/ X.25 Network Access cards connect devices to computers over a Packet Switching Network (PSN), by using a private or public PAD.

A **PAD**, or **Packet Assembler/Disassembler**, is a device that converts asynchronous character streams into packets that can be transmitted over a PSN. Supported devices attached to the DTC can be remotely connected using a PAD.

Figure 1-2 shows PAD access to HP 3000 and other computers using a DTC equipped with the DTC/X.25 Network Access card. Note that only terminals are connected to the public PAD. This is because devices that are opened using the software, such as serial printers, must be connected to a private PAD and must be permanently associated with a reserved **logical device** (**ldev**) number on the MPE/iX that accesses them.

Figure 1-2 DTC/X.25 Network Access for a PAD



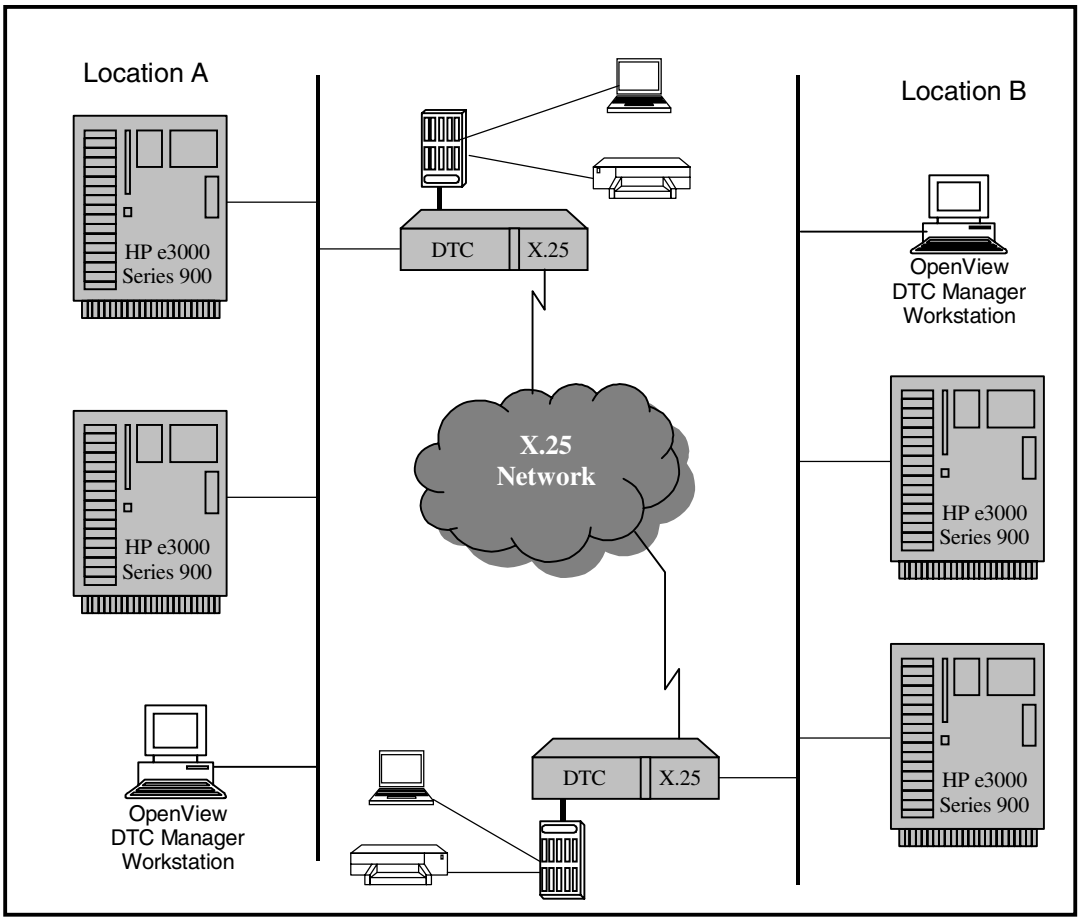
X.25 Network Access

X.25 iX System Access, when used in conjunction with DTC/X.25 Network Access, allows you to establish a DTC/X.25 iX Network Access Link, thus connecting an HP e3000 computer to a public or private X.25 PSN. The X.25 network protocol processing is done by the DTC/X.25 Network Access card installed in the DTC. If PC-based management is used, then multiple HP e3000s can share the same X.25 network connection.

If PC-based management is used, or if Release 7.0 or 7.5 is installed with the latest DTS patches, then multiple HP e3000s can share the same X.25 network connection. If Host-Based management is used, and the latest DTS version is not installed, then X.25 access is limited to the HP e3000 that is managing the DTC.

Figure 1-3 shows a Wide Area Network (WAN) consisting of two DTCs joined by an X.25 PSN. Both DTCs must include at least one DTC equipped with at least one DTC/X.25 Network Access card. The DTCs can be managed by either OpenView Windows Workstations or by the host system.

Figure 1-3 DTC/X.25 iX Network Access Link

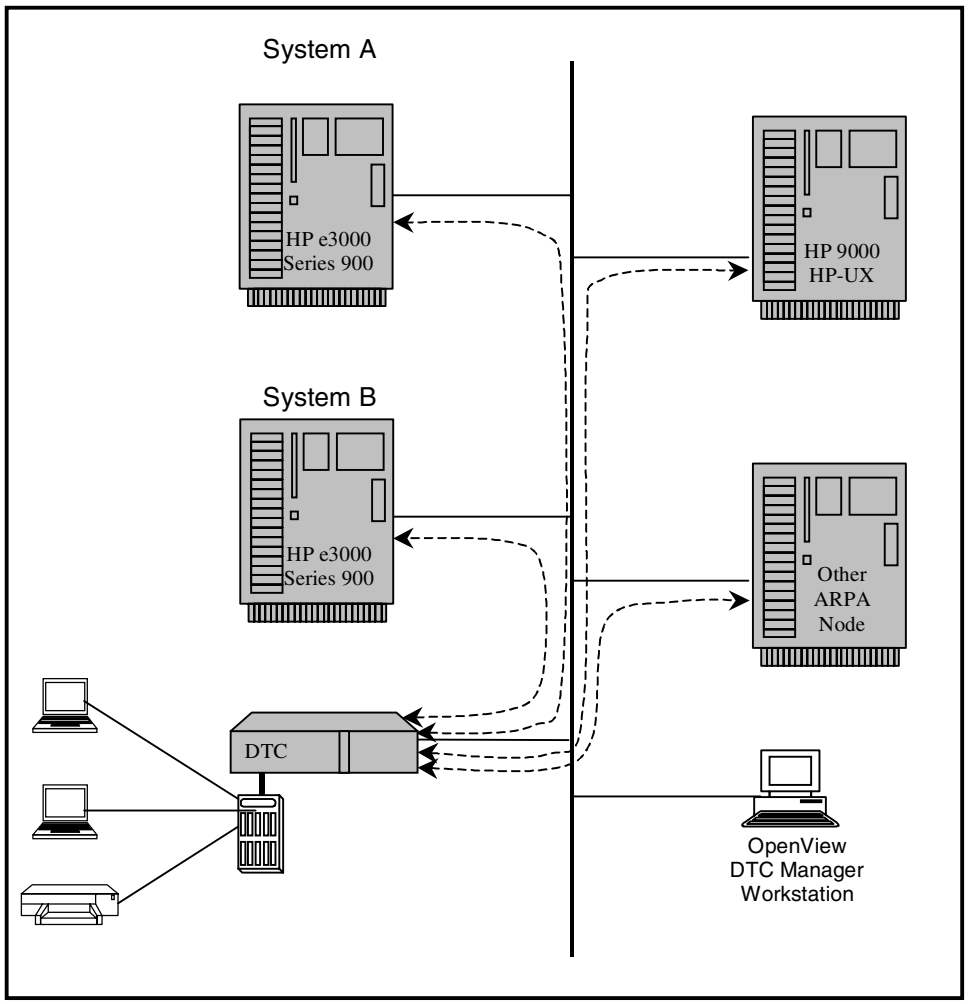


Multi-System Access

Figure 1-4 shows a sample network configuration. The terminals connected to DTC 1 are configured so that they are able to establish connections to either System A or System B through the **DTC Switching User Interface**. Output devices connected to DTC 1, such as serial printers or plotters, are configured so that they can be opened using the software from either host.

The DTC can be managed by either the OpenView Windows Workstation or the HPe3000 host. The HPe3000 host or the OpenView Windows Workstation must reside on the same LAN segment as the DTCs which it manages. That is no routers are allowed between the Managing platform and the managed DTCs.

Figure 1-4 DTC Switching



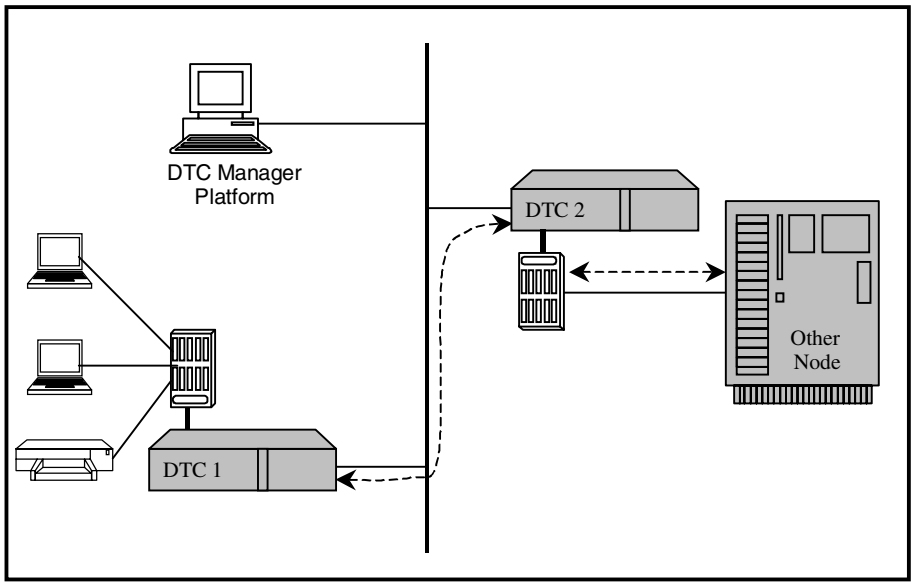
Extended Switching

By arranging DTCs and DTC terminal connections in a special way, terminal users can establish communications with most computers or other devices that have an RS-232 interface available. This is referred to as **extended switching** or **back-to-back** access.

Figure 1-5 shows two DTCs in a simple back-to-back configuration. DTC 1 has terminals connected to it. DTC 2 is connected through one of its ports to the RS-232 serial port on another computer. A terminal user connected through DTC 1 is able to establish a communications link to the other system by going through DTC 2.

Note that the DTC Management platform is on the same LAN segment as the DTCs involved in the back-to-back configuration..

Figure 1-5 Extended Switching to another Host

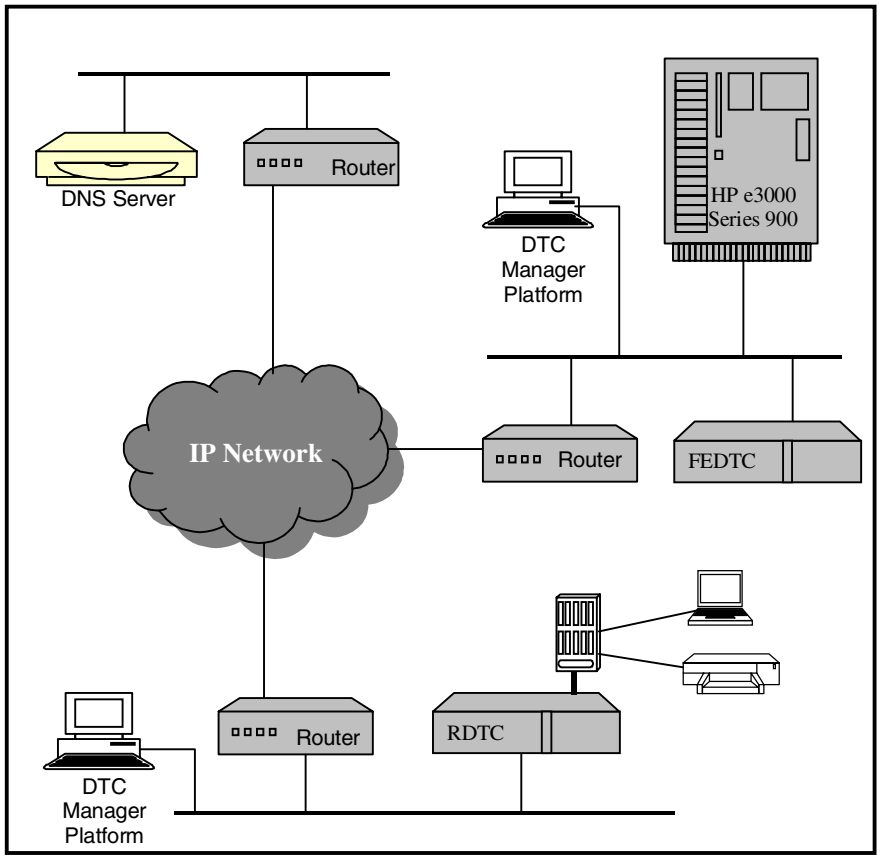


Routable AFCP Connections

Routable AFCP is a method of encapsulating AFCP packets into a UDP/IP packet to permit devices connected to a DTC to communicate to an HP e3000 computer across a routed IP network. The encapsulation is done in the DTC. A remote dtc (RDTC) encapsulates the AFCP packets into an UDP/IP packet and sends these packets to the front-end dtc (FEDTC). The FEDTC deencapsulates these packets and sends AFCP packets transparently to the HP e3000. In the opposite direction, the HP e3000 sends AFCP packets to the FEDTC. The FEDTC encapsulates these packets into UDP/IP packets and sends them to the RDTC. The RDTC deencapsulates them and forwards them to the addressed DTC port.

Figure 1-6 shows the hardware and topology needed to implement a Routable AFCP DTC configuration. Note that on each LAN segment where a DTC resides, there must be a DTC management platform present to manage the DTC. The platform can be the OpenView DTC Manager or the HP e3000 host that has the latest DTS versions installed. Although terminal and printer connections become routable in this enviornment, the DTC management protocols are not.

Figure 1-6 Routable AFCP Hardware Topology



Remote DTCs can be: DTC 72MX, 16MX, 16RX, 16, 48 with memory extensions. The DTC 16iX, 16TN and 48 without memory extension do not support Routable AFCP. The Front End DTC must be a DTC 72MX, DTC 16MX, DTC 16RX or Telnet Express Box. The Remote or Front end DTCs do not need to be dedicated to Routable AFCP. They can be used to establish other supported connections at the same time.

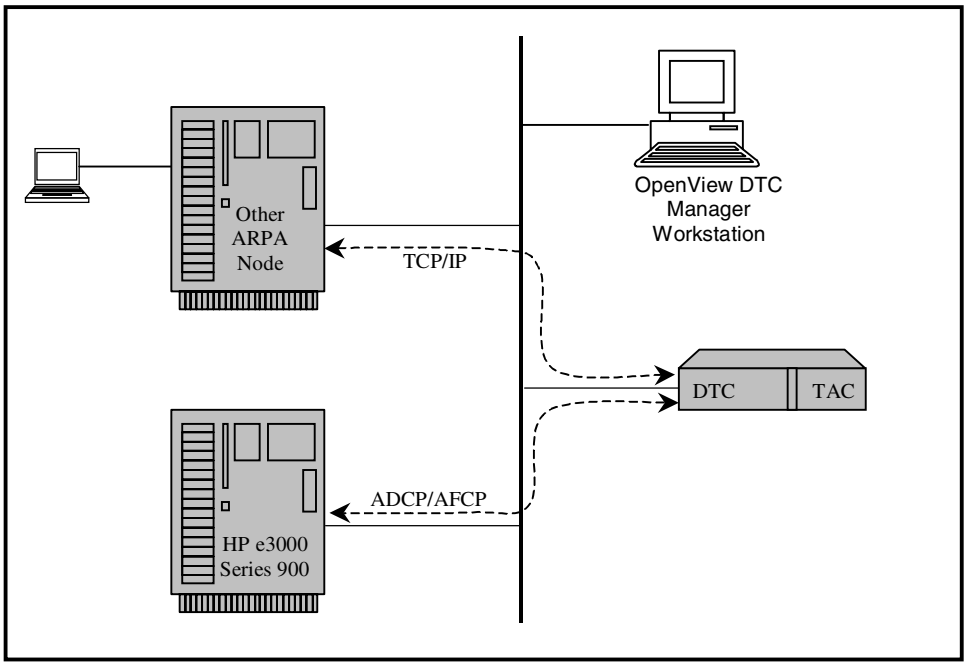
Telnet/iX Access

Telnet/iX provides connections to MPE systems from terminals connected to systems running ARPA standard Telnet services. Telnet/iX includes a Telnet Access Card (TAC) that resides in the DTC 48 or DTC 72MX and provides protocol conversion between Telnet and AFCP. Equivalent functionality is provided by the Telnet Express Server (HP2344A).

NOTE A DTC 48 cannot contain both a TAC and an X.25 card.

Figure 1-7 shows a terminal user connected to an ARPA node and using the Telnet service to access an HP e3000 Series 900. The TAC card in the DTC converts the Telnet traffic into TIO traffic for the MPE system.

Figure 1-7 DTC Telnet/iX Access



2 Preparing to Configure DTCs

This chapter contains information that is needed before configuration of systems for asynchronous device (terminal and printer) connections can begin. It also provides worksheets for you to collect your network configuration data before actual configuration.

Chapter 5, “Configuring Serial Devices (for Host-Based Management),” and Chapter 6, “Configuring Serial Devices (for PC-Based Management),” show step-by-step process for configuring terminals, printers, and other serial devices.

NOTE If you are configuring X.25 networking capabilities on a HP e3000 Series 900 computer using host-based network management, use *Configuring and Managing Host-Based X.25 Links* instead of this manual to configure DTCs and DTC connections.

NOTE You can automatically add and configure a new host-based managed DTC to the HP 3000 system without needing to specify detailed configuration information such as DTC cards/boards and ldevs. For more information refer to Chapter 3, “ Automatic Configuration of DTCs.”

Plan the Network

Before configuration can begin, the physical layout and configuration parameters for the systems, the DTCs, the OpenView Windows Workstation, and the connected devices on the LAN must be defined. This information must be translated into terms that the MPE/iX operating system can understand and use.

For example, a node name for the system must be indicated and a link name must be specified. Additionally, the physical path for the LANIC must be identified. Each DTC needs a name and the devices connected to it will have characteristics associated with them.

Once this information is entered in the configuration file (`NMCONFIG.PUB.SYS`), the system can communicate with each device connected to the DTC. HP e3000 Series 900 uses a utility called NMMGR to enter configuration information into the `NMCONFIG.PUB.SYS` file.

On the pages that follow, information and worksheets are provided to help define these required configuration parameters.

Defining the HP e3000 System

The following configuration parameters are required to define the HP 3000 host for asynchronous device connections.

`Local HPe3000 NodeName` The name by which the HP e3000 Series 900 computer is known in your network. The format of a node name is *nodename.domain.organization*, where each field can contain 16 or fewer characters (alphanumeric, underscores, or hyphens). The first character of each field must be alphabetic. For example: `ACCOUNTS.MKT2.HP`.

`Are You Using OpenView DTC Manager?` Determines the method to be used for network management. If the answer is `YES` then the system will be configured using PC-based network management. If the answer is `NO`, then the system will be configured using host-based network management.

`Link Name` The link name that will be used by the HP e3000's Datacommunications and Terminal Subsystem (DTS) when device connections are established. It must start with a letter and can be up to eight alphanumeric characters. `DTSLINK` is the default and should be used for your DTS configuration.

`Physical Path of LANIC (Slot# of LANIC Card)` The location of the LANIC (LAN Interface Controller Card) in the system's backplane. The physical path of the card is determined by the location of the card in the backplane. Labels on the system back panel list the paths for the slots. See the Hardware Installation manual for your system to determine the optimum slot locations.

Defining the DTC

The following parameters are required to define each DTC used for connection between the HP e3000 and its asynchronous devices (terminals and printers).

`DTC Name` A name for the DTC, up to eight alphanumeric characters, beginning with a letter. Each DTC configured on the system must have a unique name.

`DTC LAN Station Address` The local station address of the DTC. The HP 2345B (DTC 48) station address is printed inside the front cover. The HP 2340A (DTC 16) station address is printed on the label located on the upper right-hand corner of the back panel of the DTC. The HP J2070A (DTC 72MX) and J2062A/J2063A/J2064A (DTC 16iX/16MX/16RX) station address is printed on the label located at the lower center of the back panel of the DTC.

A typical LAN address looks like: `08-00-09-1A-11-11`.

For DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment, use the value `00-00-00-00-00-00` as the DTC 16RX LAN address. Configuration of the DTC 16RX on the HP 9000 host using DTC 16RX Manager uses the DTC's IP address and not its LAN address.

`DTC Node Name` A fully qualified node name of the DTC, in the form *nodename.domain.organization*, where each field can contain 16 or fewer characters (alphanumeric, underscores, or hyphens). The first character of each field must be alphabetic.

Assign meaningful node names. For example, `ACCTS.IXNET.ACCTG` and `PAY.IXNET.ACCTG` are meaningful names for two nodes on the same Local Area Network (LAN) within the accounting department. One node (`ACCTS.IXNET.ACCTG`) is used by the accounts staff. The other node (`PAY.IXNET.ACCTG`) is used by the payables staff. The *domain* field is the same because the nodes belong to the same network. The *organization* field is the same because the nodes belong to the same internetwork.

`DTC IP Address (optional)` The internet protocol (IP) address of the DTC. The IP address is optional. It is used if your HP e3000 is configured as part of a network and you want the DTC to be able to respond to PING/iX requests.

An IP address has four fields of decimal numbers:

`xxx.xxx.xxx.xxx`

where `xxx` is a number from 0 to 255.

An IP address has two parts: a network portion and a node portion. The following are examples of three types of IP addresses:

Class A: `nnn xxx.xxx.xxx`

Class B: `nnn.nnn xxx.xxx`

Class C: `nnn.nnn.nnn xxx`

where nnn represents the network portion and xxx represents the node portion of the address. The *network* portion must be the same for all nodes on the network; the *node* portion must be unique for all nodes on the network. Examples of IP addresses for two DTCs on the same network follow:

```
C 192.191.191 008

C 192.191.191 009.
```

You can obtain a Class B or Class C IP address from:

Government Systems, Inc.
Att: Network Information Center
7990 Boeing St.
Vienna, VA 22183
(800) 364-3642 or FAX (703) 821-6161

For DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment, the IP address of the DTC16RX is configured using the DTC 16RX Manager on the HP 9000 host and not on the HP 3000. Any value entered for the DTC 16RX in NMMGR will be ignored.

`DTC Cards (or DTC Boards)` The number and types of connector cards in the DTC. (The cards are also referred to as **boards**.) DTC 16 can have up to 2 asynchronous cards and 1 DTC/X.25 Network Access card, DTC 48 up to 6 cards, and DTC 72MX up to 4 cards.

DTC 16iX/16MX/16RX has its two port connectors built directly onto its backplane for support of up to 16 asynchronous devices. It does not have removable cards; you do not specify the number or type of cards for a DTC 16iX/16MX/16RX.

The valid card types are:

For DTC 16 and DTC 48:

`D`	for direct connect cards (up to 8 ports per card),
`M`	for modem connect cards (up to 6 ports per card),
`X`	for DTC/X.25 Network Access cards (for connection)

For DTC 72 MX:

`L`	for the LAN card, pre-installed in slot 0
`A`	for asynchronous processor boards (up to 24 ports per card for direct and modem connections)
`X`	for DTC/X.25 Network Access cards (for X.25 connection).

`DTC Event Logging` For each DTC, you may specify which event logging class is to be enabled. Event logging class 1 logs catastrophic events and will always be enabled. Class 2 logs critical events; class 3 logs non-critical events; classes 4 and 5 log informative events and class 6 provides statistical information. It is recommended that you only enable classes 4 through 6 when you encounter problems, because they will generate a substantial amount of events logged.

Event logging classes do not apply for DTC 16RX access to an HP 3000 in an MPE/iX host-based management environment; any values entered in these fields for the DTC 16RX will be ignored.

Defining the DTC Connector Cards (or Boards)

Connector cards (also called **boards**) in the DTC allow terminals, printers, and other serial devices to be connected to the DTC for communication with an HP 3000 Series 900.

For each connector card in a DTC, you must define the characteristics of its ports for connection to terminals, printers, and other serial devices. The following parameters are required:

`Card Number` The card number specifies which card in the DTC is being configured.

DTC 16s allow 2 connector cards, labeled card # 0 and card #1, with the third slot (card # 2) reserved for a DTC/X.25 Network Access card. When looking at the rear panel of the DTC, card # 0 is located on the left, card # 1 is in the middle, and card # 2 is on the right.

DTC 48s allow up to 6 connector cards, labeled card # 0 to 5.

DTC 72MXs allow up to 3 connector cards plus a LAN card that is preinstalled in slot 0; the connector cards are labeled card # 1 through 3.

For the DTC 48 and 72MX, card # 0 resides at the bottom of the DTC and card # 1 resides above it, and so on.

Note that the DTC 16iX/16MX/16RX does not have connector cards. Its port connectors are built directly onto its backplane.

`Direct or Modem Connect` You must specify whether a direct or modem connection is used for the ports in a card. Direct connections are used for devices that reside near the DTC. Modem connections are essential for communications over telephone lines.

`Port Number` Each port on a connector card is assigned a number, starting with port # 0 on the left most side of the card.

`Logical Device Number (LDEV)` The ldev number is used by MPE/iX to designate devices. Devices with ldev numbers permanently assigned to them are called **nailed** devices. Printers and UPSs, as well as devices that will be programmatically accessed, must be nailed devices. Each nailed ldev number assigned in NMMGR must be unique.

If the DTC management is PC-based (that is, managed by an OpenView Windows Workstation), or you have the latest patches installed on Release 7.0 or 7.5 or newer, you may have ports without ldev numbers assigned to them; hence they are **non-nailed** devices. Non-nailed devices have ldev numbers that are assigned from a pool of available ldev numbers for the duration of the device connection to the system.

If the DTC management is Host-Based (the DTC is managed by the HP e3000) you may also configure a **non-nailed** port if the ldev number of -1 is entered. If an ldev number of -1 is entered, then a profile name must also be entered. A port that is configured with the ldev number of -1 will be downloaded with the DTC parameters configured in the

specified profile. If no ldev number and profile are specified, the port is downloaded with the parameters configured in the profile specified as the Non-Nailed Terminal profile on the Host Configuration screen.

`Terminal and Printer Profiles` Each port that has an ldev number other than 0 specified needs a profile assigned to it. A profile defines a set of characteristics for a terminal, printer, or another serial device. A profile can be of five types: a **terminal profile**, a **PAD terminal profile**, a **printer profile**, **PAD printer profile**, or a **host profile**. Refer to Chapter 7, "Terminal and Printer Profiles," for more information on the profiles that are supplied in the sample configuration file.

If the ldev number -1 is entered and the profile type is of TERMINAL type, then the port is a non-nailed port. If the profile is of HOST type, then the port is a HOST port that is intended to be used a described in Chapter 1 in the section "Extended Switching". A profile of PRINTER type is not allowd if the ldev is -1.

If the characteristics provided in the sample profiles are different from those required by the terminals and printers connected to your DTCs, then you can define new profiles.

It is suggested that you use default profiles `TR10D96` for direct connect terminals and `PR18D96` for direct connect printers or `PR22D24` for HP printers with status checking. For PAD terminals and printer, use the defaults `TR24PAD` and `PR26PAD`, respectively. For UPSs, use the default profile `UP10D12`.

The name of the profile can be up to eight characters long and must start with a letter, followed by letters and numbers. At any one time, up to 1024 profiles can be configured per system.

Configuring With NMMGR

NMMGR, the Node Management Configuration Manager, is the utility used by HP e3000 Series 900 to configure asynchronous device connections. The parameters described previously in this chapter are entered in NMMGR through a screen-by-screen user interface. These parameters are then stored by NMMGR into the HP e3000 network configuration file `NMCONFIG.PUB.SYS`.

To invoke NMMGR, type the following command at the MPE prompt:

```
NMMGR.PUB.SYS
```

Figure 2-1 shows the screen flow for configuring terminals, printers, and other serial devices in NMMGR. Use the function keys that are located at the bottom of each screen to visit the next screen on the flowchart. All screens have a **[Prior Screen]** key that can be used to display the screen visited prior to the current screen, as shown in the flowchart.

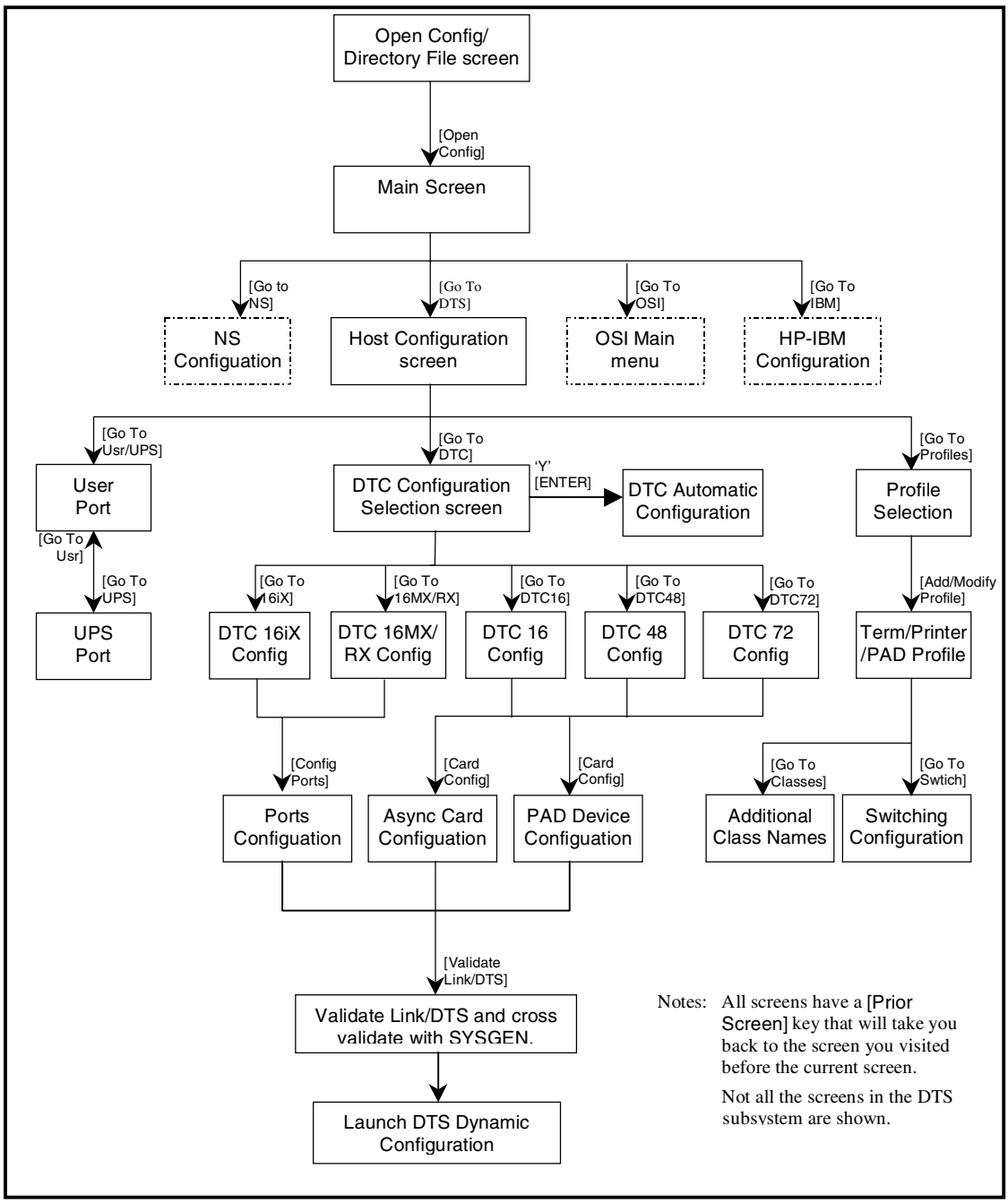
Chapter 3, "Automatic Configuration of DTCs," and Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," provides an overview of automatic and dynamic configuration capabilities, respectively. Chapter 5, "Configuring Serial Devices (for Host-Based Management)," and Chapter 6, "Configuring Serial Devices (for PC-Based Management)," show the step-by-step process for configuring terminals, printers, and other serial devices using NMMGR, for host-based and PC-based management, respectively.

NOTE

You may use NMMGR's maintenance mode interface to manage network directory and configuration files. You may also use the interface to generate job streams to update remote network directory and configuration files. Refer to Appendix A for more information on maintenance mode commands and a special discussion on the `SUMMARYCONF` command.

NOTE In addition to the DTS subsystem, NMMGR is used to configure other network subsystems on the HP e3000 Series 900, such as NS (Network Services), IBM, and OSI. NMMGR provides many functions and utilities that are beyond the scope of this manual. Refer to *Using the Node Management Services* for detailed information on NMMGR.

Figure 2-1 NMMGR DTS/DTC Screen Flow



DTS Configuration Worksheets

Before you proceed to NMMGR, it is recommended that you use the worksheets provided here to gather the necessary configuration information. Make copies of these worksheets and fill in the parameter information, then use these worksheets to guide you through configuration in NMMGR.

HP e3000 DTC Configuration Worksheet

Fill out worksheet as shown in Figure 2-2 with configuration information as needed.

Figure 2-2 DTC Configuration Worksheet

DTC Configuration Worksheet

Use one worksheet for each DTC

DTC type (check one): DTC72MX: ____ DTC16iX: ____ DTC16MX/RX: ____
DTC48: ____ DTC 16: ____

DTC Name: _____

DTC LAN Station Address: _____

DTC Node Name: _____
(Node.Domain.Organization)

DTC IP Address: _____

Card Types Installed in the DTC:

Card # Type:

0 ____
1 ____
2 ____
3 ____
4 ____
5 ____

Event Logging Classes: (Y/N)
1. ___ 2. ___ 3. ___
4. ___ 5. ___ 6. ___

Enable RAFCP Front End: ____
Enable Automatic Restart: ____

Notes:

DTC Card Type can be:

DTC 72MX: L (LAN)
A (Async card
X (X.25 card)

DTC 48/16: D (direct connect)
M (modem connect)
X (X.25 card)

Number of Cards

DTC 72MX: 4
DTC 48 6
DTC 16 3

Enable RAFCP and Auto Restart available on DTCs as follows:

	DTC16	DTC48	DTC16iX	DTC16MX	DTC72MX
RAFCP	No	No	No	Yes	Yes
Auto Restart	Available for Host-Based X.25 Management only				

DTC Card Configuration Worksheet

Fill out worksheet as shown in Figure 2-3 for each direct connect card you are configuring

Figure 2-3 DTC Asynch Card Configuration Worksheet

DTC Card Configuration Worksheet

Use one worksheet for each card in a DTC
or each DTC 16iX/16MX/16RX

DTC type (check one): DTC72MX: ____ DTC16iX: ____ DTC16MX/RX: ____
DTC48: ____ DTC 16: ____

DTC Name: _____ Card Number: ____

Port Group type
(D or M)* ____ ____ ____

Port	Ldev	Profile Name	Port	Ldev	Profile Name	Port	Ldev	Profile Name
0	____	_____	8	____	_____	16	____	_____
1	____	_____	9	____	_____	17	____	_____
2	____	_____	10	____	_____	18	____	_____
3	____	_____	11	____	_____	19	____	_____
4	____	_____	12	____	_____	20	____	_____
5	____	_____	13	____	_____	21	____	_____
6	____	_____	14	____	_____	22	____	_____
7	____	_____	15	____	_____	23	____	_____

Notes: DTC 16/48 modem connect cards use ports 0-5.
DTC 16/48 direct connect cards use ports 0-7.
DTC 16iX/MX/RX use ports 0-15.
DTC 72MX use ports 0-23.

* D – Direct connect, M – Modem Connect.

DTCX.25 Card Configuration -- Nailed PAD Devices Worksheet

Fill out worksheet as shown in Figure 2-4 for each DTC X.25 Network Access card for which you are configuring nailed PAD connections.

Figure 2-4 DTC X.25 Nailed PAD Devices Worksheet

DTC X.25 Card Configuration
Nailed PAD Connections Worksheet

Use additional sheets if you need to list more nailed PAD devices.

DTC Name: _____ Card Number:____

Ldev	Profile	Device Name	Ldev	Profile	Device Name
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

3 Automatic Configuration of DTCs

This chapter describes how you can add and configure a new host-based managed DTC to the HP e3000 system without needing to specify detailed configuration information such as DTC cards/boards and ldevs (herein referred to as automatic configuration).

You can perform an automatic configuration by using a command file that is activated either outside or inside the NMMGR utility. You may choose to add a DTC automatically inside NMMGR if you need to make other DTS configuration changes. These two methods are described below.

NOTE If you want to dynamically implement DTS changes made in NMMGR (dynamic configuration) or perform a DTS shutdown or restart, refer to Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart." If you want to manage/dynamically configure host-based X.25 links, refer to the *Configuring and Managing Host-Based X.25 Links* manual.

Performing an Automatic Configuration Outside NMMGR

Automatic configuration is done via a command file called DTCCNTRL which allows you to manage DTS configurations. DTCCNTRL requires that you have a minimum of Network Manager (NM) capability.

To perform an automatic configuration, you must still provide the DTC's LAN address. Also, all serial ports configured via automatic configuration using DTCCNTRL will be configured as nailed, direct connect terminal ports using the terminal profile TR10AUTO. You can modify the default profile characteristics associated with TR10AUTO using NMMGR, if needed, to match your special requirements. If you want to change the profile, run NMMGR first before invoking DTCCNTRL. Refer to Host-Based Terminal Profiles table in Chapter 7, "Terminal and Printer Profiles," for more information on TR10AUTO profile characteristics.

You can only perform automatic configuration of new DTCs if you are operating in a host-based management environment. In a PC-based environment,DTCCNTRL will report an error when the command is invoked.

When automatic configuration is invoked, a default configuration is created in the NMCONFIG.PUB.SYS file. The default configuration will be saved with DTC name as DTCxxxx where "xxxx" is the last 4 digits of the LAN address.

Follow the steps listed here to automatically add a DTC to DTS:

1. Turn the DTC's power on.
2. Invoke DTCCNTRL at the CI prompt either without specifying the desired automatic configuration operation or by specifying it using the syntax outlined below:
   - Automatic configuration operation not specified:

```
:DTCCNTRL

0     exit

1     dynamically implement DTS changes made in NMMGR

2     view status of last DTS dynamic configuration

3     automatically add a new DTC

4     shutdown DTS subsystem

5     restart DTS subsystem

6     manage/dynamically configure host-based x.25

7     help


For help on these topics, select 7 at the prompt below

Select one of the numbers above corresponding to the desired
operation: 3
```

- Automatic configuration operation specified:

  ```
  :DTCCNTRL func=autoconf
  ```

3. The following prompt will appear:

   ```
   ****Make sure your DTC is turned on NOW****

   Enter the DTC LAN address in the format of xx-xx-xx-xx-xx-xx or press
   RETURN to exit:
   ```

   First, make sure that the DTC's power has been turned on. Then, enter the LAN address of the DTC to be configured. The LAN address can be found on a label inside the front cover or on the back panel of the actual DTC box. Note that the LAN address is different from the IP address which is discussed in step 5 below.

4. DTCCNTRL will create a default DTC node name structured as `DTCxxxx.domain.organization`, where `xxxx` are the last four digits of the DTC's LAN address and `domain.organization` are taken from the host's node name.

   At the prompt `"The default DTC node name is DTCxxxx.domain.organization. Press RETURN to continue or enter the DTC node name to overwrite default:"` press the **[Return]** key to continue or enter a different DTC node name to overwrite the default.

5. At the prompt `"Enter optional DTC IP address in the format of n.n.n.n or press RETURN to continue:"` enter the optional DTC IP address or press the **[Return]** key to continue. The IP address is used if your HP 3000 is configured as part of a network and you want the DTC to be able to respond to PING/iX requests.

6. The following will appear on the screen indicating successful DTC automatic configuration:

   ```
   DTCxxxx.domain.organization automatic configuration in progress.....
   ```

   (DTC download messages will appear here if you are at the system console.)

   ```
   DTCxxxx.domain.organization configured and downloaded
   successfully.

   All ports configured successfully.

   END OF PROGRAM

   :
   ```

Performing an Automatic Configuration Inside NMMGR

Automatic configuration can also be performed by invoking the DTCCNTRL command file inside the NMMGR utility. Refer to Chapter 5, "Configuring Serial Devices (for Host-Based Management)," for detailed steps on the NMMGR DTS host-based management configuration process. To automatically add and configure a DTC within NMMGR, you must still provide the DTC's LAN address. Also, as with performing an automatic configuration outside NMMGR, all serial ports using DTCCNTRL will be configured as nailed, direct connect terminal ports using the terminal profile TR10AUTO.

NOTE You can only perform automatic configuration of new DTCs if you are operating in a host-based management environment. In a PC-based management environment, NMMGR will report an error if the automatic configuration is invoked.

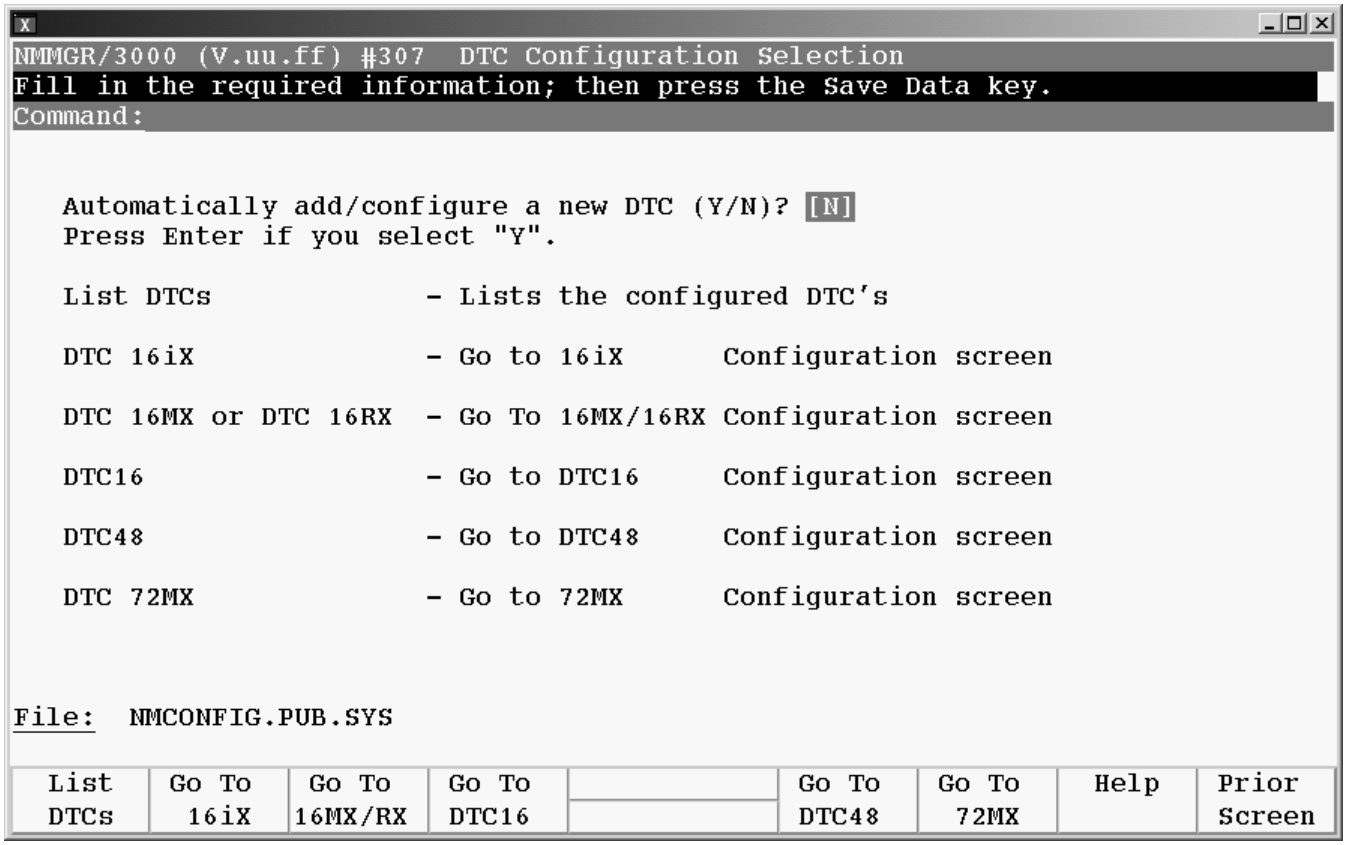
Step 1: Use Valid Configuration File

You must first already have a valid network configuration file and your HP e3000 must not have experienced any Datacommunication Configurator (DCC) errors during the last reboot. Refer to Appendix E, "Error Messages," for more information on DCC error messages.

Step 2: Activate Automatic Configuration Process

The DTC Configuration Selection Screen (Figur e3-1) is displayed when you press the **[Go to DTC]** key at the Host Configuration Screen. Here you can access the DTC Automatic Configuration Screen and activate the automatic configuration process.

Figure 3-1 DTC Configuration Selection Screen



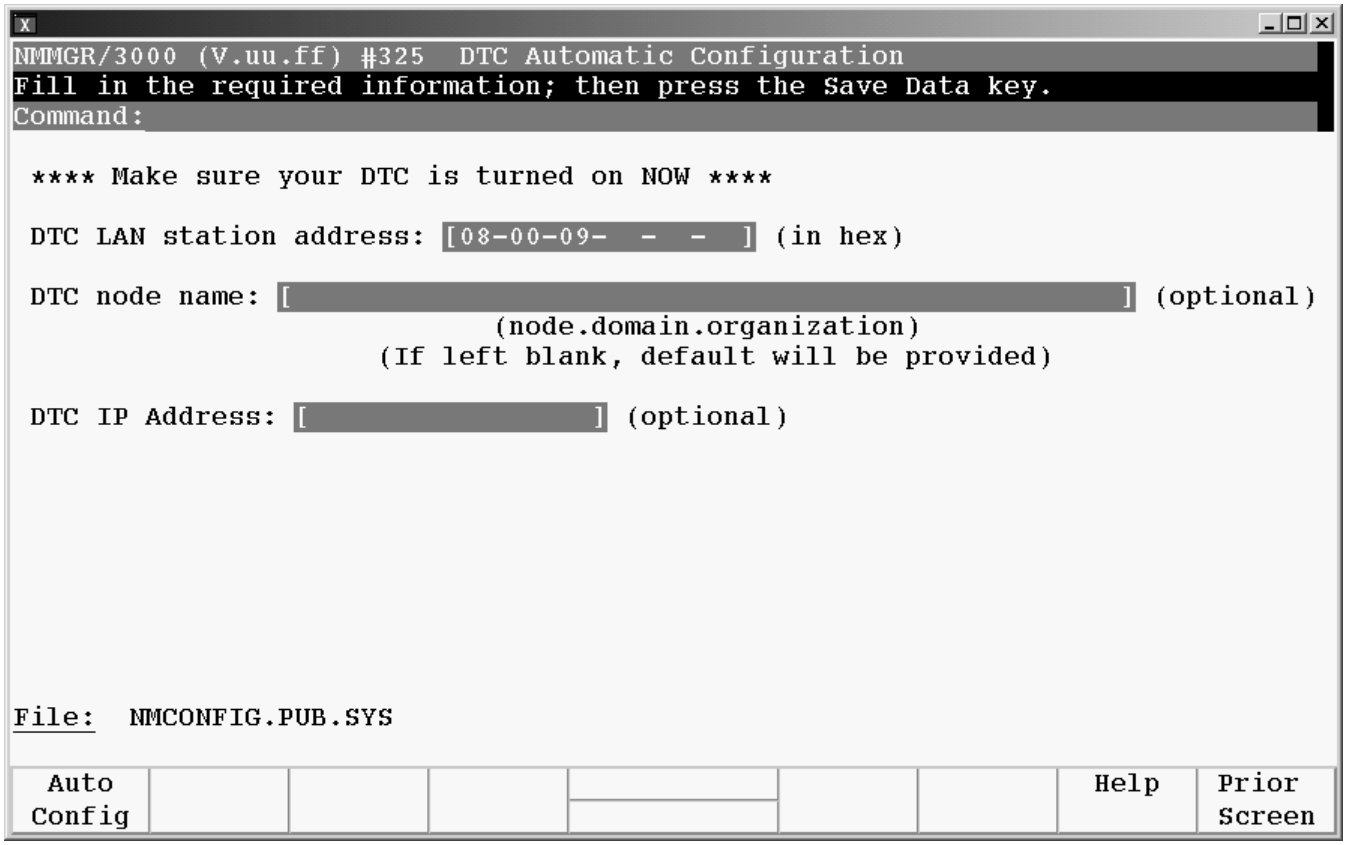
Follow the steps listed here to enter data for this screen.

1. In the "Automatically add/configure a new DTC (Y/N)?" field, enter a Y and press the **[Enter]** key.
2. The DTC Automatic Configuration Screen will appear.

Step 3: Complete Automatic configuration

The DTC Automatic Configuration Screen appears (Figur e3-2).

Figure 3-2 The DTC Automatic Configuration Screen



Follow the steps listed here.

1. Make sure that the power for the DTC that you want to automatically add and configure is turned on.
2. Enter the LAN address of the DTC to be configured in the "DTC LAN station address" field. The LAN address can be found on a label inside the front cover or on the back panel of the actual DTC box. Note that the LAN address is different from the IP address which is discussed in step 4 below.
3. (Optional) Enter the DTC node name in the format *node.domain.organization* in the "DTC node name" field. If you leave this field blank, a default DTC node name will be created. The default node name created will be DTCxxxx.domain.organization, where xxxx are the last four digits of the DTC's LAN address and domain.organization are taken from the host's node name.
4. (Optional) Enter the DTC IP address in the "DTC IP Address" field. The IP address is used if your HP e3000 is configured as part of a network and you want the DTC to be able to respond to PING/iX requests.
5. Press the **[Auto Config]** function key to invoke DTCCNTRL and start the automatic configuration process.

6. The following will appear on the screen indicating successful DTC automatic configuration:

   ```
   DTCxxxx.domain.organization automatic configuration in progress.....
   ```

   (DTC download messages will appear here if you are at the system console.)

   ```
   DTCxxxx.domain.organization configured and downloaded
   successfully.

   All ports configured successfully.

   (Press RETURN when done viewing screen contents)
   ```

7. Press the **[Return]** key when you have finished viewing the automatic configuration messages. You will return to the DTC Automatic Configuration screen.

   When automatic configuration is complete, a default configuration is created in the `NMCONFIG.PUB.SYS` file. The default configuration will be saved with DTC name as DTCxxxx where "xxxx" is the last 4 digits on the LAN address.

8. You may automatically configure other DTCs from this screen by repeating steps 1 through 7 for each DTC. If you have automatically configured all desired DTCs, proceed to step 9.

9. Press **[Prior Screen]** to return to the DTC Configuration Selection screen. From here, you may continue with other DTS configuration changes. Refer to Chapter5, "Configuring Serial Devices (for Host-Based Management)," for steps on how to do this) or exit NMMGR. If you decide to exit and have already completed other DTS configuration changes in addition to an automatic DTC configuration, you must first validate and cross-validate your configuration file. Otherwise, you may simply exit NMMGR.

4 Dynamic Configuration and DTS Shutdown/Restart

This chapter describes how you can make most DTS configuration changes dynamically using NMMGR without rebooting the system (herein referred to as dynamic configuration. Such configuration changes include adding/deleting/ modifying terminals, printers, and DTCs.

This chapter also discusses the DTS subsystem shutdown and restart capabilities provided through the `DTCCNTRL` command.

Refer to Chapters 5 and 6 for detailed steps on the DTS configuration process for host-based and PC-based DTC management, respectively.

NOTE To automatically add/configure a host-based managed DTC to DTS without needing to specify detailed configuration information such as DTC cards/boards and ldevs, refer to Chapter 3, “Automatic Configuration of DTCs.” To manage/dynamically configure host-based X.25 links, refer to the *Configuring and Managing Host-Based X.25 Links* manual.

Dynamic Configuration

Dynamic configuration enables you to apply a select set of DTS configuration changes made in NMMGR without rebooting the system. Such configuration changes include adding or deleting terminals, printers and DTCs, changing most configuration parameters of terminals, printers and DTCs. See Table 4-1 for a complete list of configuration changes that can be modified dynamically (this includes changes that require additional actions, such as rebooting the DTC, before changes take effect).

All operations that delete ldevs are non-destructive. This means that if an ldev to be deleted is in use, then the delete is not performed. You must take the appropriate action to free the device. For example, you must stop the spooler on a spooled serial printer or log off the session on a terminal ldev. If multiple ldevs are deleted, then only free ldevs are deleted. Those ldevs that were not free will be processed again the next time DTCCNTRL is invoked.

Most changes will not affect current active sessions or users. Only those changes that require a reset of the DTC or DTC card will affect active sessions or users. A DTC reset is only required when the change is to a DTC characteristic, such as, adding a card or changing a DTC CPU parameter, such as, the DTC IP address or SNMP data. Users on other DTCs are not affected.

Some changes will require additional steps to complete once DTCCNTRL has made the desired changes. These possible additional steps are: logoff any sessions or close any jobs that access the changed devices, stop and restart the spooler if the device is a printer, stop and the start X.25/PADSUP, reboot or reset the DTC. DTCCNTRL will display a message when these steps are necessary and tell you which DTCs are affected.

Table 4-1 Dynamically Configurable Tasks

Task	Action Required for Change to Become Active
Add/configure new terminal/printer Add/delete class name Change DTC event logging class Host-based X.25 configuration changes: – Global PAD Access lists – System to System Local User Group table – System to System Switching table – Maximum number of PAD Connections – PAD Switching table – Incoming PAD Security table Change SNMP filter Change NLIO from N to Y in terminal profile Increase number of non-nailed TIO/PAD ports	No action; changes take effect dynamically
Change terminal to printer or vice versa* Change device profile characteristics:	Logoff any sessions or close any jobs associated with changed devices. If device is a printer, stop the spooler.
– change line speed	

Table 4-1 Dynamically Configurable Tasks (Continued)

Task	Action Required for Change to Become Active
– change term type file name/number – change modem type – change speed/parity – change hardware handshaking – change reset HP terminal – change allow :HELLO logon – change record width Delete: – terminal/printer* – ldev* – DTC* Decrease number of non-nailed TIO/PAD ports* Change starting ldev of non-nailed ports*	* For these changes, the device must not be owned when dynamic configuration is invoked. The terminals must be logged off and the printers must be not spooled.
Host-based X.25 configuration changes: – change PAD access – change level 1, 2, or 3 configuration	Use DTCCNTRL to: 1) Stop X.25/PADSUP 2) Start X.25/PADSUP (see Configuring and Managing Host-Based X.25 Links for more information)
Add/configure new DTC	Reboot or reset DTC or Perform automatic configuration (see character 3 for more information)
Add/configure a TIO card Change DTC IP address	1) Logoff any sessions that were logged on through the changed DTC 2) Reboot DTC (see Chapters 5/6, step 9, for more information)

Table 4-1 Dynamically Configurable Tasks (Continued)

Task	Action Required for Change to Become Active
Change AFCP/management timers Change SNMP MIB data Change SNMP trap destination	You may also use TermDSM to reset the DTC (see Troubleshooting Terminal, Printer, and Serial Device Connections for more information)
Change from host-based TIO to host-based X.25 Change DTC LAN address Change DTC name Change DTC node name Change from PC-based to host-based or vice versa Change NLIO from Y to N in terminal profile Change initially spooled in printer profile Change HP e3000 characteristics: – node name – link name – physical path of LANIC Add X.25 card to DTC when none previously existed	1) Use DTCCNTRL to shutdown/restart DTS (see Chapters 5/6, step 9, for more information) 2) Reboot DTC You may also use TermDSM to reset the DTC (see Troubleshooting Terminal, Printer, and Serial Device Connections for more information)

NMCONFIG and NMCONFIX Files

Dynamic Configuration uses both files NMCONFIG.PUB.SYS and NMCONFIX.PUB.SYS to manage the devices created by the DTS subsystem. When users wish to make any dynamic change, NMMGR will be used to modify the configuration in NMCONFIG.PUB.SYS. When DTCCNTRL is invoked, either within or from outside of NMMGR, NMCONFIG will be compared to NMCONFIX and the desired changes will be made to the system configuration. When the operation has completed successfully, the changes will be written to NMCONFIX. The configuration in NMCONFIX will always match the actual configuration of the DTS subsystem.

If any errors are encountered, then information will be saved in the NMCONFIG file that will allow DTCCNTRL to be re-invoked to complete the changes at a later time. If an operation is partially successful, then those changes that are successful will be written to NMCONFIX. For example, if you delete two ldevs and the second ldev can't be deleted because it is in use, then DTCCNTRL will save information that will allow the second ldev to be deleted once the device is no longer in use.

CAUTION If ANY other configuration file is copied to NMCONFIG.PUB.SYS or NMCONFIX.PUB.SYS then dynamic configuration will be disabled until a DTS shutdown and restart is done or the system is rebooted. This includes other files from the same system or files copied from other systems.

If there is some operation that fails, and you wish to undo the change, you can use NMMGR to change the appropriate screens back to what they were and then invoke DTCCNTRL.

Compressing the Configuration Files

As your configuration grows and changes, you may find it necessary to compress or expand your configuration file. When you add items in a file, records are added sequentially from the beginning of the file. If you delete items from a configuration file, the records are not immediately recovered, so the middle of the file may contain unused records. These unused records in the middle of the file are not available for reuse. By compressing the file, you cause all data to be stored in a contiguous block of records at the beginning of the file. This frees the unused records to be reused.

Compress the files by accessing the Compress screen in NMMGR from the utilities menu. To recover unused records enter 0 in the Number of Additional Records field and press the **[Compress File]** function key. If you enter a positive number, the number of free records will be increased by the number entered. If you enter a negative number, the number of free records will be decreased by the entered number. The maximum file size limit is 65,535 records.

NOTE If you compress the NMCONFIG.PUB.SYS file you must also compress the NMCONFIX.PUB.SYS file. You will be allowed to compress the NMCONFIX.PUB.SYS file, but will not be allowed to modify any records.

See the *Using the Node Management Services Utilities* manual for additional information on how to compress the configuration files.

Performing a Dynamic Configuration

Follow the steps below to dynamically configure DTS changes. Refer to Chapter 5, "Configuring Serial Devices (for Host-Based Management)," and Chapter 6, "Configuring Serial Devices (for PC-Based Management)," for more detailed steps on the DTS configuration process using NMMGR for host-based and PC-based DTC management, respectively.

NMMGR can keep up to 70 changes. This means that you can change a maximum of 70 different screens before you invoke DTCCNTRL. After the 64th change NMMGR displays a warning that tells you the limit is near. If more than 70 changes are made NMMGR warns that the current change will not take effect using DTCCNTRL. Those changes made after 70 entries will not be kept and can not be made dynamically. After DTCCNTRL is invoked and the changes were successful, NMMGR can again keep up to 70 new changes. Those changes that were not successful will be saved so they can be retried at a later time. When a new DTC is added NMMGR considers this to be one change even if you save data on many screens to configure this DTC.

1. Run the NMMGR program and make all desired DTS configuration changes. The network management configuration file must be NMCONFIG.PUB.SYS for the configuration changes to become active dynamically.

NOTE

If you are changing profile characteristics, you can see which ldevs and DTCs will be affected by the change by pressing the **[Assoc Ldevs]** function key on the profile screen corresponding to the profile you are changing. After pressing this key, you will see a list of all ldevs using this profile in the DTCs configured in DTS. Refer to Chapter 7, "Terminal and Printer Profiles," for more information.

2. After successful validation and cross-validation, NMMGR will prompt you as to whether you want DTS changes to take effect now. The following prompt will appear:

```
Do you want DTS changes to be become active now (Y/N)?


Y =   all changes made take effect now

N =   all changes made will take effect upon next dynamic
      configuration or system boot

H =   help


>
```

If you type Y, dynamic configuration changes will take effect now. NMMGR calls DTCCNTRL which dynamically implements the DTS changes made in NMMGR.

If you type N, dynamic configuration changes will not take effectnow. Your changes will take effect the next time dynamic configuration is invoked, a DTS shutdown/restart is performed, or the system is rebooted. Dynamic configuration changes can be implemented later by calling DTCCNTRL from the CI prompt any time thereafter.

Or you can run NMMGR again and select validate DTS/Link. See the section "DTCCNTRL After NMMGR Exit," for steps on how to invoke the DTCCNTRL command at the CI prompt.

If you type H, you will see help text describing the options.

NOTE

You can suppress the display of the question and have DTS changes become active dynamically, without prompting, by using capabilities within NMSTART as discussed later in this chapter.

3. If you selected Y in step 2 above and the DTS changes you have made are dynamically configurable, no other action is required and changes will become active automatically. You will see a message on the screen indicating that no other actions are required.

   If the DTS changes you have made require additional actions before changes become active, refer to Chapters 5 and 6, step 9, for more information. If this is the case, you will see messages on the screen indicating what actions are required before changes become active.

   Refer to Table 4-1 for a list of configuration changes that can be modified dynamically.

4. After viewing the messages describing what actions are required, if any, enter **[RETURN]** when you see the prompt:

   ```
   (Press RETURN when finished viewing screen contents.)
   ```

   You will return to the Validation screen. From here you can make further changes or exit NMMGR.

DTCCNTRL After NMMGR Exit

If you choose not to invoke DTCCNTRL implicitly within NMMGR, you can run the command from the CI prompt at any time after you exit NMMGR. DTCCNTRL requires that you have a minimum of Network Manager (NM) capability.

The command can be entered either without specifying the desired dynamic configuration operation or by specifying it using the syntax outlined below:

- Dynamic configuration operation not specified:

```
:DTCCNTRL

0    exit

1    dynamically implement DTS changes made in NMMGR

2    view status of last DTS dynamic configuration

3    automatically add a new DTC

4    shutdown DTS subsystem

5    restart DTS subsystem

6    manage/dynamically configure host-based x.25

7    help
```

```
For help on these topics, select 7 at the prompt below.


Select one of the numbers above corresponding to the desired
operation: 1
```

- Dynamic configuration operation specified:

  ```
  :DTCCNTRL func=dynconf
  ```

Refer to Chapter 5, “Configuring Serial Devices (for Host-Based Management),” and Chapter 6, “Configuring Serial Devices (for PC-Based Management),” for more information on actions required for changes to take effect.

NOTE You must have made all desired DTS changes in NMMGR first before invoking DTCCNTRL from the CI prompt.

NOTE To automatically add/configure a host-based managed DTC to DTS without needing to specify detailed configuration information such as DTC cards/boards and ldevs, refer to Chapter 3, “Automatic Configuration of DTCs.” To manage/dynamically configure host-based X.25 links, refer to the *Configuring and Managing Host-Based X.25 Links* manual.

Using NMSTART

When NMMGR is run, one of the first actions it does is to look for an ASCII file called NMSTART.PUB.SYS. If this file is found, NMMGR will read the contents and attempt to execute the commands in the file.

A command can be placed in the file that will control the display of the question "Do you want DTS changes to become active now (Y/N)?" when validation is complete. The command has the following format:

```
DTSDYNCONF [OFF|ON|PERMOFF]
```

If NMMGR is run from a session and starts in maintenance mode, and the DTSDYNCONF command has not been called, DTCCNTRL will not be invoked and the prompt will not appear even if there are DTS changes. If NMMGR is started in screen mode and you switch to maintenance mode at the command line, then the default is OFF.

When DTSDYNCONF is set to OFF, the question and prompt will appear. NMMGR will wait for a response.

When DTSDYNCONF is set to ON, and NMMGR is run from a session, the question will be displayed but DTCCNTRL is invoked without waiting for a response.

When DTSCYNCONF is set to PERMOFF, NMMGR will never display the question or invoke DTCCNTRL.

When NMMGR is run from a job, NMMGR, will run in maintenance mode and accept commands one line at a time. In this case, the “DTS changes” question will not be displayed unless one of the commands is "DTSDYNCONF ON".

LOGDCC and LOGDCCBK Files

When the system rebooted or a DTS shutdown/restart executed, an ASCII file call LOGDCC.PUB.SYS is purged and recreated to log DCC startup console messages, and the results of any dynamic configuration operations. This file acts as a log of all dynamic configuration changes since the last system reboot or DTS restart.

An example of the contents in LOGDCC.PUB.SYS is as follows:

```
==========      WED, APR 16, 1996, 5:10 PM

DCC STARTUP     - ENTER - version C0200xxx compiled 96xxxx

DCC STARTUP     - OK

==========      WED, APR 16, 1996, 5:16 PM

                   << Deleting DTC02 in process... >>

                   ** Deleting DTC02 completed successfully.

                   ** DTC02 changes completed successfully.

                   << DTC01 changes in process... >>

                   * Adding TIO ldev 100 to card 0 (profile = TR10D96).

                   * Adding TIO ldev 101 to card 0 (profile = TR10D96).

                   ** DTC01 changes completed successfully.

                   << Adding DTC03 in process... >>

                  ** Adding DTC03 completed successfully.

SYSTEM WILL COMPLETE DYNAMIC CONFIGURATION ONCE ADDITIONAL ACTIONS ABOVE (IF
ANY) ARE TAKEN.

                  * New non-nailed PAD profile TR10D96A.

                  * Non-nailed port changes completed successfully.

ACTION:           CHECK that you have logged off any sessions or closed any
                  jobs associated with devices that have been changed.


SYSTEM WILL COMPLETE DYNAMIC CONFIGURATION ONCE ADDITIONAL ACTIONS ABOVE (IF
ANY) ARE TAKEN.
```

If the system is not rebooted or DTS restart is not done for a long time, the file LOGDCC may become full. If the file becomes full DTCCNTRL renames LOGDCC.PUB.SYS to LOGDCCBK.PUB.SYS. If LOGDCCBK already exists it will be purged. DTCCNTRL will then recreate LOGDCC so that this file will always contain the most current history of dynamic configuration changes.

Dynamic Configuration Status

You can also use DTCCNTRL to check the status of the last dynamic configuration. To see the status of the last dynamic configuration, type the DTCCNTRL command at the CI prompt either without specifying the desired operation or by specifying it using the syntax outlined below:

- View status operation not specified:

```
:DTCCNTRL

0    exit

1    dynamically implement DTS changes made in NMMGR

2    view status of last DTS dynamic configuration

3    automatically add a new DTC

4    shutdown DTS subsystem

5    restart DTS subsystem

6    manage/dynamically configure host-based x.25

7    help


For help on these topics, select 7 at the prompt below.


Select one of the numbers above corresponding to the desired
operation: 2
```

- View status operation specified:

```
:DTCCNTRL func=dcstatus
```

  If there were no errors from the last dynamic configuration performed by invoking DTCCNTRL, you will see the message "No errors from last DTS dynamic configuration." If errors occurred during the last dynamic configuration, you will see the message "Errors occurred from the last DTS dynamic configuration. See LOGDCC.PUB.SYS for error detail." Refer to the previous section in this chapter, "LOGDCC and LOGDCCBK Files," for more information on the LOGDCC file.

DTS Shutdown

The DTS shutdown capability is provided by the DTCCNTRL command. It allows you to bring down the entire DTS subsystem and includes the release of all TIO-related system resources. DTCCNTRL requires that you have a minimum of System Manager (SM) capability. This operation can only be done from the system console.

When combined with the DTS restart capability discussed in the next section, you can resolve errors that may arise during Datacomm Configurator (DCC) start-up without rebooting the HP e3000 host. If you see DCC error messages, first fix any problems that caused the DCC startup error and then run DTCCNTRL to shut down and restart DTS. Refer to Appendix E, “Error Messages,” for more information on DCC errors.

NOTE Issuing the DTCCNTRL command to perform a DTS shutdown will result in the deletion of the entire DTS/TIO subsystem from the system. No TIO users can use the system while it is shut down.

When DTS shutdown is invoked, all devices that are configured by the DTS subsystem are scanned and DOWNed. If any device is found that is logged on, spooled or owned by any process then the shutdown will not continue and all DOWNed devices are returned to the UP state. No active sessions or owned devices are affected. If no owned or in use devices are found then the shutdown will proceed to delete all DTS ldevs and release all DTS resources.

If desired DTS shutdown can be invoked with the “forced” option. If the “forced” options is specified, then any devices that are logged on, spooled or owned by any process will be reset and the sessions aborted. The “forced” option is specified on the command line when DTCCNTRL is invoked. See the next section for the syntax used to invoke DTS shutdown.

Performing a DTS Shutdown

To perform a DTS shutdown, type the DTCCNTRL command at the CI prompt either without specifying the desired shutdown operation or by specifying it using the syntax outlined below:

- DTS shutdown operation not specified:

```
:DTCCNTRL

0     exit

1     dynamically implement DTS changes made in NMMGR

2     view status of last DTS dynamic configuration

3     automatically add a new DTC

4     shutdown DTS subsystem

5     restart DTS subsystem

6     manage/dynamically configure host-based x.25

7     help
```

```
For help on these topics, select 7 at the prompt below.


Select one of the numbers above corresponding to the desired
operation: 4
```

- DTS shutdown operation specified:

  ```
  :DTCCNTRL func=shutdown
  ```

  or to invoke the “forced” option:

  ```
  :DTCCNTRL func=shutdown, forced=y
  ```

CAUTION When the “forced” option is invoked, then all sessions logged on to TIO devices will be aborted and all spooled TIO printers will be stopped.

NOTE To dynamically configure DTS changes, refer to the “Dynamic Configuration” section earlier in this chapter. To automatically add/configure a host-based managed DTC to DTS without needing to specify detailed configuration information such as DTC cards/boards and ldevs, refer to Chapter 3, “Automatic Configuration of DTCs.” To manage/dynamically configure host-based X.25 links, refer to the *Configuring and Managing Host-Based X.25 Links* manual.

DTS Restart

The DTS restart capability is provided by the DTCCNTRL command and allows you to restart the DTS subsystem.

NOTE The DTS must first be shut down before it can be restarted.

Performing a DTS Restart

To perform a DTS restart, type the DTCCNTRL command at the CI prompt either without specifying the desired restart operation or by specifying it using the syntax outlined below:

- DTS restart operation not specified:

```
:DTCCNTRL

0    exit

1    dynamically implement DTS changes made in NMMGR

2    view status of last DTS dynamic configuration

3    automatically add a new DTC

4    shutdown DTS subsystem

5    restart DTS subsystem

6    manage/dynamically configure host-based x.25

7    help


For help on these topics, select 7 at the prompt below.


Select one of the numbers above corresponding to the desired
operation: 5
```

- DTS restart operation specified:

```
:DTCCNTRL func=restart
```

NOTE To dynamically configure DTS changes, refer to the “Dynamic Configuration” section earlier in this chapter. To automatically add/configure a host-based managed DTC to DTS without needing to specify detailed configuration information such as DTC cards/boards and ldevs, refer to Chapter 3, “Automatic Configuration of DTCs.” To manage/dynamically configure host-based X.25 links, refer to the *Configuring and Managing Host-Based X.25 Links* manual.

5 Configuring Serial Devices (for Host-Based Management)

This chapter will use the configuration information that was collected on the worksheets in Chapter 2, “Preparing to Configure DTCs.”

NOTE If you use OpenView DTC Manager to manage your DTCs, refer to Chapter 6, “Configuring Serial Devices (for PC-Based Management),” instead of this chapter.

NOTE If you are configuring X.25 networking capabilities on a HP e3000 Series 900 computer using host-based network management, use *Configuring and Managing Host-Based X.25 Links* instead of this manual to configure DTCs and DTC connections.

Network Configuration Overview

Information required for network configuration on the host is contained in one file. The name of this configuration file is NMCONFIG.PUB.SYS.

When building a new configuration file, it is not necessary to define every field. This is because a sample configuration file is supplied with the MPE/iX operating system. The sample configuration file is called NMSAMP1.PUB.SYS. Hewlett-Packard recommends using the sample file as a template for initial configuration.

CAUTION Use the sample configuration file for **first** time configurations only. Information previously configured using NMMGR, and stored in NMCONFIG.PUB.SYS, will be overwritten when the sample file is copied to NMCONFIG.PUB.SYS.

The NMCONFIG.PUB.SYS file can be modified using NMMGR. Only one configuration file can be active at a time and the active file must be called NMCONFIG.PUB.SYS. Accordingly, modified or new configuration files must be copied to NMCONFIG.PUB.SYS before they can be used by the system.

CAUTION If ANY other configuration file is copied to NMCONFIG.PUB.SYS or NMCONFIX.PUB.SYS then dynamic configuration will be disabled until a DTS shutdown and restart is done or the system is rebooted. This includes other files from the same system or files copied from other systems.

Copy the Sample File

Network information is stored in a configuration file called NMCONFIG.PUB.SYS. If you do not already have a NMCONFIG.PUB.SYS file, create a copy of NMCONFIG.PUB.SYS from the sample configuration file supplied on the HP e3000, NMSAMP1.PUB.SYS.

To copy NMSAMP1.PUB.SYS into NMCONFIG.PUB.SYS, enter these commands at the MPE/iX prompt (:):

```
HELLO MANAGER.SYS,PUB

FILE CONFIG=NMCONFIG.PUB.SYS;DEV=1

FCOPY FROM=NMSAMP1.PUB.SYS;TO=*CONFIG;NEW
```

NOTE "DEV=1" must be specified in the FILE equation to specify that the NMCONFIG.PUB.SYS file is to be stored to system disk 1.

Modify the Network Management Configuration File

Use NMMGR to enter asynchronous device configuration information into the network management configuration file (NMCONFIG.PUB.SYS). A step-by-step procedure for updating the host's network management configuration file follows.

NOTE Before modifying the NMCONFIG.PUB.SYS file, make a backup copy of it. If the modifications made to the configuration file are successful, purge the backup copy.

Step 1: Begin the Configuration Process

Run the NMMGR program. Node manager (NM) and network administrator (NA) capabilities are required to run this program. To run NMMGR, enter the following command at the MPE prompt and then press the **[Return]** key.

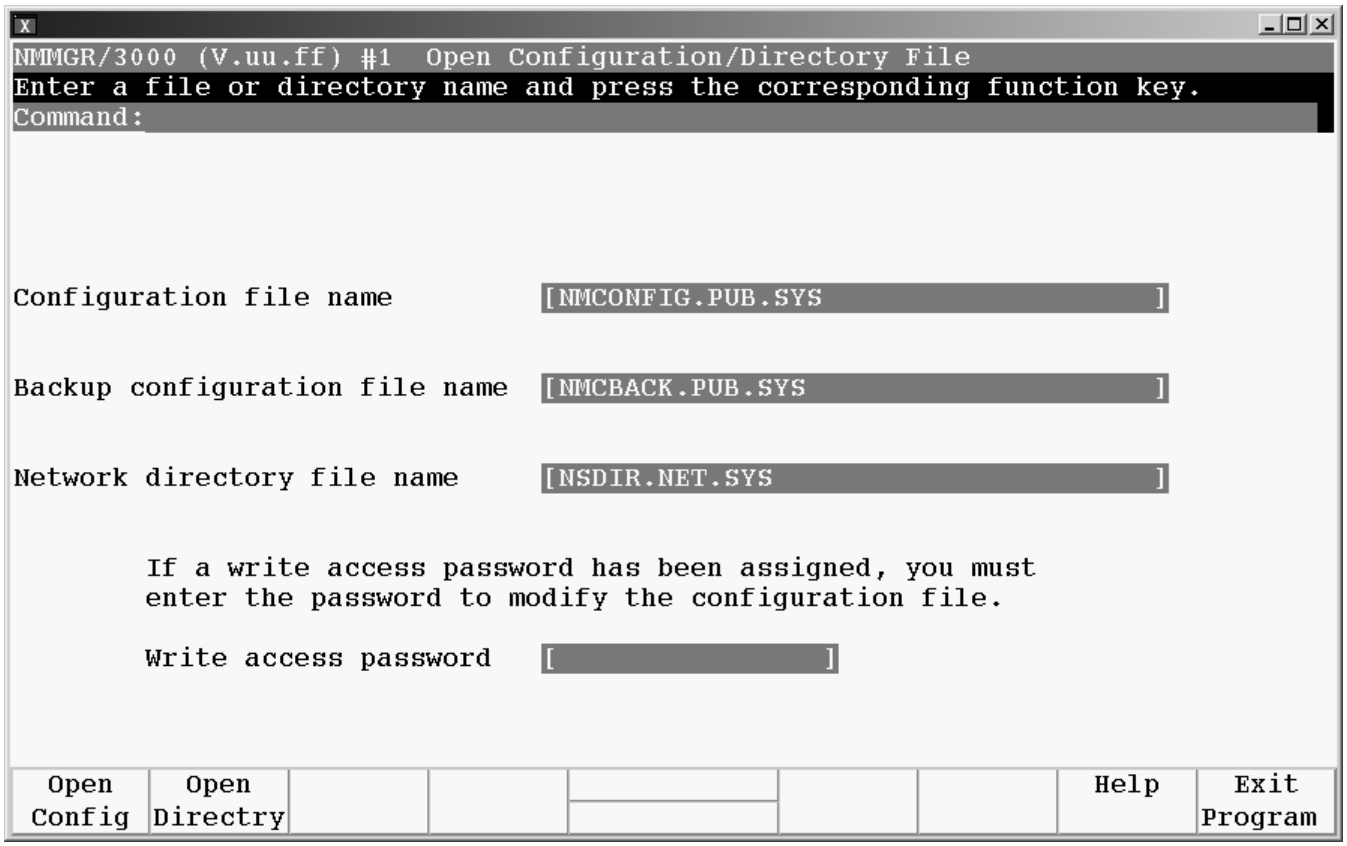
```
NMMGR.PUB.SYS
```

NOTE You must be logged on to the SYS account to run NMMGR.

Step 2: Open the Network Management Configuration File

The Open Configuration/Directory File screen is displayed (Figure 5-1). This screen lets you specify the configuration and backup file names.

Figure 5-1 Open Configuration/Directory Screen



Follow the steps listed here to enter data for this screen. Refer to "Fields" subsection on the next page for detailed information about each field on the screen.

1. `NMCONFIG.PUB.SYS` is the name required by the software. Verify that this name is displayed in the `Configuration file name` field.
2. Verify that the name of the correct backup configuration file is in the `Configuration file name` field. The default is NMCBACK.*group.account*.
3. Press the **[Open Config]** function key.
4. If the configuration file you are opening does not exist, the following message will appear on the message line at the top of the screen:

```
Config file does not exist; press Open Config again to create it.
```

Press the **[Open Config]** key again to confirm the creation of the file you specified.

Fields

`Configuration file name` The only valid configuration file name the system recognizes for use by the network subsystem is `NMCONFIG.PUB.SYS`.

You can create or modify a configuration file using a different name and save it as an **offline configuration file**. You can use offline configuration files as a means of creating and storing configurations that you want to use in the future. When you are ready to use an offline configuration file, rename it as `NMCONFIG.PUB.SYS`, validate within NMMGR (SYSGEN cross-validation is done automatically within NMMGR), and reboot the system or perform a DTS shutdown/restart (see Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for more information on DTS shutdown/restart).

`Backup configuration file name` A backup file name must be specified whenever a configuration file is opened or created. The default backup configuration file name is `NMCBACK.PUB.SYS`. The backup file will be automatically updated with the contents of the configuration file each time the configuration file is successfully validated.

`Network directory file name` The Network directory file must be configured for each new X.25 node (unless you will only be accessing the node using direct level 3 access). This field is only used for X.25 network management. The network directory contains information that one X.25 node needs in order to communicate with other X.25 nodes. The only network directory file name supported by HP is `NSDIR.NET.SYS`.

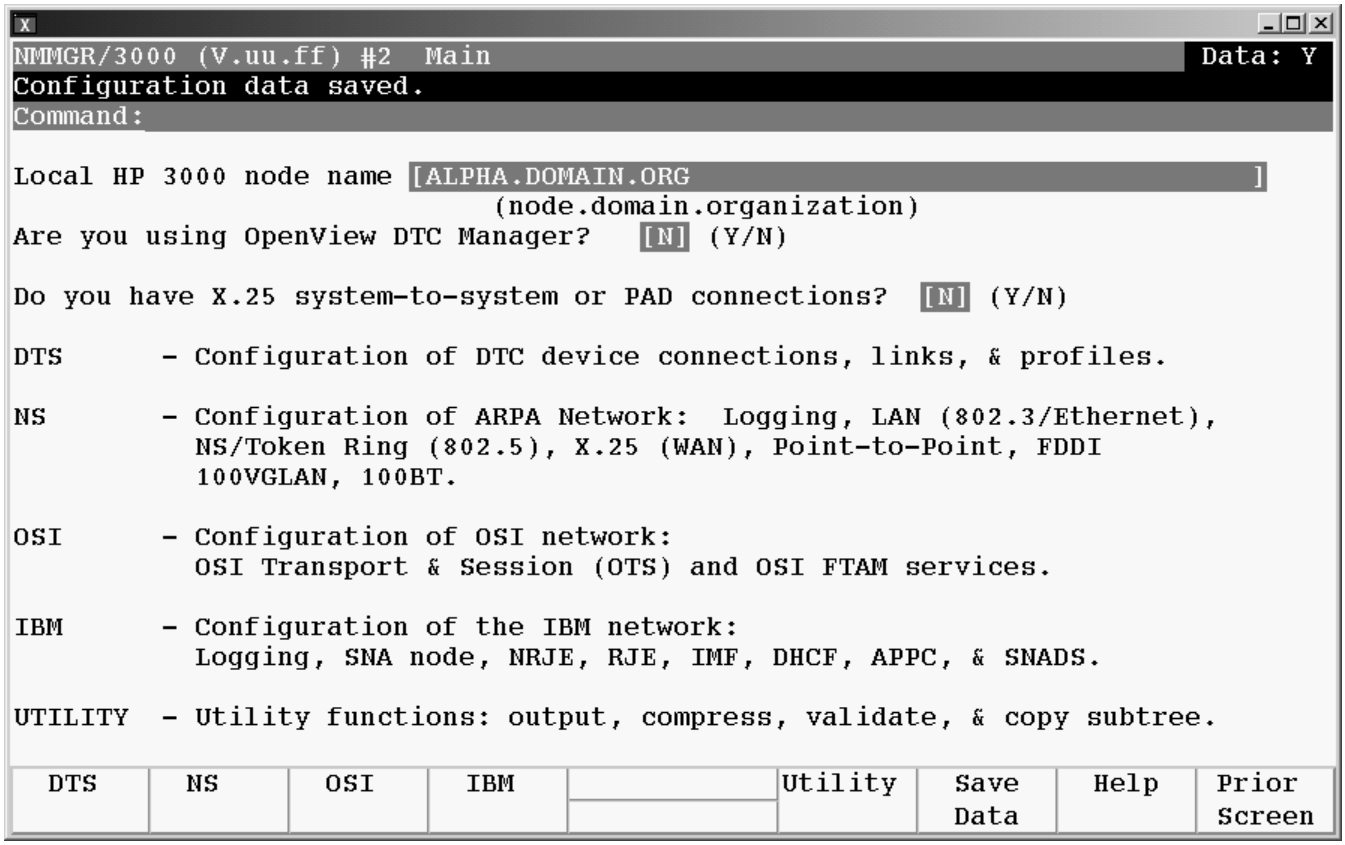
`Write access password`The password is an optional feature. If a password has been assigned, you must enter it in the password field to update the configuration file. It is possible to open the file without using an assigned password, but the file will be in read only mode and NMMGR will not accept any changes.

If a password has not been assigned, you should ignore the password field. If you want to assign a password for the system you are configuring, refer to *Using the Node Management Services*.

Step 3: Configure the Local Node Name

The Main screen is displayed after you press the **[Open Config]** key (Figure 5-2). This screen lets you specify the HP e3000 host's name. It also asks whether you are using the HP e3000 host or an OpenView Windows Workstation (PC) for DTC management, and if you are using X.25 or PAD.

Figure 5-2 Main Screen



1. Assign a node name to the HP e3000 host in the "local HP e3000 node name" field. Use the format *nodename.domain.organization*.

   If your HP e3000 host is the only computer in your network, you may enter any node name. If you have several computers on your network, you must make sure the node names for each host are unique. Refer to Chapter 2, "Preparing to Configure DTCs," for more information on node name.

2. In the field after the question, "Are you using the OpenView DTC Manager?", enter an N.

   This means that you will **not** use the OpenView DTC Manager (that is, use a PC to manage your DTCs). Instead, you will use the HP 3000 host to manage your DTCs.

   If you specify "Y" for using OpenView DTC Manager refer to Chapter 6, "Configuring Serial Devices (for PC-Based Management)."

3. In the field after the question, "Do you have X.25 system-to-system or PAD connections?", enter an N for no.

If you have X.25, refer to the *Configuring and Managing Host-Based X.25 Links* manual.

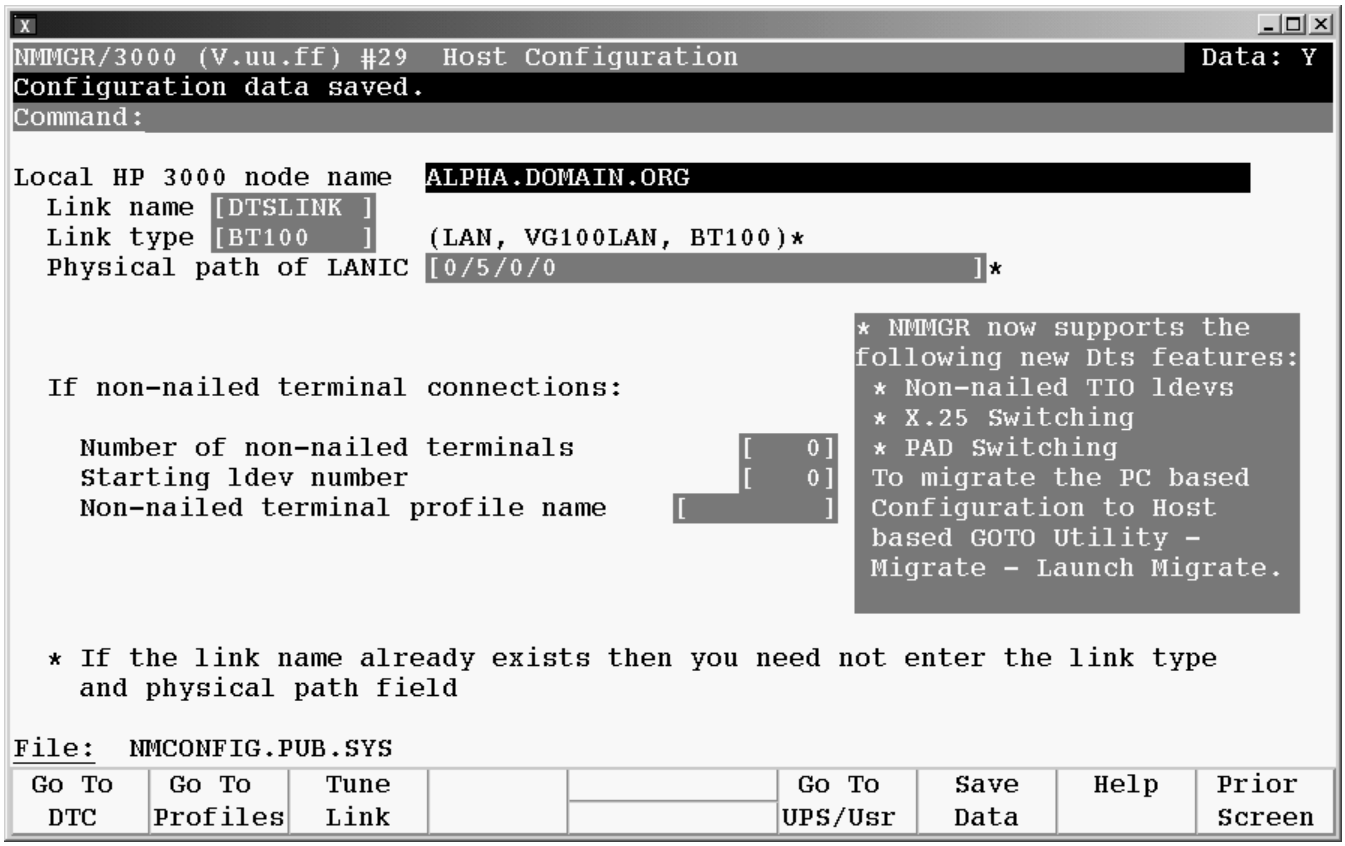
4. After you enter the information on the screen, press the **[Save Data]** function key to save your entries.
5. After the data is saved (the `Data` flag in the upper right-hand corner is `Y`), press the **[DTS]** function key.

Step 4: Configure the Link

The Host Configuration screen is displayed when you press the **[DTS]** function key at the Main screen (Figure 5-3).

This screen is used to configure the Datacommunications and Terminal Subsystem (DTS) on the HP e3000. DTS defines the interaction between the system and any asynchronous devices, such as terminals and printers.

Figure 5-3 Host Configuration Screen (Host-Based)



1. "Local HP e3000 node name" is a display-only field. Verify that it is correct.
2. Enter the name of the LINK that you want to be used by the HP e3000 DTS subsystem. DTSLINK is the default.
3. Enter the Link type of the LAN card you will use for the interface. If the LINK name is already defined in the LINK tree of the NMCONFIG file, then leave this field blank.
4. In the "Physical path of LANIC" field, type the slot number for the LANIC card in the host. If the LINK name is already defined in the LINK tree of the NMCONFIG file, then leave this field blank.
5. Verify that the cursor is in the Number of non-nailed terminals field. Type the number of non-nailed terminals, as listed on the worksheets. This is the maximum number of terminals, not configured as nailed terminals, that can logon to the computer.

6. Verify that the cursor is in the `Starting Ldev Number` field. Type in the ldev number where the non-nailed pool should start. The non-nailed devices will be configured with the starting ldev number and higher.

   For example, if the number of ldevs is 2 and the starting ldev number is 200, then the non-nailed ldevs would be 200 and 201. If 201 is already configured as a nailed device then the non-nailed devices would be 200 and 202.

7. Verify that the cursor is in the `Non-nailed terminal profile name` field. Type the name of the terminal profile that the non-nailed terminals will use, as listed on the worksheets.

8. Repeat paragraphs 4 through 6 for the PAD fields. No additional configuration is needed for non-nailed connections.

9. Press the **[Save Data]** function key. Press the **[Go to DTC**] function key to proceed to step 5 Select DTC type.

   If you don't want to configure PAD incoming security, press the **[Go to DTC]** function key to skip to Step 8: Select DTC Type. If you do want to configure PAD Incoming Security and create PAD Access lists, then press the **[Go to Access]** function key and continue to Step 5: Configure PAD Node Names List.

NOTE The **[Go To USR/UPS]** key takes you to the screen to configure the HP Support Modem Port Screen. This screen is used to configure the ldev, the line speed and parity, and the Modem type, for the Support Modem Port. The default ldev number assigned is 21. The configuration of user port is only supported for the NIO LAN console card (for example, HP e3000 Series 9X7 and 9X7 LX) and the N and A Class systems. Refer to the *System Startup, Configuration, and Shutdown Reference Manual* for more information on the Support Modem port.

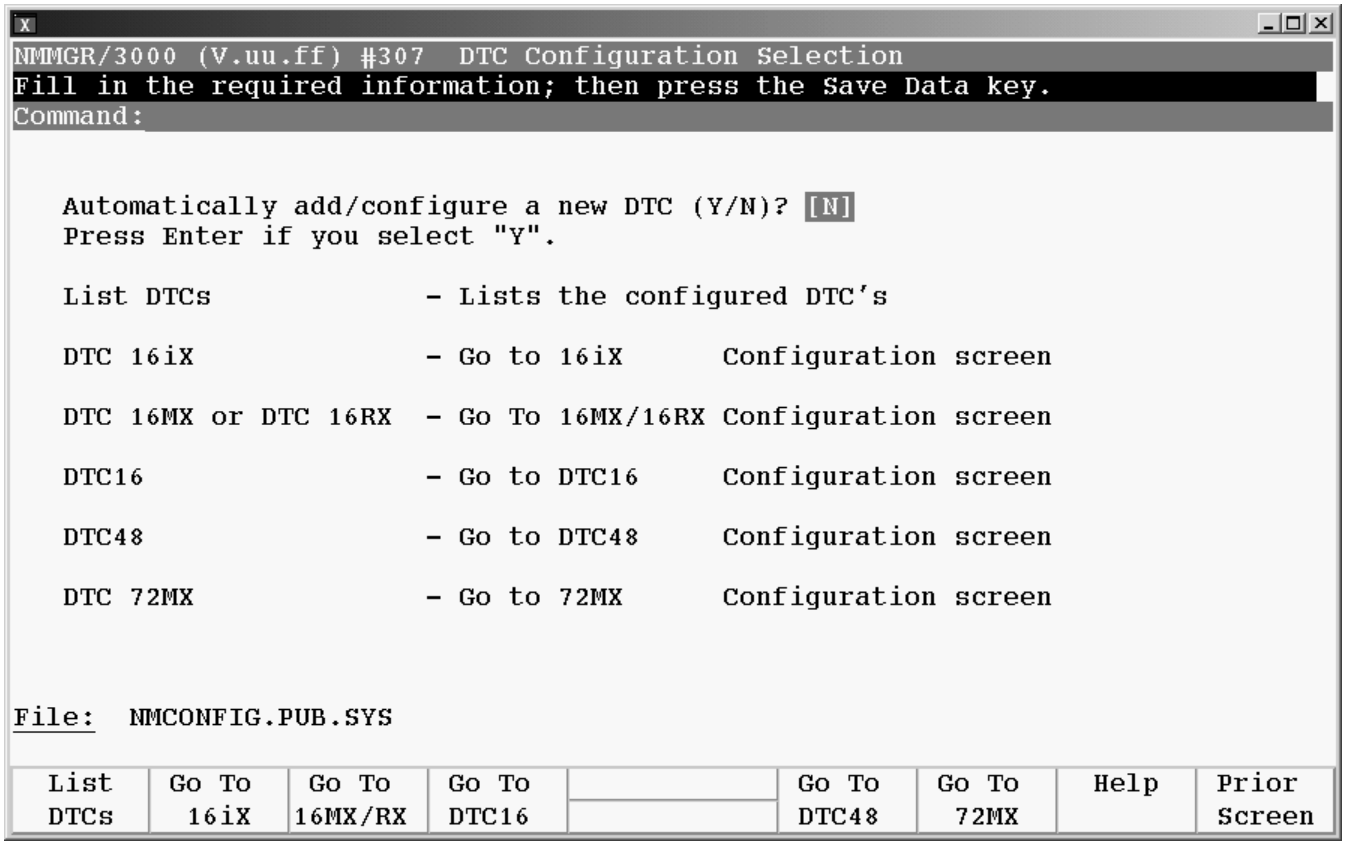
NOTE On the HP Support Modem Port screen is the key **[Go To UPS Port]** which takes you to the Uninterruptible Power Supply Port Screen where you can configure the parameters for the Uninterruptible Power Supply Port. This screen is used to configure the ldev number, line speed, and parity on the port to support an uninterruptible power supply (UPS) connection. The default ldev number is 22. This port is available and supported on HP e3000 Series 9X8 and the N and A Class systems.

A UPS can also be connected to a DTC port via a configuration process that does NOT use the **[Go To UPS Port]** key. Refer to Chapter 9, "Describing Asynchronous Devices," and the *System Startup, Configuration, and Shutdown Reference Manual* for information on the UPS and on how to connect a UPS to a DTC port.

Step 5: Select DTC Type

The DTC Configuration Selection screen (Figur e5-4) is displayed when you press the **[Go To DTC]** key at the Host Configuration screen. Here you specify the type of DTC to configure. You can also trigger the process to automatically add and configure a new DTC without needing to specify detailed configuration information. See Chapter 3, "Automatic Configuration of DTCs," for instructions on triggering the automatic configuration process.

Figure 5-4 DTC Configuration Selection Screen



1. Select the DTC type by pressing one of the function keys: **[DTC16iX]**, **[DTC16MX/ RX]**, **[DTC16]**, **[DTC48]**, or **[DTC72MX].**

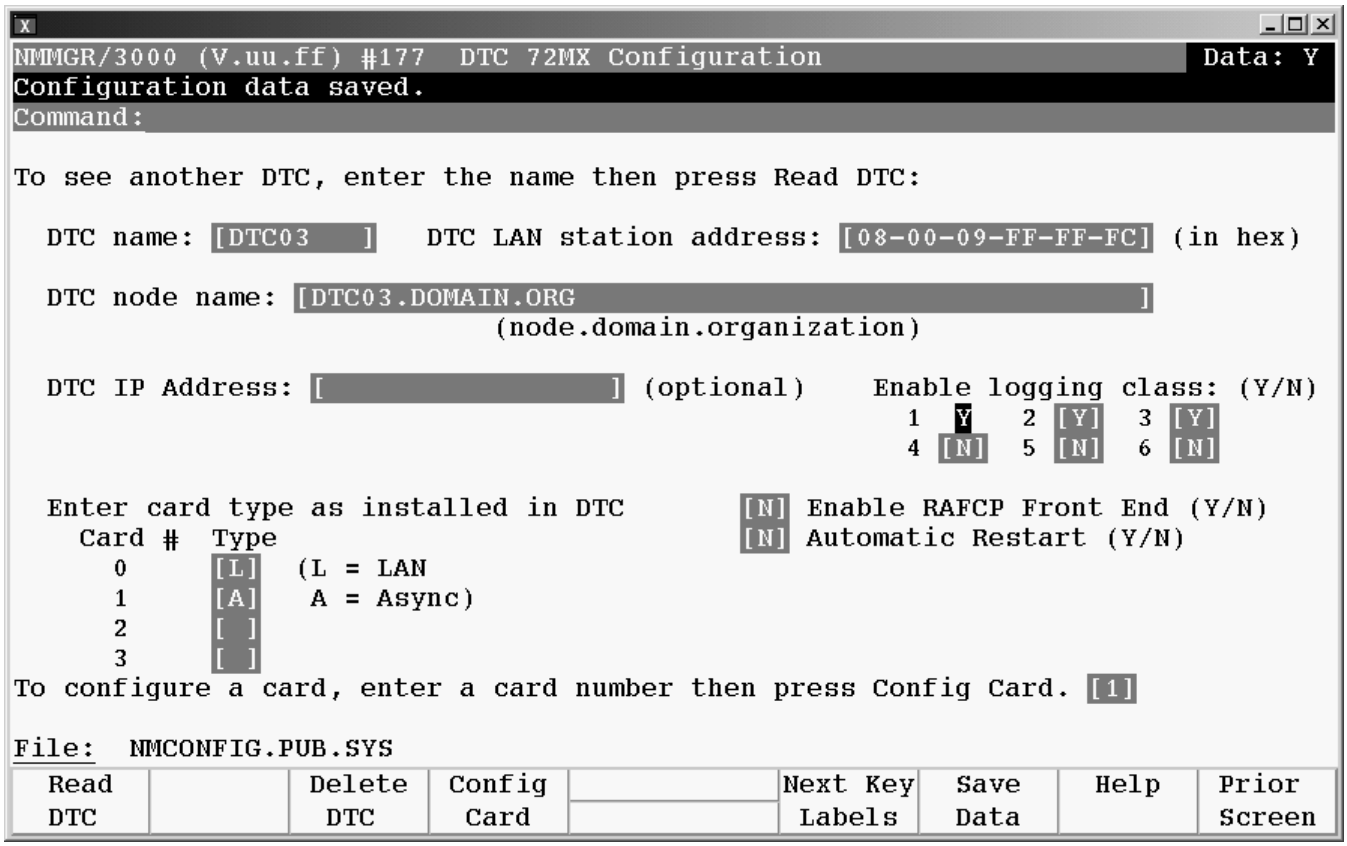
   NMMGR will take you to the configuration screen for the specified DTC type.

NOTE You may use the **[List DTCs]** key on the DTC Configuration Selection Screen to see a list of all DTC names configured on your system.

Step 6: Specify DTC Configuration

The DTC Configuration screen is displayed after you select the DTC type at the DTC Configuration Selection screen. Figure 5-5 shows the DTC Configuration screen for a DTC 72MX. (DTC Configuration screens for DTC 16iX, DT C16MX/RX, DTC 16, and DTC 48 vary slightly).

Figure 5-5 DTC Configuration Screen



1. Enter the DTC's name in the "DTC name" field.

   The DTC name can be up to eight alphanumeric characters, beginning with a letter. *The DTC name must be unique on the system*. It is acceptable (and common) to use the *nodename* part of the DTC node name as the DTC name. See step 3 below for more information.

2. Enter the DTC's LAN address in the "DTC LAN station address" field.

   The LAN address can be found on a label inside the front cover or on the back panel of the DTC box.

   If a valid LAN address is entered, then this DTC will be defined as a **managed** DTC on the system. If you want to define this DTC as a **non-managed** DTC on this system, then use the value 00-00-00-00-00-00 as the LAN address. In this case, you will be allowed to define only NAILED devices for all the connector cards.

   For DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment, you **must** use the value 00-00-00-00-00-00 as the DTC 16RX LAN address.

3. Type in the DTC's node name in the "DTC node name" field.

   Use the format *nodename.domain.organization*, where *nodename* identifies the DTC. If there is more than one DTC on the network, the *nodename* of each DTC must be unique. The following are examples of valid DTC node names on the same network:

   ALPHA.ACCTG.TEKLAB

   BETA.ACCTG.TEKLAB

   Note that "DTC name" and "DTC node name" are two different fields. However, it is acceptable (and common) to use the *nodename* part of the "DTC node name" as the "DTC name", such as:

   DTC name = ALPHA

   DTC node name = ALPHA.ACCTG.TEKLAB

4. (Optional) Enter an IP address for the DTC, if you want this DTC to be able to respond to PING/iX requests. Otherwise, leave the "DTC IP Address" field blank.

   For DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment, the IP address of the DTC 16RX is configured using the DTC 16RX Manager on the HP 9000 host and not on the HP e3000. Any value entered in this field for the DTC 16RX will be ignored.

   Refer to Chapter 2, "Preparing to Configure DTCs," for more information on IP addresses.

5. Enable the event logging classes that you want. It is recommended that you enable classes 2 and 3 and disable classes 4 through 6. See "DTC Event Logging" in Chapter 2, "Preparing to Configure DTCs," for information on these event logging classes. Note that logging class 1 is not configurable and is always enabled.

   Event logging classes do not apply for DTC 16RX access to an HP 3000 in an MPE/iX host-based management environment; any values entered in these fields for the DTC 16RX will be ignored.

6. Verify that the cursor is in the "Type" field under "Enter card types as installed in the DTC." Enter the card type for each card in the DTC The valid card types are listed on the screen.

   Note that DTC 16iX/16MX/16RX does not have cards since its port connectors are built directly onto the DTC backplane. Refer to Chapter 2, "Preparing to Configure DTCs," for more information on card types for each DTC.

7. Enter 'Y' in the "Enable RAFCP Front End" field if you intend to use this DTC as a front-end DTC for routeable AFCP communications. You must also go to the DNS/IP Routing screen and provide the IP addresses of the Domain Name Servers and routers that you intend to use. This field is available only on the DTC72MX and DTC16MX screen. If this DTC is configured as a non-managed DTC, then any value entered will be ignored.

8. The Automatic Restart field applies only to Host-Based X.25 Management.Any Value entered in this filed will be ignored.

9. Press the **[Save Data]** function key.

10. To configure a card in the DTC, enter the number of the card you want to configure in the "To configure a card, enter a card number ..."field at the bottom of the screen. The desired card number must have a valid card type entered in the "type" field.

Press the **[Config Card]** function key. Proceed to step 7: Configure DTC Cards.

To configure the ports on a DTC 16iX/16MX/16RX, simply press the **[Config Ports]** function key. Proceed to step 7: Configure DTC Cards. Repeat Steps 1 through 8 above for every newly-added DTC to be managed by the HP e3000 host. If you want to select a DTC that has already been configured, enter the DTC's name in the DTC name field and press the **[Read DTC]** function key.

11. Repeat steps 1 through 8 above for every newly-added DTC to be managed by the HP 3000 host. If you want to select a DTC that has already been configured, enter the DTC's name in the `DTC name` field and press the **[Read DTC]** function key.

Next Key Labels

When the **[Next Key Labels]** key is pressed, another set of key labels are displayed, this allows additional optional information to be configured for the DTC. These keys provide access to the following configuration screens:

`DNS/IP Routing` This key goes to a screen used to configure the DTC to use Domain Name Services for IP address resolution and IP routing configuration. These services are configured when **back-to- back** connection through routers are used or connections are to be made from DTC ports to HP 9000s or third party ARPA nodes. See Chapter 8,"Additional DTC Configuration," for steps to do this.

`Tune DTC` This key goes to a screen to change the AFCP, TCP and management timers for the DTC, if needed. Refer to Chapter 8, "Additional DTC Configuration," for steps to do this.

`DTC U I` This key goes to a screen that has information that defines how the DTC user interface behaves. The DTC user interface is used when a DTC port is configured as a switched port. See Chapter 1, "Introduction," for a description of how switching is used and Chapter 7, "Terminal and Printer Profiles," for a description of how to configure ports to allow switching.

`Config SNMP` You may use the **[Config SNMP]** key on the DTC Screen to configure the DTC to act as an SNMP agent. This key goes to a screen to configure the DTC to act as an SNMP agent. Refer to Appendix C, "DTC User Interface," for steps to do this. Refer to the *DTC Technical Reference Guide* manual for more information on SNMP.

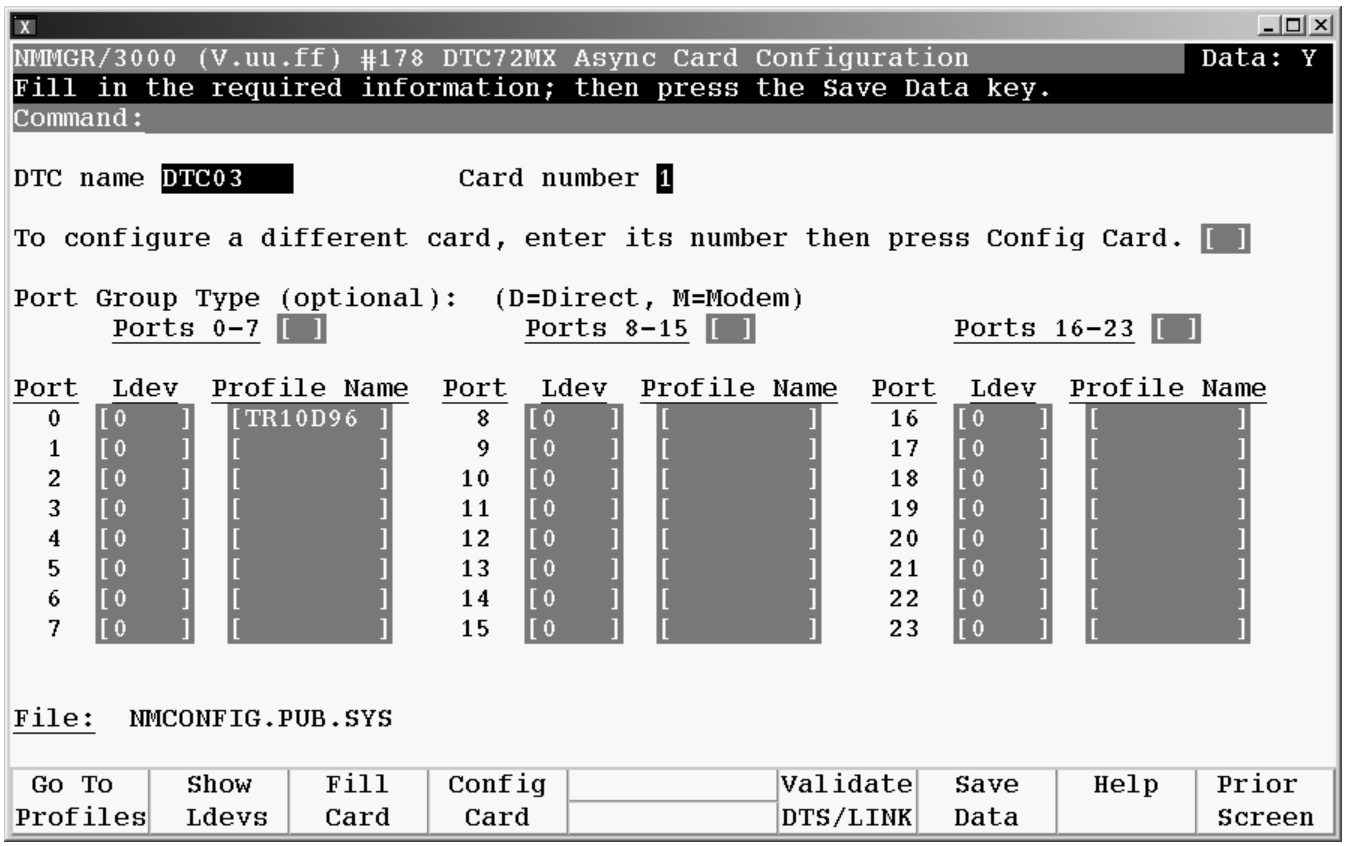
Step 7: Configure DTC Cards

When you press the **[Config Card]** key at the DTC Configuration screen, NMMGR will display the corresponding card configuration screen for the specified card in the DTC. Figure 5-6 shows an example of a Card Configuration screen for DTC 72MX for asynchronous connect card. (Screens vary slightly for DTC 16iX/16MX/16RX, DTC 16, and DTC 48).

The corresponding screen for a DTC 16iX/16MX/16RX is called a Port Configuration Screen since DTC 16iX/16MX/16RX has port connectors built directly onto the backplane and does not have connector cards.

Use this screen to configure the ports in the specified card. On this screen, logical device (ldev) numbers and profile names are associated with individual ports on the card.

Figure 5-6 DTC Card Configuration Screen



1. Verify that the DTC name and card number displayed are correct.
2. (Optional) Enter the port group type. The valid types are `D` for direct connect and `M` for modem connect. The default is `D`.
3. Press the **[Tab]** key to move the cursor to the first port on the card. Enter an ldev number for this port in the `"Ldev"` field.

   Ldev numbers used for each port on the DTC must be unique.

   For example, you can use ldev number 100 for port 0 of the first card, and increment the ldev number by 1 for each consecutive port.

   So a DTC 72MX with 3 asynchronous cards (a total of 72 ports) would be assigned ldev numbers 100 through 123 for the 24 ports on the first card, 124 through 147 for the ports on the second card and 148 through 171 for the ports on the third card.

   For the second DTC, you would start with an ldev number greater than 171.

   To configure a non-nailed port, leave the ldev number 0 and Profile name blank. You may also configure a non-nailed port by entering the ldev number -1 a specifying a profile. You must also then configure a TERMINAL or HOST profile type in the Profile Name field. The DTC port will be configured with the parameters in the specified profile.

NOTE

Pressing the **[Show Ldevs]** key will display a list of all the ldev numbers configured in NMMGR in addition to the DTC name, card type, and profile name.

4. Enter the profile name for each port in the "Profile Name" field.

   A profile for the port defines the characteristics of the device to be connected to that port.

   For direct terminals ports, the suggested profile to use is TR10D96. For direct printer ports, the suggested profile to use is PR18D96 (or PR22D24 for HP printers with status checking). For a UPS connected to a DTC port, the suggested profile is UP10D12.

   The tables in Chapter 7, "Terminal and Printer Profiles," list terminal, printer and UPS profiles supplied by the system. You may also create your own profiles. Refer to Chapter 7, "Terminal and Printer Profiles," for more information on profiles.

5. Repeat above two steps for every port in this card.

NOTE

To reduce typing ldev numbers and profiles on the screen, you can use the **[Fill Card]** key to automatically assign ldev numbers and profile names. First, enter an ldev number (and profile name if you do not wish to use the default profile name) for port 0, then press **[Fill Card]**; the system will automatically assign incremental ldev numbers to each subsequent port on the screen and copy the specified profile for each port. The system will automatically save the data it has entered.

The **[Clear Display]** key on your keyboard will clear the part of your screen that is below the cursor position. You may use this key and the **[Fill Card]** key to quickly modify a screen.

6. Press the **[Save Data]** function key to save the data on the screen.

CAUTION

Before you exit this screen, make sure you press **[Save Data]** if you want to keep the data on the screen; otherwise your screen input will be lost. This occurs even if you temporarily exit the screen to read **[Help]** information.

7. To configure another card, enter the card number you want to configure in the field "To configure a different card, enter its number,..." . The desired card number must have already been configured in the previous section, "Step 6: Specify DTC Configuration." The card is configured if a valid card type is entered in the "Type" field on the previous DTC configuration screen.
8. Press the **[Config Card]** function key. The corresponding screen for the card number entered in the last step will be displayed.
9. If all the cards have been configured, press the **[Prior Screen]** function key to return to the DTC Configuration Selection screen to select another DTC to configure. Otherwise, if every DTC has been configured, press the **[Validate DTS/LINK]** function key to validate the configuration file.

NOTE

NMMGR allows the configuration of up to 4649 terminal I/O devices. The largest valid ldev number allowed is 4679.

Step 8: Validate/Cross-Validate the Configuration File

Validation ensures that no conflicts exist in the network configuration file (NMCONFIG.PUB.SYS) between the DTCs and other configuration parameters. After NMMGR validates the network configuration file, it will automatically cross-validate the file with the system I/O devices configured through the SYSGEN utility. This will take place only if the file opened at the start of the NMMGR session is NMCONFIG.PUB.SYS and validation is successful. Additionally, you must have System Manager (SM) capability or the cross- validation will not occur. The commands used for SYSGEN cross-validation are in the file NMGRXVAL.PUB.SYS. If this file does not exist, NMMGR will create the file for you before cross-validating. You can edit this file as appropriate for your environment.

Refer to the MPE/iX manual, *System Startup, Configuration, and Shutdown Reference Manual*, for information on SYSGEN.

1. To validate the configuration file, press the **[Validate DTS/LINK]** key at the Card Configuration Screen, or type `validate` at the command line on top of any NMMGR screen and press **[Enter]**. (Note that the **[Enter]** key is not the carriage return key.)

   The DTS validation procedure starts by displaying the following on the terminal:

```
-> Validation of DTS/LINK started. <-
-> Validation of DTS/LINK finished. <-
```

   If errors were encountered in the configuration file, the validation procedure will print out the total number of errors found. Error messages will also be displayed explaining the problems found. Refer to for more information about these error messages.

2. After validation of the network configuration file is complete, the following will appear on the screen as the file is cross-validated with the files created with SYSGEN (warning messages may vary):

```
NMMGR will now cross-validate the NMCONFIG file with SYSGEN.

SYSGEN version E.02.00 : catalog version E.02.00    THU, DEC  4, 1997,  2:58 AM
Copyright 1987 Hewlett-Packard Co. All Rights Reserved.

        **note** Retrieving NMMGR configuration data...

        ** First level command **

        io                log (lo)       misc (mi)        spu (sp)
        sysfile (sy)

        basegroup (ba)    keep(ke)       permyes (pe)     show (sh)
        tape (ta)

        clear (cl)(c)     exit (ex)(e)   help (he)(h)     oclose (oc)
        redo
```

```
 sysgen> PERMYES ON
 sysgen> BA CONFIG
 sysgen> SY

        ** SYSFILE configurator commands **

        aauto (aa)      aboot (ab)     acmsl (ac)        asprog (as)
        cmsl (cm)       dauto (da)     dboot (db)        dcmsl (dc)
        dsprog (ds)     lcmsl (lc)     rauto (ra)        rboot (rb)
        rcat (rc)       rcmsl (rcm)    rdcc (rd)         ripl (ri)
        rnmlib (rn)     rsprog (rs)    show (sh)

        clear (cl)(c)   exit (ex)(e)   help (he)(h)      hold (ho)
sysfile> RDCC

        **note** Retrieving NMMGR configuration data...
sysfile> HO

sysfile> EX

 sysgen> KE

        keeping to group CONFIG.SYS
        Purge old configuration (yes/no)?Automatic yes
        ** configuration files successfully saved **
 sysgen> EX

Cross-validation with SYSGEN was successful.
Copying validated configuration file to backup file, please wait ***
```

3. After successful validation and cross-validation, and if the file in use is NMCONFIG.PUB.SYS, the following prompt will appear:

```
Do you want DTS changes to be become active now (Y/N)?


Y =    all changes made take effect now

N =    all changes made will take effect upon next dynamic
       configuration or system boot

H =    help


>
```

Answer Y if you want to invoke DTCCNTRL and make DTS changes take effect now, or answer N if you don't want DTS changes to take effect now. Note any messages that describe additional actions needed for changes to become active. After you exit NMMGR you can review any actions needed by viewing the logs at the end of the file LOGDCC.PUB.SYS.

If you answer N, the DTS changes will take effect the next time DTCCNTRL is invoked, a DTS shutdown/restart is done, or the system is rebooted.

Type H if you need more help to answer the question. See Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for more information on dynamic configuration.

4. After viewing the messages describing what actions are required, if any, enter **[RETURN]** when you see the prompt:

   ```
   (Press RETURN when finished viewing screen contents.)
   ```

   You will return to the Validation screen. You may make additional configuration changes or exit NMMGR.

Step 9: Ensure DTS Changes Become Active

If you answered Y to the question "Do you want DTS changes to become active now (Y/N)?" in step 8, refer to Table 4-1 in Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for a list of configuration tasks and associated actions for changes to become active. For those tasks indicating "No action; changes take effect dynamically," no additional actions are required for the DTS changes to become active. You will see a message on the screen indicating that no other actions are required. For other tasks requiring additional actions for changes to become active, you will see messages on the screen indicating what actions must be taken first..

NOTE If you answered N to the question in step 8, thus choosing not to call DTCCNTRL, refer to Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for details on how to invoke DTCCNTRL outside NMMGR.

Performing a DTC Reboot

First, logoff any sessions. To reset the DTC, turn off the power and then turn on the power again for the DTC.

You may also use TermDSM, an online diagnostic program for host-managed DTCs, to reset the DTC. Refer to *Troubleshooting Terminal, Printer, and Serial Device Connections* for more information.

Performing a DTS Shutdown/Restart

To perform a DTS shutdown and restart, use the DTCCNTRL command. Refer to Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for more information on how to use this command to perform a DTS shutdown/restart.

6 Configuring Serial Devices (for PC-Based Management)

This chapter describes NMMGR configuration steps that you need to perform for PC-based management (that is, when the DTCs are managed by an OpenView Windows Workstation). For information on configuring for host-based management, refer to Chapter 5, “Configuring Serial Devices (for Host-Based Management).”

NOTE If you are configuring X.25 networking capabilities on a HP e3000 Series 900 computer using host-based network management, use *Configuring and Managing Host-Based X.25 Links* instead of this manual to configure DTCs and DTC connections.

If you are using PC-based management to manage your DTCs, most of the configuration is done on the OpenView DTC Manager.

However, you still need to use NMMGR to configure the following information:

- DTS information on the HP e3000, such as: the HP e3000’s node name, the link name, and the physical path of the LANIC (the slot number where the LAN Interface Card resides on the HP 3000).
- The maximum number of devices that can log onto the HP 3000 system at one time.
- DTC information. For each DTC with **nailed** ports that will communicate with the HP e3000, you need to configure DTC information in NMMGR; such as: DTC name, DTC node name, and types of cards in the DTC.
- Port configuration for each **nailed** device, such as printers and UPSs, and terminals that will be accessed programmatically.

NOTE If you want the current HP e3000 system to be able to accept DTC connections through a Telnet Express Server (HP 2344A), that is, connections from terminals on systems running ARPA, you must configure the profile for the non-nailed terminals to be a modem profile.

OpenView DTC Manager and NMMGR

When the system is configured for PC-Based management, there are several parameters configured in NMMGR that must match corresponding parameters configured in the OpenView DTC Manager. For each DTC that is to have access to the system using nailed devices there must be a corresponding DTC configured on the OpenView DTC Manager. The corresponding DTC is the DTC that has the same DTC Node Name in NMMGR and the OpenView DTC Manager. The following is a list of those parameters that must match and the step where the parameter is configured in NMMGR:

- The HP e3000's node name configured in step 3 must match the default destination for any DTC ports configured as non-switched terminals or DTC ports configured as dedicated printers.
- The DTC's node name configured in step 6 must be configured for a corresponding DTC on the OpenView DTC Manager.
- The DTC's card types and configuration, configured in steps 6 and 7 must match the configuration of a corresponding DTC on the OpenView DTC Manager.
- The PAD device name and the PAD device type, if one is specified, that is configured in step 7, subsection Configure X.25 card, must match the PAD device name and type configured on the PAD access screen on the OpenView DTC Manager.

Copy the Sample File

Network information is stored in a configuration file called NMCONFIG.PUB.SYS. If you do not already have a NMCONFIG.PUB.SYS file, create a copy of NMCONFIG.PUB.SYS from the sample configuration file supplied on the HP e3000, NMSAMP1.PUB.SYS.

To copy NMSAMP1.PUB.SYS into NMCONFIG.PUB.SYS, enter these commands at the MPE/iX prompt (:):

```
HELLO MANAGER.SYS,PUB

FILE CONFIG=NMCONFIG.PUB.SYS;DEV=1

FCOPY FROM=NMSAMP1.PUB.SYS;TO=*CONFIG;NEW
```

NOTE "DEV=1" must be specified in the FILE equation to specify that the NMCONFIG.PUB.SYS file is to be stored to system disk 1.

CAUTION If ANY other configuration file is copied to NMCONFIG.PUB.SYS or NMCONFIX.PUB.SYS then dynamic configuration will be disabled until a DTS shutdown and restart is done or the system is rebooted. This includes other files from the same system or files copied from other systems.

Modify the Network Management Configuration File

Use NMMGR to enter asynchronous device connection information into the Network Management Configuration File NMCONFIG.PUB.SYS. The procedure for updating the configuration file follows.

Step 1. Begin the Configuration Process

To run NMMGR, enter the following command at the MPE/iX prompt and then press the **[Return]** key.

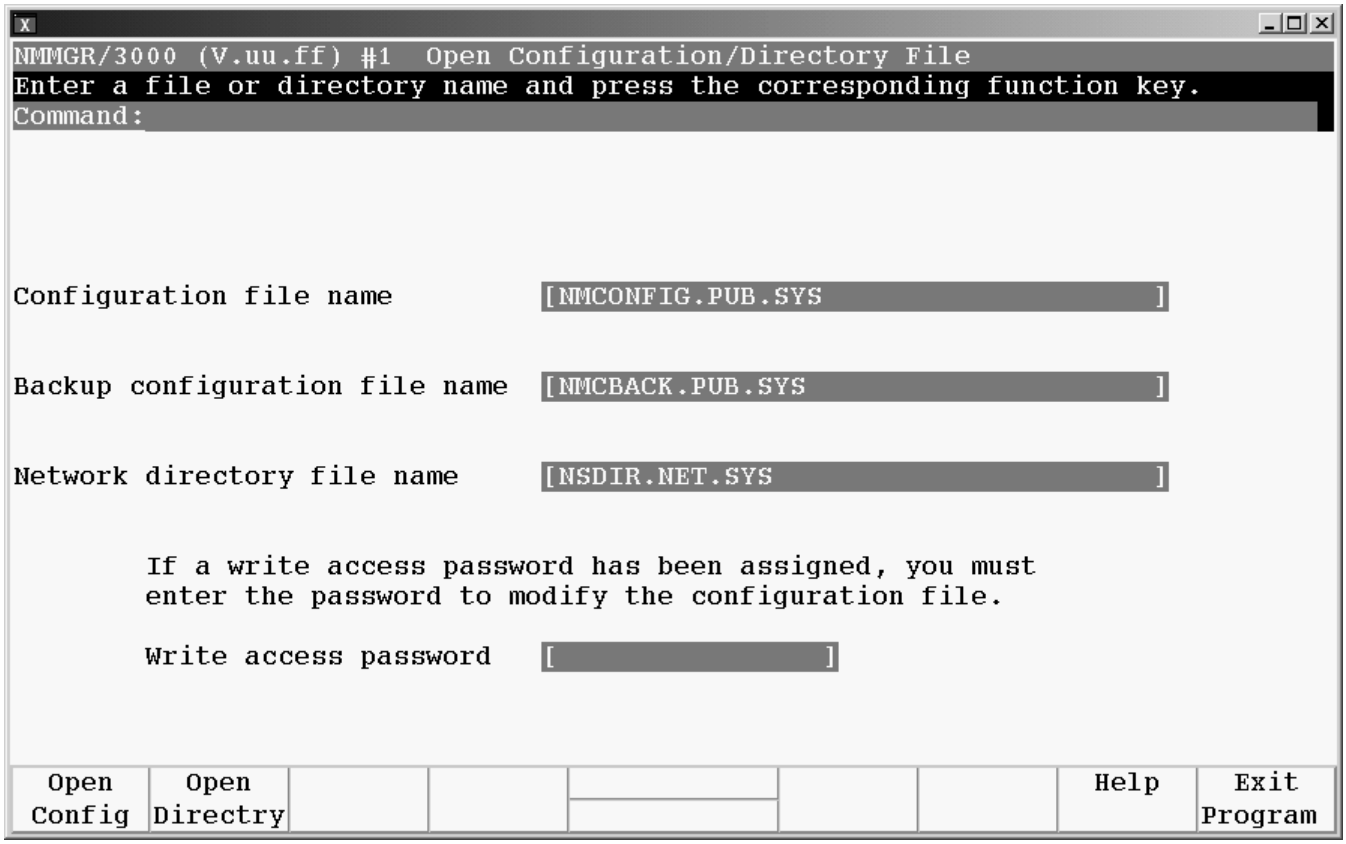
```
NMMGR.PUB.SYS
```

NOTE You must be logged on to the SYS account to run NMMGR.

Step 2: Open the Network Management Configuration File

Invoke NMMGR, the Open Configuration/Directory File screen as shown in Figur e6-1, allows you to specify the configuration file name.

Figure 6-1 Open configuration/Directory Screen



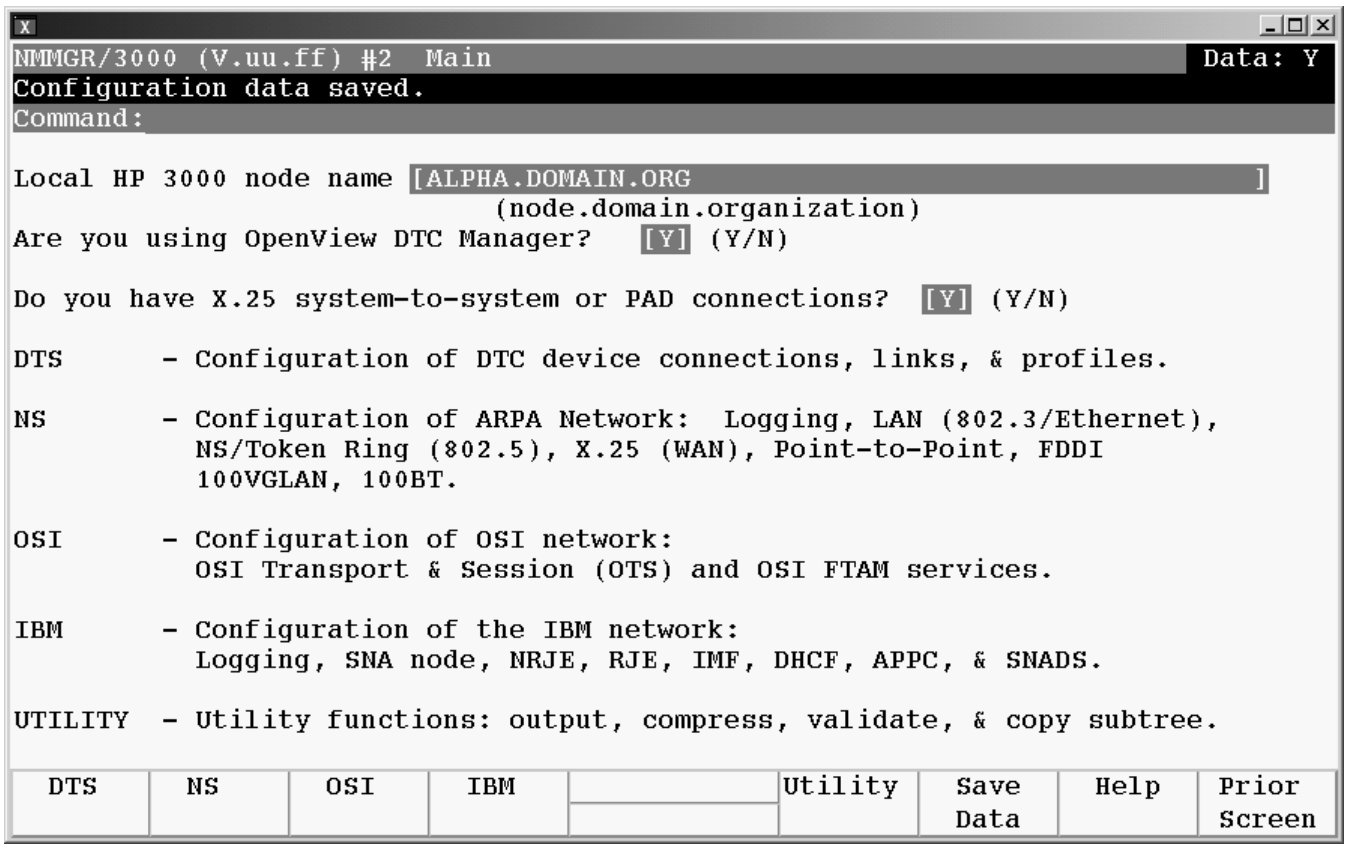
1. Use the default configuration file name, NMCONFIG.PUB.SYS.
2. Enter a backup configuration file name. The default is NMCBACK.PUB.SYS.

3. Use the default network directory file `NSDIR.NET.SYS` for X.25 network management, if you have X.25 connection.
4. The `Password` field is optional. Refer to the *Using the Node Management Services* manual if you want to set a password.
5. Press the **[Open Config]** key.

Step 3: Configure the Local Node Name

The Main screen is displayed (Figure 6-2). This screen lets you specify the HP 3000's node name. It also asks whether you are using the HP 3000 or an OpenView Windows Workstation to manage the DTCs, and if you are using X.25 or PAD.

Figure 6-2 Main Screen

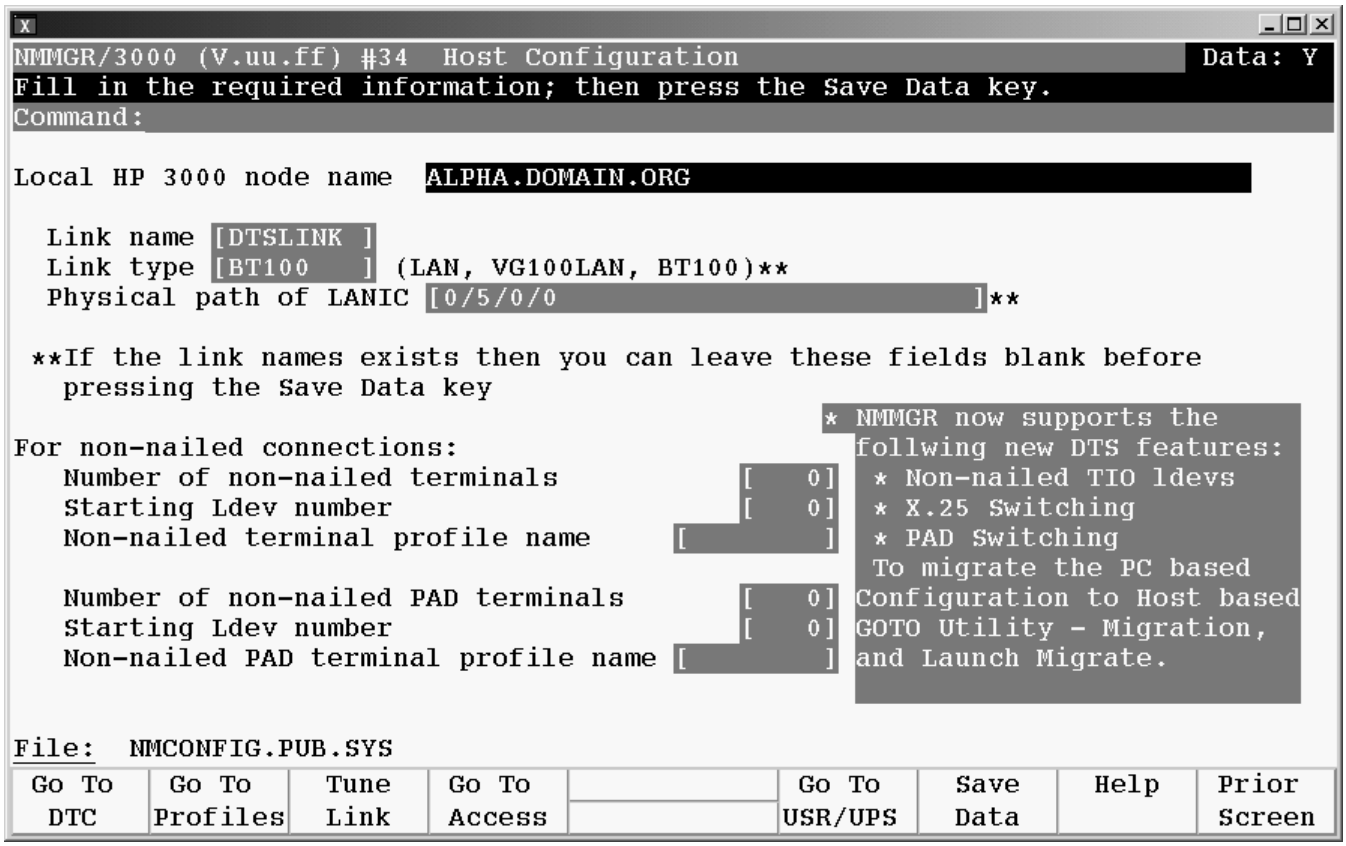


1. Assign a node name to the HP e3000 Make sure this node name is the same as the one you specified for this computer in the OpenView DTC Manager.
2. Enter `Y` to the question, `"Are you using the OpenView DTC Manager?."`
3. If you have PAD or X.25, enter `Y` to the question, `"Do you have X.25 system-to-system or PAD connections?."`
4. Press the **[Save Data]** key.
5. Press the **[DTS]** key.

Step 4: Configure the Link

The Host Configuration screen is displayed when you press the **[DTS]** key at the Main screen (Figure 6-3).

Figure 6-3 Host Configuration Screen (PC-Based)



1. "Local HP e3000 node name" is a display-only field. Verify that it is correct.
2. Use the default link name, DTSLINK.
3. Enter the slot number of the LANIC in the "Physical path of LANIC" field. See Chapter 2, "Preparing to Configure DTCs," for a list of suggested slot numbers to use.
4. Enter the desired number of non-nailed terminals to be allowed on the HP 3000. Currently, NMMGR allows the configuration of up to 4649 terminal I/O devices.
5. Enter the ldev number where the non-nailed pool should start. The non-nailed devices will be configured on ldevs with the starting ldev number and higher.

   For example if the number of ldevs is 2 and the starting number is 200 then the non-nailed ldev would be 200 and 201. If 201 is already configured as a nailed device then the non-nailed device would be 200 and 202.
6. Enter the profile to use for the non-nailed terminals.

NOTE

If you want the HP e3000 system to be able to accept connections from terminals on ARPA systems via a Telnet Express Server, you must use a modem profile for the non-nailed terminals, such as `TR10U24`. Note that you may use direct connect devices on a port with a modem profile.

See the Host-Based Terminal Profiles table in Chapter 7, "Terminal and Printer Profiles," for a list of available profiles. You may also create your own profile. For more information on profiles, refer to Chapter 7, "Terminal and Printer Profiles."

7. Enter the desired number of non-nailed PAD terminals to be allowed on the HP 3000. Currently, NMMGR allows the configuration of up to 4649 terminal I/O devices.
8. Enter the ldev number where the non-nailed pool should start. The non-nailed devices will be configured on ldevs with the starting ldev number and higher.

   For example if the number of ldevs is 2 and the starting number is 200 then the non-nailed ldev would be 200 and 201. If 201 is already configured as a nailed device then the non-nailed device would be 200 and 202.
9. Enter the profile to use for the non-nailed PAD terminals.
10. Press the **[Save Data]** key.

This concludes NMMGR configuration for PC-based management for this HP 3000 computer if this computer will not be accessing any nailed devices.

If the HP e3000 computer needs to access nailed ports in one or more DTCs, press the **[Go To DTC]** key and proceed to Step 5 to configure the nailed ports. Note that printers and UPSs are nailed devices, so you need to configure any DTC that has printer or UPS ports.

NOTE

You can type `"help whatsnew"` at the command line of this screen for more information on DTS dynamic configuration. You can also refer to Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for more information on how to make DTS configuration changes dynamically. Automatic DTC configuration is available for host-based environments only.

Step 5: Select DTC Type

The DTC Configuration Selection screen (Figur e6-4) is displayed when you press the **[Go To DTC]** key at the Host Configuration screen. Here you specify the type of DTC to configure. You only need to configure DTCs with **nailed** ports that will be accessed by this HP e3000 computer.

Figure 6-4 DTC Configuration Selection Screen

```
NMMGR/3000 (V.uu.ff) #307  DTC Configuration Selection
Fill in the required information; then press the Save Data key.
Command:


   Automatically add/configure a new DTC (Y/N)? [N]
   Press Enter if you select "Y".

   List DTCs             - Lists the configured DTC's

   DTC 16iX              - Go to 16iX      Configuration screen

   DTC 16MX or DTC 16RX  - Go To 16MX/16RX Configuration screen

   DTC16                 - Go to DTC16     Configuration screen

   DTC48                 - Go to DTC48     Configuration screen

   DTC 72MX              - Go to 72MX      Configuration screen


File:  NMCONFIG.PUB.SYS

| List DTCs | Go To 16iX | Go To 16MX/RX | Go To DTC16 |  | Go To DTC48 | Go To 72MX | Help | Prior Screen |
```

1. Select the DTC type by pressing one of these function keys: **[DTC16iX]**, **[DTC16MX/RX]**, **[DTC16]**, **[DTC48]**, or **[DTC72MX]**.

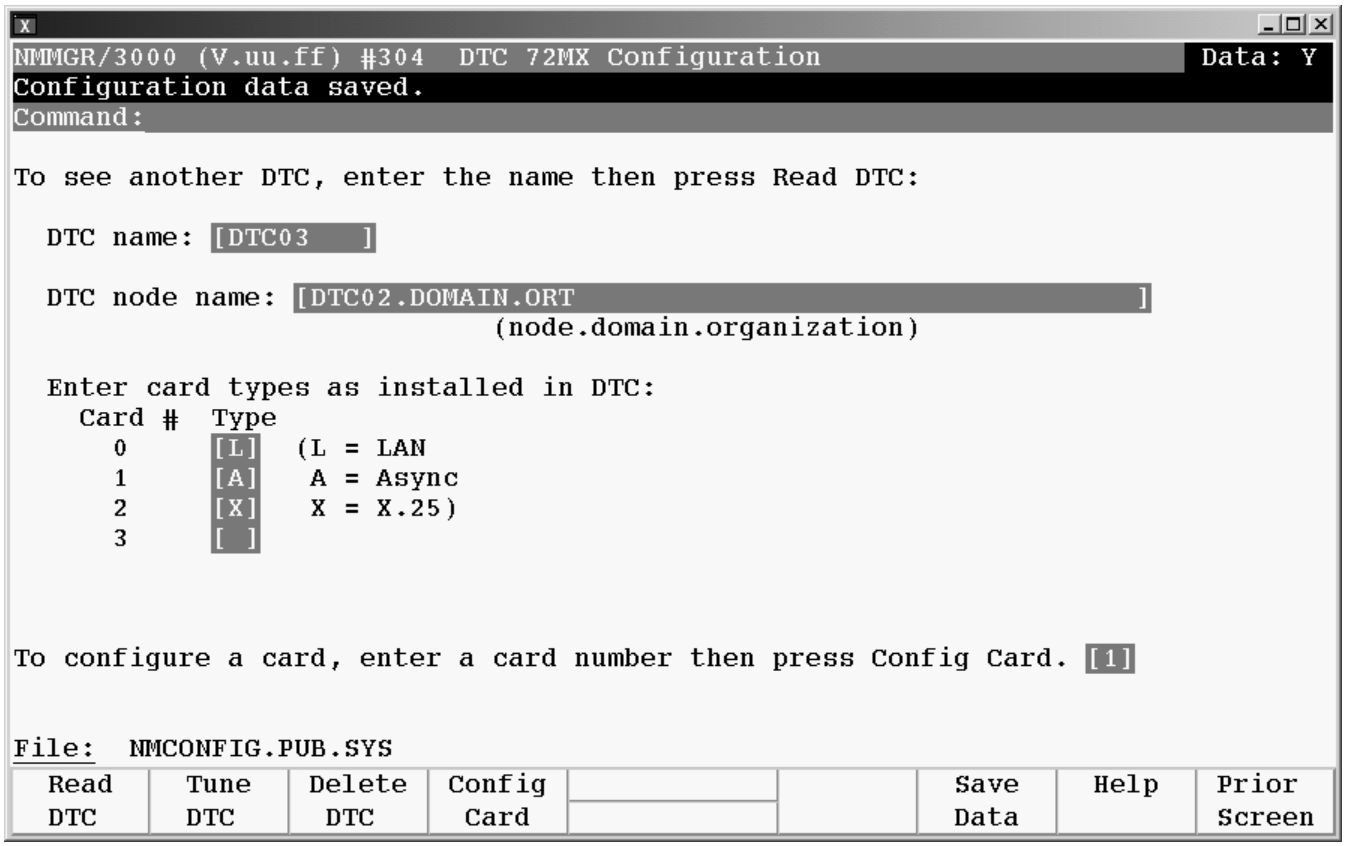
NMMGR will take you to the corresponding configuration screen for the specified DTC type.

NOTE Automatic DTC configuration is not available for PC-based environments. If you answer `Y` to the question `"Automatically add/configure a new DTC (Y/N)?"` on this screen, you will see an error message.

Step 6: Specify DTC Configuration

The DTC Configuration screen is displayed after you select the DTC type. Figur e6-5 shows a DTC Configuration screen for a DTC 72MX. (DTC 16iX/16MX/16RX, DTC 16 and DTC 48 screens vary slightly.)

Figure 6-5 DTC Configuration Screen



1. Enter the DTC name in the "DTC name" field.
2. Enter the DTC's node name in the "DTC node name" field.
3. Enter the card type for each card in the DTC **with nailed devices**. (Printers and UPSs, and any terminals that will be accessed programmatically are nailed devices.)

   Note that DTC 16iX/16MX/16RX does not have cards since its port connectors are built directly onto the DTC backplane.

   Refer to Chapter 2, "Preparing to Configure DTCs," for more information on card types for each DTC.
4. Press the **[Save Data]** function key.
5. To configure a card in the DTC, enter the card number in the "To configure a card, enter a card number ..." field.

   You only need to configure a card if the card contains nailed devices. Press the **[Config Card]** function key. Proceed to step 7: Configure DTC Cards.

If you are configuring a direct or modem connect card the **[Config Card]** key will go to the screen described in the subsection Configure a Direct Connect Card. If you are configuring a X.25 card the **[Config Card]** key will go to the screen described in the subsection Configure a X.25 Card.

To configure the ports on a DTC 16iX/16MX/16RX, simply press the **[Config Ports]** function key. Proceed to step 7: Configure DTC Cards.

6. Repeat steps 1 through 5 above for every newly-added DTC with nailed devices that will be accessed by this HP e3000 computer. If you want to select a DTC that has already been configured, enter the DTC's name in the `DTC name` field and press the **[Read DTC]** function key.

NOTE You may use the **[Tune DTC]** key on the DTC Configuration Screen to change the AFCP timers for the DTC, if needed. Refer to Chapter 8, " Additional DTC Configuration," for steps to do this.

Step 7: Configure DTC Cards

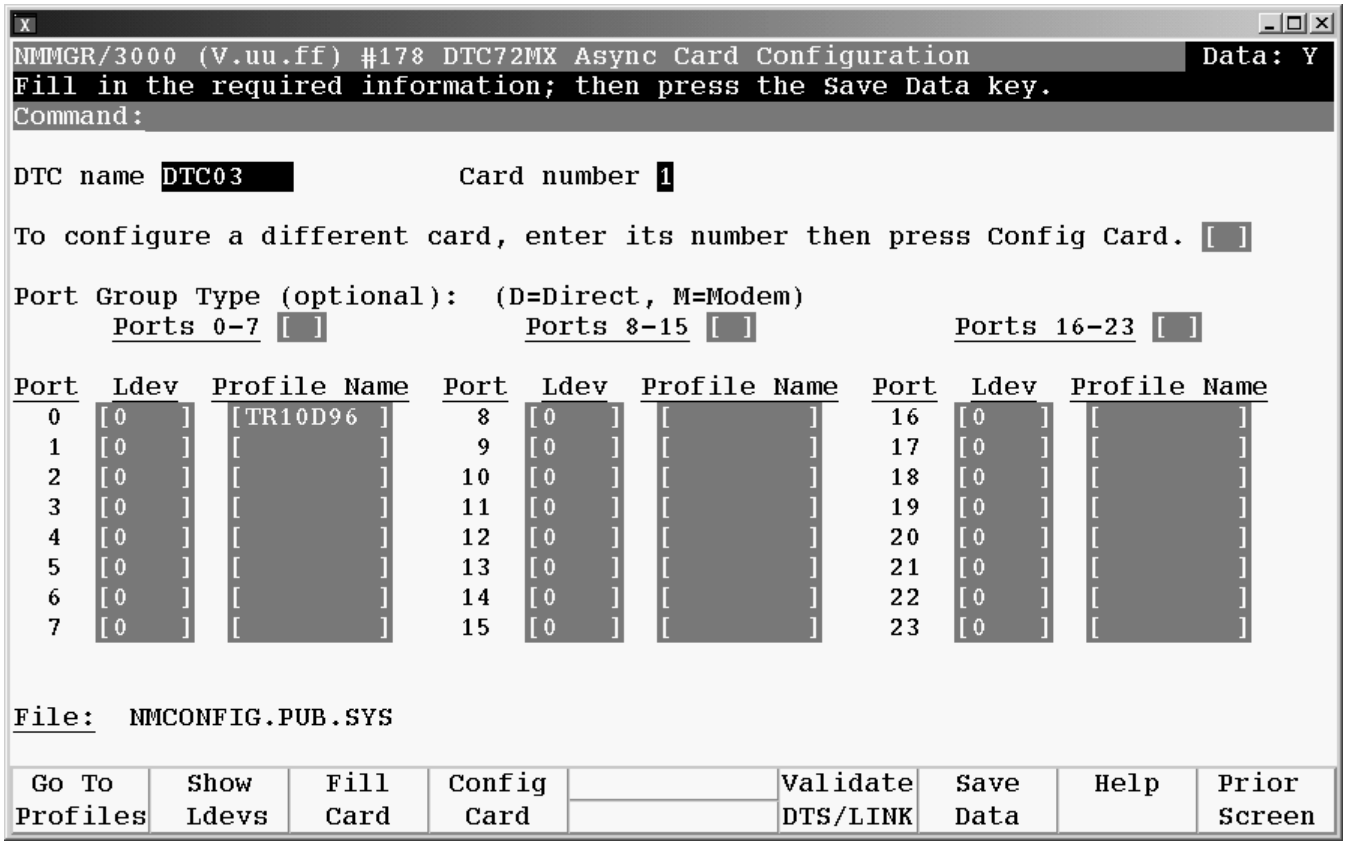
When you press the **[Config Card]** key at the DTC Configuration screen, NMMGR will display the corresponding card configuration screen for the specified card in the DTC. Figure 6-6 shows an example of a Direct Connect Card Configuration screen for DTC 72MX. (Screens for DTC 16iX/16MX/16RX, DTC 16 and DT C48 vary slightly.) Figure 6-7 shows the screen for configuring nailed PAD devices on a X.25 card.

NOTE You only need to configure **nailed** ports (such as printer ports) in the DTC. If you do not have nailed ports on a card, you can skip this step.

Configure a Direct Connect Card

When you press the **[Config Card]** key at the DTC Configuration screen and the card is a direct or modem connect card, NMMGR will display the screen appropriate for the DTC. The screen for a DTC72MX is shown in Figur e6-6.

Figure 6-6 DTC Card Configuration Screen



1. Verify that the "DTC name" and "Card number" displayed are correct.
2. Use the **[Tab]** to move the cursor to the first **nailed** port on the card. Enter the ldev number and profile for each nailed device.

   Ldev numbers used for each port on the DTCs must be unique. Up to 4649 terminal I/O devices may be configured on an HP e3000 Series 900. The largest valid ldev number is 4679.

   A profile for the port defines the characteristics of the device to be connected to that port. For direct terminal ports, the suggested profile to use is TR10D96. For direct printer ports, the suggested profile to use is PR18D96 (or PR22D24 for HP printers with status checking). For a UPS connected to a DTC port, the suggested profile is UP10D12. Refer to Chapter 7, "Terminal and Printer Profiles," for more information on profiles.
3. Press the **[Save Data]** key.
4. Enter the card number of a different card that needs to be configured in the "To configure a different card, enter a card number, ..." field on the screen.

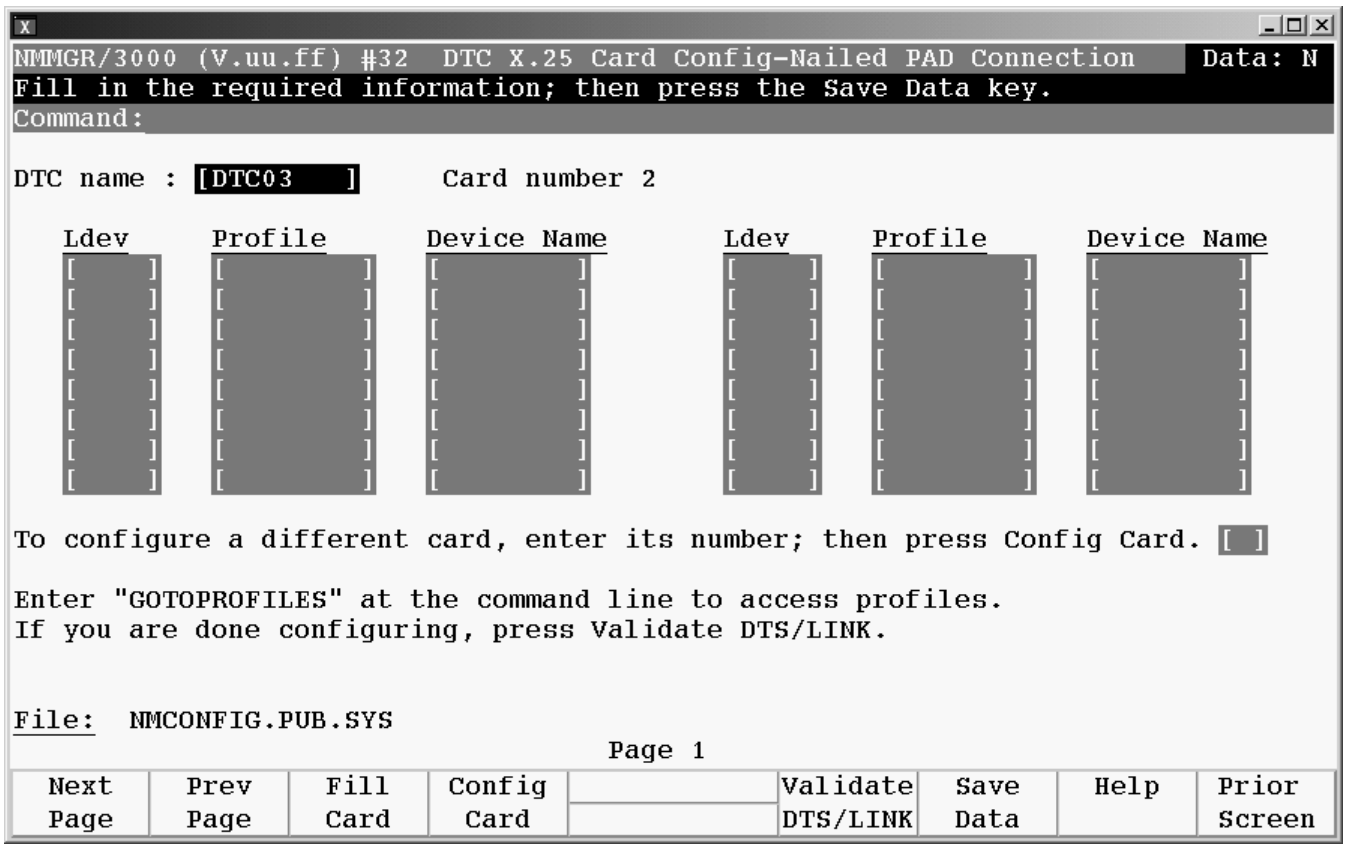
5. Press the **[Config Card]** function key. The corresponding screen for the card number entered in the last step will be displayed.
6. If all the cards with nailed ports have been configured, press the **[Prior Screen]** key to return to the DTC Configuration Selection screen to select another DTC with nailed ports to configure. Otherwise, if every DTC has been configured, press the **[Validate DTS/LINK]** key to validate the configuration file.

Configure a X.25 Card

When a X.25 card is configured using PC-based management, you can use the screen in Figure 6-7 to configure nailed PAD devices. The screen is only available for a DTC 48, DTC 16 and DTC 72MX.

NOTE Also refer to *Using HP OpenView DTC Manager* for all other X.25 and PAD configuration information.

Figure 6-7 DTC X.25 Card Configuration Screen



1. Verify that the "DTC name" and "Card number" displayed are correct.
2. Use the **[TAB]** key to move the cursor to the desired fields. Enter the ldev number, profile and device name in the fields on the screen for nailed device.

   Ldev numbers used for each port on all DTCs must be unique. Up to 4649 terminal I/O devices may be configured on the HP 3000 Series 900. The largest valid ldev number is 4679.

The device name entered must match the PAD Device Name entered in the PAD Access screen on the OpenView DTC Manager. Refer to *Using HP OpenView DTC Manager*.

Step 8: Validate/Cross-Validate the Configuration File

Validation ensures that no conflicts exist in the network configuration file (`NMCONFIG.PUB.SYS` between the DTCs and other configuration parameters. After NMMGR validates the network configuration file, it will automatically cross-validate the file with the system I/O devices configured through the SYSGEN utility. This will take place only if the file opened at the start of the NMMGR session is `NMCONFIG.PUB.SYS` and validation is successful. Additionally, you must have System Manager (SM) capability or the cross-validation will not occur. The commands used for SYSGEN cross-validation are in the file `NMGRXVAL.PUB.SYS` . If this file does not exist, NMMGR will create the file for you before cross-validating. You can edit this file as appropriate for your environment. Refer to the MPE/iX manual, *System Startup, Configuration, and Shutdown Reference Manual*, for information on SYSGEN.

1. To validate the configuration file, press the **[Validate DTS/LINK]** key at the Card Configuration screen, or type `validate` at the command line on top of any NMMGR screen and press **[Enter]**. (Note that the **[Enter]** key is not the carriage return key.)

   The DTS validation procedure starts by displaying the following on the terminal:

   ```
   -> Validation of DTS/LINK started. <-

   -> Validation of DTS/LINK finished. <-
   ```

   If errors were encountered in the configuration file, the validation procedure will print out the total number of errors found. Error messages will also be displayed explaining the problems found. Refer to Appendix E, “Error Messages,”for more information about these error messages.

2. After validation of the network configuration file is complete, the following will appear on the screen as the file is cross-validated with the files created with SYSGEN (warning messages may vary):

```
NMMGR will now cross-validate the NMCONFIG file with SYSGEN.


SYSGEN version E.02.00 : catalog version E.02.00    THU, DEC  4, 1997,  2:58 AM
Copyright 1987 Hewlett-Packard Co. All Rights Reserved.

        **note** Retrieving NMMGR configuration data...

        ** First level command **

        io                log (lo)       misc (mi)        spu (sp)
        sysfile (sy)

        basegroup (ba)    keep(ke)       permyes (pe)     show (sh)
        tape (ta)
```

```
        clear (cl)(c)     exit (ex)(e)   help (he)(h)     oclose (oc)
        redo
 sysgen> PERMYES ON

 sysgen> BA CONFIG

 sysgen> SY

        ** SYSFILE configurator commands **

        aauto (aa)      aboot (ab)     acmsl (ac)        asprog (as)
        cmsl (cm)       dauto (da)     dboot (db)        dcmsl (dc)
        dsprog (ds)     lcmsl (lc)     rauto (ra)        rboot (rb)
        rcat (rc)       rcmsl (rcm)    rdcc (rd)         ripl (ri)
        rnmlib (rn)     rsprog (rs)    show (sh)

        clear (cl)(c)   exit (ex)(e)   help (he)(h)      hold (ho)
sysfile> RDCC

        **note** Retrieving NMMGR configuration data...
sysfile> HO

sysfile> EX

 sysgen> KE

        keeping to group CONFIG.SYS
        Purge old configuration (yes/no)?Automatic yes
        ** configuration files successfully saved **
 sysgen> EX

Cross-validation with SYSGEN was successful.
Copying validated configuration file to backup file, please wait ***
```

3. After successful validation and cross-validation, and if the file in use is NMCONFIG.PUB.SYS, the following prompt will appear:

```
Do you want DTS changes to be become active now (Y/N)?


Y =   all changes made take effect now
```

```
N =   all changes made will take effect upon next dynamic
      configuration or system boot

H =   help


>
```

Answer `Y` if you want to invoke DTCCNTRL and make DTS changes take effect now, or answer `N` if you don't want DTS changes to take effect now. Note any messages that describe additional actions needed for changes to become active. After you exit NMMGR you can review any actions needed by viewing the logs at the end of the file `LOGDCC.PUB.SYS`.

If you answer `N`, the DTS changes will take effect the next time `DTCCNTRL` is invoked, a DTS shutdown/restart is done, or the system is rebooted.

Type `H` if you need more help to answer the question. See Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for more information on dynamic configuration.

4. After viewing the messages describing what actions are required, if any, enter **[RETURN]** when you see the prompt:

   ```
   (Press RETURN when finished viewing screen contents.)
   ```

   You will return to the Validation screen. You may make additional configuration changes or exit NMMGR.

Step 9: Ensure DTS Changes Become Active

If you answered `Y` to the question `"Do you want DTS changes to become active now (Y/N/H)?"` upon NMMGR exit in step 8, refer to Table 4-1 in Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for a list of configuration tasks and associated actions for changes to become active.

For those tasks indicating "No action; changes take effect dynamically," no additional actions are required for the DTS changes to become active. You will see a message on the screen indicating that no other actions are required.

For other tasks requiring additional actions for changes to become active, you will see messages on the screen indicating what actions must be taken first.

NOTE If you answered `N` to the question in step 8, thus choosing not to call DTCCNTRL, refer to Chapter 4, "Dynamic Configuration and DTS Shutdown/Restart," for details on how to invoke DTCCNTRL outside NMMGR.

Performing a DTC Reboot

First, logoff any sessions. To reset the DTC, turn off the power and then turn on the power again for the DTC.

You may also use TermDSM, an online diagnostic program for host-managed DTCs, to reset the DTC. Refer to *Troubleshooting Terminal, Printer, and Serial Device Connections* for more information.

Performing a DTS Shutdown/Restart

To perform a DTS shutdown and restart, use the `DTCCNTRL` command. Refer to Chapter 4, “Dynamic Configuration and DTS Shutdown/Restart,” for more information on how to use this command to perform a DTS shutdown/restart.

7 Terminal and Printer Profiles

This chapter describes what are terminal and printer profiles and how to create and modify your own profiles. The process is similar for both host-based and PC-based management. Differences between host-based and PC-based management will be noted.

What is a Profile

A profile is a grouping of device connection specifications and characteristics that can be associated to devices. Profiles can be associated to terminals, printers, PAD terminals and printers, and UPSs.

The sample configuration file on the HP e3000 Series 900 supplies several terminal and printer profiles for use. You may also create your own profiles.

The tables at the end of this chapter, list terminal and printer profiles supplied by the HP e3000 Series 900, respectively.

Profile Name

Each profile is identified by a profile name. The name can be up to eight characters long and must start with a letter followed by letters and numbers. At any one time, up to 1024 profiles can be configured per system.

The profiles supplied by the HP e3000 configuration file follow a naming convention. For example, `TR10D96` denotes a terminal profile (`TR`) of terminal type 10 (`10`), for direct connect (`D`), with line speed of 9600 bps (`96`). Printer profiles starts with `PR`, such as `PR18D96`. The standard UPS profile is `UP10D12` where (`UP`) denotes an HP PowerTrust UPS. Host port profiles naming convention starts with HO, such as HO96 which is a host profile with a line speed of 9600 bps.

Terminal Profiles

Terminal profiles define terminal characteristics for terminals, PCs running in terminal emulation mode, and UPSs. A terminal profile defines the following terminal characteristics:

- The profile name.
- The terminal type used (10, 18, 24) or the terminal type file name if you are using a terminal type file created through the workstation configurator utility (`TTUTIL.PUB.SYS`).

  For more information, see `Terminal type file name` under “Terminal Profile Screen,” later in this chapter.
- The line speed, in bits per second. (Does not apply to the DTC 16RX).
- The record width in characters (bytes).
- The type of modem used, if any.
- Specify the protocol used to establish a modem link between the DTC and an attached device. (Does not apply to the DTC 16RX).
- Whether the user is allowed to enter the `:HELLO` command to logon to the HP 3000.
- Whether the terminal will use hardware handshake. (Supported on DTC 16iX/ 16MX and DTC 72MX only.)
- The type of parity that will be used if parity is enabled.
- Specifies whether auto speed and parity sensing will occur at logon for terminals using this profile. (Does not apply to the DTC 16RX).

- Specifies whether the terminal will be reset after a DTC is powered on or after the connection is re-established. (Does not apply to the DTC 16RX).
- Number of stop bits to be used for asynchronous characters. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)
- Whether to enable flow control between the DTC port and the connected device.
- Specifies whether native language devices will be used.
- The device class names associated with the terminal.

The terminal profile also defines additional information used for host-based terminal switching. All terminal switching parameters are optional.

- The terminal port name. Usually used for extended switching connections.
- Specify whether the DTC user interface timeout is active.
- Specify whether switching is enabled for the port.
- Specify whether the DTC will establish a connection automatically when the modem lines are raised.
- The maximum number of sessions allowed from a terminal.
- Specify whether “keep alive” mechanism is to be activated to detect if connection is still there. (Does not apply to the DTC 48 without memory extension.)
- Specify whether port configuration parameters; data length and parity, have to be forced when binary mode is selected. (Supported on DT C16iX/DT C16MX and DTC 72MX only.)
- Specify destination node if automatic connection is enabled.
- Specify the character that will return the terminal user to the DTC user interface.

Terminal profile characteristics are described in detail under “Terminal Profile Screen,” later in this chapter.

Printer Profiles

Printer profiles define printer characteristics for printers. A printer profile defines these printer characteristics:

- The profile name.
- The printer type used (18, 21, 22, or 26) or the printer type file name if you are using a printer type file created through the workstation configurator utility (`TTUTIL.PUB.SYS`).

  For more information, see `Printer type file name` under “Printer Profile Screen,” later in this chapter.
- The line speed in bits per second. (Does not apply to the DTC 16RX).
- The record width in characters (bytes).
- The type of modem used, if any.
- Specify the protocol used to establish a modem link between the DTC and an attached device. (Does not apply to the DTC 16RX).

- The type of parity that will be used, if parity is enabled. (Does not apply to the DTC 16RX).
- Whether the printer is initially spooled.
- Whether the printer will use a native language character set.
- Whether hardware handshake is used. (Supported on DTC 16iX/16MX and DTC 72MX only.)
- Number of stop bits to be used for asynchronous characters. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)
- Whether to enable flow control between the DTC port and the connected device.
- The device class names associated with the printer.

The printer profile also defines additional information used for host-based printer switching. Host-based printer switching allows a printer port to be shared by several systems. All printer switching parameters are optional.

- The printer port name.
- Specify whether the printer can be accessed by a single system or multiple systems.
- Specify whether the DTC will establish a connection automatically when the modem lines are raised.
- Specify the number of hosts sharing this printer.
- Specify whether “keep alive” mechanism is to be activated to detect if connection is still there. (Does not apply to the DTC 48 without memory extension.)
- Specify whether port configuration parameters; data length and parity, have to be forced when binary mode is selected. (Supported on DT C16iX/DT C16MX and DTC 72MX only.)
- Specify destination node if automatic connection is enabled.
- A string that may be sent to the device under specific conditions such as after a port reset, or a connection is closed.

Printer profile characteristics are described in detail under “Printer Profile Screen,” later in this chapter.

PAD Terminal Profiles

A PAD terminal profile defines these characteristics of the PAD terminal:

- The profile name.
- The terminal type used (24 recommended) or the terminal type file name if you are using a terminal type file created through the workstation configurator utility (`TTUTIL.PUB.SYS`).
- The record width in characters (bytes).
- Whether the terminal user can issue the `:HELLO` command at the terminal.
- Whether the terminal will reset itself after a lost connection (for use with HP terminals only).
- Whether the terminal will use a native language character set.

- Whether or not the DTC will perform a PAD test at connection establishment time to determine the PADs behavior.
- Whether the DTC will send an initial profile to set the PAD to default X.3 parameters at connection establishment time. (If you set this option to `N` you must also set `"PAD test requested"` to `N`.
- Whether to allow changes to X.3 parameters after connection establishment.
- How the data forwarding option is set. (You may select a data forwarding option only if you request `"X.3 setting"` to allow changes to X.3 parameters.)
- The device class names associated with the terminal.

The following four parameters will be ignored when a profile is configured for non-nailed devices: PAD test requested, send initial profile, X.3 setting requested, and data forwarding parm #3 and #4. These four parameters will also be ignored when the connection is made through a public PAD, because the connection will be established to a non-nailed device on the host.

PAD Printer Profiles

A PAD printer profile defines these characteristics of a PAD printer:

- The profile name
- The printer type used (26 for PAD printer) or the printer type file name if you are using a terminal type file created through the workstation configurator utility (`TTUTIL.PUB.SYS`).
- The record width in characters (bytes).
- Whether the printer is initially spooled.
- Whether the printer uses a native language character set.
- Whether or not the DTC will perform a PAD test at connection establishment time to determine the PADs behavior.
- Whether the DTC will send an initial profile to set the PAD to default X.3 parameters at connection establishment time. (If you set this option to `N` you must also `"PAD test requested"` to `N`.
- Whether to allow changes to X.3 parameters after connection establishment.
- The device class names associated with the printer.

Host Profiles

A Host profile is used to configure DTC ports to be used for extended switching connections. Extended switching connections are also referred to as **back-to-back** connections. If Host profiles are configured on DTC 16RX ports, all values for the profiles are ignored. The ports on a DTC 16RX are configured using the DTC 16RX Manager on the HP 9000 host and not the HP e3000.

A Host profile defines the following port characteristics on the DTC:

- The name of the port.
- The line speed, in bits per second.

- The type of modem used, if any.
- Specify the protocol used to establish a modem link between the DTC and the attached device.
- The type of parity that will be used if parity is enabled.
- The mode of data transfer in **back-to-back** connections, can be ASCII or binary.
- Specify whether ENQ/ACK flow control is enabled.
- Number of stop bits to be used for asynchronous characters. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)
- Whether to enable flow control between the DTC port and the connected device.
- Specify whether “keep alive” mechanism is to be activated to detect if connection is still there. (Does not apply to the DTC 48 without the memory extension.)
- Specify whether port configuration parameters; data length and parity, have to be forced when binary mode is selected. (Supported on DT C16iX/DT C16MX and DTC 72MX only.)
- Specify whether the DTC will establish a connection automatically when the modem lines are raised.
- Specify whether hardware handshaking will be used.
- Specify destination node if automatic connection is enabled.
- A string that may be sent to the device under specific conditions such as after a port reset, or a connection is closed.

See the “Host Profile Screen (Host-Based)” section, for more information on how to configure extended switching ports.

Terminal Types

A terminal type is a collection of characteristics that cause a terminal to act and react in a specific way. It defines the relationship between the terminal and the MPE/iX operating system. Three terminal types are supplied with MPE/iX: terminal type 10, terminal type 18, and terminal type 24.

Terminal Type 10

Use terminal type 10 for Hewlett-Packard terminals and Hewlett-Packard personal computers running in terminal emulation mode. This type enables the XON/XOFF protocol (both receive and transmit). It supports block mode data transfers and can detect data transmission errors through the use of parity checking. This terminal type can work with some non-Hewlett-Packard devices, but none of them are supported.

NOTE The system console uses terminal type 10, but it does not have the same functionality as other terminals connected and configured as terminal type 10. A UPS also uses terminal type 10, but it has different functionality from other devices connected and configured as terminal type 10.

Terminal Type 18

Use terminal type 18 for non-Hewlett-Packard devices. It differs from terminal type 10 in the following ways:

- Block mode data transfers are not supported.
- Data protection is supplied through the XON/XOFF protocol. By default, parity checking is not used.
- The read trigger character is not recognized.

Terminal Type 24

Use terminal type 24 for PAD terminals. Limitations apply to operations over PAD connections. For example, the following functions are not supported:

- Block mode applications.
- HP Block Mode applications.
- Parity generation, programmatically
- Parity checking, programmatically.

For more information on supported PAD operations, refer to the *Asynchronous Serial Communications Programmer's Reference Manual*.

Printer Types

A printer type is a collection of characteristics that cause a printer to act and react in specific ways. It defines the relationship between the printer and the MPE/iX operating system. Four printer types are supplied with MPE/iX: printer type 18, printer type 21, printer type 22, and printer type 26.

Printer Type 18

Use printer type 18 for spooled and application printers, without status checking. An application printer is controlled by a program running on an MPE/iX computer. The program performs the following functions:

- Opens the printer.
- Writes to the printer.
- Initializes the printer before each listing.
- Spools output to the printer.
- Sends messages to the system console or the user's terminal.
- Checks the status of the printer. (Only some printers can supply this information.)
- Closes the printer.

Printer type 18 responds to an XOFF character sent from a printer. The XOFF protocol stops the flow of data to the printer so data cannot be lost. However, the printer cannot send an XOFF character if it is unplugged, turned off, or loses power. In these instances, data is lost.

Printer Type 21

Use printer type 21 for remote spooled printers. These are asynchronous printers that can use the MPE/iX spooler.

Printer type 21 uses the XON/XOFF protocol and status checking. Status checking means an HP printer that respond to the interrogation string: **[Esc]** ? **[DC1]**.

In addition, data transmission errors can be detected (but not corrected) using parity checking.

Printer Type 22

Use printer type 22 for local spooled printers. These are asynchronous printers that can use the MPE/iX spooler, but not with modems.

Printer type 22 supports the same data protection methods (the XON/XOFF protocol and status checking) as printer type 21, except for parity checking.

Printer Type 26

Use printer type 26 for remote spooled printers connected to a network. These are printers that can be spooled and connected through a modem to a statistical multiplexer or printers connected to a PAD. Printer type 26 builds on printer type 22, with additional features to cope with delays that occur over a buffered connection.

The status request is sent and the time begins. If there is no reply, the timer is reset. This is repeated 10 times.

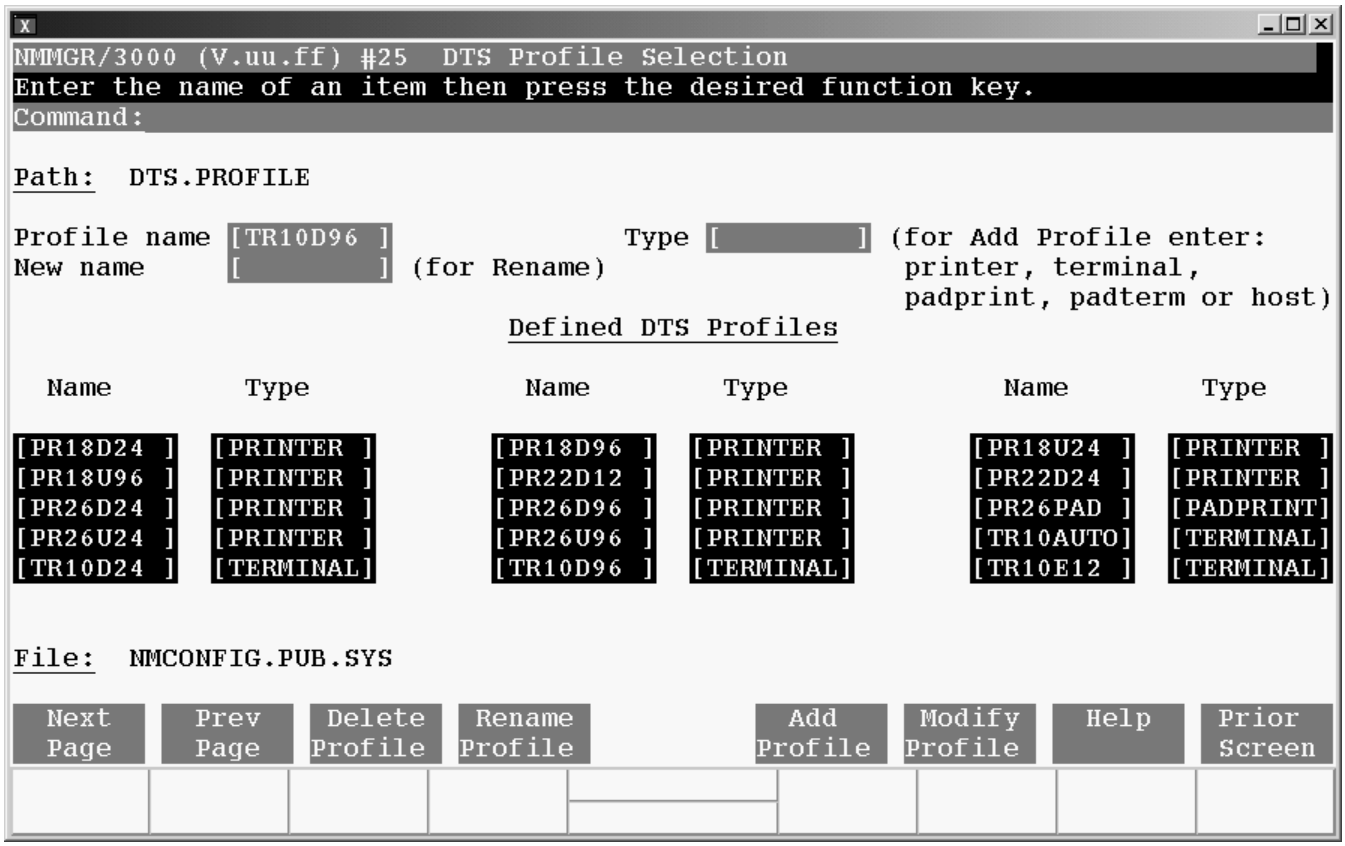
If the status request detects an error condition, for example the printer runs out of paper, a system console message is displayed and the retry is done only one more time. If there is no reply or an error occurs, the connection is closed and the spooler stopped.

The XOFF timer is also retried 10 times. After the last entry, the connection shuts down and data is refused. In addition to status request and XOFF changes, all closed connection requests from the computer are not acted upon for 10 seconds. This avoids having to reestablish the remote connection if another spoolfile becomes ready to print before the 10 second wait expires.

Creating and Modifying Profiles

The DTS Profile Selection screen for PC-based management (Figure 7-1) lists the profiles available in your configuration file. (To reach this screen, press the **[Go to Profiles]** key at the Host Configuration screen or the Card Configuration screen.) From this Profile Selection screen, you may review, add, delete, or modify profiles. (Screen varies slightly for host-based management.)

Figure 7-1 DTS Profile Selection Screen



1. To review, add, delete, rename, or modify a profile, go to the Profile Selection screen.
2. Enter the profile name in the `profile name` field.
3. If you are *deleting a profile*, press the **[Delete Profile]** key. You must press the key again to confirm the deletion. You are done. Exit this screen by pressing the **[Prior Screen]** key.
4. If you are *renaming a profile*, enter the new profile name in the `New name` field and press **[Rename Profile]**. You are done. Exit this screen by pressing the **[Prior Screen]** key.
5. If you are *adding a profile*, enter the profile type in the `Type` field. For host-based configuration files the valid profile types are: `terminal`, `printer`, `padterm`, `padprint`, `host`. Press the **[Add Profile]** key. Proceed to step 7 below. For pc-based configuration files the valid types are: `terminal`, `printer`.

6. If you are *modifying or reviewing a profile*, press the **[Modify Profile]** key. Proceed to the next step below.
7. The appropriate profile screen will be displayed, showing the settings of the specified profile.

   Examples of Terminal Profile screen, Printer Profile screen, PAD Terminal Profile screen, PAD Printer Profile screen, and host port profile screen are shown later in this chapter.
8. Review the profile settings. Use the **[Tab]** key to move around the fields in the screen. Make changes as needed by typing over the current values.
9. If you want to save the changes, press the **[Save Data]** key.
10. To return to the Profile Selection screen, press the **[Prior Screen]** key.
11. To exit the Profile Selection screen, press the **[Prior Screen]** key again.

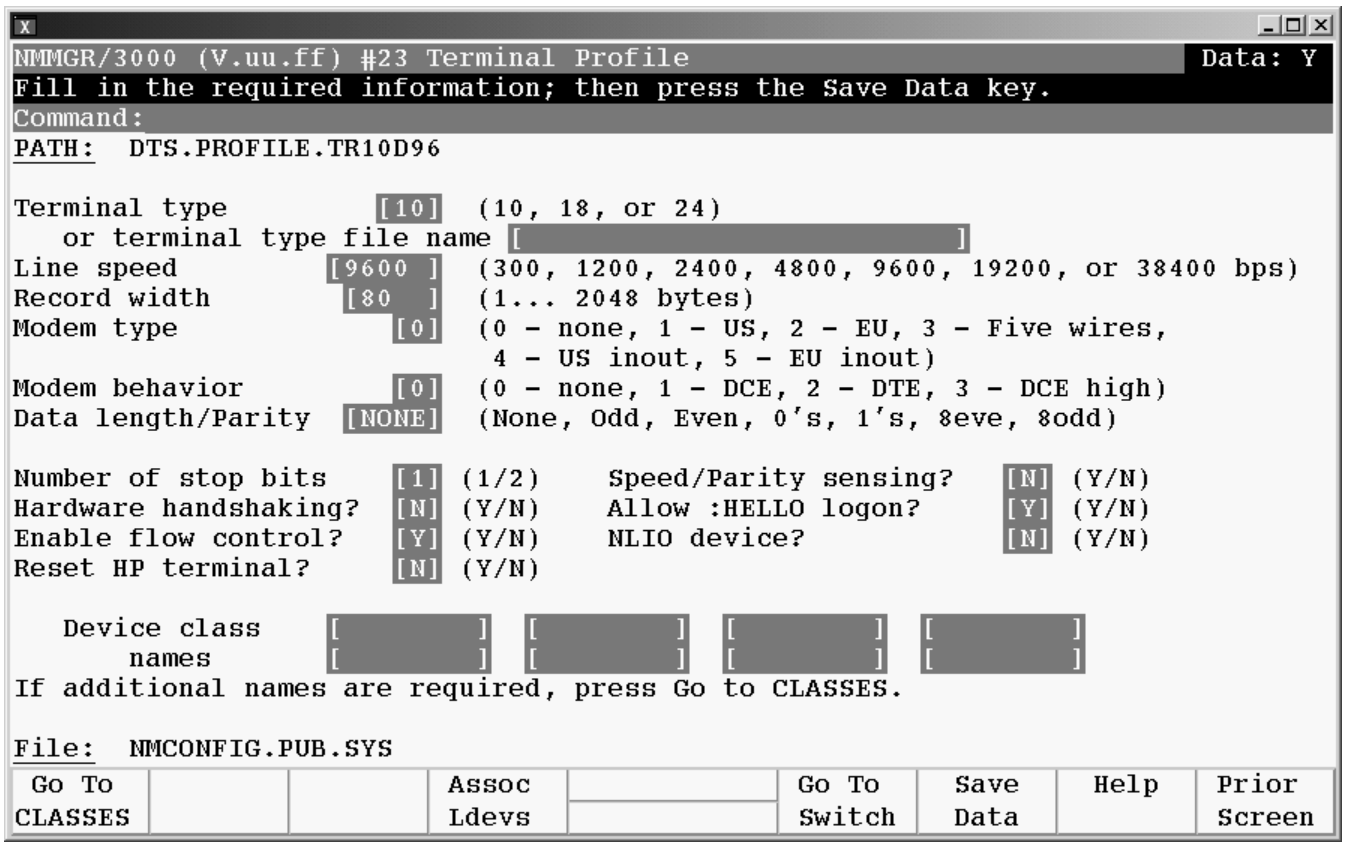
Fields

`Profile name`	The name of the profile to be reviewed, added, modified, deleted, or renamed.
`Type`	Required only if adding a new profile. Specifies whether the profile is to be a terminal, printer, PAD terminal, PAD printer, or host port profile. UPSs use a terminal type of profile.
`New name`	The new name for the profile. Required only when renaming a profile.
`Defined DTS Profiles`	Display only. Lists the name and type of existing profiles. If more than 15 profiles exist, they are listed on additional pages of this screen. Use the **[Next Page]** key to move forward on the pages and the **[Prev Page]** key to move back on the pages of the screen.

Terminal Profile Screen (Host-Based)

The Terminal Profile screen is used to define characteristics associated with a terminal profile. Figure 7-2 shows a Terminal Profile screen for host-based management. The PC-based Terminal Profile screen varies slightly, see Figure 7-4, Terminal Profile screen (PC-Based).

Figure 7-2 Terminal Profile Screen (Host-Based)



Review the profile settings on the screen. Use the **[Tab]** key to move from field to field. Make changes as needed by typing over the current values. When you have made the desired changes, press the **[Save Data]** key. Refer to the "Fields" subsections for detailed information about each field on the screen.

Press the **[Prior Screen]** key to return to the Profile Selection screen or Press the **[Go To Switch]** key to go to the Terminal Switching Configuration Screen.

Fields

`Terminal type` The terminal type associated with the profile. Three terminal types are supplied with MPE/iX: terminal type 10, 18 and 24. See Terminal Types earlier in this chapter.

`Terminal type file name` Instead of using the default terminal types 10, 18, or 24, you may create your own terminal type and save it in a file. To create a customized terminal type, use the Workstation Configurator, `TTUTIL.PUB.SYS`. Refer to the *Customizing Terminal and Printer Type Files with Workstation Configurator* for more information.

`Line speed` The line speed, in bits per second. Supported speeds are 300, 1200, 2400, 4800, 9600, 19200, and 38400. (Line speed 38400 is supported for direct connect devices on DTC 16iX/16MX and DTC 72MX only, and the attached device must also support this speed. This field does not apply for DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment; any value entered in this field for a DTC 16RX will be ignored.)

`Record width` The number of characters for each record. For HP terminals, the record width is usually 80 (the width of the screen).

`Modem type` Specifies the type of modem used in the connection.

`0` means that modems will not be used.

`1` means that a US modem will be used.

`2` means that a European modem will be used.

`3` means that a Five wires modem will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`4` means that a US In Out modem will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`5` means that a European Modem In Out will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`Modem behavior` The DTC supports the following types of modem behavior which define the protocol used to establish a modem link between the DTC port and the attached device.

`0` means no modem used.

`1` specifies DCE modem behavior. Used for terminal connections. It uses a 2 minute timer to establish the link, and the DTC may disconnect if a carriage return is not received within a 2 minute interval.

`2` specifies DTE modem behavior. Used for termtype 26 supported on MPE/iX for remote printer access.

`3` specifies DCE modem behavior, except that it does not use a 2 minute timer to establish the link. The DTC does not disconnect the link after a 2 minute interval and the port remains open for connection establishment. (This option is supported on DTC 16iX/16MX and DTC 72MX only.)

This field does not apply for DTC 16RX access to an H P3000 in an MPE/iX host-based management environment; any value entered in this field for a DTC 16RX will be ignored.

`Data Length/Parity` Specifies the type of parity and data length will be used using this profile. The full list of supported data length with parity settings is as given:

None means that the 8 bits data length with parity none will be used.

Even means that the 7 bits data length with even parity will be used.

Odd means that 7 bits data length with odd parity will be used.

0's means that 7 bits data length with parity forced to 0 will be used.

1's means that 7 bits data length with parity forced to 1 will be used.

8eve means that 8 bits data length with even parity will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

8odd means that 8 bits data length with odd parity will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

Number of stop bits Specifies the number of stop bits to be used for asynchronous characters. Enter a 1 to set 1 stop bit and 2 for 2 stop bits. The default value is 1. Supported on DTC 16iX/DTC 16MX and DTC 72MX only.

Speed/Parity sensing? Specifies whether auto speed and parity sensing will occur at logon for terminals using this profile. This field does not apply for DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment; any value entered in this field for a DTC 16RX will be ignored.

Hardware handshaking? Specifies whether hardware handshake will be used. Hardware handshake uses modem signals CTS and RTS to pace the data transfer from the DTC to the attached device. (Supported on DTC 16iX/16MX and DTC 72MX only. This field does not apply for DTC 16RX access to an HP e3000 in an MPE/iX host- based management environment; any value entered in this field for a DTC 16RX will be ignored.)

Allow :HELLO logon? Specifies whether the :HELLO logon will be accepted from the terminals.

Enable flow control? Specifies whether to enable flow control between DTC port and connected device. If set to Y, flow control is made with XON/XOFF characters. If set to N, the XON/XOFF characters sent from device are not interpreted by DTC. The default value is Y. This function is also known as "software handshake".

NLIO device? Specifies whether native language devices will be used.

Reset HP terminal? Specifies whether or not the terminal will be reset after the DTC is powered on or after the connection is aborted or re-established (for HP terminals only). This field does not apply for DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment; any value entered in this field for a DTC 16RX will be ignored.

Device class names Device classes provide a means of accessing devices associated with a profile. Each device class name is up to eight alphanumeric characters beginning with a letter. Up to 450 device class names may be associated with a profile; the total number of supported, configured device classes defined in all profiles is 2000. Use the **[Go to CLASSES]** key to move to an Additional Device Class Names screen to add more device classes.

NOTE If you are changing profile characteristics, you can see which ldevs and DTCs will be affected by the change by pressing the **[Assoc Ldevs]** function key on the profile screen corresponding to the profile you are changing. After pressing this key, you will see a list of all ldevs using this profile in the DTCs configured in DTS.

Terminal Switching Configuration Screen

Figure 7-3 displays the Terminal Switching Configuration screen. You can reach this screen by pressing **[F5]**, the **[Go To Switch]** function key, at the Terminal Profile screen. The Terminal Switching Configuration screen allows you to configure host-based terminal switching parameters.

Path name: DTS.PROFILE.*profname*.SWITCH

Figure 7-3 Terminal Switching Configuration Screen

```
NMMGR/3000 (V.uu.ff) #322  Terminal Switching Configuration          Data: N
Fill in the required information; then press the Save Data key.
Command:

PATH:  DTS.PROFILE.TR10D96.SWITCH

Terminal name          [                  ]  (optional)

Data transfer                          [1]  (1 - ASCII, 2 - Binary)
Escape from data transfer character   [  ]  (Y/N) (optional)
Maximum  number of sessions            [1]  (1 to 5)

Enable port?            [Y] (Y/N)     DTC user interface timeout?  [N] (Y/N)
Enable switching?       [N] (Y/N)     Enable keep alive?           [Y] (Y/N)
Automatic connection?   [N] (Y/N)     Save port config in binary?  [N] (Y/N)

Default destination     [ALPHA.DOMAIN.ORG                                  ]
Initialization string   [                  ]  (optional)

The DTC16iX does not support changes to the fields on this screen. If this
profile is configured on ports on the DTC16iX, default values will be used
for all fields.
File:  NMCONFIG.PUB.SYS

                                                  Save    Help    Prior
                                                  Data            Screen
```

Review the profile settings on the screen. Use the **[Tab]** key to move from field to field. Make changes as needed by typing over the current values. When you have made the desired changes, press the **[Save Data]** key. Refer to the “Fields” subsection for detailed information about each field on the screen.

Press the **[Prior Screen]** key to return to the Terminal Profile screen.

Fields

`Terminal name` Optional field which specifies the terminal port name. You may enter up to 16 characters or an IP address. For routable **back-to-back** environments, this field must contain a valid IP address for the terminal port in the format `xxx.xxx.xxx.xxx`, where `xxx` is a number from `0-255`.

`Data transfer` Specifies the mode of data transfer. For **back-to-back** connections, the field can be either ASCII or binary. If the profile will not be configured for **back-to-back** connections, enter `1` for ASCII. The default is ASCII.

`Escape from data transfer character` Optional field which specifies the character which will return the terminal user to the DTC user interface. Field applies only if switching is enabled. Field may be either an ASCII character or a control character entered as `^char` where `char` is any letter, `[`, `\`, `^`, `_`, or `]`. If field is left blank, you will not return to the DTC user interface before logging off the session.

`Maximum number of sessions` The number of concurrent sessions allowed from a terminal. The maximum number of sessions allowed is `5` and the default is `1`. If the connection is established to a HP e3000 that is configured as host-based then only one connection to that host is allowed. If the connection is established to a PC-based system and the DTC port configured as non-nailed, then you may establish up to the maximum number of sessions specified. Only one connection is active at any given time. All other sessions are in a suspended state. See Appendix C, "DTC User Interface," for a description of the DTC user interface commands.

`Enable port?` Specifies whether communication can be established to the port. Enter an `N` to disable the port. The default is `Y`. If disabled, no connections can be established to the port.

`DTC user interface timeout?` Specifies whether the DTC user interface timeout is active. If enabled, terminal connection to the DTC user interface is automatically disconnected after the timeout period defined on DTC User Interface screen (Figure 8-3). Field is valid only if switching is enabled in the `"Enable switching?"` field. Enter a `Y` to enable the DTC user interface timeout, the default is `N`.

`Enable switching?` Specifies the switching capability of the port. Enter a `Y` to enable switching. The default is `N`. If switching is enabled, you are allowed to access more than one system. You will see a DTC prompt that is specified on the DTC User Interface screen Figure 8-3 in Chapter 8, "Additional DTC Configuration." Connection to other systems on the LAN can be made by entering `connect system name` at the DTC prompt (refer to Chapter 8, " Additional DTC Configuration," for more information on the DTC user interface). If switching is disabled, the terminal will be automatically connected to the host defined in the `"Default destination"` field.

`Enable keep alive?` Specifies whether "keep alive" mechanism is to be activated. When there is no data transfer between the and the DTC and the system, then the "keep alive" mechanism is used to detect if the connection is still there. The default value is `Y` (enable). Enter an `N` to disable the field. Not applicable for DTC 48 without the memory extension. This feature is only applicable for ARPA (TCP/IP) connections.

`Automatic connection?` Specifies whether a connection is automatically established to the system specified in the `"Default destination"` field. Enter a `Y` to enable automatic connection. The default is `N`. If enabled, the DTC senses the modem signal's rise and automatically connects the device to the value of `"Default destination"`. `"Allow :HELLO logon?"`

field on Terminal Profile screen must be enabled. Field is valid for modem ports only ("Modem behavior" field on Terminal Profile screen must be set to 1, 2, or 3).

Save port config in binary? Specifies whether the port configuration parameters data length and parity settings will be maintained when binary mode is selected. If set to Y, then the port configuration remains unchanged when binary mode is selected. If set to N, then the data length is set to 8 and parity is set to none when binary mode is selected. The default is N. Supported on DTC 16iX/DTC 16MX and DTC 72MX only.

Default destination Specifies the default system to which the terminal will connect. This destination will be used if the c[onnect] command is entered without a system name at the DTC prompt or if automatic connection is enabled. Field must be completed if switching is disabled or if automatic connection is enabled. Field can be a node name in the format *name.domain.organization* or an IP address in the format xxx.xxx.xxx.xxx. Default is the entry in the field "Local HP e3000 node name" on the Main screen.

Initialization string Optional field that specifies the string that will be sent to the attached device under one of the following circumstances:

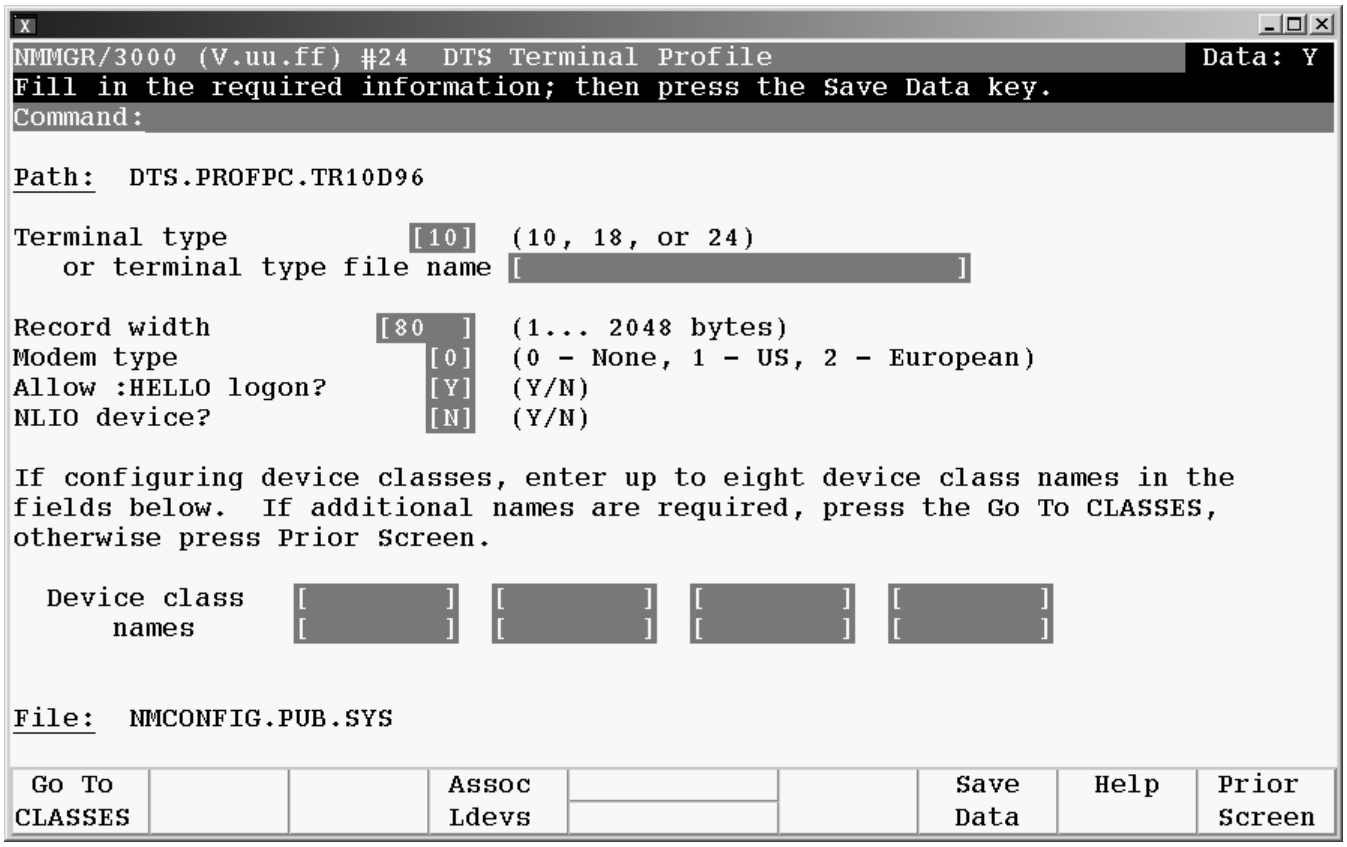
- After resetting a port.
- After closing a session on the host and returning to the DTC user interface.
- After entering the escape character during a system session and returning to the DTC user interface.
- After establishing a connection to the DTC user interface for modem connections when all modem signals are up.

Field is case-sensitive and can be up to 16 characters, including special characters and escape-code sequences in the format ^char.

Terminal Profile Screen (PC-Based)

Figure 7-4 shows a Terminal Profile screen for PC-based management. Note that you only need to configure a terminal profile for **nailed** terminals if you are using PC-based management. Nailed terminals are ports with permanent ldevs assigned to them and can be accessed programmatically.

Figure 7-4 Terminal Profile Screen (PC-Based)



NOTE

The Terminal Profile screen used for PC-based management contains a subset of the fields used by host-based management (Figure 7-2). Refer to the previous subsection for an explanation of the fields.

The reason PC-based terminal profiles contain fewer fields is that most terminal characteristics are defined in the OpenView DTC Manager (on the PC).

Printer Profile Screen (Host-Based)

The Printer Profile screen is used to define the characteristics associated with a printer profile. Figure 7-5 shows a Printer Profile screen for host-based management. PC-based management Printer Profile screen varies slightly, see Figur e7-7.

Figure 7-5 Printer Profile Screen (Host-Based)

```
NMMGR/3000 (V.uu.ff) #21 Printer Profile                                  Data: Y
Fill in the required information; then press the Save Data key.
Command:
PATH:  DTS.PROFILE.PR18D96

Printer type        [18]  (18, 21, 22, or 26)
   or printer type file name [                          ]
Line speed          [9600 ]  (300, 1200, 2400, 4800, 9600, 19200, or 38400 bps)
Record width         [132 ]  (1... 2048 bytes)
Modem type              [0]  (0 - None, 1 - US, 2 - EU, 3 - Five wires,
                              4 - US inout, 5 - EU inout )
Modem behavior          [0]  (0 - none, 1 - DCE, 2 - DTE, 3 - DCE high)
Data length/Parity [NONE]  (None, Even, Odd, 0's, 1's, 8eve, 8odd)

Number of stop bits     [1] (1/2)
Hardware handshaking?   [N] (Y/N)     Initially spooled?   [Y] (Y/N)
Enable flow control?    [Y] (Y/N)     NLIO device?         [N] (Y/N)

   Device class    [        ]  [        ]  [        ]  [        ]
                   [        ]  [        ]  [        ]  [        ]

If additional class names are required, press Go To CLASSES.

File:  NMCONFIG.PUB.SYS
 Go To  |        |        | Assoc  |        | Go To  | Save   | Help   | Prior
CLASSES |        |        | Ldevs  |        | Switch | Data   |        | Screen
```

Review the profile settings on the screen. Use the **[Tab]** key to move from field to field. Make changes as needed by typing over the current values. When you have made the desired changes, press the **[Save Data]** key. Refer to the "Fields" subsection below for detailed information about each field on the screen.

Press the **[Prior Screen]** key to return to the Profile Selection screen or Press the **[Go To Switch]** key to go to the Printer Switching Configuration Screen.

Fields

`Printer type` The printer type associated with the profile. Four printer types are supplied with MPE/iX: printer type 18, 21, 22 and 26. See Printer Types earlier in this chapter.

`Printer type file name` Instead of using the default printer type files 18, 21, 22, or 26, you may create your own customized printer type and store it in a file. Use the Workstation Configurator, `TTUTIL.PUB.SYS` to create your own printer type files. Refer to the *Customizing Terminal and Printer Type Files with Workstation Configurator* for more information.

`Line speed` The line speed, in bits per second. Supported speeds are 300, 1200, 2400, 4800, 9600, 19200, or 38400. (Line speed 38400 is supported for direct connect devices on DTC 16iX/DTC 16MX and DTC 72MX only, and the attached device must also support this speed. This field does not apply for DTC 16RX access to an HP e3000 in an MPE/iX host-based management environment; any value entered in this field for a DTC 16RX will be ignored.)

`Record width` The number of characters for each record. For HP printers, the record width is usually 132 (the width of the line).

`Modem type` Specifies the type of modem used in the connection.

`0` means that modems will not be used.

`1` means that a US modem will be used.

`2` means that a European modem will be used.

`3` means that a Five wires modem will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`4` means that a US In Out modem will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`5` means that a European Modem In Out will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`Modem behavior` The DTC supports the following types of modem behavior which define the protocol used to establish a modem link between the DTC port and the attached device.

`0` means no modem used.

`1` specifies DCE modem behavior. Used for terminal connections. It uses a 2 minute timer to establish the link, and the DTC may disconnect if a carriage return is not received within a 2 minute interval.

`2` specifies DTE modem behavior. Used for termtype 26 supported on MPE/iX for remote printer access.

`3` specifies DCE modem behavior, except that it does not use a 2 minute timer to establish the link. The DTC does not disconnect the link after a 2 minute interval and the port remains open for connection establishment. (This option is supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

This field does not apply for DTC 16RX access to an H P3000 in an MPE/iX host-based management environment; any value entered in this field for a DTC 16RX will be ignored.

`Data Length/Parity` Specifies the type of parity and data length will be used using this profile. The full list of supported data length with parity settings is as given:

`None` means that the 8 bits data length with parity none will be used.

`Even` means that the 7 bits data length with even parity will be used.

`Odd` means that 7 bits data length with odd parity will be used.

`0`'s means that 7 bits data length with parity forced to 0 will be used.

1's means that 7 bits data length with parity forced to 1 will be used.

8eve means that 8 bits data length with even parity will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

8odd means that 8 bits data length with odd parity will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

Number of stop bits Specifies the number of stop bits to be used for asynchronous characters. The possible values are 1 or 2 stop bits. This is applicable only for DTC 72MX, DTC 16MX and DTC 16iX. This field does not apply for DTC 16RX access to an HP 3000 in an MPE/iX host-based management environment and any value entered in this field for a DTC 16RX will be ignored.

Hardware handshaking? Specifies whether hardware handshake will be used. Hardware handshake uses modem signals CTS and RTS to pace the data transfer from the DTC to the attached device. (Supported on DTC 16iX/16MX and DTC 72MX only. This field does not apply for DTC 16RX access to an HP e3000 in an MPE/iX host- based management environment; any value entered in this field for a DTC 16RX will be ignored.)

Initially spooled? Specifies whether the device that uses this profile will be initially spooled when the system is rebooted. If the device was added dynamically, the device can be spooled any time after the device is created.

Enable flow control? Specifies whether to enable flow control between DTC port and connected device. If set to Y, flow control is made with XON/XOFF characters. If set to N, the XON/XOFF characters sent from device are not interpreted by DTC. This function is also known as "software handshake". This field does not apply for DT C16RX access to an HP 3000 in an MPE/iX host-based management environment, and any value entered in this field for a DT C16RX will be ignored.

NLIO device? Specifies whether native language devices will be used.

Device class Device classes provide a means of accessing devices associated with a profile. Each device class name is up to eight alphanumeric characters beginning with a letter.

Up to 450 device class names may be used for a printer profile; the total number of supported, configured device classes defined in all profiles is 2000. Use the **[Go To CLASSES]** key to go to an Additional Device Class Names screen for entering additional device class names.

NOTE

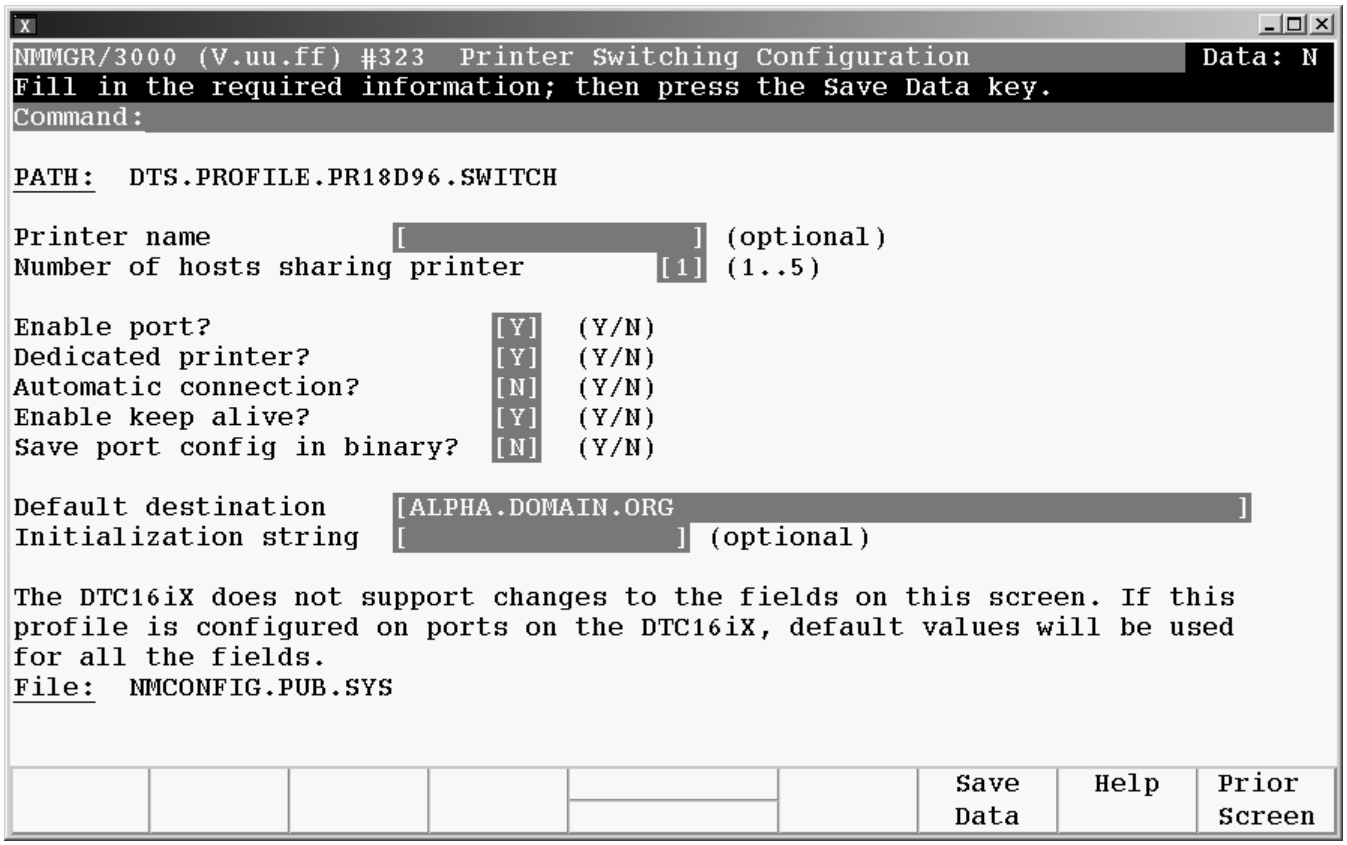
If you are changing profile characteristics, you can see which ldevs and DTCs will be affected by the change by pressing the **[Assoc Ldevs]** function key on the profile screen corresponding to the profile you are changing. After pressing this key, you will see a list of all ldevs using this profile in the DTCs configured in DTS.

Printer Switching Configuration Screen

Figure 7-6 displays the Printer Switching Configuration screen. You can reach this screen by pressing **[F5]**, the **[Go To Switch]** function key, at the Printer Profile screen. Use the Printer Switching Configuration screen to configure host-based printer switching parameters.

Path name: DTS.PROFILE.*profname*.SWITCH

Figure 7-6 Printer Switching Configuration Screen



Review the profile settings on the screen. Use the **[Tab]** key to move from field to field. Make changes as needed by typing over the current values. When you have made the desired changes, press the **[Save Data]** key. Refer to the "Fields" subsection for detailed information about each field on the screen.

Press the **[Prior Screen]** key to return to the Terminal Profile screen.

`Printer name` Optional field which names the printer port. You may enter up to 16 characters or an IP address. For routable **back-to-back** environments, field must contain a valid IP address for the printer port in the format `xxx.xxx.xxx.xxx`

`Number of hosts sharing printer` Specifies the number of hosts that can share the printer. If the port is being accessed by one system, and a second system attempts to access the port, the second system will be put in a queue and will be allowed to access the port when the first system is

done. If more than the specified number of hosts attempt to access the port, the spooler will be stopped on error on the systems that exceeds the limit. The maximum allowed is 5 hosts and the default value is 1.

`Enable port?` Specifies whether communication can be established to the port. Enter an N to disable the port. The default is Y. If disabled, no connections can be established to the port.

`Dedicated printer?` Specifies whether the printer can be accessed by a single system or multiple systems. If enabled, the printer can only be accessed by the host specified in the "Default destination" field. You must enter a valid host name in the "Default destination" field if the "Dedicated printer?" field is enabled. Enter an N to allow the printer to be shared by more than one system. The default is Y.

`Automatic connection?` Specifies whether a connection is automatically established to the system specified in the "Default destination" field. If enabled, the DTC senses the modem signal's rise and automatically connects the device to the value of "Default destination". Field is valid for modem ports only ("Modem behavior" field on Printer Profile screen must be set to 1, 2, or 3).

`Enable keep alive?` Specifies whether "keep alive" mechanism is to be activated. When there is no data transfer between the DTC and system, then the "keep alive" mechanism is used to detect if the connection is still there. The default value is Y (enable). Enter and N to disable the field. Not applicable for DTC 48 without the memory extension.

`Save port config in binary?` Specifies whether the port configuration parameters data length and parity settings will be maintained when a binary mode is selected. If set to Y, then the port configuration remains unchanged when binary mode is selected. If set to N, then the data length is set to 8 and parity is set to none when binary mode is selected. The default is N. Supported on DTC 16iX/DTC 16MX and DTC 72MX only.

`Default destination` This field specifies the system to which the printer is dedicated if "Dedicated printer" is enabled, or to which the printer will connect when automatic connection is enabled. The field is required if "Dedicated Printer" is set to Y or if "Automatic Conneciton" is set to Y. Field can be a node name in the format *name.domain.organization* or an IP address in the format xxx.xxx.xxx.xxx. Default is the entry in the field "Local HP e3000 node name" on the Main screen.

`Initialization string` Optional field that specifies the string that will be sent to the attached device under one of the following circumstances:

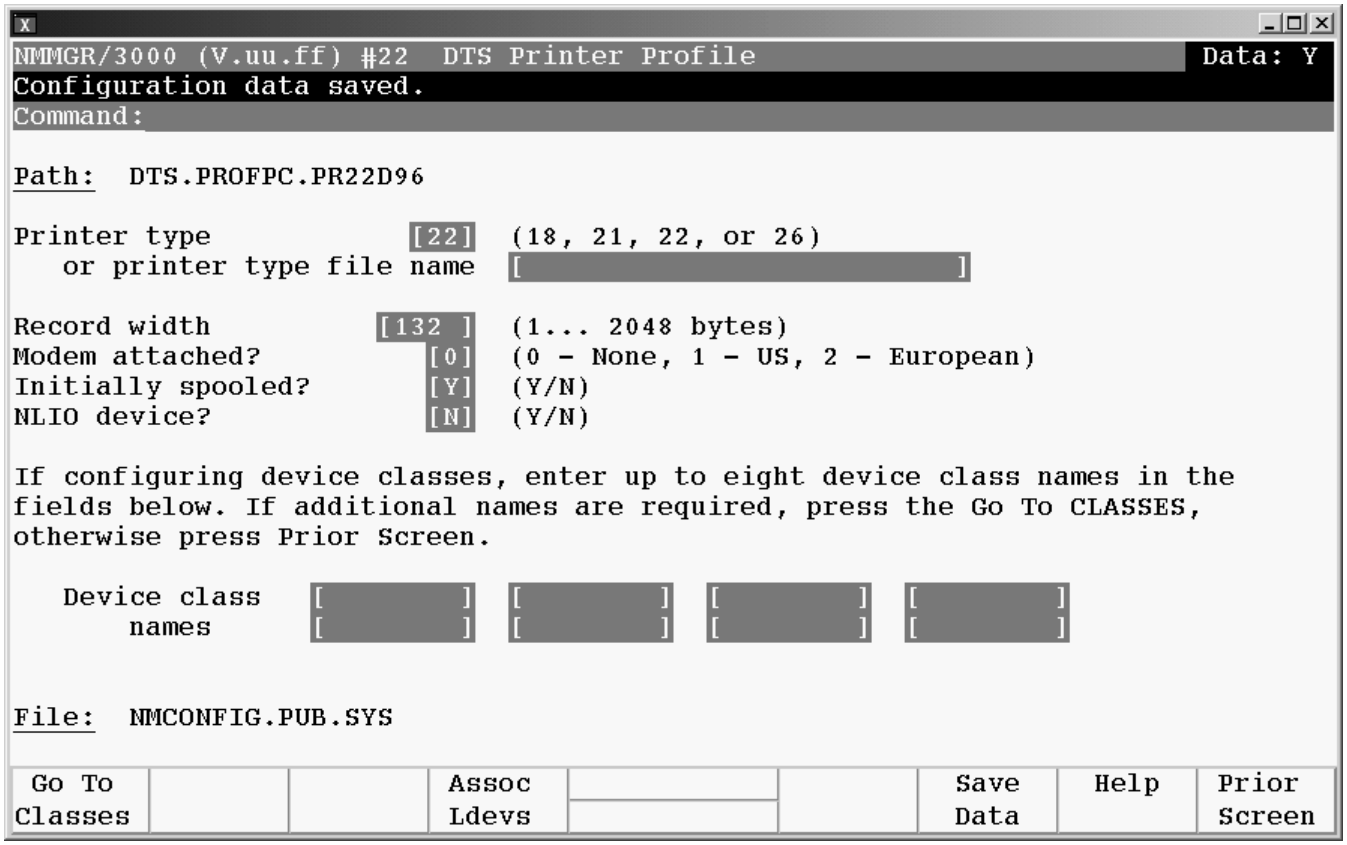
- After resetting a port.
- After the port is closed at the end of the spool file.
- After establishing a connection to the DTC user interface for modem connections when all modem signals are up.

Field is case-sensitive and can be up to 16 characters, including special characters and escape-code sequences in the format ^char.

Printer Profile Screen (PC-Based)

Figure 7-7 shows a Printer Profile screen used for PC-based management.

Figure 7-7 Printer Profile Screen (PC-Based)



NOTE

The Printer Profile screen used for PC-based management contains a subset of the fields used by the Printer Profile screen used for host-based management (Figure 7-5). Refer to the previous subsection for an explanation of the fields.

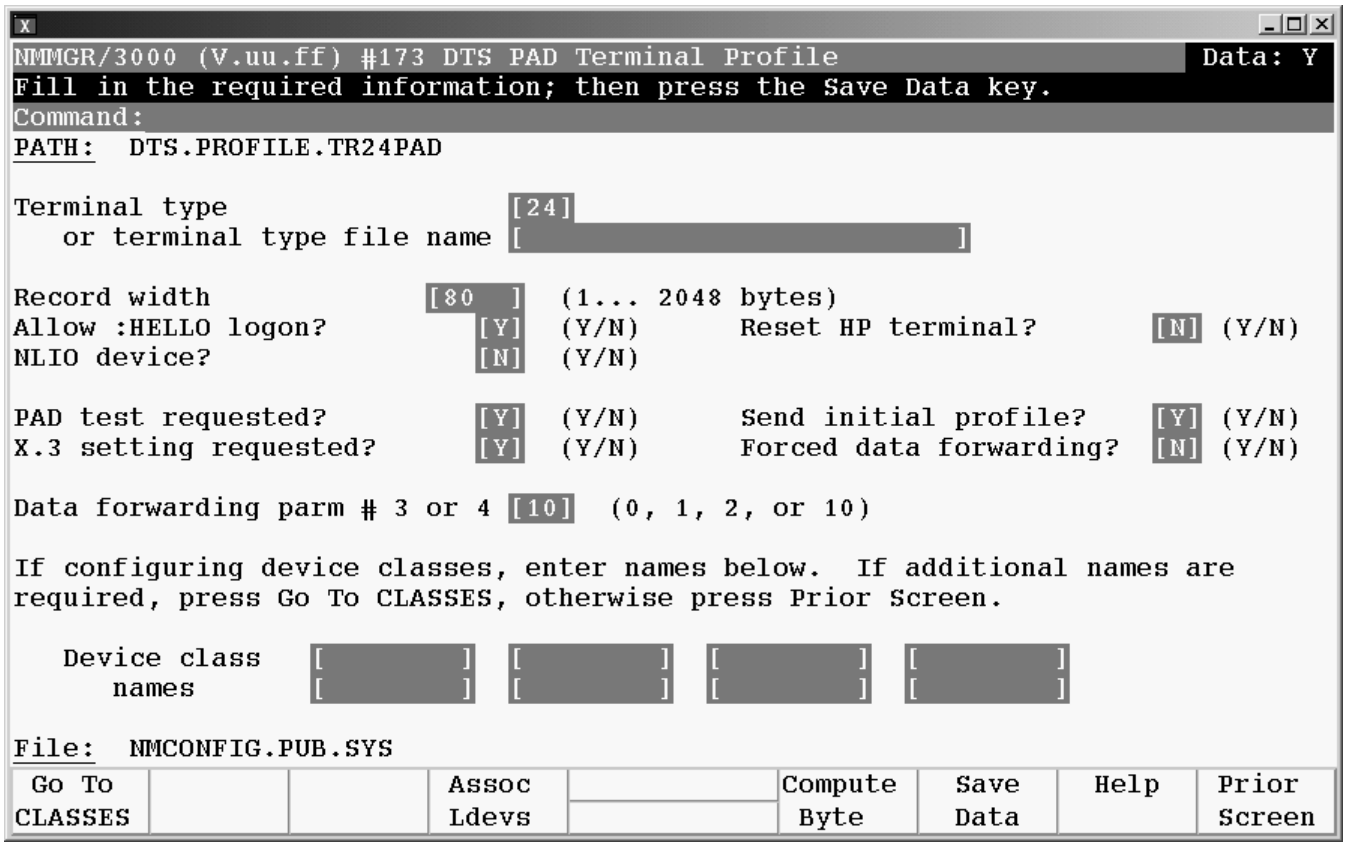
The reason PC-based printer profiles contain fewer fields is that most printer characteristics are defined in the OpenView DTC Manager (on the PC).

Note that the field "Modem attached?" is the same as "Modem type" in the host-based Printer Profile screen.

PAD Terminal Profile (Host-Based)

The PAD Terminal Profile screen, as shown in Figure 7-8 is used to define the characteristics associated with a PAD terminal profile. Note that this screen is used for host-based management only. For PC-based management, you should use the regular PC-Based Terminal Profile screen shown in Figure 7-4 for PAD terminals.

Figure 7-8 PAD Terminal Profile Screen (Host-Based)



Review the profile settings on the screen. Use the **[Tab]** key to move from field to field. Make changes as needed by typing over the current values. When you have made the desired changes, press the **[Save Data**] key. Refer to the "Fields" subsection for detailed information about each field on the screen.

Press the **[Prior Screen]** key to return to the Profile Selection screen.

Compute Byte

When this key is pressed, NMMGR will display a decimal value that is calculated from the value of some of the fields on the PAD Terminal Profile screen. This value describes certain parameters of the connection between a PAD and the X.25 card in the DTC. See the *Configuring and Managing Host-Based X.25 Links* manual for more detail on the contents and purpose of the compute byte value.

Fields

`Terminal type` The terminal type being associated with the profile. The only valid terminal type for PAD terminal profiles is terminal type 24.

`Terminal type file name` A terminal type file created with the Workstation Configurator utility (`TTUTIL.PUB.SYS`), to be associated with the profile instead of the system-supplied terminal type. Enter the fully qualified file name (*filename.group.account*). Refer to the *Customizing Terminal and Printer Type Files with Workstation Configurator* for more information on `TTUTIL.PUB.SYS`.

`Record width` The number of characters for each record. For HP terminals, the record width is usually 80 (the width of the screen).

`Allow :HELLO logon?` Specifies whether `:HELLO` logon will be accepted from the terminals.

`Reset HP terminals?` Specifies whether or not the terminal will be reset after the DTC is powered on or after the connection is aborted or re-established (for HP terminals only).

`NLIO device?` Specifies whether native language devices will be used.

`PAD test requested?` Specifies whether the DTC will set and read several X.29 parameters at connection establishment time to determine the PAD's behavior.

`Send initial profile`? Specifies whether at connection establishment, the PAD is set to default X.3 terminal parameter values.

`X.3 setting requested?` Specifies whether changes to X.3 parameters may be made after connection establishment.

`Forced data forwarding?` Specifies whether the Data Forwarding Parms #3 and #4 will be allowed to change after connection establishment. If this field is `N` then data forwarding parms #3 and #4 can change if the port changes from a normal read to VPLUS mode or if an Alternate End of Record (AEOR) is set. If this field is `Y` then the data forwarding parms #3 and #4 setting established at connection time is always used.

`Data forwarding parm #3 and #4` This setting tells the PAD when a packet must be sent to the PDN. Parm #3 selects the set of characters that will signal the PAD to forward data to the PDN. Parm #4 sets the idle timer in 1/20 second increments. The idle timer will signal the PAD to forward data if the time between successive characters from the terminal exceeds the idle timer value.

When the data forwarding parameter is `10` and a normal read is sent, parm #3 is `2` (data forwarding character is a carriage return) and parm #4 is `0` (no idle time set). In VPLUS mode, parm #4 is `10` (idle timeout is 1/2 sec).

If the data forwarding parameter is `1` or `2`, parm #4 is `1` (idle timeout is 1/20 sec) or parm #4 is `2` (idle timeout is 1/10 sec), respectively, and parm #3 is `0` (no data forwarding character).

If the data forwarding parameter is `0`, parm #3 is 127 (all characters are data forwarding) and parm #4 is `0` (no idle time set).

The following four parameters will be ignored when a profile is configured for non-nailed devices: PAD test requested, send initial profile, X.3 setting requested, and data forwarding parm #3 and #4. For non-nailed devices, the first three parameters will be set to `Y` and the

last parameter set to `0`. The four parameters will also be ignored for connections made through public PADs because the connections are made to non-nailed ldevs.

`Device class names` Device classes provide a means of accessing devices associated with a profile. Each device class name is up to eight alphanumeric characters beginning with a letter.

Up to 450 device class names may be used for a printer profile; the total number of supported, configured device classes defined in all profiles is 2000. Use the **[Go To CLASSES]** key to go to an Additional Device Class Names screen for entering additional device class names.

NOTE

If you are changing profile characteristics, you can see which ldevs and DTCs will be affected by the change by pressing the **[Assoc Ldevs]** function key on the profile screen corresponding to the profile you are changing. After pressing this key, you will see a list of all ldevs using this profile in the DTCs configured in DTS.

PAD Printer Profile (Host-Based)

The PAD Printer Profile screen, as shown in Figur e7-9 is used to define the characteristics associated with a PAD printer profile. This profile screen is used for host-based management only. For PC-based management, you should use the regular PC-based Printer Profile screen shown in Figure 7-7 for PAD printers.

Figure 7-9 PAD Printer Profile Screen (Host-Based)

```
NMMGR/3000 (V.uu.ff) #174 DTS PAD Printer Profile                    Data: Y
Fill in the required information; then press the Save Data key.
Command:

PATH:  DTS.PROFILE.PR26PAD

Printer type            [26]
   or printer type file name [                              ]

Record width          [132 ]  (1... 2048 bytes)
Initially spooled?       [Y]  (Y/N)
NLIO device?             [N]  (Y/N)
PAD test requested?      [Y]  (Y/N)
Send initial profile     [Y]  (Y/N)
X.3 setting requested?   [Y]  (Y/N)


If configuring device classes, enter names below.  If additional names are
required, press Go To CLASSES, otherwise press Prior Screen.

   Device class    [         ]  [         ]  [         ]  [         ]
      names        [         ]  [         ]  [         ]  [         ]

File:  NMCONFIG.PUB.SYS
 Go To  |        |        | Assoc  |        |        | Save   | Help   | Prior
CLASSES |        |        | Ldevs  |        |        | Data   |        | Screen
```

Review the profile settings on the screen. Use the **[Tab]** key to move from field to field. Make changes as needed by typing over the current values. When you have made the desired changes, press the **[Save Data]** key. Refer to the “Fields” subsection for detailed information about each field on the screen.

Press the **[Prior Screen]** key to return to the Profile Selection screen.

Fields

`Printer type` The printer type being associated with the profile. Use printer type 26 for PAD printer profiles.

`Printer type file name` A printer type file created with the Workstation Configurator utility (`TTUTIL.PUB.SYS`, to be associated with the profile instead of the system-supplied printer type. Enter the fully qualified file name (*filename.group.account*). Refer to the *Customizing Terminal and Printer Type Files with Workstation Configurator* for more information on `TTUTIL.PUB.SYS`.

`Record width` The number of characters for each record. For HP terminals, the record width is usually 132 (the width of the line).

`Initially spooled?` Specifies whether the printer will be initially spooled.

`NLIO device?` Specifies whether native language devices will be used.

`PAD test requested?` Specifies whether the DTC will set and read several X.29 parameters at connection establishment time to determine the PAD's behavior.

`Send initial profile?` Specifies whether at connection establishment, the PAD is set to default X.3 printer parameter values.

`X.3 setting requested?` Specifies whether changes to X.3 parameters may be made after connection establishment.

`Device class names` Device classes provide a means of accessing devices associated with a profile. Each device class name is up to eight alphanumeric characters beginning with a letter.

Up to 450 device class names may be used for a printer profile; the total number of supported, configured device classes defined in all profiles is 2000. Use the **[Go To CLASSES]** key to go to an Additional Device Class Names screen for entering additional device class names.

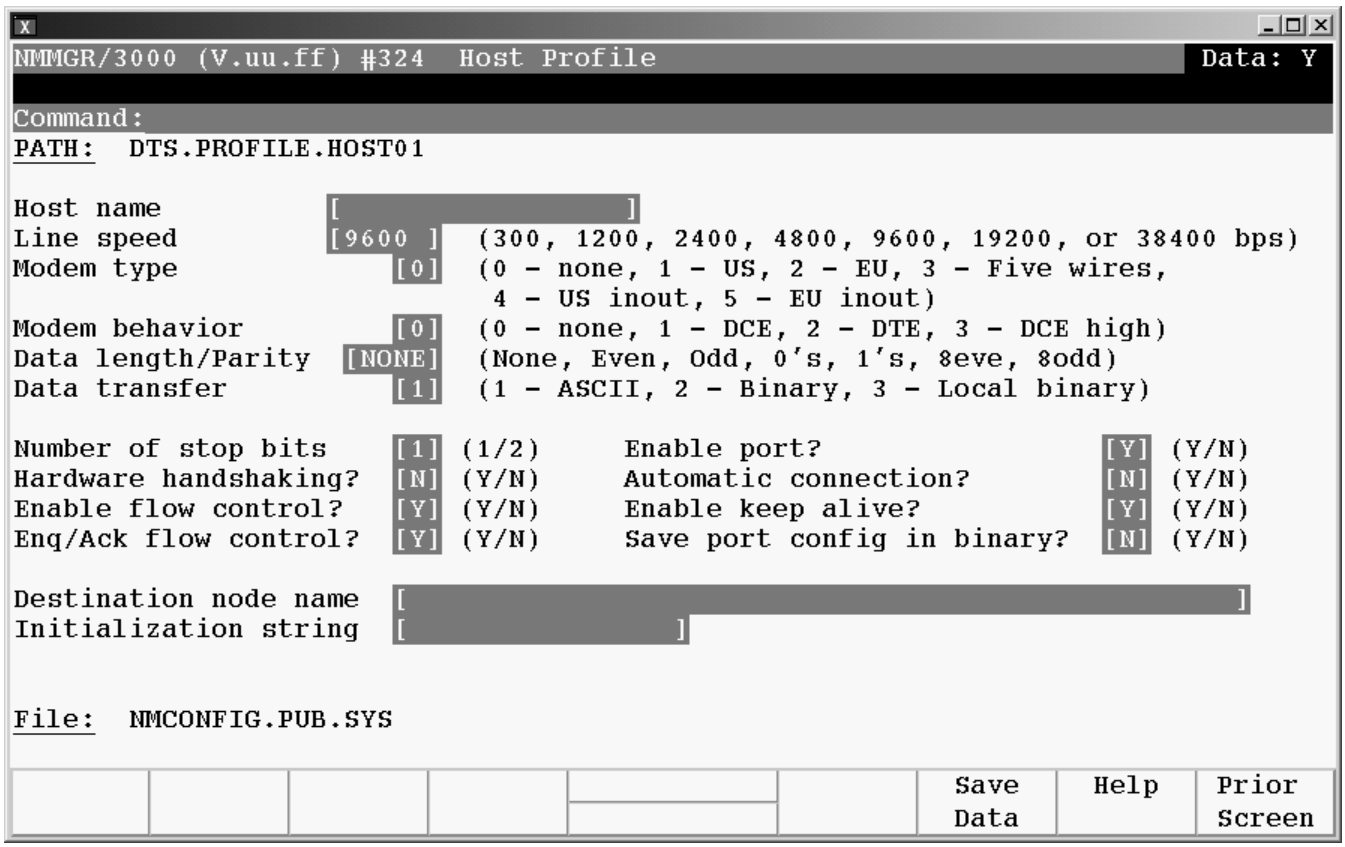
NOTE If you are changing profile characteristics, you can see which ldevs and DTCs will be affected by the change by pressing the **[Assoc Ldevs]** function key on the profile screen corresponding to the profile you are changing. After pressing this key, you will see a list of all ldevs using this profile in the DTCs configured in DTS.

Host Profile Screen (Host-Based)

Figure 7-10 displays the new Host Profile screen. Use this screen to configure host ports for **back-to-back**.

Path name: DTS.PROFILE.*profname*

Figure 7-10 Host Profile Screen



Review the profile settings on the screen. Use the **[Tab]** key to move from field to field. Make changes as needed by typing over the current values. When you have made the desired changes, press the **[Save Data]** key. Refer to the "Fields" subsection for detailed information about each field on the screen.

Press the **[Prior Screen]** key to return to the Profile Selection screen.

Fields

`Host name` Names the port. Field can be a node name up to 16 characters long or an IP address in the format `xxx.xxx.xxx.xxx`. If a node name is entered, the domain and organization names from the DTC node name will be taken to form a fully-qualified host node name. Also, if a node name is entered, the IP address of the DTC configured with this host port must be entered in the `"DTC IP Address"` field on the DTC Configuration screen (Figure 5-5 displays the DTC 72MX Configuration screen as an example).

If routers are used to connect two DTCs, this field must contain an IP address.

`Line speed` The line speed, in bits per second. Supported speeds are 300, 1200, 2400, 4800, 9600, 19200, and 38400. Default is 9600. (Line speed 38400 is supported for direct connect devices on DTC 16iX/DTC 16MX and DTC 72MX only, and the attached device must also support this speed.)

`Modem type` Specifies the type of modem used in the connection.

`0` means that modems will not be used.

`1` means that a US modem will be used.

`2` means that a European modem will be used.

`3` means that a Five wires modem will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`4` means that a US In Out modem will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`5` means that a European Modem In Out will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`Modem behavior` The DTC supports the following types of modem behavior which define the protocol used to establish a modem link between the DTC port and the attached device. Default is `0`.

`0` means no modem used.

`1` specifies DCE modem behavior. Used for terminal connections. It uses a 2 minute timer to establish the link, and the DTC may disconnect if a carriage return is not received within a 2 minute interval.

`2` specifies DTE modem behavior. Used for termtype 26 supported on MPE/iX for remote printer access.

`3` specifies DCE modem behavior, except that it does not use a 2 minute timer to establish the link. The port remains open for connection establishment and the DTC does not disconnect the link after a 2 minute interval. (This option is supported on DTC 16iX/16MX and DTC 72MX only.)

`Data Length/Parity` Specifies the type of parity and data length will be used using this profile. The full list of supported data length with parity settings is as given:

`None` means that the 8 bits data length with parity none will be used.

`Even` means that the 7 bits data length with even parity will be used.

`Odd` means that 7 bits data length with odd parity will be used.

`0`'s means that 7 bits data length with parity forced to 0 will be used.

`1`'s means that 7 bits data length with parity forced to 1 will be used.

`8eve` means that 8 bits data length with even parity will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`8odd` means that 8 bits data length with odd parity will be used. (Supported on DTC 16iX/DTC 16MX and DTC 72MX only.)

`Data transfer` Specifies the mode of data transfer in **back-to-back** connections. Field may be either ASCII or binary. Default is ASCII.

`Number of stop bits` Specifies the number of stop bits to be used for asynchronous characters. The possible values are `1` or `2` stop bits. Default value is `1`. Enter a `1` to set 1 stop bit. Enter a `2` to set 2 stop bits. This is applicable only for DTC 72MX, DTC 16MX and DTC 16iX. This field does not apply for DTC 16RX access to an HP 3000 in an MPE/iX host-based management environment, and any value entered in this field for a DTC 16RX will be ignored.

`Enable port?` Specifies whether communication can pass through the port. If disabled, no communication can pass through the port. Default is `Y`.

`Hardware handshaking?` Specifies whether hardware handshake will be used. Hardware handshake uses modem signals CTS and RTS to pace the data transfer from the DTC to the attached device. Default is `N`. (Supported on DTC 16iX/16MX and DTC 72MX only.)

`Automatic connection?` Enables automatic connection capability of the port. When enabled, the port will automatically connect to the system specified in the `"Destination node name"` field. The connection will be established when the port senses the rise of the modem signals of the device connected to the port. Field can be enabled on modem ports only (`"Modem behavior"` field on Terminal Profile screen must be set to `1`, `2`, or `3`). Default is `N`.

`Enable flow control?` Specifies whether to enable flow control between DTC port and connected device. If set to `Y`, flow control is made with XON/XOFF characters. If set to `N`, the XON/XOFF characters sent from device are not interpreted by DTC. This function is also known as “software handshake”. This field does not apply for DT C16RX access to an HP 3000 in an MPE/iX host-based management environment and any value entered in this field for a DTC 16RX will be ignored.

`Enable keep alive?` Specifies whether “keep alive” mechanism is to be activated. When there is no data transfer between the DTC and the system, then the “keep alive” mechanism is used to detect if the connection is still there. The default value is `Y` (enable). Enter an `N` to disable the field. Not applicable for DTC 48 without the memory extension.

`Enq/Ack flow control?` Enables enq/ack flow control. Enq/ack flow control is needed when the host port is connected to MPE/V systems. Default is `Y`.

`Save port config in binary?` Specifies whether the port configuration parameters; data length and parity, get forced when binary mode is selected. If set to `Y`, then the port configuration remains the same when binary mode is selected. If set to `N`, then data length is forced to 8 and parity to none when binary mode is selected. Default value of this field is `N` Only applicable for new DTCs.

`Destination node name` Optional field which specifies the system to which the port will connect if `"Automatic connection?"` field is enabled. A name must be entered if `"Automatic connection?"` is enabled.

`Initialization string` Optional field which specifies the string that will be sent to the attached device under one of the following circumstances:

- After resetting a port.
- After the connection to this port is closed.
- After establishing a connection to the DTC user interface for modem connections when all modem signals are up.

Field is case-sensitive and can be up to 16 characters, including special characters and escape-code sequences in the format `^char`.

System Supplied Terminal and Printer Profiles

The following tables list the terminal and printer profiles supplied by the MPE/iX system for host-based and PC-based management. You may choose these profiles for your terminal and printer configuration. You may also create your own profiles. See Table 7-1 for Host-Based Terminal Profiles.

Table 7-1 Host-Based Terminal Profiles

Profile Name	Characteristics	Suggested Devices
TR10D24	Terminal type 10 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminals? N Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected directly Se t a t 2400 bps
TR10D96	Terminal type 10 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminals? N Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminal Connected directly Set at 9600 bps
TR10E12 TR10U12	Terminal type 10 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminals? N Allow :HELLO logon? Y NLIO devices? N N odevice classes assigned	Supported HP terminals Connected to modem port Set at 1200 bps
TR10AUTO (used for Automatic Configuration)	Terminal type 10 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminals? N Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected directly Set at 9600 bps

Table 7-1 Host-Based Terminal Profiles (Continued)

Profile Name	Characteristics	Suggested Devices
TR10U24	Terminal type 24 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminals? N Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected to modem port Set at 2400 bps
TR24	Terminal type 24 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminals? N Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected to a PAD Set at 9600 bps
TR24PAD	Terminal type 24 Record width of 80 bytes Allow :HELLO logon? Y Reset HP Terminals? N NLIO devices? N PAD test requested? Y Send initial profile? Y X.3 setting requested? Y Data forward parm #3, 4? 10 No device classes assigned	Supported HP terminals Connected to a PAD
UP10D12	Terminal type 10 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminal? N Allow :HELLO logon? Y NLIO devices? N Device class: HPUPSDEV	Supported HP PowerTrust UPSs Connected directly Set at 1200 bps

See Table 7-2 for PC-Based Terminal Profiles.

Table 7-2 PC-Based Terminal Profiles

Profile Name	Characteristics	Suggested Devices
TR10D24	Terminal type 10 Record width of 80 bytes Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected directly

Table 7-2 PC-Based Terminal Profiles (Continued)

Profile Name	Characteristics	Suggested Devices
TR10D96	Terminal type 10 Record width of 80 bytes Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected directly
TR10E12 TR10U12	Terminal type 10 Record width of 80 bytes Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected to modem port
TR24	Terminal type 24 Record width of 80 bytes Allow :HELLO logon? Y NLIO devices? N No device classes assigned	Supported HP terminals Connected to modem port
UP10D12	Terminal type 10 Record width of 80 bytes Parity: none Speed/Parity Sensing? N Reset HP Terminals? N Allow :HELLO logon? N NLIO devices? N Device class: HPUPSDEV	Supported HP PowerTrust UPSs Connected directly Set at 1200 bps

See Table 7-3 for Host-Based Profiles.

Table 7-3 Host-Based Printer Profiles

Profile Name	Characteristics	Suggested Devices
PR18D24	Printer type 18 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP1	Printers with no status checking Connected directly Set at 2400 bps
PR18D96	Printer type 18 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP2	Printers with no status checking Connected directly Set at 9600 bps

Table 7-3 Host-Based Printer Profiles (Continued)

Profile Name	Characteristics	Suggested Devices
PR18U24	Printer type 18 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP3	Printers with no status checking Connected to modem port Set at 2400 bps
PR18U96	Printer type 22 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP4	Printers with no status checking Connected to modem port Set at 9600 bps
PR22D12	Printer type 22 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP5	Supported HP printers with status checking Connected directly Set at 1200 bps
PR22D24	Printer type 22 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP6	Supported HP printers with status checking Connected directly Set at 2400 bps
PR26D24	Printer type 26 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP7	Supported HP printers Connected directly Set at 2400 bps
PR26D96	Printer type 26 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP8	Supported HP printers Connected directly Set at 9600 bps
PR26PAD	Printer type 26 Record width of 132 bytes Spooled No NLIO devices PAD test requested? Y Send initial profile? Y X.3 setting requested? Y Device class: SERLP9	Supported HP printers Connected to a PAD

Table 7-3 Host-Based Printer Profiles (Continued)

Profile Name	Characteristics	Suggested Devices
PR26U24	Printer type 26 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP10	Supported HP printers Connected to a modem port Set at 2400 bps
PR26U96	Printer type 26 Record width of 132 bytes Spooled No NLIO devices Parity: none Device class: SERLP11	Supported HP printers Connected to a modem port Set at 9600 bps

See Table 7-4 PC-Based Printer Profiles.

Table 7-4 PC-Based Printer Profiles

Profile Name	Characteristics	Suggested Devices
PR22D12	Printer type 22 Record width of 132 bytes Spooled No NLIO devices No device classes assigned	Supported HP printers with status checking Connected to modem port
PR22D24	Printer type 22 Record width of 132 bytes Spooled No NLIO devices No device classes assigned	Supported HP printers with status checking Connected to modem port
PR26	Printer type 26 Record width of 132 bytes Spooled No NLIO devices No device classes assigned	Supported HP printers Connected to modem port

8 Additional DTC Configuration

This chapter describes how to configure additional optional configuration parameters that are available from the DTC Configuration screen. These screens (except for Tune DTC) are only available from a host-based configuration. These additional screens allow you to configure the following:

- Configure the DTC to use the address resolution facilities of Domain Name Services (DNS) and IP routing. These services are only used by Switched DTC ports when connecting to an ARPA (TCP/IP) node.
- Tune your DTC by selecting AFCP, TCP and management timers that are appropriate for your DTC and network traffic.
- Configure the parameters that define how the DTC user interface behaves on switched DTC ports.
- Configure the DTC to act as an SNMP (Simple Network Management Protocol) agent.

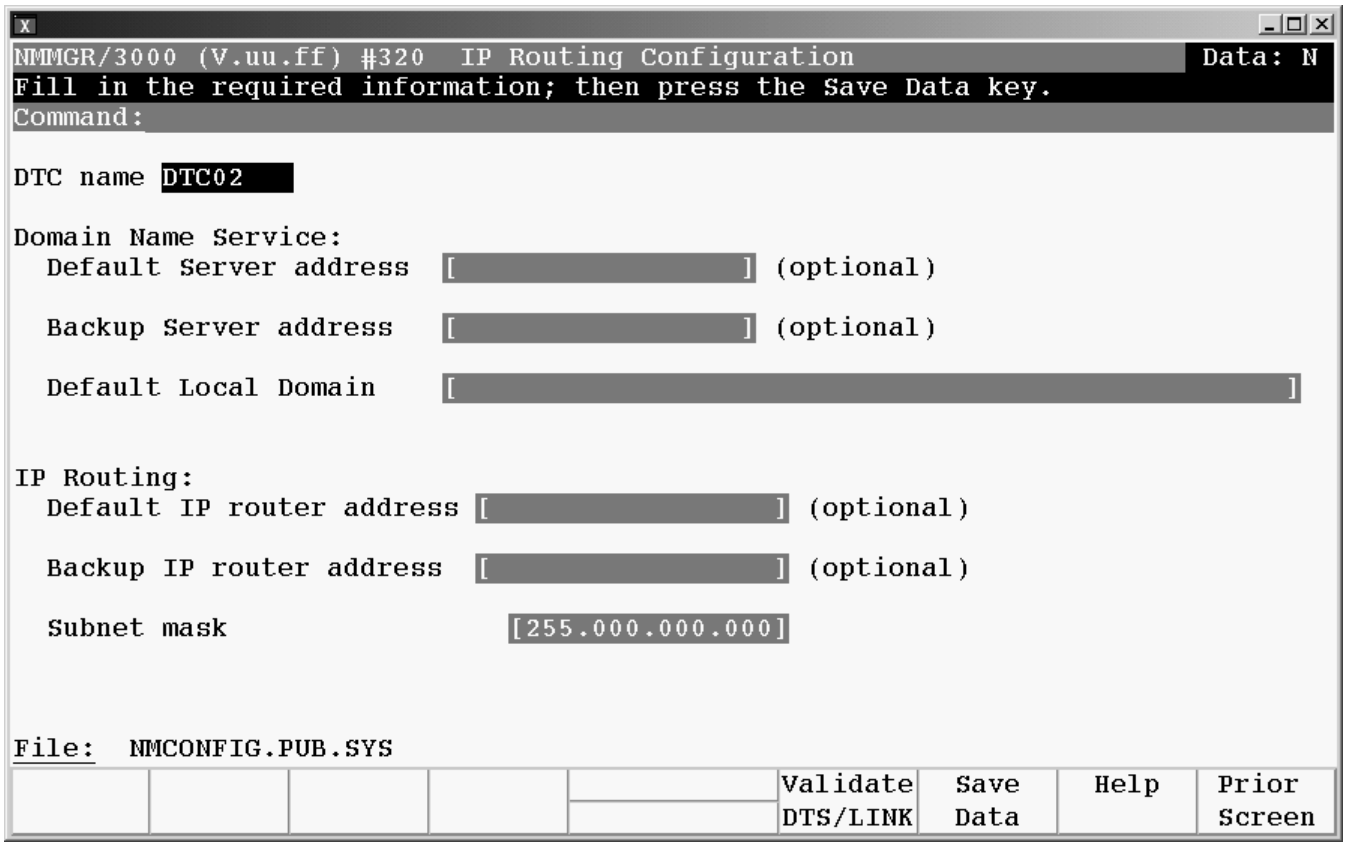
If the configuration is PC-based then refer to the *Using HP OpenView DTC Manager* manual.

These additional screens are accessed from the DTC Configuration screen. When the DTC Configuration screen is accessed, function key **[F5]**, the **[Next Key Labels]** is available. When the **[Next Key Labels]** key is pressed, another set of key labels is displayed that allows these additional screens to be accessed. When the **[Next Key Labels]** is pressed again, the original set of function keys is displayed.

Configuring DNS/IP

Figure 8-1 displays the DNS/IP Routing Configuration screen. You can reach this screen by pressing **[F1]**, the **[DNS/IP Routing]** function key, at the DTC Configuration screen. See the beginning of this chapter to find out how to access the **[DNS/IP Routing]** function key.

Figure 8-1 DNS/IP Routing Configuration Screen



Domain Name Services and IP routing are configured only if you wish to use DNS to resolve system names when switched DTC ports are connecting to ARPA (TCP/IP) nodes or when using **back-to-back** connections. IP routing is only needed when **back-to-back** connections and routers will be used on the network. Do not configure IP routing if no routers will be used.

Follow the steps listed here to enter data for this screen. Refer to the “Fields” subsection for detailed information about each field on the screen.

1. “DTC name” is a display-only field.
2. (Optional) Enter the address of the DNS server on the network. If this field is configured, then default local domain must also be configured.
3. (Optional) Enter the address of the Backup DNS server on the network.
4. (Optional) Enter the ARPA default local domain name. If this field is configured then the Default Server Address must also be configured.
5. (Optional) Complete the “Default IP router address” field.

6. (Optional) Complete the "Backup IP router address" field.
7. Complete the "Subnet mask" field. The default is 255.000.000.000.
8. After you have entered the desired values, press the **[Save Data]** key.
9. Press the **[Prior Screen]** key to return to the DTC Configuration screen. Or, press **[Validate Link/DTS]** to validate your configuration if you have completed configuration for your DTCs.

Fields

DTC name — A display-only field. The configuration applies to the DTC whose name is shown.

Default Server address — Optional field which is the address of a Domain Name Server that will be used to resolve ARPA domain names into an IP address. If this field is configured, then default local domain must also be configured.

Backup Server address — Optional field which is the address of a Domain Name Server that will be used to resolve ARPA domain names if the Default Server is not available.

Default Local Domain — Optional field whose value is concatenated with a name the user provides to generate a fully qualified domain name. If this field is configured then the Default Server Address must also be configured.

This field consists of alphanumeric characters separated by periods. There can be any number of fields, but the total length can not exceed 50 characters. This field is used by the DTC to generate a fully qualified Domain Name when a user connects to a ARPA node from a switched DTC port. Refer to the *DTC Technical Reference* manual for further information on how the DTC uses this field.

NOTE

When choosing a domain name, ensure that the same name is not already in use as an NS nodename.

When a user connected to the DTC user interface types c[onnect] <nodename>, The DTC attempts to generate a fully qualified domain name. If the <nodename> contains at least one period. The DTC assumes it is already a domain name and doesn't use this field. Otherwise it concatenates the <nodename> with the contents of this field. The DTC then sends a request to the Default Server to resolve the domain name into an IP address.

Default IP router address — Optional field which specifies the IP address of the default router. The router routes outbound packets for destinations outside the local subnet. The address of the IP router is used for **back-to-back** connections or extended switching configurations.

Backup IP router address — Optional field which specifies the IP address of the backup router. The backup router is used if the default router is not available.

Subnet mask — Subnet masks are used by IP to check if the packets should be sent to the destination without routing, or if it should be routed to a destination network different from the current network or subnet. The first field must be 255. If no subnetting is required, use the default 255.000.000.000.

Subnet masks specify how many bits of the IP address to reserve for subdividing the network into subnets. The initial calculation is done in binary, with bits reserved for the network and subnet set to "1"s, and the bits reserved for the host set to "0"s. The decimal value is then displayed.

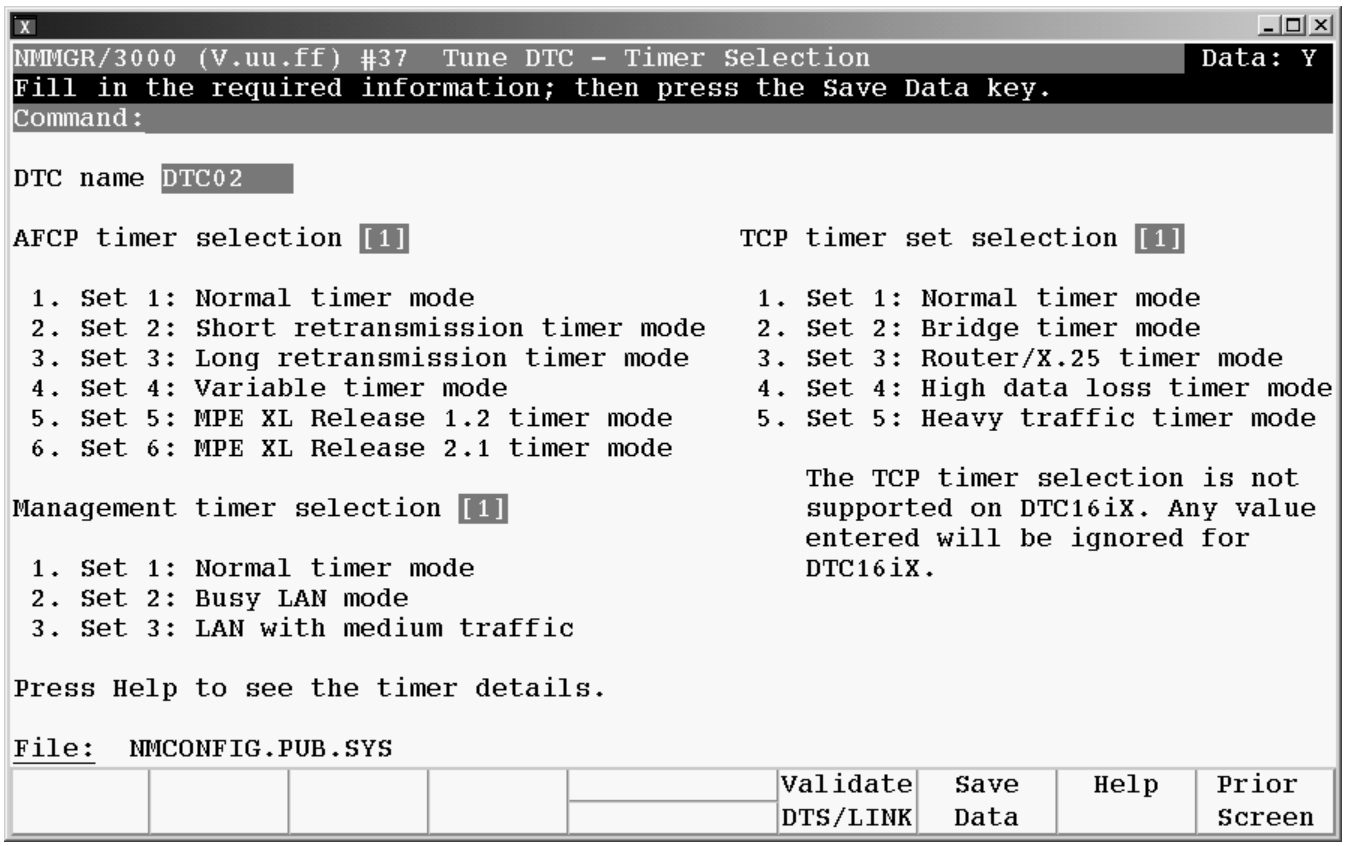
Tuning Your DTC

This section describes the steps for tuning your DTC by selecting the AFCP, TCP and management timers that are appropriate for your DTC and network traffic. The timer selection is made by choosing a set from a predefined set of timer values. The TCP timers are only used for **back-to-back** connections from switched DTC ports.

Figure 8-2 displays the Tune DTC — Timer Configuration screen. This screen is reached by pressing **[F2]**, the **[Tune DTC]** function key at the DTC Configuration screen.

The Tune DTC – Timer Selection screen for host-based management is shown below. The screen for PC-based management contains only the AFCP timer selection. For PC-based management the TCP and management timers are configured on the DTC OpenView workstation.

Figure 8-2 Tune DTC — Timer Selection Screen



1. The `DTC name` field is a display field and shows the name of the DTC you are currently configuring.
2. Select one of six predefined sets of values for AFCP timers. The default is selection `1`.
3. Select one of five predefined sets of TCP timer values. The default i s`1`.
4. Select one of two predefined sets of values for management timer. The default is selection `1`. The management protocol timers determine different transmission algorithms.

5. After you have selected the desired timer values, press the **[Save Data]** key.
6. Press the **[Prior Screen]** key to return to the DTC Configuration screen, or press **[Validate DTS/LINK]** to validate your configuration if you have completed configuration for your DTCs.

NOTE

If you changed your network configuration, validate the configuration and cross-validate with SYSGEN before exiting NMMGR. Refer to Chapter 5, "Configuring Serial Devices (for Host-Based Management)," for information on these steps.

For host-based management, after you invoke dynamic configuration, both host and DTC values will take effect once you logoff any sessions or stop and restart the spooler associated with changed devices and download the DTC. For PC-based management, only the host values will take effect because the DTCs are managed by the OpenView DTC Manager on the PC. You must use the OpenView DTC Manager to configure and download the DTC timer values. In this case, you must ensure consistency of timer selections between the host and the DTC during configuration in NMMGR and OpenView DTC Manager.

Fields

`AFCP Timer Set 1` Normal timer mode. This selection is appropriate for most users operating in a normal LAN environment.

`AFCP Timer Set 2` Short retransmission timer mode. This is appropriate in a LAN environment where there is a high number (greater than 1%) of packets lost on the LAN. The values are adapted to provide shorter retransmission values and higher number of retries.

`AFCP Timer Set 3` Long retransmission timer mode. This is appropriate in a LAN environment where the LAN is very reliable. The values are adapted to reduce LAN traffic and host driver overhead.

`AFCP Timer Set 4` Variable retransmission timer mode. This is appropriate in exceptional cases where there is a very high percentage of lost packets on the LAN. The values are adapted to prevent saturation of the LAN.

`AFCP Timer Set 5` MPE XL release 1.2 timer mode. This is appropriate for use with HP e3000 MPE XL FOS release 1.2.

`AFCP Timer Set 6` MPE XL release 2.1 timer mode. This is appropriate for use with HP e3000 MPE XL FOS release 2.1.

`TCP Timer Set 1` Normal timer mode. For local transaction processing applications and Telnet connections on local LAN.

`TCP Timer Set 2` Bridge timer mode. Same mode as Set `1` but with bridges. Suitable for LANs with moderate delays.

`TCP Timer Set 3` Router/X.25 timer mode. Same mode as Set `1` but with routers or X.25. Suitable for LANs with longer delays.

`TCP Timer Set 4` High data loss timer mode. Suitable for networks with high data losses.

`TCP Timer Set5` Heavy traffic timer mode. Suitable for extended switching applications on local LAN or with bridges where there is heavy traffic.

`Management Timer Set 1` Normal traffic mode. This is appropriate in a LAN environment with normal traffic

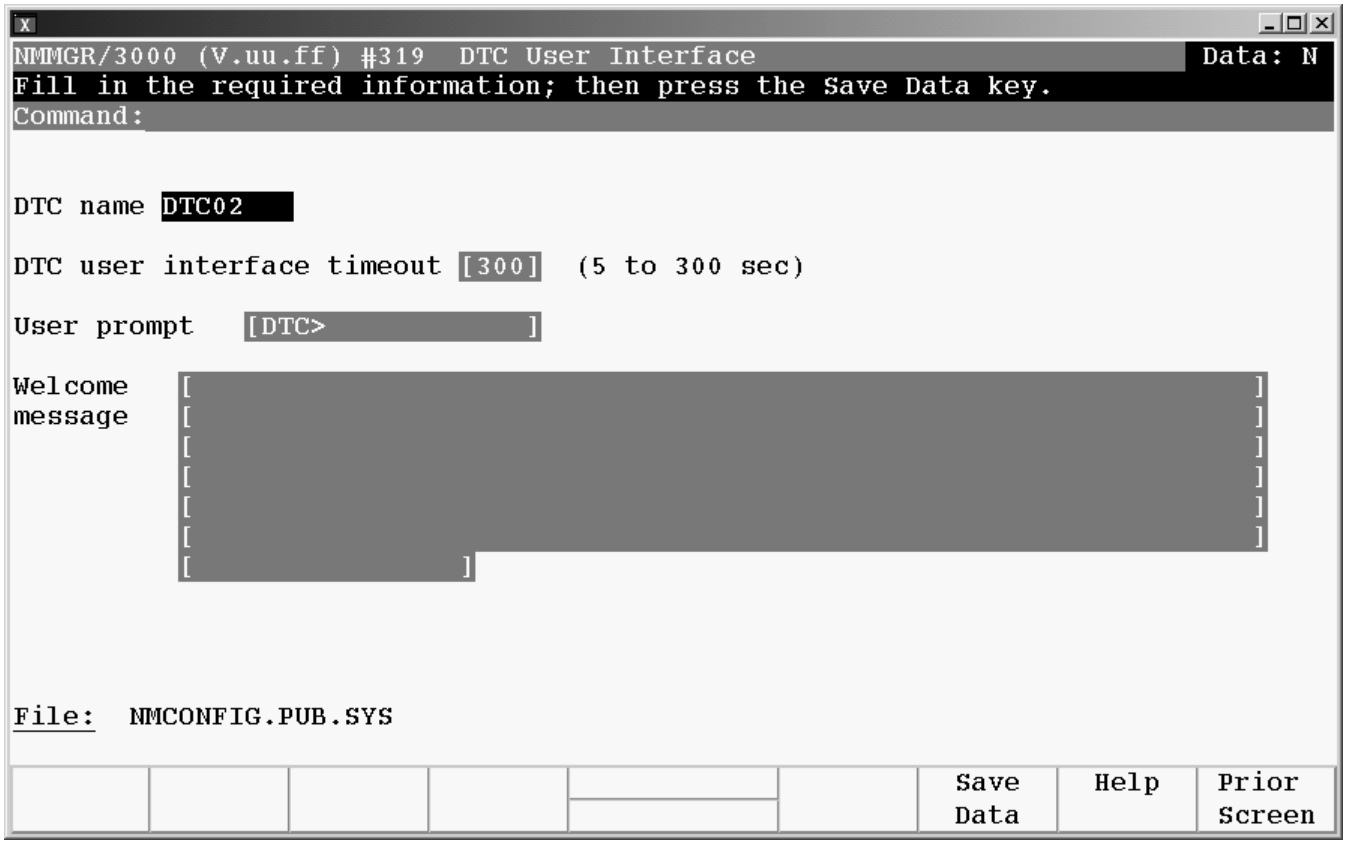
`Management Timer Set 2` Busy LAN mode. This is appropriate in a LAN environment with busy traffic.

Configuring the DTC User Interface

When a DTC port is assigned a profile that has the field “Enable Switching” set to `Y` then the user will enter the DTC user interface when **[RETURN]** is first pressed. While at the DTC user interface, the user can enter several commands. The DTC user interface screen is used to configure parameters that determine how this user interface behaves. See Appendix C, “DTC User Interface.”

Figure 8-3 displays the DTC User Interface screen. This screen is reached by pressing **[F3]**, the **[DTC U I]** function key at the DTC Configuration screen. See the beginning of this chapter to find how to access the **[DTC U I]** function key.

Figure 8-3 DTC User Interface Screen



Follow the steps listed here to enter data for this screen. Refer to “Fields” subsection following these steps for detailed information about each field on the screen.

1. `"DTC name"` is a display-only field.
2. Enter the desired DTC user interface timeout period (in seconds) in the `"DTC user interface timeout"` field. The default is 300 seconds.
3. Enter the desired prompt in the `"User prompt"` field. The default is `DTC>`.
4. (Optional) Complete the `"Welcome message"` field.
5. After you have completed the necessary fields, press the **[Save Data]** key.

6. Press the **[Prior Screen]** key to return to the Tune DTC – Timer Selection screen.

Fields

`DTC name` A display-only field. The configuration applies to the DTC whose name is shown.

`DTC user interface timeout` Specifies the inactivity time before the terminal connection to the DTC user interface is automatically disconnected. This timeout applies only to those ports that have the `"DTC user interface timeout?"` field enabled on the Terminal Switching Configuration screen (Figure 7-3). The timer is inactive during a terminal connection to a system via the DTC and reactivates after you log off and return to the DTC user interface. Valid values range from 5 to 300 seconds. The default is 300 seconds.

`User prompt` Sets the prompt displayed at the DTC user interface. Only terminal ports with switching capability will see this prompt. Terminal ports without switching capability are connected directly to the host system and bypass the DTC user interface. The prompt is one line long, a maximum of 16 characters, and is case-sensitive. The default is `DTC>`.

`Welcome message` Optional field which specifies the message displayed when the DTC user interface is first opened or when a `STATUS` command is issued at the DTC user interface. Text entered can be a maximum of 400 characters and is case-sensitive. Control characters can be entered as `^char`. A line break in the message can be added by embedding the control character sequence `"^j^m"` in the text.

Configuring SNMP

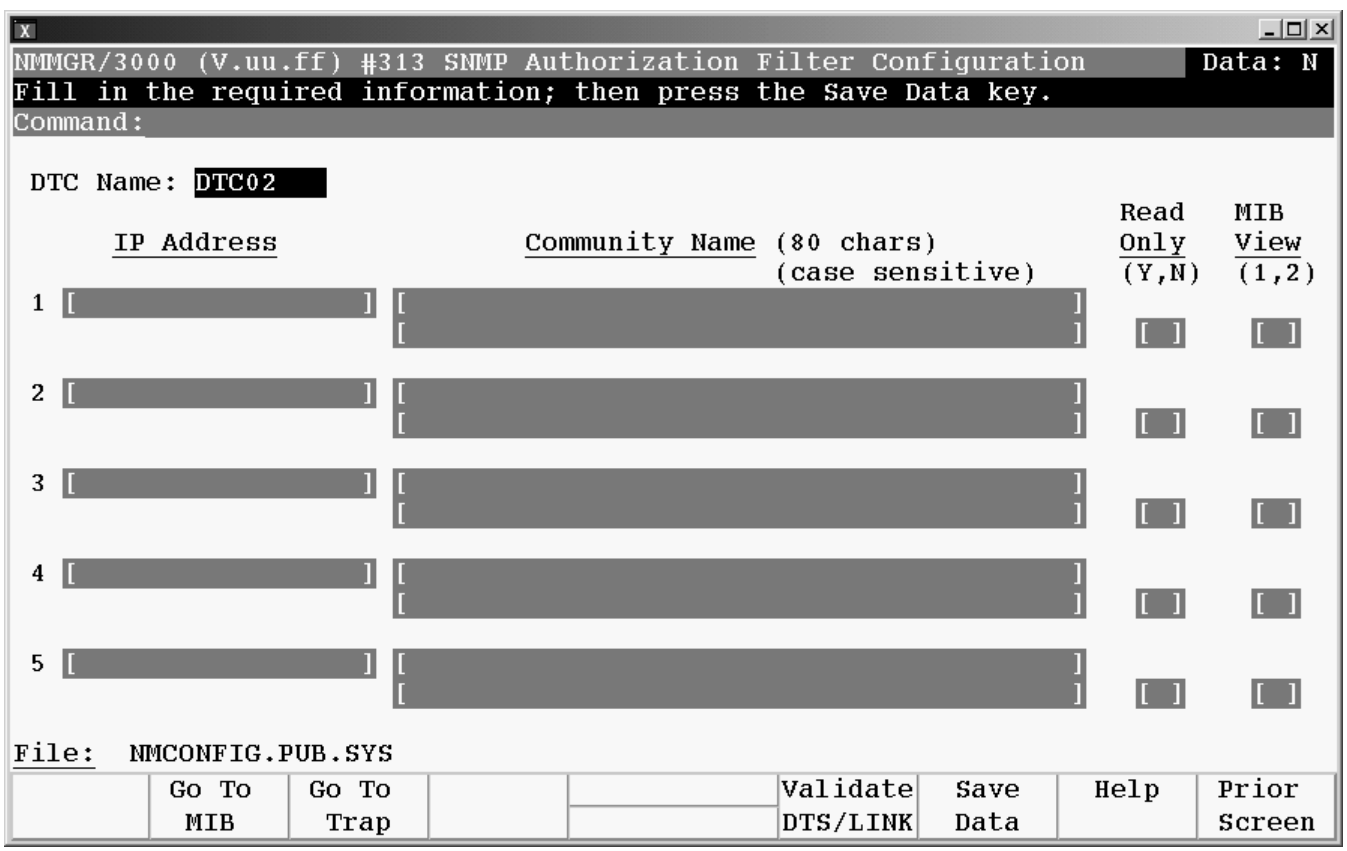
This section describes how to configure a host-managed DTC to act as an SNMP (Simple Network Management Protocol) agent. For PC-based DTC management, refer to the *Using HP OpenView DTC Manager* manual.

Configuring SNMP Authorization Filters

To configure SNMP authorization filters, access the SNMP Authorization Filter Configuration screen within NMMGR. This screen can be accessed by pressing **[F4]**, the **[Config SNMP]** function key at the DTC Configuration screen. See the beginning of this chapter to find out how to access the **[Config SNMP]** function key. (Refer to Figure 5-5 for an example of a DTC Configuration screen for a D TC72MX.) The screen can also be accessed by pressing the **[Go To Filter]** key at the SNMP MIB Configuration screen or the SNMP Trap Destination Configuration screen.

The SNMP Authorization Filter Configuration screen for host-based management is shown below, in Figure 8-4. You can configure authorization filters for up to five SNMP managers.

Figure 8-4 SNMP Authorization Filter Screen



The "DTC Name" field is a read-only field which indicates the SNMP configuration is for that specific DTC.

1. Enter the IP address of the SNMP manager in the "IP Address" field.

   The IP address can be any valid individual IP address, or enter *.*.*.* or @.@.@.@ to indicate that any IP address is allowed access.

2. Enter the name of the SNMP community to which the DTC belongs in the "Community Name" field.

   The community name is a maximum of 80 alphanumeric characters and is case-sensitive.

3. The "Read Only" field defines the access mode to MIB objects. Enter a Y to restrict the SNMP manager to read-only access; enter an N if MIB objects can be modified by the SNMP manager.

   If two or more managers are configured with the same community name, the "Read Only" field must be the same for each manager.

4. The "MIB View" field defines which SNMP parameters can be accessed by the SNMP manager. Enter 1 for DTC MIB or 2 for MIB-II.

   If two or more managers are configured with the same community name, the "MIB View" field must be the same for each manager.

5. After you have configured the authorization filters, press the **[Save Data]** function key.

   Note: Partially-configured filters are not acceptable.

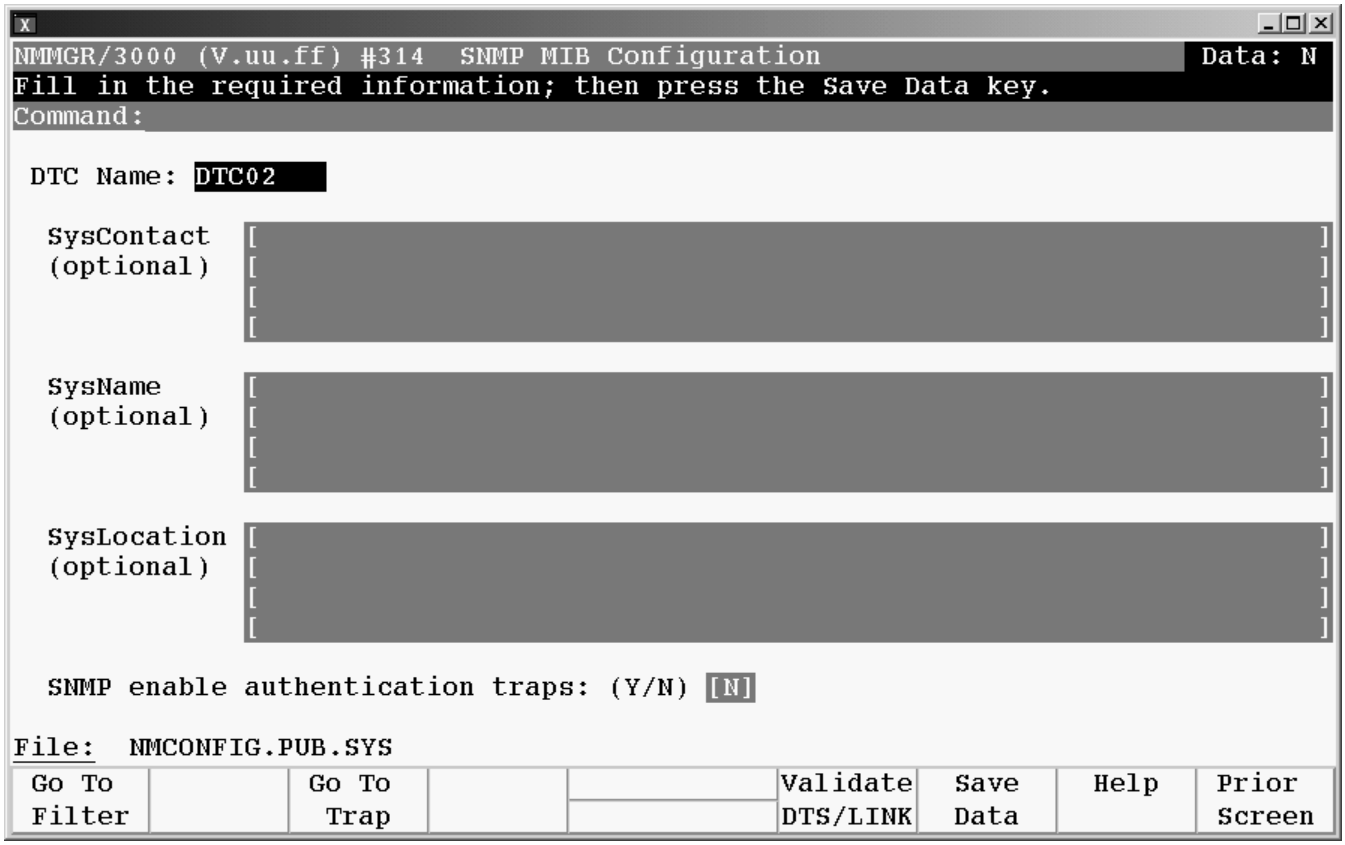
6. Press the **[Go To MIB]** key to configure SNMP MIB parameters or the **[Go To Trap]** key to configure trap destinations. If you have completed configuration of MIB parameters and trap destinations, press the **[Prior Screen]** key to return to the DTC Configuration screen, or press **[Validate DTS/LINK]** to validate your configuration if you have completed configuration for your DTCs.

Configuring SNMP MIB Parameters

To configure SNMP MIB parameters and enable/disable authentication traps, access the SNMP MIB Configuration screen. This screen can be accessed by pressing the **[Go To MIB]** key at the SNMP Authorization Filter Configuration screen or the SNMP Trap Destination Configuration screen.

The SNMP MIB Configuration screen for host-based management is shown below, in Figure 8-5.

Figure 8-5 SNMP MIB Configuration Screen



The "DTC Name" field is a read-only field which indicates the SNMP configuration is for that specific DTC.

1. The "SysContact", "SysName", and "SysLocation" fields provide optional information about the DTC such as contact person, the DTC's fully-qualified name and physical location.

   Each field allows text up to 256 alphanumeric characters and is case sensitive.

2. The "Enable authentication traps" field indicates whether the SNMP agent should generate authentication failure traps. Enter Y to enable trap generation (see the section on "Configuring Trap Destinations"); enter N to disable it.

3. After you have configured the MIB parameters, press the **[Save Data]** function key.

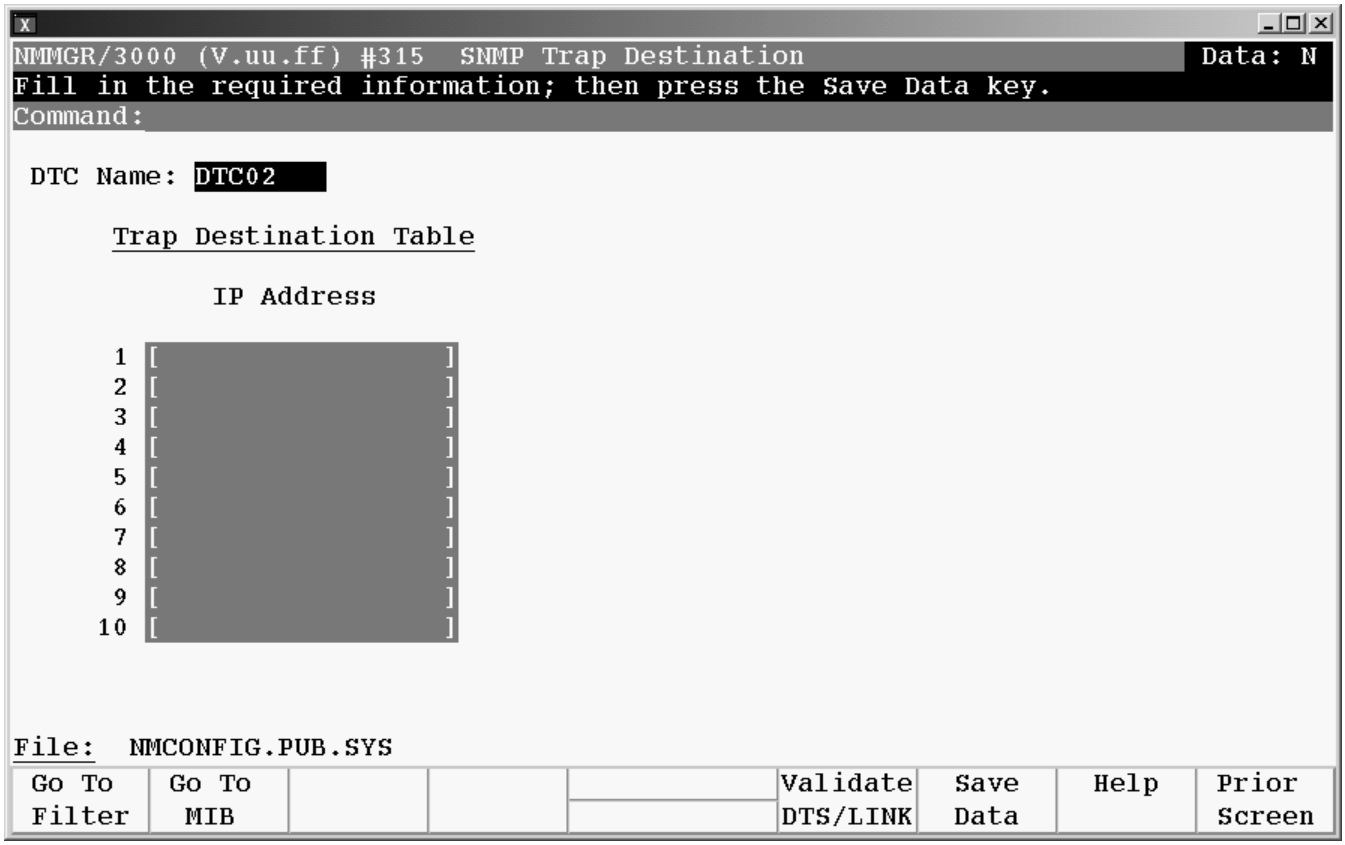
4. Press the **[Go To Trap]** key to configure trap destinations or the **[Go To Filter]** key to configure authorization filters. Or, if you have completed configuration for your DTCs, press **[Validate DTS/LINK]** to validate your configuration.

Configuring Trap Destinations

To specify the SNMP managers that will receive any SNMP error messages generated by the DTC, access the SNMP Trap. Destination Configuration screen. This screen can be accessed by pressing the **[Go To Trap]** key at the SNMP MIB Configuration screen or SNMP Authorization Filter Configuration screen.

The SNMP Trap Destination Configuration screen for host-based management is shown in Figure 8-6. You can configure up to ten IP addresses for trap destinations.

Figure 8-6 SNMP Trap Destination Screen



The "DTC Name" field is a read-only field which indicates the SNMP configuration is for that specific DTC.

1. Enter the IP address of the SNMP manager in the "IP Address" field.

   The IP address must be a valid individual IP address; the global definition of IP addresses, "*.*.*.*" or "@.@.@.@", is not valid for this screen.

   Note: Only DTC MIBs can send error trap information. Make sure that all IP addresses entered have MIB View = "1" (see SNMP Authorization Filter Configuration screen).

2. After you have configured the trap destinations, press the **[Save Data]** function key.

3. Press the **[Go to Filter]** key to configure authorization filters or the **[Go To MIB]** key to configure MIB parameters. Or, if you have completed configuration for your DTCs, press **[Validate DTS/LINK]** to validate your configuration.

9 Describing Asynchronous Devices

This chapter discusses the following concepts:

- How the HP e3000 Series 900 initially recognizes devices and how it communicates with them from that time on.
- How devices are owned, who can own them, and the restrictions that apply when a device is owned.
- How the MPE/iX file system perceives devices and its response to some of their characteristics.
- How different device operation modes set the functionality of devices.
- How the connection type sets certain device characteristics.

This chapter also discusses processes that are internal to the Datacommunications and Terminal Subsystem (DTS)

- How to control the flow of data.
- How to control terminals.
- How to control printers.

How MPE/iX Identifies Devices

Asynchronous devices (terminals, printers, plotters, etc.) are located and communicated with in two ways:

- Through the device's **logical device (ldev) number**.
- Through the **physical path** from the HP e3000 to the asynchronous device.

Logical Device Numbers

The ldev number is a value that the MPE/iX operating system uses to recognize attached devices. Terminals attached to Datacommunications and Terminal Controllers (DTCs), managed by an HP e3000 host, are configured with **nailed** ldev numbers. Terminals attached to DTCs, managed by an OpenView Windows Workstation, can be configured to have either **nailed** ldev numbers or **non-nailed** ldev numbers on the host systems to which they have access. Logical device numbers are associated with nailed devices during configuration.

A nailed device has a permanently assigned ldev number. A non-nailed device has an ldev number associated with it after a session is requested.

A terminal connected through a DTC to multiple HP e3000 computers can have nailed connections on more than one host system. Alternatively, a terminal can have a nailed connection on one host system and a non-nailed connection on another, or it can be configured to have non-nailed connections on all of the systems to which it has access.

Non-Nailed Devices

A non-nailed device is able to establish a connection to the HP e3000 computer but has no permanently assigned ldev number in the NMMGR configuration file. The user of a terminal connected as a non-nailed device can establish a session provided a connection is available and the host configuration specifies a device profile matching the characteristics of the device requesting the connection.

When the user logs onto the host, an ldev number is assigned from a pool of available ldev numbers. When the connection is ended (the user logs off), the ldev number is returned to the pool of ldev numbers and becomes available for use by a different device. It is possible to configure non-nailed devices only when PC-based management is used.

Nailed Devices

A nailed device is permanently assigned an ldev number through the NMMGR configuration of the HP e3000 computer. Any time a connection exists between a computer and one of its nailed devices, the same ldev number will belong to that device. Only nailed devices can be accessed programmatically. All printers must be nailed, as must any device that will be accessed programmatically. Devices with permanently assigned ldev numbers keep the same ldev number unless that number is modified through NMMGR and the host is restarted. All devices are nailed when host-based network management is used.

NOTE If two or more systems have access to the same nailed device, contention for that device might exist. Only one system can access a nailed device at any time. For example, if system A accesses the nailed device, system B will not be able to access the nailed device at the same time. The nailed device is being used by system A and is probably not broken, even though it can't be reached.

An ldev number can be assigned to any asynchronous device, including the following:

- The system console
- Printers, Terminals, and Plotters
- Other serial devices

System Console

The system console is always connected through the access port on the HP 3000 Series 900 computer. The system console's ldev number is assigned during system initialization and remains constant unless it is modified through the SYSGEN utility and the host is restarted.

Printer

Printers are assigned ldev numbers during configuration making them nailed devices. Each printer keeps the same ldev number unless that number is modified through NMMGR and the host is restarted.

Terminals

Usually, many terminals are connected to a DTC. Some terminals can have permanent ldev numbers assigned during NMMGR configuration.

Other terminals might not have permanent ldev numbers assigned (non-nailed). Instead, these terminals will use an ldev number from a pool of available ldev numbers. Non-nailed devices can be configured if PC-based network management is used. Refer to "Nailed Devices" and "Non-Nailed Devices" earlier in this chapter for more information.

Terminal users should know the physical device address for their terminal. If a terminal is having problems, the physical device address is needed to troubleshoot the terminal. The physical device address consists of identifiers for the DTC, the interface card, and the port to which the device is connected. Refer to "Device Physical Path" later in this chapter for more information.

Plotters

Sometimes plotters are connected to a DTC. Plotters, like printers, always have assigned ldev numbers (always a nailed device).

UPSs

HP PowerTrust UPSs can be connected to DTCs as nailed devices. Only the MPE/iX operating system accesses these devices.

Other Non-Supported Devices

Devices that conform to Hewlett-Packard's asynchronous protocol and are capable of being physically connected to the DTC can be controlled through Asynchronous Serial Communications (ASC). This includes test instruments, data collection devices, etc. To determine if a device can be non-nailed or if it must be nailed, refer to "Nailed Device" and "Non-Nailed Device" in this chapter. *Contact your Hewlett-Packard support representative for more information on non-supported devices. Take extreme care when connecting non-supported devices*.

Device Physical Path

Each asynchronous device (excluding the system console, PADs, and Telnet/iX devices) is connected to a port on an interface card within a DTC; this is the device's physical path. The address for the physical path, or the physical device address, consists of identifiers for the DTC, the interface card, and the port to which the device is connected. Note that the physical device address can be used to troubleshoot a device and its connection.

How Devices Are Owned and Why

Devices (terminals, printers, plotters, etc.) are subject to ownership. If a device is owned by a process, then use of the device by other processes is restricted. For instance, when a session owns a terminal, only the process which initiated the session or its child process, can access the terminal.

To determine which process owns a device, use the MPE/iX `SHOWDEV` command. Asynchronous devices will be listed as one of the following:

- Available. The device is not owned. Any process that wants to claim ownership of the device can do so. For terminals, this means that no one is logged on to the device or no other process has programmatically opened the terminal. For printers, it means that the device is not spooled, nor has it been opened by a user program.
- Unavailable. The device is owned. The owner—a job, a session, or the system—is also listed.
- Spooled. The device is owned by the spooler while data is being transferred between a spoolfile (on disk) and the device. Other processes can access the device through the spooler, but only the spooler process owns the device. Printers and plotters are the only asynchronous devices that are spooled.

NOTE UPS devices are always owned by the system.

How the File System Manages Information

The file system is the part of the MPE/iX operating system that manages information being stored or transferred. It handles various input/output operations, such as passing information to and from user processes. All input and output operations are done through files. Files can be kept in any storage medium and accessed by any input/output peripheral device.

Two basic types of files exist:

- Disk files. These are files residing on disk, immediately accessible to the system and potentially shareable by several sessions or jobs at the same time.
- Device files. These are files currently being input from or output to any peripheral device *except* a disk.

How Operation Modes Set Functionality

Six device operation modes can be used. Each has different capabilities and is intended for a specific purpose. The six are as follows:

- System console
- Session-accepting devices
- Programmatic devices
- Spooled devices
- Slaved devices
- Uninterruptible Power Supply (UPS) devices on the DTC.

System Console

On CIO systems, the system console is the only device that is not connected to the computer through a DTC. The computer is aware of its existence from system initialization. It is connected to a special interface card in the cabinet called the access port.

Although the system console is session-accepting, it has the following added functionality:

- Receipt of console messages. The system console is the message center for the computer. Messages can be informational, such as notifying an operator when users log on or off the host. Messages can also alert an operator to take an action, such as mounting a magnetic tape on the tape drive so that its data can be accessed by a user program.
- Execution of console commands requiring the console attention character. These commands are called **[CTRL]-A** commands. Using **[CTRL]-A**, an operator can interrupt an action on the system console to enter commands that will abort one or all users, answer console requests, or shutdown the computer.
- Execution of other console commands. These commands are used for system startup and shut down procedures.

Because the system console serves a specific purpose, the following functionality is not provided:

- System console operation at 19200 bps. Supported speeds are 300, 1200, 2400, 4800, and 9600 bps.
- User block mode applications. Only block mode applications that use VPLUS can run on the system console. NMMGR *is* supported on the system console.

  Block mode applications do not prevent the system console from printing received messages. Such messages can cause data on block mode screens to be overwritten or lost. Because of this, block mode applications should not be run on the console.

Some console functionality can be given to the logical console. The system console can "pass" console functionality (except **[CTRL]-A**) to any other user; a user with system manager capability can "grab" the console by issuing the `CONSOLE` command.

The logical console can receive messages sent to the system console, but it cannot execute console commands that require the console attention character (**[CTRL]-A**). When a logical console is used, the system console can still execute **[CTRL]-A** commands. Refer to "Session-Accepting Devices" later in this chapter for more information on the logical console.

The logical console cannot be assigned to:

- Devices configured with switching enabled.
- Devices connected through a PAD.
- Devices connected through Telnet/iX.

HP-PB Console Support

HP Precision Bus (HP-PB) provides console support for some models of the H P3000 Series 900 family. It is supported by the SCSI/Console LAN Card. This card provides two serial ports for remote and session activity. HP e3000 Series 9X8 systems have a third port available for a UPS device connection.

The first two serial ports only support the 239X and 700/9X terminals and emulators with Terminal Type 10. They do not support the following:

- Set XOFF timer
- Set block mode alert character
- Set Flow Control characters (XON/XOFF)
- Set form feed character
- Enable or disable form feed
- Set termtype file
- FDEVICECONTROL intrinsics

In addition, the console port does not support:

- Set parity
- Set speed
- Binary mode

The first serial port provides a connection to the local console. The port is always fixed as LDEV 20. For backwards compatibility with the CIO console, speed and parity on the console **cannot** be changed. The speed is set at 9600 baud and the parity is set at none.

The second serial port is capable of connecting to the console port path and connecting directly to the system. Although the second port can connect directly to the system and be used as a user port, it should be reserved for remote support access. It is configured as LDEV 21 by default. Baud line rate is set at 9600 and parity is set at none.

NOTE The second serial port can be set as a remote console or a session port but never both. When the user port is configured as a modem port for remote support, the session is aborted after a powerfail, since modem connections do not recover after a powerfail.

The third port, on HP e3000 Series 9X8 systems only, can support an H PPowerTrust UPS connection. Refer to Chapter 5, "Configuring Serial Devices (for Host-Based Management)," and Chapter 6, "Configuring Serial Devices (for PC-Based

Management),” for details on how to configure this connection for host-based and PC-based management environments, respectively. These devices are able to provide status information about the condition of the UPS to the system through this port. The system will respond and provide console messages to the operator regarding the status of the UPS. This port cannot be used for session access because the port is not configured as session-accepting. This port is configured in SYSGEN as ldev 22 by default; the baud rate is set at 1200 and the parity is set at none. For more information on the UPS, refer to *Performing System Manager Tasks*.

Session-Accepting Devices

Session-accepting devices are opened with the HELLO command, and then a session is initiated. The session remains active until the user logs off by typing the BYE command, or initiates a different session by typing the HELLO command.

Session-accepting devices are terminals or PCs running in terminal emulation mode. During a session, the terminal is used for interactive (conversational) communication with the computer.

The terminal user can do any of the following:

- Enter MPE/iX commands.
- Run programs.
- Enter data.
- Receive output from the computer.
- Place the terminal under partial control of a program running on the computer.
- Communicate with other terminal users and with the system operator.
- Transfer data and control information between the computer and a slaved device connected to the terminal.
- Change the line speed of the terminal.
- Terminate the session.

Also, session-accepting devices that are not connected through a PAD or Telnet/iX and are not configured for switching can temporarily obtain partial system console functionality by using the CONSOLE command. A terminal that is the logical console can receive console messages, execute commands that do not require **[CTRL]-A**, and return console control to the system console (through the CONSOLE command).

Programmatic Devices

Programmatic devices run under the control of a program on the computer. The program accesses the device through the file system by treating the device as a file (device file). The file system passes information from the controlling program to the software which communicates directly with the device.

A programmatic device is captive of the program because access to the device is through the program only. For instance, MPE/iX commands cannot be executed from a terminal under the control of a program unless the controlling program initiates the command. A programmatic device can be used for input, output, or both, depending on the device and how the controlling program opened it.

Spooled Devices

MPE/iX is equipped with a spooling facility to assist in the management of nonshareable devices. When a spooler process controls a nonshareable device, the device appears to be shared among several users, when in fact, it can process only one file at a time. This is done by temporarily storing data on disk instead of sending it directly to the device. The disk essentially becomes a staging area, while the spooler manages the selection of output spool files destined for the spooled device.

A user program writing data to a spooled output device actually writes records to a disk file instead of to the device itself. When the output device is available, the spooler process selects a file and begins to send the data in the file to the device.

Slaved Devices

If two devices share the same port in the DTC (one device is connected to the port and the other device is connected by an additional cable to the first device), only one device is recognized by the DTS software. The device that is recognized is referred to as the **master device**, while the other device is called a **slave device**. The master might or might not be the device that is physically connected to the port.

NOTE The existence of slaves is not known to the DTS software or the MPE/iX operating system. Therefore, slaved devices are not supported.

A wide variety of devices can be connected as slaves, such as terminals, printers, card readers, flexible-disk drives, cartridge tape units, and plotters. Slaves can be connected in the following ways:

- As pass-through slaves (also called eavesdrop).
- As remote slaves (also called end-of-the-line).

UPS Devices on the DTC

Ports on the DTC can be configured to support UPS connections. When a DTC port is configured and connected to a UPS, the port is able to receive status messages about the condition of the UPS. These messages are passed on to the operating system and displayed as console messages. When a DTC port is configured for a UPS connection, the port cannot be used as a session-accepting device.

Configuration of DTC ports for UPS connections is similar to port configuration for terminal connections. To configure a port for a UPS connection, a profile is needed which is identical to `TR10D96` except for the following parameters:

- Line speed is set to `1200`.
- `Allow :HELLO logon?` field is set to `N`.
- First device class field is `HPUPSDEV`.

The sample configuration file, `NMSAMP1.PUB.SYS`, contains the profile `UP10D12` which is configured with the above parameters. Enter this profile in the `Profile Name` field on the Async Card Configuration Screen for the DTC port corresponding to the UPS connection.

For DTCs under PC-based management, you must configure the correct baud rate using the OpenView DTC Manager.

For more information on the UPS, refer to *Performing System Manager Tasks*.

How Connections Set Characteristics

Asynchronous devices can be connected to the DTC in the following ways:

- Directly connected to the DTC.
- Remotely connected through a modem, a mux, a switch, a PBX, a PAD, or Telnet/iX.

Direct Connections

A direct connection is one in which a device's data communications cable is plugged into a port without being connected to any other communications equipment. Two standards are available for direct connections to HP e3000 Series 900 systems, RS-232-C and RS-422.

RS-232-C direct connections need only consist of the wire the device uses to send data, the one it uses to receive data, and a ground wire. If RS-232-C cables are used, each device can be up to 50 feet (15m) away from the DTC.

Cables for RS-422 use two wires for each send and receive, plus a ground wire. These cables are less susceptible to noise and can be used at longer distances from the DTC than devices using RS-232-C cables. If RS-422 cables are used, each device can be up to 4000 feet (1200m) away from the DTC.

The system console is normally located next to the computer. The cable that attaches the system console to the access port uses the RS-232-C specification.

The speeds supported for direct connections are 300, 1200, 2400, 4800, 9600, and 19200 bps. (Direct connected devices on DTC 16iX/16MX and DTC 72MX also support 38400 bps.) Note that the system console does not support 19200 or 38400 bps.

Modem Connections

Modem connections are more complex because more equipment is used. The RS-232-C standard is used for modem connections, with more of the circuits defined by the standard implemented to support the requirements of the modem connection. A device's RS-232-C data communications cable is connected to a modem (or the device has an integral modem); the modem sends data through telephone lines to another modem. The second modem is connected through a RS-232-C cable to a port on the DTC. Both of the RS-232-C cables must adhere to a 50 foot (15m) length restriction. However, no restrictions are placed on the distance between modems.

Only full-duplex asynchronous modems are supported for use with HP 3000 Series 900 computers. Twenty-five pin RS-232-C cables must be used on each end of a modem connection because, in addition to send, receive, and ground signals, control signals are also required to control the modems.

Both terminals and serial printers are supported over modems. However, because data is traveling for long distances through telephone lines of varying quality, parity must be used to detect transmission errors. This means that only printers that support printer-type 21 should be used over modems, since parity cannot be used with other printer type files.

Theoretically, remote devices are supported at the same speeds as devices connected directly. However, most full duplex asynchronous modems support only a limited set of speeds. Common modem speeds are 300, 1200, and 2400 bps. Note that the device, the modems, and the data communications configuration must be set to the same transmission speed for the connection to work.

How to Access Multisessions

Multisession is the ability to have a device on a DTC simultaneously associated with multiple sessions, jobs, or processes on one or more hosts.

Each port can support up to 5 connections and connections can only be active one at a time; the other connections are in a “hold” state. The connection establishment method (Session or Programmatic, that is, FOPEN) for multiple connections associated with a particular port is determined by the first established connection. If this is a session then the other multisession connections to that port must be session. Similarly, if the first connection is established through the use of a programmatic process, the other multisession connections must be established through the use of a programmatic process.

Multisession is only available in a PC-based network environment (that is, when the DTCs are managed by an OpenView Windows Workstation on the LAN).

Multisession is supported on switched ports only and some restrictions apply to nailed devices. See the list below:

- **Switched Ports**: Multisession is supported only for switched ports.
- **Non Switched Ports**: The DTC User Interface is not accessible to non switched ports. For Multisession to establish another connection it needs the DTC User Interface.
- **Nailed LDEV**: If a switched port is configured as a nailed LDEV on a system, then multiple sessions from that port to that system are not possible because the port can have only the one connection associated with the assigned LDEV on the host system. Although multiple sessions to that particular host are not possible, it is possible to establish multiple sessions from that switched port to other systems.
- **Non Nailed LDEV**: If a switched port is configured as a non nailed LDEV on a system, then multiple sessions from that port to that system are supported in addition to multiple sessions to multiple systems.

How to Use Duplex Printing

Duplex printing is the ability to print on both the front and back sides of the printer paper. The Laserjet 3D and the Laserjet 3SI are the two PCL (Printer Control Language) laser printers that support duplex printing. These two printers also support simplex (one-sided) printing.

To use duplex printing on these printers, duplex printing must be configured and enabled. Configuration consists of modifying an existing printer type file so that Duplex Printer Mode is enabled. This is done using the Workstation Configurator (`TTUTIL.PUB.SYS`). This printer type file is then assigned to the printer in NMMGR. This allows the Terminal I/O driver to send the Front-of-Page (FOP) escape sequence to the printer when appropriate.

In the Workstation Configurator, the field before the question `Does the printer support duplex printing (Y, N)`, type `Y` to indicate that a printer may be used as a duplex printer. To save this modification, press **[ENTER]** and then the `SAVE DATA` function key.

Once configuration is complete the printer must be enabled for duplex printing. Duplex printing can be enabled and disabled by sending escape sequences to the printer. This can be done in three ways:

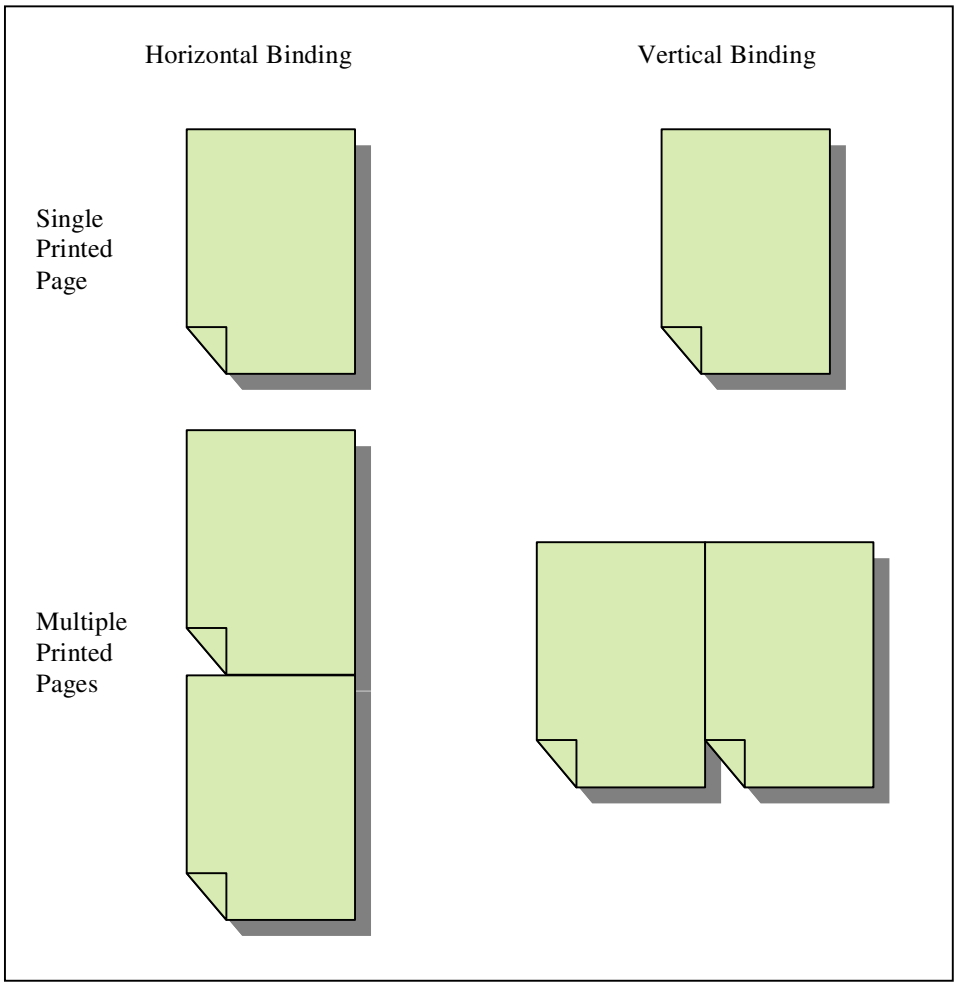
- Escape sequences can be embedded in the data file being printed.
- The printer type file can be modified to include the escape sequence as part of the initialization string.
- The printer type file can be modified to include the escape sequence as a Vertical Forms Control (VFC) string.

There are three escape sequences for duplex printing:

[ESC]&l1S -	Enable vertical binding duplex mode
[ESC]&l2S -	Enable horizontal binding duplex mode
[ESC]&10S -	Disable duplex mode (enable simplex mode)

The two duplex modes provide for the binding of the final document. Vertical binding allows for binding a document along the physical length of the page and horizontal binding allows for binding a document along the physical width of the page. This is shown in Figure 9-1, where the dotted line (- - -) represents binding.

Figure 9-1 Duplex Mode Page Binding



In addition to the escape sequences mentioned above, the **[RESET]** escape sequence (**[ESC]**) will also disable duplex mode and return the printer to simplex mode. Therefore, the duplex mode escape sequences should be entered after the **[RESET]** escape sequence in an initialization string.

Since the duplex mode escape sequences can be embedded within a data file, it is possible for a printer configuration not to be in agreement with how the printer is enabled.

To avoid this situation, close attention to detail during configuration and use of escape sequences is required. When configuring simplex printers, always indicate in the Printer Control screen of the printer file that duplex printing is supported. Also, do not send duplex mode escape sequences to simplex printers. When configuring duplex printers for duplex printing, it is mandatory to indicate in the Printer Control screen that duplex printing is supported. Duplex printing will not be effective until the escape sequences

are received by the printer. Similarly, duplex printing will remain in effect until the Disable duplex mode escape sequence is received or the **[RESET]** escape sequence is received.

For detailed information on `TTUTIL.PUB.SYS`, refer to *Customizing Terminal Type Files and Printer Type Files with Workstation Configurator*.

For detailed information on the use of the escape sequences refer to the technical reference manual provided with the printer.

How to Control the Flow of Data

Flow control is how the transfer of data between the computer and the asynchronous device is regulated. Flow control protects the computer and the device from data overruns. A **data overrun** occurs when the sender of data transmits the data faster than the receiver can accept it. Because the receiver cannot accept all of the data being sent, it is said to be *overrun* with data. Therefore, some data may be lost.

When asynchronous devices communicate with a HP e3000 Series 900 computer, one main method of flow control is used: the **XON/XOFF protocol**. This protocol controls the flow of data between devices and the Datacommunications and Terminal Controller (DTC). Its purpose is to protect devices from data overruns.

An additional mechanism is used for controlling the flow of data from a device to the computer: the **read trigger character**. The read trigger character tells a device when it is allowed to send data. Its purpose is to protect the DTC from data overruns.

Flow control is also called **pacing methods**. For instance, terminal settings for the XON/XOFF protocol are called transmit pacing (`XmitPace`) and receive pacing (`RecvPace`).

Because flow control guards against data overruns, it is a means of data protection. Other methods of data protection used with asynchronous devices are parity and printer status requests. Refer to “How to Control Printers” later in this chapter for more information on parity and printer status requests.

The XON/XOFF Protocol

The XON/XOFF protocol is controlled by the recipient of the data being transferred. The recipient sends an XOFF character to the sender of the data if it is unable to continue to receive data. The sender then suspends the transmission of data. When the receiver can accept data again, it sends the XON character to the sender, and the transmission of data is resumed.

Assuming that receive pacing is enabled at a terminal (this is *not* the terminal’s default setting), the terminal will send an XOFF character if any one of the following occur:

- The terminal is placed in local mode. (Remote mode is necessary to communicate to the computer; refer to the manual that came with the terminal for an explanation of local and remote modes.)
- The terminal’s buffer (a temporary data storage area) fills up because data is being received faster than the terminal is able to display it.
- The terminal user presses **[CTRL]-S**. (Pressing **[Stop]** on HP239x terminals also sends the XOFF character to the computer. Note that this key is a toggle switch; the second time it is pressed, it sends an XON character to the computer, the third time, an XOFF character, and so forth.)

After a terminal sends an XOFF character, the DTC waits indefinitely for an XON character.

A printer will send an XOFF character if any one of the following occur:

- The printer is placed off-line.
- The printer runs out of paper.

- The paper in the printer jams.
- The printer's buffer fills up because data is being received faster than the printer is able to process it.

When printers (using printer type files 21, 22, or 26) send an XOFF character to the computer, an internal timer (called the XOFF timer) starts. If the timer expires before the printer sends an XON character, a message is sent to the system console. The message informs the operator that intervention is needed to get the printer to function again. After a printer using printer type file 18 sends an XOFF character to the computer, the computer waits indefinitely for the XON character, but no message is sent to the system console.

Use of the XON/XOFF protocol assumes the following:

- Full-duplex communication lines are used.
- The attached devices are capable of using the XON/XOFF protocol.
- The attached devices are capable of transmitting and receiving simultaneously.

These requirements are met if supported devices and cables are used. If non-HP devices are used, ensure that these requirements are filled.

NOTE The two handshake characters, XON (the ASCII DC1 character) and XOFF (the ASCII DC3 character), are defined as **special characters** and are reserved for the purpose of protocol. These characters cannot be used as data except in binary mode.

The Read Trigger Character

The read trigger character tells an asynchronous device when it can send data to the computer. It prevents a device from sending data before the computer is ready to receive it. Data sent before the read trigger character is received is not accepted unless typeahead is enabled. If typeahead is enabled, data can be entered at any time and the read trigger character is not necessarily sent to the terminal. After the computer sends the read trigger character, the input of data can proceed.

The ASC software generates the read trigger character at the beginning of each read when the computer is ready to accept data. The read trigger character is the ASCII DC1 character (the same as XON). If the device is operating in character mode, the device can begin transmitting without further exchange of protocol characters.

However, if the data is sent through block mode, the device informs the DTC by sending an ASCII DC2 character in response to the read trigger character. The DTC, informed that a lot of data will be coming, sends another read trigger character when it is ready to accept the block of data. This second read trigger character is called a block read trigger character.

How to Control Terminals

DTS helps control the operation of terminals. It automatically handles the input and output of data to the terminal as explained earlier in this chapter under "How to Control the Flow of Data." Alternative methods for controlling terminals are as follows:

- Echoing characters to the terminal screen as they are typed at the keyboard.
- Allowing special characters to be processed as intended. For example, **[Enter]** signals the end of input data and the backspace character causes an unwanted character to be deleted from input data. Other examples of special characters include system break (**[Break]**) and subsystem break (usually **[CTRL]-Y**).
- Modifying the transmission speed through the `SPEED` or `SET` commands.

It is possible to programmatically change the method that the DTS uses to control a terminal. A program can change the following attributes:

- Parity error checking.
- The method of input for a read from character mode to block mode.
- The set of special characters recognized by the DTC.
- The maximum byte count or a maximum time to enter data.

Each of the methods for controlling terminals is explained in the following pages. Refer to the *Asynchronous Serial Communications Programmer's Reference Manual* for more information on programmatic device control.

Echo

When characters are typed on a keyboard, the terminal user expects each character to appear on the screen as it is typed. This is referred to as echo. Any of the following settings determine whether echo occurs:

- Local echo enabled.
- The modem echo is enabled.
- DTC echo is enabled.
- Typeahead echo is enabled.

Only one of these settings should be enabled at any time. Each of these settings are described below. Hewlett-Packard recommends setting DTC echo. (*DTC echo is automatically enabled for devices configured as terminals*.)

Local Echo

When terminals are installed, local echo is turned off. If local echo is turned on, the terminal will echo each character to the screen as it is typed. Local echo is used with half-duplex communications lines and some statistical multiplexers. *Note that block mode applications usually turn local echo on because input characters are sent to the DTC in a block of data, instead of one character at a time.*

Modem Echo

Modems are able to echo characters as they are typed. *This feature should not be used*. This feature is usually disabled in the modem's default configuration setting.

DTC Echo

DTC echo is enabled for both terminal type file 10 and terminal type fil e18. The DTC will echo to the terminal screen each character as it is typed. DTC echo provides a simple form of data protection since data that appears after it is typed has been successfully transmitted to the DTC and back to the terminal screen again. *Disable DTC echo for block mode reads*; Local echo takes over the function of DTC echo because data is transferred to the DTC in a block of characters, instead of one character at a time.

Typeahead Echo

Typeahead allows the terminal user to continuously enter data without having to wait for the system to process the data and return the MPE prompt (:). Typeahead echo mode determines whether input characters will be echoed to the terminal screen once or twice.

Disabling Echo

Sometimes characters should not be echoed to the screen, for instance, when entering a password. In this case, the computer disables echo. However, if characters should not be echoed to the screen at other times, the `SET ECHO=OFF` command can be used. Echo can also be disabled by a program through the use of the `FCONTROL` or `FDEVICECONTROL` intrinsic. *Note that programs controlling block mode reads* must disable DTC echo.

Special Characters

Special characters are ASCII characters that have certain functions assigned to them; they signal the DTC to take a particular action. The results of using special characters are called special control functions. These include the characters described below, as well as the characters used for protocols. The following characters described here are defaults and are modifiable by applications.

Backspace

When a backspace character is entered, the DTC deletes the previous character from the input data and echoes the backspace character to the terminal (provided echo is enabled). When the echoed backspace character is received, the cursor on the screen moves back one character and is positioned at the character that was deleted. Use **[Backspace]** or **[CTRL]-H** to backspace.

Line Delete

To delete a line of data while in character mode, press **[CTRL]-X**. After **[CTRL]-X** is pressed, three exclamation points (!!!), along with a carriage return and line-feed, are displayed, signaling that all read data was deleted.

End-of-Record Character

When a terminal operates in character mode, a special character is set to enable the user to end a read. This is called the **End-of-Record (EOR)** character. It is also called a record terminator or line terminator. Two types of EOR characters exist: standard EOR character and additional EOR character.

Standard EOR Character

When users finish typing a line and press **[Return]** (the standard EOR character), data is transmitted. The carriage return character terminates the read but it is not included in the data of the read or counted in the number of actual characters read. When the EOR character is detected, a carriage return is echoed to the screen and the ASC software generates a line feed. This places the cursor at the beginning of the next line. The EOR character can be replaced with another character during transparent editing; this is done through the `FCONTROL 41` intrinsic.

Additional EOR Character

Also referred to as an alternate EOR character, this character is included in the data and the actual character count (byte count) of the data. The read does not end normally, but terminates in an error stating that the additional EOR character was encountered. The program that initiated the read must recover from the error by deleting the additional EOR character from the input data, subtracting one from the byte count, and sending a carriage return and line feed to place the cursor in its proper place.

AEOR characters can be defined through the `FCONTROL 25` or, `40` intrinsics. Note that when a read terminates, the program must call the `FCHECK` intrinsic to see why the read terminated. If returns an error code of 31, it means the read ended with the additional EOR character.

Up to 16 AEOR's are available but only through the use of `FDEVICECONTROL 192, 66`.

System Console Attention Character

When **[CTRL]-A** is entered on the system console, it signals a **[CTRL]-A** console command. The computer sends the system console a carriage return and line feed along with an equals sign prompt (=), signaling that it is ready for the command. **[CTRL]-A** commands are allowed only on the system console. For more information on the system console and its special commands, refer to *MPE/iX Managing Peripherals*.

NOTE **[CTRL]-A** is not accepted as a special character from a terminal that is connected to a DTC.

System Break

Using default operating conditions, the ASC software responds to a system break signal from the terminal and alerts the computer. The system break function interrupts the execution of programs, subsystems, and most MPE/iX commands. Once the program or subsystem is interrupted, it can be aborted by entering the `ABORT` command or the program or subsystem can be restarted by entering the `RESUME` command.

To transmit a system break signal, press **[Break]**. System break can be disabled programmatically. Refer to the *MPE/iX Intrinsics Reference Manual* for more information on system break.

Some application programs, such as block mode programs, change the settings of terminals and the characteristics of their device files. These programs should return the devices to normal operating mode before they complete.

If a program does not disable break (through the `FCONTROL` or `FDEVICECONTROL` intrinsic), the user can still use **[Break]**. If **[Break]** is pressed, the program might not be able to recover but the MPE/iX operating system will by assuming that the terminal is in normal operating mode.

A VPLUS block mode application can be reset by pressing **[CTRL]**, **[Shift]**, and **[Reset]** simultaneously. Other block mode applications are harder to reset. Sometimes, it is necessary to turn the terminal off and on. Other times, the port must be reset. Refer to *Troubleshooting Terminal, Printer, and Serial Device Connections* for information on resetting ports if host-based management is being used. Refer to *Using OpenView DTC Manager* for more information on resetting ports if PC-based management is being used.

Subsystem Break

Subsystem break stops a program-local or subsystem-local command and enables the user to enter a different command. The default subsystem break character in standard editing mode is **[CTRL]-Y**.

Subsystem break is not enabled by default. It must be enabled programmatically through the `FCONTROL 17` intrinsic. A subsystem break character can also be defined when entering transparent editing through the **FCONTROL 41** intrinsic.

Transmission Speed

Asynchronous data transmission speeds on MPE/iX computers range from 300 bps to 19200 bps. The following speeds are supported:

300, 1200, 2400, 4800, 9600, and 19200 bps. 38400 bps is also supported for direct connected devices on DTC 16iX/16MX and DTC 72MX.

The speed chosen must be supported by the terminal. A terminal can be changed to any supported speed if it is directly connected to the DTC. The speed of a terminal connected to a modem should be set to the speed of the modem and the telephone line being used.

Parity

Parity verifies that each character of data is transmitted between a device and the system without error. It detects data transmission errors, but does not correct them.

Parity can be used only with 7-bit character sets, such as USASCII, because the eighth bit is used as a parity bit. Character sets that use all eight data bits cannot use parity. Examples include the terminal's alternate character set and character sets used for European languages.

Two types of true parity exist: odd and even. Odd parity counts the number of ones in the seven data bits for each character. Every character has an odd number of bits set to one. If there is an odd number of ones, the eighth bit (parity bit) is set to zero; if there is an even number of ones, the eighth bit is set to one. When the character is transmitted, the receiver verifies that the number of bits set to one is an odd number.

If one of the bits is transmitted incorrectly, the number of bits is even and an error is detected. If two bits are transmitted incorrectly, the character might contain an odd number of ones and the error won't be detected. Since most data transmission errors involve only one bit of the character, most transmission errors are detected.

Even parity works the same way as odd parity, except the total number of bits set to one in each character is set to an even number.

Hewlett-Packard asynchronous devices and the ASC software use two other parity settings as well. These are called ones and zeros. With ones parity, the parity bit of each character is set to one; with zeros parity, the parity bit is set to zero. If the eighth bit is involved in a transmission error, it is detected because the bit is not what was expected.

It is possible to not use parity at all. This is called none parity or 8-bit pass-through. Neither the sender nor receiver of data sets the eighth bit or checks it for parity. (A terminal using a 7-bit character set and no parity places a zero in the eighth position so that characters being transmitted are always eight bits long.)

Parity can be enabled through the FCONTROL intrinsic or the FDEVICECONTROL intrinsic. When enabled, the ASC software generates parity on outgoing data and checks for parity errors on incoming data. After the parity is checked, the parity bit is set to zero because the program using the data has no need for parity information. Parity checking is handled the same way in block mode as in character mode.

Parity settings for terminals must match the type of parity used by the ASC software. *The default parity setting for HP terminals is to generate zeros parity*, but not to check parity on data from the computer. HP terminals will work correctly with the ASC software without having to modify any configuration values.

If enabling parity, verify that the program which uses the FCONTROL or the FDEVICECONTROL intrinsic either requests that the user change the terminal's parity setting to the new setting of the ASC software or pass the proper escape sequences to change the terminal's settings. When a parity error is detected, the read is completed in error. The ASC software reports the error to the program reading the data.

Input Modes

Data can be input in character mode or block mode. Characteristics and limitations for each are determined by the ASC software and the attached terminal.

Character Mode

Characters are transmitted to the DTC as they are typed. The DTC expects to receive them this way. If DTC echo is enabled, characters are echoed back to the screen as they are received.

Character mode is how terminals are opened, whether by a session or a program. Character mode reads are terminated with the carriage return character (**[Return]** or **[CTRL]-M**).

Block Mode

When a terminal operates in block mode, characters are held in the terminal's memory (buffer) as they are typed. Characters are not transmitted to the DTC until a specific action is taken. Pressing **[Enter]** at the end of a block of data will normally send it to the DTC.

An application program can use an alternate method to end a block mode read. Refer to "Terminating Reads" later in this chapter for more information on ways to end a block mode read.

Block mode is enabled programmatically by executing a block mode application at the terminal. The program needs to change the terminal's configuration settings. It should do this automatically by sending escape sequences to the terminal.

Blocks of characters can be input to the DTC a line at a time (called line block mode) or a page at a time (called page block mode), depending on the type of block mode used. Because characters are displayed on the screen as they are entered, local editing and cursor control features can be used to alter a line or page before it is transmitted to the DTC.

Data is transmitted one character (literally one byte) at a time, with each character bound by start bits and stop bits. Block mode sends data in one transmission "burst," although the characters are transmitted one by one in a long stream.

Data Editing Modes

Data input from a terminal is usually intended as data for the computer: commands, input to a program, etc. Some characters are not interpreted as data, but as special characters. When these characters are encountered, the DTC or the ASC software is signaled to perform a specific function. The functions vary from deleting a character to interrupting a program or subsystem.

The data editing mode defines which characters are recognized as special characters by the system. The types of data editing modes are as follows:

- Standard editing.
- Transparent editing.
- Binary editing.

Special character sets are defined for each editing mode. All special characters apply in standard editing mode, fewer apply in transparent editing mode, and no special characters are recognized in binary editing mode. Refer to the *Asynchronous Serial Communications Programmer's Reference Manual* for more information on data editing modes.

Terminating Reads

Reads can be programmatically terminated in one of several ways:

- An EOR or AEOR character is sent from the terminal.
- The input byte count is reached.
- The read limit timer expires.
- The block mode read timer expires.
- The system break character (if it is enabled) is sent from the terminal.
- The subsystem break character is sent from the terminal.
- The **[CTRL]-A** character is sent from the system console.
- The DTC encounters a parity error (only when parity checking is enabled).

Note that when using binary editing mode, a read cannot be terminated by any character. Binary reads can be terminated only if either:

- The input byte count is reached.
- The read limit timer expires.

How to Control Printers

Controlling printers is similar to controlling terminals, except for two differences:

- Printers have no need for control mechanisms (such as echo, read trigger, special characters, or modes of input) related to user input. Note: printers which support status checking require a read trigger.
- Printers need additional control mechanisms to define how output will appear on the printed page, as well as special ways to prevent data loss.

Each of the methods for controlling printers is explained in the pages that follow. Refer to the *Asynchronous Serial Communications Programmer's Reference Manual* for more information on programmatic device control.

Transmission Speed

Asynchronous data transmission speeds on MPE/iX computers range from 300 bps to 19200 bps. The following speeds are supported:

300, 1200, 2400, 4800, 9600, and 19200 bps. 38400 bps is also supported for direct connect devices on DTC 16iX/16MX and DTC 72MX.

If host-based, transmission speed is configured through NMMGR. The speed chosen must be supported by the printer. A printer can be changed to any supported speed if it is directly connected to the DTC. The speed of a printer connected to a modem is set by the speed of the modem and the telephone line being used.

Parity

Parity verifies that each character of data is transmitted between the system and the printer without error. It detects data transmission errors, but does not correct them. Printers using printer type file 21 use parity. Printer type file 21 generates odd parity. When a printer using printer type file 21 encounters a parity error, it remembers the error until the ASC software verifies the printer's status. When the error is returned to the ASC software, a message is printed on the system console.

Printers using printer type files 18 or 22 cannot use parity. Additionally, the `FCONTROL` and the `FDEVICECONTROL` intrinsic cannot be used to change the parity settings for printers. For more information on parity, refer to "How to Control Terminals" earlier in this chapter.

Status Request

Printers using printer type files 21, 22, or 26 have a data protection mechanism that prevents the DTC from sending data to a printer when it is unable to print it. This mechanism is called **status request** or **status checking**. Printers respond to the request and return information on their status. A status request is sent after each file has printed.

Some printers are unable to return status information to the ASC software or to the user program controlling it. These printers should use printer type file 18, which does not send status checks to printers. Since the ASC software has no way of knowing when something is wrong, data can be lost.

Vertical Format Control

Many printers use Vertical Format Control (VFC) to direct the placement of output. VFC instructs a printer to skip to predetermined lines or to a specific point on a page with typically one or two commands, instead of counting and outputting a number of blank lines and spaces. This capability is often referred to as "Skip to Channel *x*," where *x* is one of the predetermined points.

Printer Initialization

When a printer is shared, each user can manipulate the printer in a different way. One user can change the printer's characteristics (such as margins, tabs, or print density) and affect another who does not want those characteristics.

To prevent one user from affecting other users, the printer must be initialized to a known state before printing the next job. When a printer configured as printer type file 21, 22, or 26 is opened, the ASC software writes an initialization character string to the printer.

Printers using printer type file 18 cannot use the initialization string. This means that if a user changes the printer's characteristics, the characteristics are not reset by the ASC software. The user's program must reset the printer when it is finished with it.

A Using NMMGR in Maintenance Mode

This appendix tells you how to use NMMGR's maintenance mode interface to manage network directory and configuration files. It allows you to also generate job streams to update remote network directory and configuration files. It includes the following:

- A description of how to enter NMMGR maintenance mode from the screen mode interface or from a batch job.
- A table summarizing each of the maintenance mode commands, including the syntax and purpose of the command.
- A detailed description of the `SUMMARYCONF` command.

Refer to *Using the Node Management Services (NMS) Utilities Manual* for more information on NMMGR's maintenance mode commands.

Using Maintenance Mode

NMMGR's **maintenance mode** is a character mode interface used to manage both network directory and configuration files. It can be used interactively, from within the screen mode interface, or as a set of commands entered via a batch job.

Maintenance mode can generate a job stream to sequentially update directories on a list of NS nodes. This feature saves you from manually changing the network directory files of every node on a network when you make a configuration change. You define the list of nodes to be updated by this automated process. Additionally, the process provides logging information and is recoverable.

Maintenance mode commands are read from the formal file designator NMMGRCMD, which defaults to $STDINX. You can redirect the input to come from a standard ASCII file by using a file equation for NMMGRCMD.

Entering Maintenance Mode from Screen Mode

You can access maintenance mode from within screen mode, execute one or more maintenance mode commands, and return to screen mode. There are two methods you can use to enter the maintenance interface from screen mode. The two methods are as follows:

- Enter the screen mode command `NM[MGRCMD]` in the command window of any screen and press **[ENTER]**.
- Press the **[Maint Mode]** function key from the Network Directory Main screen.

When you use either method, a screen appears with the maintenance mode prompt:

```
NMMGR>
```

When you enter maintenance mode from screen mode the interface is interactive. You can enter any appropriate maintenance mode commands at the prompt. In some cases, a command will prompt you for additional input which you can enter by typing a response to the new command prompt. When each command has completed execution, you will be returned to the maintenance mode prompt as shown.

When you are finished entering maintenance mode commands, type `EXIT` at the prompt to leave the maintenance mode interface and return to screen mode.

Running Maintenance Mode from a Batch Job

You can also access maintenance mode directly from a batch job by running NMMGR within a job stream or by running NMMGR with a file equation for the formal designator NMMGRCMD set to a command file. An example of such an equation is:

```
:FILE NMMGRCMD=CMDFILE
```

Command input is echoed to $STDLIST if you are running NMMGR from within a job stream or when the input is read from a command file.

You can create a command file using any editor that is capable of generating ASCII output. Blank command lines may be entered freely.

Maintenance Mode Commands

Table A-1 lists the NMMGR maintenance mode commands, their syntax, and the actions they perform.

NOTE

Subsystem break (**[CTRL]Y**) may be used to interrupt the operation of the COPYCONF, DELETENODE, HELP, LISTDIR, MAKESTREAM and MERGEDIR commands. The EXPANDDIR command cannot be interrupted.

The VERSIONCONF command must be used before the PATHCONF command, which must be used before the READCONF, READALLCONF, WRITECONF, and UPDATECONF commands to define the current path.

Table A-1 NMMGR Maintenance Mode Commands

Command	Syntax		Action
:MPECommand	Syntax for MPECommand		Executes *MPECommand*. *MPECommand* must be a programmatically executable MPE command.
ADDCONF	ADDCONF pathname [type]		Adds subtree of empty records to the configuration file.
ADDLDEV	ADDLEV {dtcname} {dtc-nodename} {station-address]	[filename]	Adds LDEVs to a DTC card.
ADDLU	ADDLU SNAnodename [filename]		Adds LUs to the SNA node transport screen.
ADDNODE	ADDNODE [filename]		Adds or updates a node in the current network directory.
ADDVC	ADDVC [filename		Adds a virtual circuit address key to the network directory and to the configuration file.

Table A-1 NMMGR Maintenance Mode Commands (Continued)

Command	Syntax		Action
CARDCONF	CARDCONF cardno		Sets the current DTC card number for the READALLCONF, READCONF, UPDATECONF, and WRITECONF commands.
COMPRESSCONF	CARDCONF cardno		Compresses or expands the current configuration file.
CONTINUE	CONTINUE [ON or OFF]		Prevents NMMGR from terminating in a job because of a maintenance mode error.
COPYCONF	COPYCONF srcpath[:srcfile] [,[destpath] [:destfle]][;KEEP] [;NOVERS]		Copies a configuration subtree
DELETECONF	DELETECONF path		Deletes a subtree from the current configuration file.
DELETENODE	DELETENODE [nodename]	[:LOCAL] [:GLOBAL]	Deletes an entry from the network directory.
DTSDYNCONF	DTSDYNCONF ON or OFF or PERMOFF]		Control the display of the dynamic configuration question and execution of DTCCNTRL when DTS validation is complete.
DTSXVAL	DTSXVAL [ON or OFF]		Enable or suppress automatic cross-validation with SYSGEN.
EXIT	EXIT		Exits from maintenance mode.

Table A-1 NMMGR Maintenance Mode Commands (Continued)

Command	Syntax		Action
EXITVALIDATE	EXITVALIDATE subsystem [ON or OFF]		Validates a subsystem's configuration, if needed, when exiting from NMMGR.
EXITWARN	EXITWARN subsystem [ON or OFF]		Warns the user that a subsystem needs to be validated before exiting NMMGR.
EXPANDDIR	EXPANDDIR numrecs		Increases the capacity of a network directory file.
HELP	HELP [keyword]		Calls up the help function.
LISTDIR	LISTDIR [nodename]		Lists the contents of a network directory.
LISTLDEV	LISTLDEV {dtcname} {dtc-nodename} {station-address}	{filename}	Lists LDEVS for a DTC card in a format compatible with ADDLDEV.
LISTLU	LISTLU SNAnodename [filename]		Lists LUs in a format compatible with ADDLU
MAKESTREAM	MAKESTREAM streamfile, nodefile, commandfile		Creates a job stream used to perform network directory or configuration file updates on remote nodes.
MERGEDIR	MERGEDIR {otherdir [,nodename[} {configfile}	[;LOCAL] [;KEEP] [;NOKEEP] [;TIMESTAMP] [;GLOBAL]	Merges entries from another network directory or configuration file into the current network directory.
NICONF	NICONF niname [nitype]		Sets up paths to add or update NETXPORT NI configurations.

Table A-1 NMMGR Maintenance Mode Commands (Continued)

Command	Syntax		Action
OPENCONF	OPENCONF fileref		Opens a nodal configuration file and makes it the current configuration file.
OPENDIR	OPENDIR fileref		Opens a network directory file and makes it the current directory.
PAGECONF	PAGECONF pageno		Sets the page number for multipage data screens.
PASSWORD	PASSWORD [password]		Sets the password. Validates the NETXPORT subsystem configuration. Changes the password to allow write access on the OPEN screen.
PATHCONF	PATHCONF[=]path		Sets the current path in the current configuration file.
PURGECONF	PURGECONF [pathname]		Deletes the subtrees of records from the configuration file.
PURGELDEV	PURGELDEV {dtcname} {dtc-nodename} {station-address}	{filename}	Purges LDEVs from the DTC card.
PURGELU	PURGELU SNAnodename [filename]		Purges LUs from the SNA node transport screen.
PURGENI	PURGENI [niname]		Purges a network interface from the configuration file and performs cleanup.
PURGEVC	PURGEVC [filename]		Deletes a virtual circuit address key from the network directory and the configuration file.

Table A-1 NMMGR Maintenance Mode Commands (Continued)

Command	Syntax	Action
READALLCONF	READALLCONF [;FORMAT]	Reads all data from the current configuration record.
READCONF	READCONF fieldname [;FORMAT]	Reads selected data from the current configuration record.
SUMMARYCONF	SUMMARYCONF subsysem[, subsystem[, ...]]	Prints a report for one or more communications subsystems.
UPDATECONF	UPDATECONF	Updates the current path in the configuration file.
VALIDATECONF	VALIDATECONF subsystem	Validates subsystem configuration.
VERSIONCONF	VERSIONCONF version	Checks whether the specified version number matches NMMGR's current version number.
WRITECONF	WRITECONF fieldname, data	Writes data to individual fields of the current path in the configuration file.

NOTE Subsystem break (**[CTRL]Y**) may be used to interrupt the operation of the COPYCONF, DELETENODE, HELP, LISTDIR, MAKESTREAM and MERGEDIR commands. The EXPANDDIR command cannot be interrupted.

SUMMARYCONF

Prints a summary report for one or more communications subsystems.

Syntax

```
SUMMARYCONF subsystem[, subsystem[, ...]]
```

Parameters

subsystem	The name of the subsystem(s) for which the report will be generated. If more than one subsystem is entered, a report will be printed for each subsystem in the order given. If ALL is entered, a report will be printed for every subsystem. Valid entries are ALL, DTS, NETXPORT, SNANODE, NRJE, IMF, DHCF, APPC, and RJE.

Description

SUMMARYCONF displays a summary report for a particular subsystem. This command is identical to the Print Summary function in the NMMGR Output Configuration screen.

Output is directed to the file defined in the file equation FORMLIST. If FORMLIST is not defined, output is sent to $STDLIST.

When you use SUMMARYCONF to print a summary report for the datacommunications and terminal subsystem (DTS), you can also specify a summary option to designate additional items in the DTS subsystem you wish to have reported. You do so in one of two ways. The first way is to enter the option on the same line as the command. For example:

```
SUMMARYCONF DTS,LINK
```

will cause a report to be generated for the DTS link configuration. You can use this method regardless of whether you entered maintenance mode from screen mode you are running a job to generate output.

You can use the second way to specify a summary option for the DTS subsystem only if you have entered maintenance mode from screen mode. This method is to enter SUMMARYCONF DTS at the NMMGR maintenance mode prompt, with no option specified. A new prompt will appear, as follows:

```
DTS Summary>
```

You can enter the DTS print option at this prompt. If you do not want to generate any additional DTS reports, enter **E[XIT]** at the prompt. You will be returned to the maintenance mode prompt.

The following DTS print summary options are available:

ALL	Displays all DTS configuration information.
DTC[*dtcname*]	Displays the configuration for all DTCs or for the DTC whose name is specified in *dtcname*.
DTS	Displays the DTS subsystem configuration parameters.
E[XIT]	Leaves DTS Summary and returns you to the maintenance mode prompt.
HELP	Displays the available DTS summary options.
LDEV [ldev[/ldev]]	Displays the configuration for all ldevs (logical devices), a single ldev, or a range of ldevs.
LINK	Displays the link configuration for the DTS.

`PORT [dtcname [card [port]]]` Displays the configuration for all configured ports, all ports on a specified DTC, all ports on a specified DTC and card, or for a specific DTC, card, and port.

`PROFILE [profile]` Displays the configuration for all profiles or for a specified profile.

`X.25 CARD [dtcname[ card#[,option]]]` Displays the information about the Host Based X.25 Card configuration. The option may be one of:

`LEVEL12`	Displays the level 1 and 2 configuration.
`LEVEL3`	Displays the level 3 configuration miscellaneous configuration data.
`SYS`	Displays the System to System Local User Group data.
`SYSSWTH`	Displays the System to System Switching data.
`PAD`	Displays the PAD Nailed devices data.
`PADSWTH`	Displays the PAD Switching data.
`SEC`	Displays the PAD Security data.

Example

To display the summary report for `NETXPORT`:

```
NMMGR>SUMMARYCONF NETXPORT
```

To display the summary report for profiles defined in the DTS subsystem:

```
NMMGR>SUMMARYCONF DTS,PROFILE
```

Or:

```
NMMGR>SUMMARYCONF DTS

DTS Summary>PROFILE
```

To display the summary report for an X.25 System to System table on a DTC card:

```
DTS Summary>X25CARD  WAR2 2 SYSSWTH
  System to System Switching Table:
    DTC Name:   WAR2  Card number: 2
    ...
DTS Summary>
```

B Migrating from Previous Releases

This appendix describes the steps for migrating network configuration files to the current MPE/iX release from previous MPE/iX or MPE V releases or to migrate the network DTS configuration from PC-based DTC management to Host-based DTC management.

A utility call NMMGRVER.PUB.SYS is provided to convert your old network configuration file to the current release format and to migrate the DTCs configured in the PC-based tree to the Host-based tree of the network configuration file.

The process to migrate from Host-Based management is designed for a configuration that contains X.25 and PAD configurations so that you can take advantage of the new Host-Based X.25 and PAD functionality. The process can also be used with a configuration that has only Nailed TIO and PAD devices. The section below describes the process to migrate your configuration from PC-Based to Host-Based DTC Management.

This appendix also includes details of the limitations of this process and actions to take to reconfigure your network configuration file to help the migration process go smoothly. The process to migrate from PC-based management to Host-based management is only available if you have installed the required patches on your system. See Appendix A in the *Managing and Configuring Host-Bassed X.25 Links* manual for complete details on how to migrate an environment with X.25 network connections.

NOTE

Customers who do not have an existing network configuration file, NMCONFIG.PUB.SYS, do not need to run NMMGRVER. Instead, they need to create a network configuration file from scratch. To do so, copy the template file NMSAMP1.PUB.SYS to NMCONFIG and then modify this network configuration file in NMMGR. These steps are covered in Chapter 5, “Configuring Serial Devices (for Host-Based Management).” If NMMGR is run on an unconverted, existing network configuration file, an error message will appear when entering the DTS subsystem indicating that a version mismatch was found and that NMMGRVER must be run to convert the file.

MPE/iX customers with an older version of NMCONFIG.PUB.SYS need to run NMMGRVER to convert their network configuration files to the current MPE/iX format. You need to migrate to the current version before adding a DTC 72MX to you network configuration. MPE V customers with an older version of NMCONFIG.PUB.SYS also need to run NMMGRVER to convert their network configuration file to the current MPE/iX format. NMCONFIG.PUB.SYS files from MPE V do not have the DTS subsystem, so NMMGRVER will create a default DTS subsystem for the new configuration file—with one default configuration for a DTC 48 and one default configuration for a DTC 72MX. Modify this network configuration file in NMMGR to fit your actual DTS and DTC configuration. These steps are covered in Chapter 5, “Configuring Serial Devices (for Host-Based Management).”

Running NMMGRVER to Update Release Version

To run NMMGRVER, logon as MANAGER.SYS in the PUB group and run the utility by entering NMMGRVER after the MPE/iX prompt. NMMGRVER will prompt you for the configuration file name. Enter NMCONFIG, and Y to the confirmation prompt.

The steps to run NMMGRVER are shown here:

```
: HELLO MANAGER.SYS,PUB

: NMMGRVER

NM Configuration File Conversion Utility 32098-20016 V.uu.ff © Hewlett-Packard Co. 1988
Utility to convert NM configuration files to be compatible with NMMGR V.uu.ff.

************************************************************
************************************************************************

*            BE SURE TO STORE BACK UP                                  *

*      Copies of Config Files BEFORE Conversion                        *

************************************************************************
************************************************************************

Fileset to scanned? NMCONFIG

OK to convert NMCONFG? Y

Backup file is NMBACKn; temporary file is Nxxxx.

** Converting MPE iX config file **

The configuration for the DTS subsystem has been updated. If this file will be used as
NMCONFIG.PUB.SYS, you must restart the DTS subsystem for the configuration to take effect.
(NMMGRVERMSG 102)

CONVERSION completed successfully. (NMMGRVERMSG 0)
```

NMMGRVER generates a backup copy of you old configuration file under file name NMBACKn, (where n starts with A, then B, C, and so on, for multiple backup copies). It also creates a temporary file Nxxxx, that is purged upon completion of NMMGRVER conversion.

After converting the network configuration file with NMMGRVER, you then run NMMGR if needed to modify the DTS subsystem to fit your actual hardware configuration. Follow the steps described in Chapter 5, “Configuring Serial Devices (for Host-Based Management),” for modifying you network configuration file.

NOTE After converting your network configuration file with NMMGRVER, you must validate and cross-validate the configuration file. You must also perform a DTS shutdown and restart to cause the DTS subsystem to use the updated configuration file. Refer to Chapter 5, “Configuring Serial Devices (for Host-Based Management),” for details to shutdown and restart DTS.

Migrating your Configuration to Host-Based Management

This section describes the process that you can use to migrate the majority of the configuration of your DTCs from PC-Based Management to Host-based Management. This process is only performed on the HPe3000 system that you want to manage your DTCs. If you have other systems that share the DTCs you do not need to make any changes to the configuration on those systems.

This section also describes the process that you can use to migrate the majority of the configuration from the OpenView DTC Manager PC to the HPe3000 Host. The tool needed to perform this migration is available as a patch to the OpenView DTC Manager product. Contact HP Support for information on how to obtain this patch.

There are two tools that are required to perform the complete process for migrating your configuration from the OpenView DTC Manager to the Hpe3000 host.

These two tools are:

- The PC Migration Tool that is integrated into the OpenView DTC Manager. This tool will be accessed via an added function of the Multiple DTC Operations tool and will create a text file that contains the `NMMGR` Maintenance Mode commands needed to create an equivalent configuration on the HPe3000 host
- The Host Migration Tool that is integrated into `NMMGRVER`. This tool will read the configuration in the PC-Based tree of the `NMCONFIG` file and merge it into the Host-based tree. If you have performed the process to migrate your OpenView DTC Manager configuration onto this system `NMMGRVER` will also merge with the configuration created by the PC tool in the Host-based tree.

The tool needed to migrate your configuration to Host-based management is included in a set of patches that also provide the enhanced features for the Host-Based DTC Management documented elsewhere in this manual. This functionality is available in the following set of patches. Future patches of each of these products will also include these features.

Table B-1 Patch IDs for MPE/iX Release 7. 0

Patch ID	Product Name	Version
NMSHD54A	Node Management Services 32098-20014	B.00.12.00X
NMCHD55A	Node Management Configurator 32098-20016	B.07.01
DTSHD56A	Terminal I/O 32022C	C.04.01
TSMHD57A	TermDSM	C.04.01
DCCHD58A	DCC/Validation	C.05.00.10x
ODMHD59A	Open View DTC Manager	A1440E00

Table B-2 Patch IDs for MPE/iX Release 7. 5

Patch ID	Product Name	Version
NMSHD35A	Node Management Services 32098-20014	B.00.13
NMCHD36A	Node Management Configurator 32098-20016	B.07.06
DTSHD37A	Terminal I/O 32022C	C.05.01
TSMHD38A	TermDSM	C.05.01
DCCHD39A	DCC/Validation	C.06.00.100
ODMHD45A	Open View DTC Manager	A1440E00

What the Migration Process Can/Cannot Do

The Migration process will be able to migrate the following portions of the DTC's configurations from the OpenView DTC Manager PC to DTCs configured on the HPe3000 host.

- The following DTC types are migrated: DTC16, DTC48, DTC16iX, DTC16MX, DTC72MX.
- All Global LAN configuration parameters will be migrated to the Host.
- All supported cards will be configured as the proper type and in the proper slots.
- The port group configuration of the DTC16MX and DTC72MX are maintained.
- All TIO ports and PAD devices will be configured as the same type as configured on the PC. (terminal/printer/host, padterm/padprint).
- All Terminal ports that aren't configured with an ldev on the host will configure as a non-nailed TIO port.
- All of the following X.25 and PAD tables will be migrated intact.
  - — Level 1 & 2 and Level 3 data
  - — System to System Switching Table
  - — System to System LUG Table
  - — DTC PAD Switching Table
  - — PAD Device Access Table
  - — PAD Incoming Security Table
- What will not be migrated:
  - — The DTC Security lists: Node Names List; Define Access List
  - — Unique TIO port and PAD device parameters will not be maintained. (See below)
  - — TAC because it is long out of support and all functions have viable alternatives.

Assumptions and Limitations

The New Host-based Management functionality provides a process to migrate a major portion of the configuration on the OpenView DTC Manager PC to the HP e3000 host. In order for the migration to work in the most consistent manner possible, the defined process makes the following assumptions and compromises.

The Migration process consists of four major steps. These steps are described in more detail later in this document. The four major steps are:

1. Run the PC Migration tool on the OpenView DTC Manager PC to create a file that contains all the NMMGR Maintenance Mode commands needed to create an equivalent configuration on the HP e3000 host.
2. .On the HP e3000 host, remove any DTC configurations from the PC-Based tree in the NMCONFIG file that aren't in use or should not be included in the migration process. Change the configuration to Host-based.
3. .Use the file created on the PC and transferred to the HP e3000 host as the input file to NMMGR to create the equivalent DTC configurations in the NMCONFIG file.
4. Run the Host Migration tool integrated into NMMGRVER that will merge the PC-Based DTCs configured in the PC tree into the Host-based tree.

Assumptions

The migration process is designed with the following assumptions.

1. The PC Migration tool will use the DTC Label assigned to the DTC on the PC as the DTC name when the DTC is added to the NMCONFIG file. If a DTC with that name is present in the host-based tree of the NMCONFIG file the NMMGR commands created by the PC migration tool will overwrite the DTC configuration.
2. The Host Migration tool is designed to merge the DTCs configured in the PC-based tree into the Host-based tree. The tool will try to merge all of the ldevs from the PC-based DTC into the corresponding Host-based DTC. The DTCs in the Host based tree are matched to the DTCs in the PC-based tree by finding the matching DTC Node Name. The DTC name in the Host-based tree is maintained.
3. All Serial ports on the DTCs will be assigned a default profile. This is necessary because with OpenView DTC Manager, each port on the DTC can to be assigned unique characteristics. This can easily cause the number of unique ports on the host to exceed the number of available profiles. It is also very difficult for an automated tool to merge the port configurations from the PC and the profiles from the PC-based tree into the Host-based tree.
4. All PAD devices will be assigned a default profile. This assignment will eliminate any non-default PAD device profile number. This case has the same difficulties as was found for TIO serial devices.
5. .The default profiles will be created if they don't already exist in the Host-Based tree in the NMCONFIG file. You can modify these profiles to apply any desired customizations to the ports to which these were assigned. The default profile assigned for each port type are:

Terminal	TR10AUTO
printer	PR18AUTO
host	HOSTAUTO

PAD Terminal TR24AUTO

PAD Printer PR26AUTO

6. It is likely that when the migration is completed, you will need to do some manual changes to the resulting configuration file to reapply some customizations. The types of customizations include:

   - Define additional profiles to assign unique port parameters
   - Complete the configuration of the TIO and PAD devices if a DTC with the same DTC Node Name was not configured in the PC tree or corresponding devices were not configured on the PC–Based DTC
   - Create the Global PAD Security Lists which consist of the Node Names List and the Access Lists

Limitations

The migration process has the following limitations. When the Host Migration tool is run, the result could leave the following discrepancies in the NMCONFIG file that you must correct to have a valid configuration. When the Host Migration tool is run, there will be error messages displayed that indicate the nature of the error.

1. If the PC Migration tool created a DTC in the Host-based tree that does not exist in the PC-Based tree (a DTC with a matching DTC Node Name was not found), the TIO ports will be left with the ldev assigned as (-1). This is an invalid ldev number for TIO printers and will be detected by Validation. You must manually correct the configuration.
2. If the PC Migration tool created a DTC in the Host-based tree that does not exist in the PC-Based tree (a DTC with a matching DTC Node Name was not found), any PAD devices will be assigned ldev of 1. This is an invalid ldev number for PAD devices and will be detected by Validation. You must manually correct the configuration.
3. If the card type configured in the Host-Based DTC does not match the card type in the PC-Based DTC then the card is not merged into the Host-based tree and the Host-based DTC will have the same configuration discrepancies as described in paragraph 1 and 2.
4. f the port type of TIO or PAD devices in the Host-based tree does not match the port type of the port in the PC based tree, then the PC-Based port configuration is not merged with Host-based configuration. The port will have the same configuration discrepancies as described in paragraph 1 and 2.
5. If a PAD device name is defined in the PC-Based DTC that is not defined in the Host-Based DTC, the device will have no X.25 address assigned. This is an invalid PAD device configuration and will be detected by Validation. You must manually correct the configuration.
6. If a DTC exists in the PC based tree that was not created in the Host-based tree (a DTC with a matching DTC Node Name was not found), then the DTC will be copied to the Host-Based tree as a non-managed DTC. (LAN Address = 00-00-00-00-00-00). All ports with an ldev number assigned in the DTC will be assigned the default profiles.
7. If you want to define unique parameters for ports, i.e., port name, you will be limited to the 1024 unique profiles available for the DTS subsystem.

Configuration Issues to Consider before Migrating

This section describes different configuration situations that you may have on your OpenView DTC Manager PC and Host systems and what you can do to reconfigure some items to make the migration go as smoothly as possible. This section also describes what configuration changes you may need to make after performing the migration process. In all situations these configuration considerations only need to be applied to the system that will become the host system that will manage DTCs. If you want, you can elect to distribute the DTC to more than one host.

Your Host's Configuration is Currently PC-Based

The migration process was designed such that this is the most likely situation that will be migrated to Host-based DTC management. In this situation, there are the following four scenarios to consider. It is possible that your configuration will have one or more of these conditions. Review both the PC-based and Host-based configurations in your NMCONFIG file and take the ACTIONs described below to reconfigure your file to best migrate your configuration.

All of the DTCs migrated from the PC are also configured in the PC-based tree on the host

This means that there is a one-to-one correspondence between the DTC migrated from the PC and those that are configured in the PC-based tree in the NMCONFIG file. The DTCs are matched by comparing the DTC Node Name.

All of the nailed ldevs numbers configured on the PC-Based DTCs will be merged onto the Host-based DTC. The non-nailed TIO ports and the HOST type ports will be retained on the Host-based DTC.

ACTION: To minimize the corrections to the configuration after the migration, check that all SIC printer ports and all PAD devices that were configured on the PC have an ldev number assigned on the corresponding DTC in the PC-based tree. The TIO ports are matched by card and port number and the PAD ports are matched by the PAD device name.

Any SIC printer or PAD device that does not have a corresponding configuration in the PC-based tree will be left with the TIO ports configured with ldev of (-1) and PAD ports configured with ldev of (1) in the Host-based tree. Both the Host Migration tool and Validation will detect the error. Use NMMGR to correct the configuration and rerun validation.

There is still a DTC configured in the Host-base tree

ACTION: You must delete any DTCs that are configured in the Host-based tree prior to performing the migration process otherwise the following behaviors will occur.

For each DTC remaining in the Host-based tree:

- Any DTC with the same DTC name as the DTC Label on the PC will be overwritten with the configuration from the PC.
- When the Host migration tool is run, the PC-based tree will be searched for a DTC with a matching DTC Node Name. If a DTC with the same DTC Node name exists in the PC-based tree, the configuration will be merged with the Host-based DTC.

- If a DTC with the same DTC Node name does not exist in the PC-based tree, the Host Migration tool will display an error message. The DTC configuration will be unchanged.

A DTC migrated from the PC is not configured in the PC-based tree

This means that at the time the Host Migration tool is run, there is at least one DTC migrated from the PC where a DTC does not exist with a matching DTC Node Name in the PC-based tree of the NMCONFIG file. This situation could be due to the condition that a DTC managed by the OpenView DTC Manager is configured on another host that is also configured as PC-based.

For those DTCs that are not configured in the PC-based tree, the migration process will leave all the TIO ports configured with ldev of (-1) and all PAD ports configured with ldev of (1) in the Host-based tree. When you run the Host Migration tool, you will see error message describing the DTCs that have this configuration.

ACTION: If you do want this system to manage this DTC, you must use NMMGR to assign valid ldev numbers to the TIO printer ports and PAD devices to successfully validate the file.

A DTC is configured in the PC-based tree that is not migrated from the PC

This means that at the time the Host Migration tool is run, there is at least one DTC in the PC-based tree where a DTC does not exist with a matching DTC Node Name in the Host-based tree of the NMCONFIG file. This situation could be due to the condition that the appropriate DTC was not selected when the PC Migration tool was run, or the DTC is managed by a different platform.

The Host Migration tool will copy the DTC to the Host based tree as a non-managed DTC (LAN Address=00-00-00-00-00-00) and assign the default profiles to the TIO and PAD Ports. An error message will be displayed describing this situation.

ACTION: If you want this non-managed DTC in your configuration. Then no action needs to be taken to create a valid configuration. Otherwise you can delete the DTC from the host-based configuration.

Your Host's Configuration is Currently Host-Based

This section describes the issues to consider if your host is currently configured for Host-Based DTC Management. You may have one or more managed or non-managed DTCs. In this situation, there are the following four scenarios to consider. It is possible that you configuration will have one or more of these conditions. Review the Host-based configurations in your NMCONFIG file and take the ACTIONs described below to reconfigure your file to best migrate your configuration.

You Have a Managed DTC

In this case your host has a DTC that is currently configured in the Host-based tree of your NMCONFIG file and you want to add the DTCs managed by your OpenView DTC Manager PC to the NMCONFIG file.

ACTION: If you want to keep the configuration of these DTCs run NMMGR and ensure that the DTC in the Host-based tree has a different DTC name than the DTC Label on the DTC to be migrated from the PC. Then use the migration file generated by the PC to add the configurations for the DTC from the PC.

For those DTCs that are migrated from the PC, there is no DTC configuration from which to get valid ldev numbers for nailed ldevs. The TIO ports are configured with ldev of (-1) and PAD ports configured with ldev of (1) in the Host-based tree. Validation will detect the error.

ACTION: DO NOT run the Host Migration tool. On the DTCs that are migrated from the PC, you must run NMMGR and assign valid ldev numbers to the nailed TIO Ports and PAD devices.

You have a Non-managed DTC I
n this case you can have two possibilities: The non-managed DTC is one of the DTC that you are migrating from the PC; the non-managed DTC is managed from another platform.

The non-managed DTC is being migrated from the PC The non-managed DTC is the one you are migrating from the PC and you want to keep the configuration of this DTC, the following actions will merge the port configurations into the configuration migrated from the PC.

ACTION: **DO NOT** run the Host Migration tool. Run `NMMGR` and ensure that the DTC in the Host-based tree has a different DTC name than the DTC Label on the DTC to be migrated from the PC. Then use the migration file generated by the PC to add the configurations for the DTC from the PC.

1. Use the `NMMGR Copy Subtree` function to copy the following paths:

   ```
   Source Path:DTS.DTC.SELECT.<Host DTC>.CARD012
   Target Path:DTS.DTC.SELECT.<PC DTC>.CARD012
   ```

   Overwrite existing subtree [Y

   and

   ```
   Source Path:DTS.DTC.SELECT.<Host DTC>.CARD345
   Target Path:DTS.DTC.SELECT.<PC DTC>.CARD345
   ```

   ```
   Overwrite existing subtree [Y]
   ```

   Where `<Host DTC>` is the DTC Name of the non-managed DTC in the NMCONFIG file and `<PC DTC>` is the DTC Label of the DTC that was migrated from the PC.

2. After performing the Copy Subtree, delete the non-managed DTC from the `NMCONFIG` file.

The non-managed DTC is being managed from another platform. In this case the configuration of the DTC is managed by a management platform other than the PC from which you will migrate the DTC configuration and you want this DTC to continue to be managed by that platform.

ACTION: **DO NOT** run the Host Migration tool. Run NMMGR and ensure that the DTC in the Host-based tree has a different DTC name than the DTC Label on any DTC to be migrated from the PC.

Process for Migrating from PC-Based to Host-Based DTC Management

The following is the process for migrating the configuration from the OpenView DTC Manager PC to an HPe3000 host.

On the Target MPE System

1. This process will need to use FTP to transfer a file from the PC to the host. Ensure that the ARPA services are running:

   : showjob

2. If you don't see a job logged on as: JINETD,MANAGER.SYS then check that FTP is properly configured on the host. Then check that the network services are running and start the ARPA process.

   :stream jinetd.net

On the Open View DTC Manager PC

3. Install the OpenView DTC Manager patch with the migration tool on the Local PC.
4. On the Local PC, logon to the DTC Mgr PC where the DTCs that will be migrated are being managed (this can be the Local or a Remote DTC Manager).

NOTE

The Remote DTC Manager PC does NOT have to have the patch installed.

5. On the HP OpenView Menus select [DTC Tools] [Manage Multiple DTCs…]. Select the new button labeled 'Migrate to Host-Based Mgmt"
6. Select the DTCs from the Known DTC's List to be migrated, click OK. You will be prompted for the migration filename to be used.
7. Select or type the filename in the filename box. The extension is set to *.PUB so that the file will be copied to group PUB when it is transferred to the host.

   The tool will run and display any errors it encounters. If you see the message 'Command successfully completed', then proceed to the next step otherwise fix any errors that need to be fixed. See the file c:\dtcmgr\exe\multidtc\multidtc.err for a list of all errors that occurred.

   The following message is only a warning, if this was the only error displayed, then the generation of the migration file was successful:

   The TAC is not supported on Host-Based Management.
   Remove the TAC before downloading the DTC from the Host.

8. Copy the migration file to the HP e3000 host:

   On the START menu, select [Programs] [MS-DOS Prompt] In the MS-DOS window enter the following commands:

```
C:\> cd \dtcmgr\exe\multidtc

C:\> dir          ( you should see the migration filename created above.)

C:\> ftp <HP e3000 system>

User> PC,manager.sys,pub

Password> (enter passwords, if any)

ftp> put <migration file> <MPE filename>;rec=,,v,ascii
     (<MPE filename> must be a legal MPE filename.)

Example:

ftp> put nmcfgcmd.pub nmcfgcmd.pub;rec=,,f,ascii


ftp> quit

Exit the MS-DOS window.
```

On the MPE System

9. Install the patches that contain the new Host-based Management functions. When the system is rebooted. DTS should startup normally, even though the NMCONFIG file is still the old format.

10. Save a backup copy of your NMCONFIG file.
11. Run NMMGRVER to update the NMCONFIG file to the version for these patches.
12. Run NMMGR and make the following configuration changes:
    - If your configuration is currently PC-Based, then make sure only those DTC that you wish to migrate to the host based configuration are configured. DELETE any that should not be migrated.
    - Perform any of the configurations changes that are needed to account for the conditions described in the section “Your Host’s Configuration is Currently PC-Based”.
    - Execute Validate/DTS to ensure that there are no validation errors.
    - Go to the NMMGR Main screen and configure:

      ```
      Are you using OpenView DTC Manager?   [N]
      ```

      If any DTCs on the OpenView DTCMgr PC have or if you plan to use any of the host-based DTCs for X.25 system-to-system or PAD connections then configure:

      ```
      Do you have X.25 system-to-system or PAD connections?  [Y]
      ```
    - On the DTS Host Configuration screen enter a valid profile name for the non-nailed TIO and PAD port profiles. Enter the number of non-nailed ldevs desired. Enter valid entries for the Link fields (Link name, Link Type, Physical path of LANIC).
    - Perform any of the configurations changes that are needed to account for the conditions described in the section “Your Host’s Configuration is Currently Host-Based”.
    - Validate the configuration with Validate/DTS. Exit NMMGR.
13. Use the file created on the PC to create the new Host-Based DTC configuration:

    ```
    :file nmmgrcmd=<MPE filename>
    ```

    Where <MPE filename> is the file transferred from the PC. The command file will perform the commands on NMCONFIG.PUB.SYS.

    Run NMMGR with one of the following commands:

    ```
    :NMMGR
    ```

    Or to capture the output in a file:

    ```
    :NMMGR >NMMGROUT
    ```

    NMMGR will run and execute the commands in the file.
14. When NMMGR finishes, review the results and ensure that no errors occurred other than the following allowed messages:

    ```
    :SAVE NMMGROUT

    :RESET NMMGRCMD

    Item already exists.  (NMGRERR 21)

    The source path was not found. (NMGRERR 280)
    ```
15. .Run NMMGRVER with the special parm that will launch the Host Migration tool:

    ```
    :run NMMGRVER;PARM=77
    ```

You will be prompted for the filename to be migrated. Enter NMCONFIG.PUB.SYS. This will run the tool that will take the DTCs configured in the PC- tree and merge them with the configuration added by the command file created on the PC.

The following message will be displayed if the migration was successful. If you see any other error messages, the migration was not successful. Go to the manual *Using the Node Management Services (NMS) Utilities* for more detailed descriptions and action to take to fix them.

```
CONVERSION completed successfully. (NMMGRVERMSG 0)
```

16. If the Host Migration tool finds any configuration discrepancies, then you will see the following message:

    ```
    Migration process found configuration discrepancies. (NMMGRVERWARN 50)
    ```

    The tool will also display messages indicating the nature of the discrepancies. You must correct them for the configuration to validate successfully. See Appendix B for the cause and action to take to correct any configuration discrepancies.

17. Run NMMGR and correct any configuration errors.
18. Update the configuration to customize any TIO or PAD ports you desire.
19. Run Validate/DTS and correct any validation errors found.
20. Perform a DTS shutdown/restart:

    ```
    :dtccntrl func=shutdown;forced=y

    :dtccntrl func=restart
    ```

21. Shutdown the OpenView DTC Manager PC that WAS managing the DTCs. Remove any TACs that may still be installed in the DTCs.
22. Cycle the power OFF then ON for all the DTCs. They should reset and download successfully from this host.
23. Startup X.25 and PAD protocols on any desired DTC. You can use the new Manage Multiple DTC option in TermDSM:

    ```
    :termdsm.diag

    Connect  DIag     DTc      DUmp     EEprom   Help

    Multi    Reset    Status   Trace    X25site  EXit    ?M

    (multiple operations)

    Current operation  NONE. Selected Modules X.25 [ ] PAD [ ]

    STARt #,#        (X.25,PAD)

    STOp  #,#        (X.25,PAD)

    Dtc   #          List of DTCs

    (carriage return to exit)  ?
    ```

Running NMMGRVER from NMMGR

The New Host-Based Management release provides two ways to launch NMMGRVER from within NMMGR.

- When the New Host-Based Management is first installed and the NMCONFIG file needs to be updated.

- To launch the Host Migration tool to merge the PC-based DTC configurations into the Host-based configuration.

These two methods allow you to upgrade your configuration to the latest release and to migrate the DTC configured in the PC based configuration to Host-Based Management with the minimum of interruptions in your system operations.

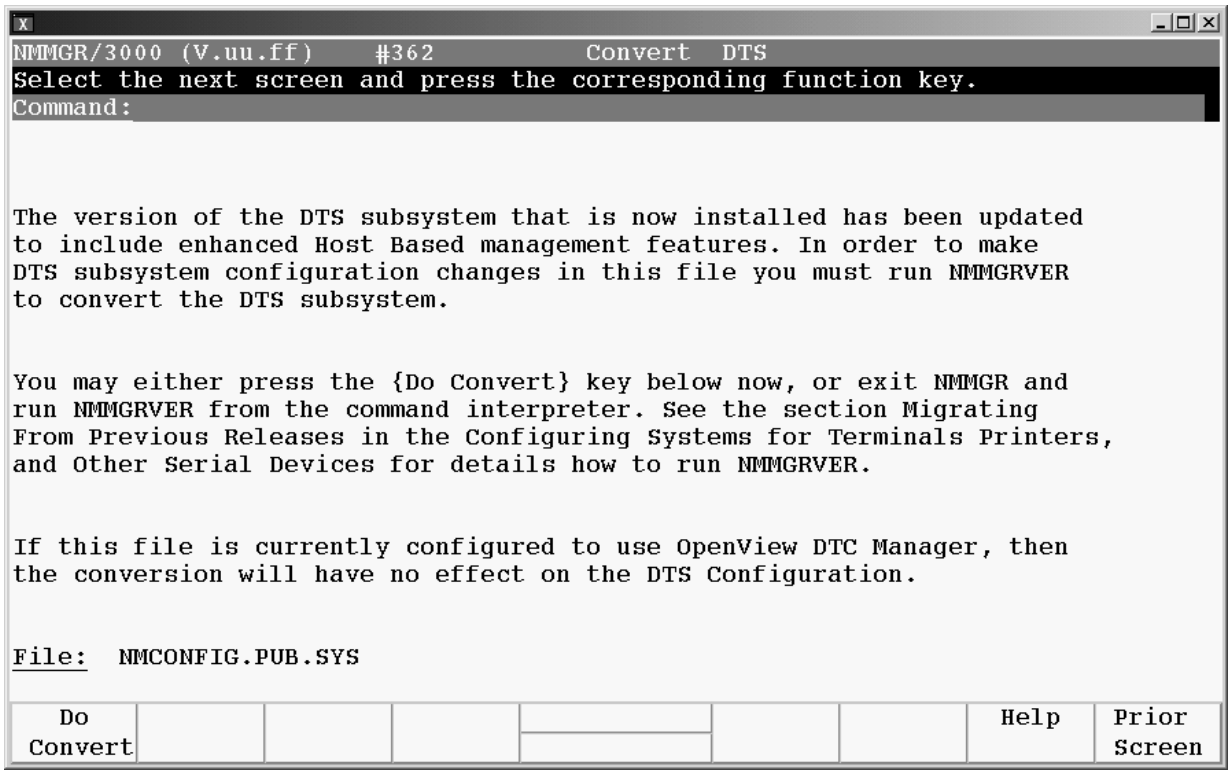
Upgrade NMCONFIG Version after installation of the New Host-Based Release

Within the New Host-Based Management release, NMMGR and the DTS subsystem utilize updated structures in the NMCONFIG file to manage the new Host-based functions. When the system is rebooted after the release is installed, the NMCONFIG file is still the old format. To allow the system to startup without error, the DTS subsystem will recognize that the NMCONFIG file is the previous release and successfully startup the DTS subsystem. You will see the following message indicating this:

```
DCC WARNING 15-22, NMCONFIG is previous version, Run NMMGRVER (DCCWARN=52)
```

If you run NMMGR but have not yet run NMMGRVER, you will see the following screen if you press the [DTS] key at the NMMGR Main screen. This screen indicates that the NMCONFIG file is still the old format and NMMGR can not make changes to the DTS subsystem. Although the DTS subsystem is correctly configured, you will not be able to make changes to the DTS configuration until you update the NMCONFIG file to the latest release with NMMGRVER.

Figure B-1 Convert DTS Screen



If you press the **[Do Convert]** key, NMMGR will automatically run NMMGRVER to allow you to update the NMCONFIG file. Follow the instructions above “Running NMMGRVER to Update Release Version”. When the update is complete, you can press the **[Prior Screen]** and resume configuring the DTS subsystem.

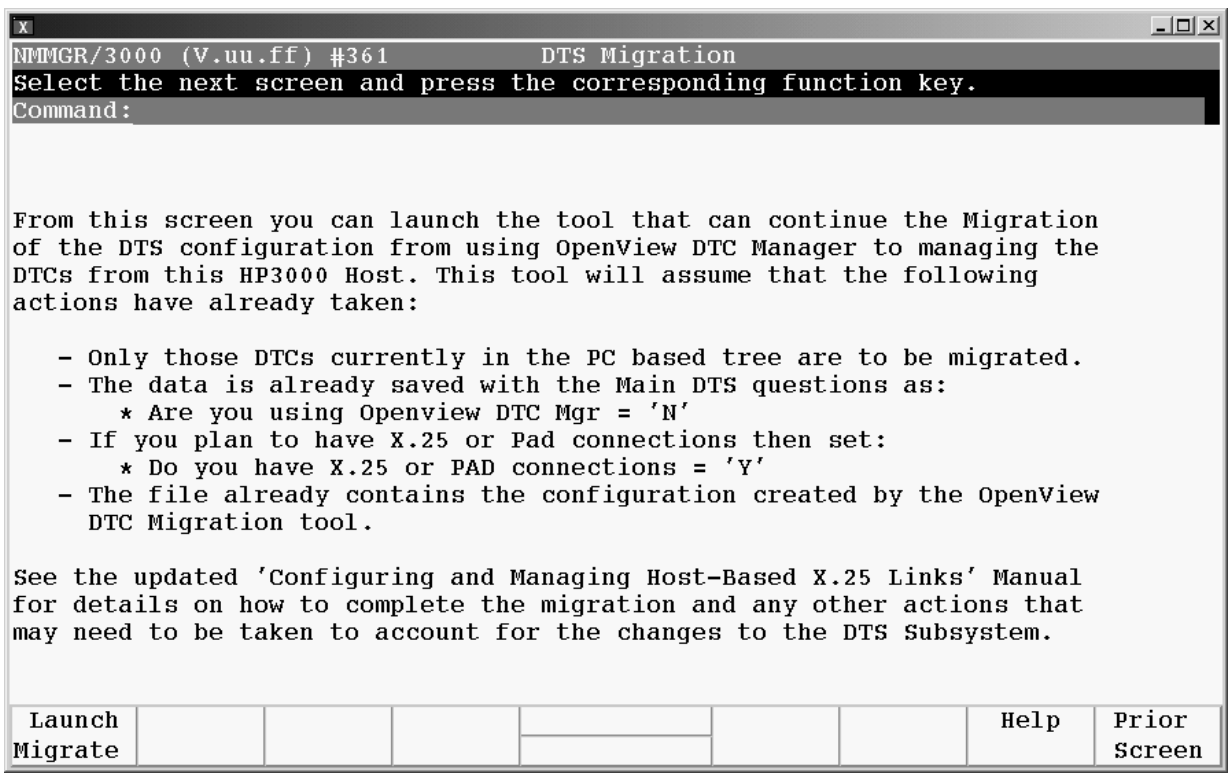
NOTE Dynamic configuration will be disabled until you run DTCCNTRL and perform a SHUTDOWN and RESTART of the DTS subsystem. See Chapter 7, "Managing Networks with DTCCNTRL" for detail on how to shutdown and restart DTS.

Migrate NMCONFIG file to Host-based Management

One of the steps to migrate from PC-Based management to Host-Based Management is to migrate the configuration of your DTCs from the PC-Based configuration to the Host-Based configuration using the Host Migration tool integrated into NMMGRVER. Before running the Host Migration tool review the section above "Your Host's Configuration is Currently PC-Based" and the section "Process for Migrating from PC-Based to Host-Based DTC Management". Complete any configuration tasks needed that are prior to running the Host Migration tool.

Once you have completed the necessary steps prior to running the Host Migration tool, you can launch the Host Migration tool from within NMMGR. To launch the Host Migration tool, press the **[Utility]** key on the NMMGR Main screen. On the Utility screen, press the **[Go To MIGRATE]** key. You will see the following screen.

Figure B-2 DTS Migration



Launch the tool by pressing the **[Launch Migrate]** key. You will be prompted for the filename to be migrated. Enter NMCONFIG.PUB.SYS.

C DTC User Interface

This appendix explains how to use the DTC user interface. Only terminals which are allowed terminal switching are connected to the DTC user interface.

Command Line Syntax

The following conventions are used for commands which must be entered at the DTC user interface.

[optional]	Text in square brackets is optional and need not be typed. For example, in the `c[onnect]` command, you can type `connect` or just `c`.
<variable>	Text in chevrons represents a variable which must be entered, for example, the name of a system. You do not type the chevrons.
either|or	A pipe (|) is used to separate two items, one of which must be entered. For example, in `<node name	IP address>` you must enter either a node name or an IP address.

DTC User Interface Commands

The following commands are available at the DTC user interface. Each command can be abbreviated. For example, to establish a connection, you can enter either `C` or `CONNECT`. The commands are not case-sensitive, so either `c` or `C` can be used.

Connect

`Connect` opens a connection to a system. The syntax of the command is:

```
C[ONNECT] < NODE NAME | IP ADDRESS | DNS NAME >
```

- If a default destination has been defined for the port, then entering just `C` or `CONNECT` will connect directly to the system.
- You should *never* pad an IP address with leading zeros. For example, if the IP address you are trying to connect to is `128.10.12.11`, you must type `connect 128.10.12.11`. If you type `connect 128.010.012.011`, the connection attempt will fail.

Disconnect

`Disconnect` closes the current system connection.

```
D[ISCONNECT]
```

Help

`Help` displays a list of the available commands, their abbreviations, and a brief explanation of what they do.

```
H[ELP]
```

Logout

`Logout` logs the user out of the DTC.

```
L[OGOUT]
```

- If the connection is via modems, the line is dropped.
- If a session is open on a system, it is closed.

Recall

`Recall` resumes a connection.

```
R[ECALL]
```

Set ASCII

`Set ASCII` sets the data transfer mode to ASCII if it has previously been set to binary by a `Set Binary` command. For **back-to-back** connections only.

```
[SET]A[SCII]
```

Set Binary

`Set Binary` sets the data transfer mode to binary. For **back-to-back** connections only.

```
[SET]B[INARY]
```

Status

`Status` displays a table showing information about the open connections from the terminal.

D RAFCP Theory of Operation

Routable AFCP is an encapsulation of AFCP packets under UDP/IP to provide the support of Terminals and Printers with the DTC and HP e3000 series 900 over a routed IP network. The encapsulation is done in the DTC. A remote dtc (RDTC) encapsulates the AFCP packets under UDP/IP and sends these packets to the front-end dtc (FEDTC). The FEDTC deencapsulates these packets and sends AFCP packets transparently to the HP e3000. For data sent in the opposite direction, the HP e3000 sends AFCP packets to the FEDTC. The FEDTC encapsulates these packets under UDP/IP and sends them to the RDTC. The RDTC deencapsulates them and forwards them to the addressed DTC port.

RAFCP allows terminals and printers to be used within routed networks. With the exception of the DTC 16RX, the DTCs can not be managed over a routable network. Remote Local Switch (RLS) on OpenView DTC Manager allows the central management of remote OpenView DTC Managers over IP networks.

Routable AFCP is supported on the following hardware and with the listed limitations:

- Remote DTCs can be DTC 72MX, DTC 16MX, DTC 16RX, DTC 16 and DTC48 with memory extensions. The DTC 16iX, 16TN and DTC48 w/o memory extension do not support Routable AFCP.
- Front End DTCs can be DTC 72MX, DTC 16MX, DTC 16RX and Telnet Express Box. These DTCs do not need to be dedicated to Routable AFCP. They can be used as regular DTCs at the same time.
- Each FEDTC and RDTC are managed by it's own DTC Management platforms. The Management platform can be the DTC 16RX Manager (DTC 16RX only), the Windows 95 Openview DTC Manager or by the HP e3000 using Host-Based Management.
- RAFCP requires MPE 5.0 Push release and OpenView DTC Manager 14.2 or DTC 16RX Manager 14.2 or newer.
- When the DTC is managed by the HP e3000 you must have the MPE/iX release 7.0 or 7.5 and must have installed the same patch set as described in Table B.1 or Table B.2 in Appendix B "Migrating from a Previous Release" to enable the FEDTC to allow RAFCP. See the section "Migrating your Configuration to Host-Based Management" in Appendix B.
- The FEDTC function has no table which limits the max number of connections it can handle. The level of traffic is limited by the DTC's processing power (e.g. by the number of packets it can transfer and by the other traffic it may be handling (local terminals, HP e3000 Telnet Access, or X.25)). More than 300 active connections have been opened through a FEDTC.

DNS Requirements

DNS contains the core information to resolve RAFCP addressing. There are 2 entries for each MPE/iX accessed using RAFCP: a Well Known Service (WKS) record which contains the IP address of the FEDTC and a protocol number referring to UDP; a TeXT (TXT) record which contains the Node name of the MPE/iX host. This name must be the same as the one entered under NMMGR on the host. There is one entry for the RDTC accessed by the FEDTC using RAFCP. It consists of an Address (A) record which contains the IP address of the RDTC. The RDTC name is the Node name configured on OpenVeiw DTC Manager of the RDTC. The ARPA domain is the one of the FEDTC.

NOTE An MPE/iX host and a RDTC must always be configured in the DNS to access the same FEDTC. Not doing this may prevent packets of the MPE/iX host (belonging to the same AFCP connection) from being forwarded correctly by the FEDTC.

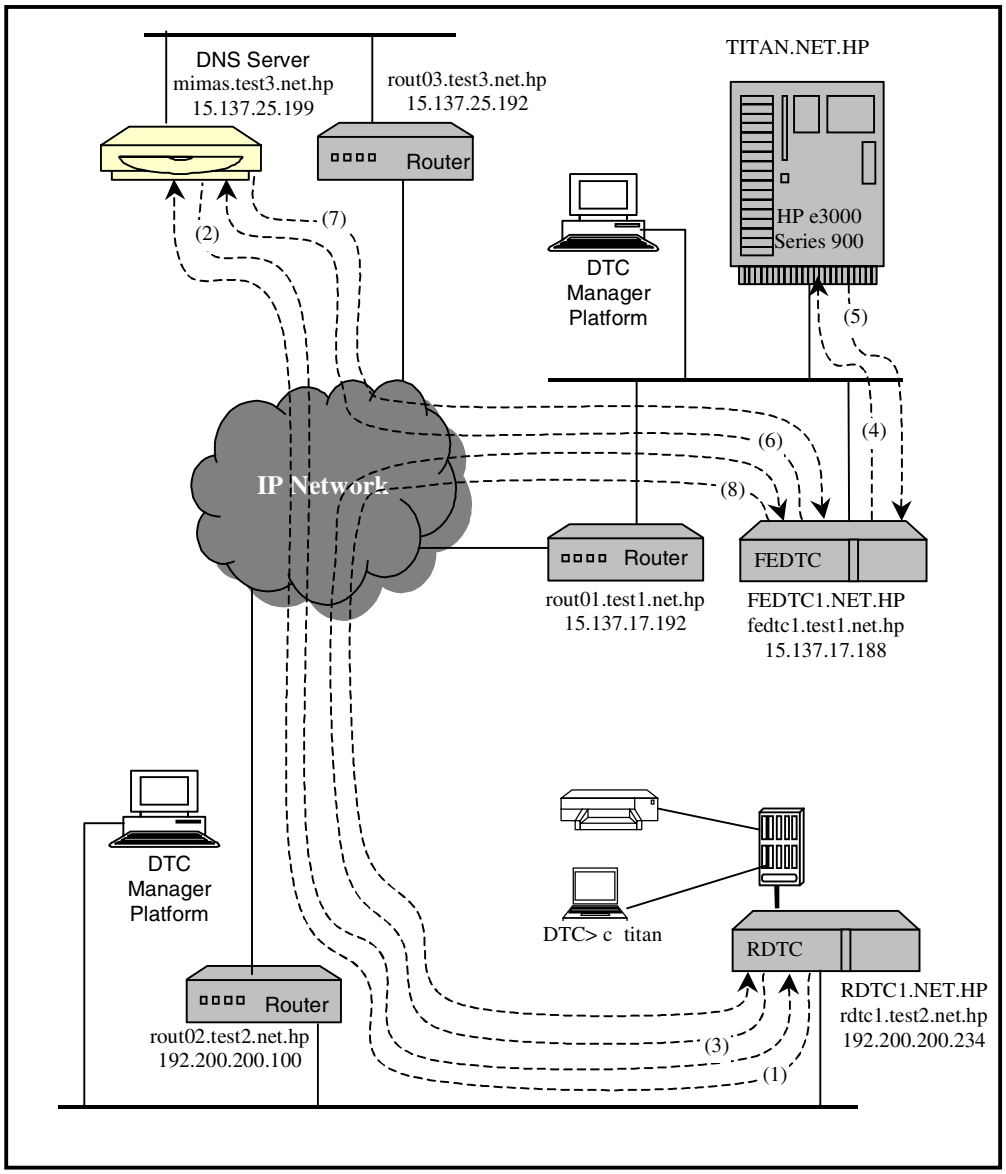
NOTE The DNS standard does not allow the use of underscores "_" in ARPA names. HP Node name may contain underscores "_". A DTC Node name configured in NNMGR or in the OpenView DTC Manager must not contain underscores "_". These names are resolved using DNS.

When users type the DTC connect command, they don't specify the ARPA domain corresponding to the FEDTC they access. If they don't specify one, the ARPA domain of the RDTC will be used to interrogate DNS. DNS must be configured accordingly.

Routable AFCP Example Configuration

This section describes how to setup and configure the DTCs and the management platform for Routable AFCP. Figure 1-6 is a figure that shows the topology of the hardware needed. The detailed configuration paramters that apply to this figure are listed below. In the figure below Uppercase names are NS domain names and lowercase names are Arpa Domain Names.

Figure D-1 Routable AFCP Example Configuration



Incoming connections through RAFCP are established by the following process

- When a user types a Connect command with a node name for an MPE/iX host, The RDTC interrogates the DNS (1). If an entry for the MPE/iX host has been entered for RAFCP, the DNS server replies (2) by providing the IP address of the FEDTC and the Node Name (NS format) of the MPE/iX host.
- Using the information provided by DNS, the RDTC sends a UDP/IP packet to the FEDTC (3). This packet contains an AFCP packet with the Node Name (NS format) of the MPE/iX host and the Node Name (NS format) of the RDTC.
- The FEDTC transmits a probe request using the Host Node name provided by the RDTC (4).
- The MPE/iX host replies to the probe request and sends the first AFCP packet to be sent back to the RDTC (5).
- The FEDTC receives the first AFCP packet that contains the Node Name of the RDTC.The FEDTC interrogates the DNS server (6) using the node part of the Node Name of the RDTC and its own ARPA domain. The DNS server provides the IP address of the RDTC (7).
- The FEDTC encapsulates the AFCP packet under UDP/IP and forwards it to the RDTC (8). An AFCP connection is established between the MPE/iX host and the RDTC through the FEDTC. Data is exchanged between the MPE/iX host and the user.

SPCIAL NOTES: The RDTC will first look in its cache table to resolve the address. If it does not find the information in its cache table, it interregates DNS and stores the information received in its cache table.

The FEDTC will first look in its probe cache table to resolve the MPE/iX node name. If it does not find the information in its cache table, it sends a probe request using the node name provided by the RDTC (retrieved from DNS).

The FEDTC or the RDTC does not always store the resolved addresses in its cache tables to allow load balancing between Front-Ends.

The following tables list the typical configuration parameters that are necessary to configure Routable AFCP as shown in the figure D-1 above.

Table D-1 Routable AFCP Configuration Parameters

The Remote DTC (RDTC) Configuration

DTC Configuration

DTC Node Name	RDTC!.NET.HP
IP Address	192.200.200.234
RAFCP Front End	NO

Domain Name Service

Default Server Address	15.137.25.199
Backup Server Address	000.000.000.000
Default Local Domain	test2.net.hp.

IP Routing

Table D-1 Routable AFCP Configuration Parameters (Continued)

Default Router Address	192.200.200.100
Backup Router Address	000.000.000.000
Subnet Mask	255.255.255.000

The Front End DTC (FEDTC) Configuration

DTC Configuration

DTC Node Name	FEDTC1.NET.HP
IP Address	15.137.17.188
RAFCP Front End	Yes

Domain Name Service

Default Server Address	15.137.125.199
Backup Server Address	000.000.000.000
Default Local Domain	test1.net.hp

IP Routing

Default Router Address	15.137.17.192
Back Router Address	000.000.000.000
Subnet Mask	255.255.248.000

Table D-2 The DNS Server Configuration

Name	Class	Type	Data	
@	IN	SOA	mimas.net.test. root.mimas.net.test. (1 ; Serial 10800 ; Serial 3600 ; Refresh every 3 hours 604800 ; Expire after a week 86000) ; Mimimum ttl of 1 day	
	IN	NS	mimas.net.test	
localhost	IN	A	127.0.0.1	
mimas	IN	A	15.137.17.199	
fedtc1	IN	A	15.137.17.188	
rdtc	IN	A	192.200.200.188	
titan	IN	WKS	15.137.17.188	17
titan	IN	TXT	“RAFCP HOST=titan.net.test	

Configuration Tips

If you have configured a DTC16RX as the remote dtc, and the 3000 is configurea as HOST based for DTC management, remember to match the following EXACTLY as they are configured on the DTC16RX config screens.

1. 1.Match the DTC node name EXACTLY as configured on the 9000 rdtc configuration screens.
2. Match the physical hardware (including the port types).
3. Enter `00-00-00-00-00-00` for the `MAC ADDRESS` of the DTC16RX

If the HP e3000 is host based, then the devices on the dtc's must be NAILED to LDEV's (Printer ports imply NAILED devices).

Troubleshooting

Make sure all nodes involved respond to `PING`. If not re-check ip addresses, subnet masks, and routing table info.

NOTE In order to test the functionality of RAFCP, the product needs to be working over a routed network. It **WILL NOT WORK** if the DTC is on the same subnet with the 3000!

A neat trick to test how the DNS server will respond to a DNS request is to perform the following;

```
nslookup
>set querytype=any
```

At this point, you should be able to enter the different DNS names and retrieve IP addresses for the DTC's, the UDP and TXT entry for each host.

E Error Messages

This Appendix contains validation, DataCommunication Configurator (DCC), and DTCCNTRL error messages.

Validation errors indicate problems with the network management configuration file. They are detected within NMMGR configuration when you attempt to validate the network management configuration file.

DCC errors indicate problems with the link or the DTS manager. They are detected when the system is rebooted, DTS shutdown or restart is performed, or certain dynamic configuration errors occur.

DTCCNTRL errors indicate problems that occurred while you were attempting to use the DTCCNTRL command to manage the operation of X.25 or PAD support services or perform dynamic configuration tasks.

Validation Error Messages

The network management configuration file must be validated before automatic cross-validation with SYSGEN takes place.

The DTS validation procedure starts by displaying the following:

```
 -> Validation of DTS/LINK started. <-
```

Errors are then listed. When the validation procedure is complete, it will print the following:

```
nnn Encountered Errors

-> Validation of DTS/LINK finished. <-
```

where *nnn* is the total number of errors found during validation.

A numerical list of validation error messages and actions for each follows.

(DTSERR 3) **Path: NMMGRpath — A read error encountered while reading the data record (bad file).**

Cause: Either a hardware problem occurred or the data record is too long.

Action: Try to print the network management configuration file. Rebuild the file from a copy of the sample file NMSAMP1.PUB.SYS. If the problem persists, contact your Hewlett-Packard support representative.

(DTSERR 4) **Path: NMMGRpath — A write error encountered while updating the data record (bad file).**

Cause: Either a hardware problem occurred or the data record file is too small.

Action: If the data record file has been compressed, it is impossible to validate the file. Go to the UTILITY screen and use the compression utility to make the file larger. Try to validate the file. If it still fails, build the file from a copy of the sample file NMSAMP1.PUB.SYS. If the problem persists when verifying the new file, contact your Hewlett-Packard support representative.

(DTSERR 5) **Path: NMMGRpath — The data record is empty (use Update Data function key).**

Cause: The data record was not created for the *NMMGRpath*.

Action: Go back to the screen specified by the *NMMGRpath* and update the screen.

(DTSWARN 6) **Path: NMMGRpath — The same physical path is being used at LINK.linkname.**

Action: This a warning only. No action is required.

(DTSERR 7) **Path: NMMGRpath — The same station address is being used at LINK.linkname.**

Cause: The IEEE 802.3 station address is already used. Each station address must be unique.

Action: Go back to the screen specified by the *NMMGRpath* or go to the screen specified by the *linkname* and correct the station address.

(DTSERR 8) **Path: NMMGRpath — LINK.linkname is not defined.**

Cause: The *linkname* specified on the DTS Configuration screen is not defined; therefore, the link data record was not created.

Action: Verify the *linkname* on the Host Configuration screen. If the link data record does not exist, update the DTS Configuration screen.

(DTSERR 9) **Path: NMMGRpath — The non-nailed device profile <name> is not defined.**

Cause: The *profilename* on the screen specified by the *NMMGRpath* is not defined; therefore, the profile data record does not exist.

Action: Check that the profile name exists on the DTS Profile Selection screen and, if it does, check that the data record for this profile was created.

(DTSERR 10) **Path: NMMGRpath — The same station address or node name is being used for DTC <name>.**

Cause: The station address or node name used on the screen specified by the *NMMGRpath* is also used on the screen specified by the path DTS.DTC.SELECT.DTCname screen.

Action: Go to the screen specified by the *NMMGRpath* or to the screen specified by the *DTC name* and modify the station address or node name.

(DTSERR 11) **Path: NMMGRpath — The same LDEV #nnn is being used at DTC<name> in card 0, 1, or 2.**

Cause: The logical device (ldev) number is being used on the screen specified by the *NMMGRpath* and on the specified DTC and one of the three cards.

Action: Go to one of the two screens and change the ldev number. The ldev number must be unique for each port.

(DTSERR 12) **Path: NMMGRpath — The same LDEV #nnn is being used at DTC <name> in card 3, 4, or 5.**

Cause: The same logical device (ldev) number is being used on the screen specified by the *NMMGRpath* and on the specified DTC and one of the three cards.

Action: Go to one of the two screens and change the ldev number. The ldev number must be unique for each port.

(DTSERR 14) **Path: NMMGRpath — LDEV #nnn is too big (must be <=4679).**

Cause: The logical device (ldev) number is bigger than the allowed maximum ldev number.

Action: Go to the screen specified by the *NMMGRpath* and modify the ldev number.

(DTSERR 15) **Path: NMMGRpath — Too many LDEVs are being used (must be <=4649).**

Cause: Too many logical device (ldev) numbers are being used.

Action: Review the screens that use ldevs and delete some ldev numbers. The validation procedure allows a total of 4649 ldevs.

(DTSWARN 17) **Path: NMMGRpath — Defined LINK.linkname is not being used.**

Cause: The defined *linkname* is not used by DTS or the network interface.

Action: This is a warning only. No action is required.

(DTSERR 18) **Path: NMMGRpath — Too many links are being used (max. number allowed = 8).**

Cause: The link specified in the *NMMGRpath* cannot be processed. Too many links are already defined.

Action: Go back to the DTS Configuration screen and delete the link specified in the *NMMGRpath*. Delete all unused links so that eight or less links are being used.

(DTSERR 19) **Path: NMMGRpath — Too many paths are being used (max. number allowed =8).**

Cause: The link specified in the *NMMGRpath* cannot be processed. Too many physical paths are already defined.

Action: Go back to the DTS Configuration screen and delete the link specified in the *NMMGRpath*. Delete all unused links so that eight or less links are being used.

(DTSERR 20) **Path: NMMGRpath — Too many DTCs are being used (max. number allowed =120).**

Cause: The DTC specified in the *NMMGRpath* cannot be processed. Too many DTCs are already configured.

Action: Go back to the DTC Configuration screen and delete the DTC specified in the *NMMGRpath*.

(DTSERR 21) **Path: NMMGRpath — Too many nodes are being used (max. number allowed =129).**

Cause: The DTC specified in the *NMMGRpath* cannot be processed. Too many nodes are being used.

Action: Go back to the DTC Configuration screen and delete the DTC specified in the *NMMGRpath*.

(DTSERR 22) **Path: NMMGRpath — Too many classes are being used (max. number allowed =1000). (DTSERR=22)**

Cause: The total number of classes exceeds the maximum allowed number.

Action: Delete class names so that no more than 1000 different class names are associated with asynchronous devices.

(DTSERR 23) **Path: NMMGRpath — Too many profiles are being used (max. number allowed =1024). (DTSERR=23)**

Cause: The total number of defined profiles exceeds the maximum allowed.

Action: Delete profiles so that no more than 1024 are specified.

(DTSWARN 24) **No link is defined. (DTSWARN=24)**

Cause: A link is not configured.

Action: Without a configured link, the network management configuration file is useless. Return to the configuration screens and add a link, making sure that all necessary data records are created.

(DTSWARN 25) **No DTC is defined.**

Cause: A DTC is not configured.

Action: An action is not required if neither terminals, printers, nor both are needed. If terminals and printers are required, return to the configuration screens and add a DTC, making sure that all necessary data records are created.

(DTSWARN 26) **Path: NMMGRpath — LINK.linkname is shared with network interface. (DTSWARN=26)**

Cause: The same link is shared between the DTS and NS subsystem. A separate link must exist for each of the two subsystems.

Action: Decide which of the two subsystems should use the existing link and configure an additional link for the remaining subsystem.

(DTSERR 30) **Path: NMMGRpath — Modem type not supported.**

Cause: The modem type specified on the DTS Terminal Profile screen is not 0, 1, or 2. A problem occurred while adding the ldev to a device class. This could be caused because the class is used by a different type of device such as a HPIB printer.

Action: Remove the class name from the profile for the ldev and delete and re- add the ldev. Cross-validate the NMCONFIG.PUB.SYS file with SYSGEN. Correct any problems found then restart DTS.

(DTSERR 32) **Path: NMMGRpath — Must supply a Physical Path.**

Cause: A physical path was not specified in the Physical Path of LANIC field.

Action: Go to the DTS Configuration screen and enter the appropriate physical path.

(DTSWARN 34) **Path: NMMGRpath — Duplicate profile class name profilename used.**

Cause: The same class name is used in several terminal profiles or the same class name is used in several printer profiles.

Action: No action is required. Informational message only.

(DTSERR 35) **Path: NMMGRpath — Class name duplicated between printer and terminal profiles.**

Cause: The same class name is used for both a terminal profile and a printer profile.

Action: Remove the duplicate class name from the terminal profile or the printer profile.

(DTSERR 36) **Path: NMMGRpath — Profile profilename specified for non-nailed terminals is of PRINTER type.**

Cause: A printer profile is specified where only a terminal profile is allowed.

Action: Change the printer profile to be a terminal profile.

(DTSERR 37) **Path: NMMGRpath — Profile profilename specified for non-nailedPAD terminals is of PRINTER type.**

Cause: A printer profile is specified where only a terminal profile is allowed.

Action: Change the printer profile to be a terminal profile.

(DTSERR 38) **Path: NMMGRpath — PAD device name for LDEV #nnn is being used in DTC <name> on Card x.**

Cause: A PAD name is used more than once on the specified DTC and card number.

Action: Remove all of the duplicate references to the PAD name.

(DTSERR 44) **Path: NMMGRpath — The same PAD LDEV #nnn is being used in DTC <name> on Card x.**

Cause: The same logical device (ldev) number is configured on the PAD card screen specified by the *NMMGRpath* and on the specified DTC and card number.

Action: Remove the duplicate ldev number.

(DTSERR 52) **Path: NMMGRpath — The same node name is being used at linkname.**

Cause: The same node name is used more than once.

Action: Remove the duplicate reference to the node name.

(DTSERR 53) **Path: NMMGRpath — Blank NODENAME.**

Cause: A host node name is not specified on the screen specified in the path.

Action: Enter a host node name on the screen specified in the path.

(DTSERR 54) **Path: NMMGRpath — The profile for LDEV #nnn, profilename, is not defined.**

Cause: An incorrect profile name was used for the logical device (ldev).

Action: Verify the profile name for the logical device in the DTS Profile Selection screen.

(DTSERR 57) **Path: NMMGRpath — Profile profilename specified for non-nailedPAD terminals is of PRINTER or PADPRINT type.**

Cause: A printer or PAD printer profile is specified where only a terminal or pad terminal profile is allowed.

Action: Change the printer profile to be a terminal profile.

(DTSERR 58) **Path: NMMGRpath — The profile for LDEV #nnn, <profilename>, is for a PAD device type.**

Cause: A PAD terminal or PAD printer profile is specified where only a terminal or printer profile is allowed.

Action: Change the PAD terminal or PAD printer profile to be a terminal or printer profile.

(DTSERR 71) **Path: NMMGRpath — Modem behavior DCE high for LDEV #nnn, defined in Profile profilename, is not supported on DTC16 and DTC48.**

Cause: DCE high modem behavior is not supported for devices on a DTC 16 or DTC 48. DCE high is being specified for LDEV #*nnn*, which is on a DTC 16 or DTC 48.

Action: Modify the modem behavior to one that is supported for the DTC, or make sure you have specified the right DTC type (not a DTC 16 or DT C48) for the device with LDEV #*nnn*.

(DTSERR 72) **Path: NMMGRpath — Hardware handshaking for LDEV #nnn, defined in Profile profilename, is not supported on DTC16 and DTC48.**

Cause: Hardware handshaking is not supported for devices on a DTC 16 or DTC 48. Hardware handshaking is being specified for LDEV #*nnn*, which is on a DTC 16 or DTC 48.

Action: Make sure you have specified the right DTC type (not a DTC 16 or DT C48), or if you are configuring ports on a DTC 16 or DTC 48, do not use a profile that specifies hardware handshaking.

(DTSERR 73) **Path: NMMGRpath — Modem behavior is not supported.**

Cause: An invalid modem behavior has been specified. Valid modem behavior values are: 0, 1, 2, or 3. The configuration file may be corrupt.

Action: Modify the modem behavior specified on the Terminal Profile or Printer Profile screens to a valid value.

(DTSERR 74) **Path: NMMGRpath — Invalid AFCP timer selection.**

Cause: You have specified an invalid AFCP timer selection.

Action: Go to the Tune DTC — Timer Selection Screen and choose a value from 1 to 6 for an AFCP timer selection.

(DTSERR 75) **Path: NMMGRpath — Invalid Management timer selection.**

Cause: You have specified an invalid management timer selection.

Action: Go to the Tune DTC — Timer Selection Screen and choose a value of 1 or 2 for a management timer selection.

(DTSERR 76) **Path: NMMGRpath — Baud rate 38400 for LDEV #nnn, defined in Profile profilename, is not supported on DTC16 and DTC48.**

Cause: You have used a profile that specified a baud rate of 38400 for a device that is connected to a DTC 16 or DTC 48.

Action: Make sure you specified the right DTC type (not a DTC 16 or DTC 48), or do not use this profile for the port with LDEV #*nnn*.

(DTSERR 77) **Internal error. Failed to get memory.**

Cause: The operating system was unable to allocate the memory needed to store data used during validation.

Action: Build a new file from the sample file NMSAMP1.PUB.SYS. Try to validate the file. If the same error message appears when verifying the new file, contact your Hewlett-Packard support representative.

(DTSERR 78) **Path: NMMGRpath — A HOST profile is currently configured on LDEV #nnn, must use LDEV # -1.**

Cause: A profile of type HOST has been configured on a DTC port and the ldev specified is not -l.

Action: Ports using HOST profiles are for back-to-back and must have an ldev of -l. Go to the screen specified in *NMMGRpath* and change the ldev to -l or use a different profile that is not of type HOST.

(DTSERR 79) **Path: NMMGRpath — X.25 card is not allowed in slot s.**

Cause: An X.25 card has been configured in a slot that is not allowed for the DTC type.

Action: Go to the DTC specified in the *NMMGRpath* and delete the X.25 card from the slot number *s*.

(DTSERR 80) **Path: NMMGRpath — Too many X.25 cards are configured. Maximum is 3. (DTSERR=80)**

Cause: To many X.25 cards have been configured in the DTC specified in *NMMGRpath*.

Action: Go to the DTC specified in the *NMMGRpath* and delete one or more X.25 cards.

(DTSERR 81) **Path: NMMGRpath — LAN cardtype is not allowed on DTC16 or DTC48.**

Cause: The configuration for the DTC specified in *NMMGRpath* has a cardtype of "L" configured. This is not allowed for DTC16 or DTC48.

Action: Go to the DTC Configuration screen specified in *NMMGRpath* and enter the correct cardtypes.

(DTSERR 82) **Path: NMMGRpath — Too many LAN cards configured. Only one is allowed.**

Cause: The configuration for the DTC specified in *NMMGRpath* has more than one LAN card specified in the cardtypes.

Action: Go to the DTC Configuration screen specified in *NMMGRpath* and change the extra "L" cardtypes to another valid type.

(DTSERR 83) **Path: NMMGRpath — Unknown cardtype specified for card c.**

Cause: The configuration for the DTC specified in *NMMGRpath* has been corrupted.

Action: Delete the DTC specified in *NMMGRpath* and re-enter the data for this DTC.

(DTSERR 84) **Path: NMMGRpath — Cardtype for card c does not match DTC card configuration.**

Cause: The configuration for the DTC specified in *NMMGRpath* has been corrupted.

Action: Delete the DTC specified in *NMMGRpath* and re-enter the data for this DTC.

(DTSERR 85) **Path: NMMGRpath — Cardtype configured on card c not allowed on dtctype.**

Cause: The configuration for the DTC specified in *NMMGRpath* has been corrupted.

Action: Delete the DTC specified in *NMMGRpath* and re-enter the data for this DTC.

(DTSERR 86) **Path: NMMGRpath — Ldev #nnn> is not valid (must be >= -l and <=4679).**

Cause: The logical device (ldev) number is outside the allowed range.

Action: Go to the screen specified in *NMMGRpath* and modify the ldev number.

(DTSERR 87) **Path: NMMGRpath —Non-nailed Ldev of -1 is not allowed with printer profile.**

Cause: An ldev number of -l has been specified on a port that has a profile configured that is of type terminal or printer.

Action: Go to the screen specified in *NMMGRpath* and change the ldev or specify a profile that is a type HOST.

(DTSERR 88) **Path: NMMGRpath — Profile for ldev #nnn, <profname>, is of HOST type.**

Cause: Profile <profname> is of type HOST and has been configured on a DTC port where ldev specified is not -l.

Action: Ports using HOST profiles are for back-to-back and must have an ldev of -l. Go to the screen specified in *NMMGRpath* and change the ldev to -l or use a different profile that is not of type HOST.

(DTSERR 89) **Path: NMMGRpath — Too few non-nailed ldevs available above TIO start ldev.**

Cause: There are not enough ldevs available above the TIO start ldev number to configure the number of ldev specified.

Action: Lower the number of TIO non-nailed ldevs or delete all TIO non- nailed ldevs and specify a lower starting ldev number. Then add the desired number of ldevs.

(DTSERR 90) **Path: NMMGRpath — Too few non-nailed ldevs available abovePAD start ldev.**

Cause: There are not enough ldevs available above the PAD start ldev number to configure the number of ldev specified.

Action: Lower the number of PAD non-nailed ldevs or delete all PAD non- nailed ldevs and specify a lower starting ldev number. Then add the desired number of ldevs.

(DTSERR 92) **Path: NMMGRpath — Attached device for LDEV#nnn, defined in Profile <profilename>, is not supported on DTC 16 and DTC 48.**

Cause: Modem devices configured (either US inout modem or European inout modem) are not supported on DTC16 or DTC48.

Action: Go to DTC specified in *NMMGRpath* and change the modem type to required modem type other than US inout or European inout.

(DTSERR 93) **Path: NMMGRpath —Eight bit with parity for LDEV #nnn, defined in Profile (profilename>, is not supported on DTC16 and DTC48.**

Cause: Eight bit data length with odd/even parity (“8odd” or “8even”) feature is not supported on DTC 16 or DTC48.

Action: Go to DTC specified in *NMMGRpath* and change the entry for the parity to the required value other than “8odd” or “8even”.

(DTSERR 94) **Path: NMMGRpath — Two stop bits for LDEV#nnn, defined in Profile <profilename>, is not supported on DTC 16 or DTC 48.**

Cause: Modem Two stop bits feature is not supported on DTC16 or DTC 48.

Action: Go to DTC specified in *NMMGRpath* and change the.entry for the stop bts to one.

(DTSERR 95) **Path: NMMGRpath — Binary port config for LDEV#nnn, defined in Profile <profilename>, is not supported on DTC 16 or DTC 48.**

Cause: Modem The feature for forcing data length and parity when binary mode is selected is not supported on DTC 16 or DTC 48.

Action: Go to DTC specified in *NMMGRpath* and change the. entry for the binary port config filed to “N”.

(DTSERR 98) **Path: NMMGRpath — Duplicate IP address or Node name found on card n.**

Cause: Two entries on the screen specified by *NMMGRpath* have the same IP address configured on the specified card.

Action: Go to specified screen and change one of the entries.

(DTSERR 100) **Path: NMMGRpath — Invalid IP address found on card n for X.25 address xxxxx.**

Cause: The format of the IP address for the entry on the screen specified by *NMMGRpath* with the specified X.25 address is invalid.

Action: Go to specified screen and fix the format of the entry.

(DTSERR 101) **Path: NMMGRpath — Invalid IP address or Node name found on card n for X.25 address xxxxx.**

Cause: The format of the IP address for the entry on the screen specified by the *NMMGRpath* with the specified X.25 address could not be determined to be a valid IP address of NS or ARPA Node Name format.

Action: Go to specified screen and fix the format of the entry.

(DTSERR 102) **Path: NMMGRpath — Too many Sys-to-Sys LUG entries found. Maximum is 256.**

Cause: The X.25 table in the DTC specified in *NMMGRpath* cannot be processed. Too many System-to-System Local User Group entries are already configured.

Action: Go to DTC configuration screen and delete the entries until only the specified number remain in *NMMGRpath*.

(DTSERR 103) **Path: NMMGRpath — Too many Sys-to-Sys Switching table entries found. Maximum is 32.**

Cause: The X.25 table in the DTC specified in *NMMGRpath* cannot be processed. Too many System-to-System Switching entries are already configured.

Action: Go to DTC configuration screen and delete the entries until only the specified number remain in *NMMGRpath*.

(DTSERR 104) **Path: NMMGRpath — Too many PAD Switching table entries found. Maximum is 32.**

Cause: The X.25 table in the DTC specified in *NMMGRpath* cannot be processed. Too many PAD Switching entries are already configured.

Action: Go to DTC configuration screen and delete the entries until only the specified number remain in *NMMGRpath*.

(DTSERR 105) **Path: NMMGRpath — Too many PAD Incoming Security table entries found. Maximum is 512.**

Cause: The X.25 table in the DTC specified in *NMMGRpath* cannot be processed. Too many PAD Incoming Security table entries are already configured.

Action: Go to DTC configuration screen and delete the entries until only the specified number remain in *NMMGRpath*.

(DTSERR 106) **Path: NMMGRpath —Node Name field must begin with a letter on card c for X.25 address xxxxx.**

Cause: The format of the Node Name on the screen specified by *NMMGRpath* for the entry with the specified X.25 address is invalid.

Action: Go to specified screen and fix the format of the entry.

(DTSERR 107) **Path: NMMGRpath —Invalid ldev number for PAD device on card c.**

Cause: The logical device (ldev) number is outside the allowed range of 2 to 4679.

Action: Go to the screen specified in *NMMGRpath* and modify the ldev number.

DTSERR 108) **Path: NMMGRpath — Did not find expected X.25 address in an entry on card c.**

Cause: An entry on the screen specified by*NMMGRpath* does not have the required X.25 address filled in.

Action: Go to the screen specified in *NMMGRpath* and add an X.25 address to the entry.

DCC Error Messages

As system start-up nears completion, the Datacomm Configurator (DCC) creates the LINK and DTS managers. If the procedure is successful, the following message will be displayed on the console:

```
DCC STARTUP OK!
```

If the procedure is not successful, the message above is replaced by one or more error messages.

When looking up an error message, note that the following strings of characters are used to represent information that is inserted when the message is generated.

- `P-L` — is replaced by a DCC procedure number and a DCC location number; used for detailed diagnostics by Hewlett-Packard support representative.
- `SSSSSSSS` — is replaced by an eight-digit hexadecimal value; also used for detailed diagnostics.
- `MMM` and `LLL` — are replaced by decimal values; used for detailed diagnostics.
- `PATH` — is replaced by an NMCONF path or LLIO physical path

(DCCERR 1) **DCC ERROR P-L, (LLIO status SSSSSSSS).**

`Cause:` A problem exists with the low-level I/O services.

`Action:` Contact your Hewlett-Packard support representative.

(DCCERR 2) **DCC ERROR P-L, (reply status SSSSSSSS, msg descriptors MMM).**

`Cause:` A problem exists with interprocess communication.

`Action:` Contact your Hewlett-Packard support representative.

(DCCERR 3) **DCC ERROR P-L, Configuration file open error SSSSSSSS.**

`Cause:` The configuration file does not exist or it is locked.

`Action:` Check to see if `NMCONFIG.PUB.SYS` exists. If it exists, verify that it is the proper file type and that it is not locked.

(DCCERR 4) **DCC ERROR P-L, (NMCONF record error SSSSSSSS). NM Path: NMMGRpath**

`Cause:` The DCC surrogate cannot read a record in `NMCONFIG.PUB.SYS`, or data in the file was not validated or the data is corrupt.

`Action:` Validate the `NMCONFIG.PUB.SYS` file and restart DTS. If the error persists, replace the file, validate it, and restart DTS.

(DCCERR 5) **DCC ERROR P-L, configuration record data was invalid. NM Path: NMMGRpath**

`Cause:` Data in the `NMCONFIG.PUB.SYS` file was not validated or the data is corrupt.

`Action:` Validate the `NMCONFIG.PUB.SYS` file and restart DTS.

(DCCERR 6) **DCC ERROR P-L, (HLIO status SSSSSSSS, ldev LLL).**

`Cause:` A problem exists with the high-level I/O services.

`Action:` Contact your Hewlett-Packard support representative.

(DCCERR 7) **DCC ERROR P-L, (Buffer manager status SSSSSSSS).**

Cause: A problem exists with the datacomm buffers.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 8) **DCC ERROR P-L, (External procedure not found, status SSSSSSSS).**

Cause: A problem exists with DCC execution.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 9) **DCC ERROR P-L, (Memory management error status SSSSSSSS).**

Cause: A problem with the system occurred; the DCC cannot obtain memory.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 10) **DCC ERROR P-L, (Ports status SSSSSSSS).**

Cause: A problem with the DCC or the port's subsystem occurred.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 11) **DCC ERROR P-L, time out on reply msg, descriptors MMM.**

Cause: The DCC did not receive a reply message within the allotted time.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 12) **DCC ERROR P-L, too many DTCs configured.**

Cause: The NMCONFIG.PUB.SYS file contains more than the supported number of DTCs.

Action: Delete the excess DTCs from the NMCONFIG.PUB.SYS file and restart DTS.

(DCCERR 13) **DCC ERROR P-L, link name specified for the DTS does not exist.**

Cause: The link name configured in NMMGR on the DTS Configuration screen does not exist.

Action: Go to the DTS Configuration screen and enter the link name, then restart DTS.

(DCCERR 14) **DCC ERROR P-L, link name specified for the DTS is not available (link status SSSSSSSS).**

Cause: A problem occurred with the link hardware; the LANIC might be in the wrong slot or it might not be connected to the LAN.

Action: Check the hardware configuration and connections, then restart DTS.

(DCCERR 15) **DCC ERROR P-L, too many links configured.**

Cause: More that eight links are configured.

Action: Delete all unused links so that eight or less links are used, then restart DTS.

(DCCERR 16) **DCC ERROR P-L, message received on wrong subque.**

Cause: A problem exists with the interprocess communication.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 17) **DCC ERROR P-L, unrecognized message received.**

Cause: A problem exists with the interprocess communication.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 18) **DCC ERROR P-L, internal DCC logic error.**

Cause: A problem internal to the DCC exists.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 19) DCC ERROR P-L, Link error status SSSSSSSS. LLIO path: NMMGRpath.

Cause: A problem occurred while configuring the link manager.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 20) DCC ERROR P-L, Add LDEV to class failure (HLIO status SSSSSSSS, ldev LLL).

Cause: A class contains more than 255 devices, or a conflict in class names exists, or NMCONFIG.PUB.SYS was not cross-validated with files created with SYSGEN.

Action: Run SYSGEN to verify the conflict.

(DCCERR 21) DCC WARNING P-L, Configuration file close error SSSSSSSS.

Cause: A problem occurred while closing the NMCONFIG.PUB.SYS file or the NMCONFIX.PUB.SYS file.

Action: Check that the files exist, and that adequate disk space is available for them. If the files exist and the disk space is large enough, check for file system or hardware problems.

(DCCERR 22) NLIO status SSSSSSSS, ldev LLL).

Cause: A problem exists in the NLIO services.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 23) DCC ERROR P-L, Blank NODENAME.

Cause: A host node name was not configured.

Action: Configure a host node name.

(DCCERR 24) DCC ERROR P-L, Configuration file not validated, status SSSSSSSS.

Cause: Either modifications were made to the network management configuration file and the file was not validated, or the file was validated but the errors listed to the console were not corrected.

Action: Either validate the network management configuration file, or correct the errors listed to the console when the file was first validated and then revalidate the file.

(DCCERR 25) DCC ERROR P-L, X.25 Level 1&2 not configured in NMMGR, status SSSSSSSS.

Cause: Level 1&2 of the X.25 network management structure have not been configured in NMMGR.

Action: Supply the required information in the X.25 Level 1&2 screen in NMMGR.

(DCCERR 26) DCC ERROR P-L, X.25 Level 3 not configured in NMMGR, status SSSSSSSS

Cause: Level 3 of the X.25 network management structure have not been configured in NMMGR.

Action: Supply the required information in the X.25 Level 3 screen in NMMGR.

(DCCERR 27) DCC ERROR P-L, Invalid card number specified, (DCC status SSSSSSSS, card number = cardnumber).

Cause: You have specified an invalid card number for the DTC type.

Action: For DTC 72MX, the valid range for card number is 0 to 3. For DTC 48, the valid range for card number is 0 to 5. For DTC 16, you may use card 0 and 1 for connector cards and card 2 for X.25 card.

(DCCERR 28) **DCC ERROR P-L, Invalid DTC type specified, (DCC status SSSSSSSS.**

Cause: The NMCONFIG.PUB.SYS file may be corrupt.

Action: Use a backup configuration file, verify and update your configuration, validate and cross-validate with SYSGEN, and restart DTS. Keep the corrupt configuration file and report this condition to your HP representative.

(DCCERR 29) **DCC ERROR P-L, DTC is not configured, NM path: NMMGRpath.**

Cause: A dynamic configuration change was attempted on a DTC that DCC has not yet created.

Action: Delete the DTC from the NMCONFIG file and run DTCCNTRL. Then add the DTC back to the NMCONFIG.PUB.SYS file.

(DCCERR 30) **DCC ERROR P-L, Ldev is already configured, (ldev: LLL).**

Cause: The ldev #LLL is already configured on the system.

Action: Validate the NMCONFIG.PUB.SYS file and then cross-validate with SYSTEM and then restart DTS.

(DCCERR 31) **DCC ERROR P-L, Duplicate node address or DTC node name. N Mpath: NMMGRpath**

Cause: The node address or DTC nodename of a DTC that was added dynamically or automatically is already configured on an existing DTC.

Action: Verify the node address and nodename of the new DTC and retry the operation. If the error occurs again, check the configurations of the other DTCs that are in the NMCONFIG.PUB.SYS file. If the duplicate entry is not found then restart DTS.

(DCCERR 32) **DCC ERROR P-L, DTC name is already configured. NMPATH: NMMGRpath**

Cause: The DTC name of a DTC that was added dynamically or automatically is already configured.

Action: Verify that the DTC name doesn't already exist in the NMCONFIG file. If the DTC name doesn't exist in the NMCONFIG file then restart DTS or pick a different name for the DTC.

(DCCWARN 33) **DCC WARNING P-L, Ldev not added to class. (HLIO status SSSSSSSS, lde vLLL).**

Cause: A class contains more than 255 devices, a conflict in class names exists, or NMCONFIG.PUB.SYS was not cross-validated with files created with SYSGEN.

Action: The ldev is still usable but will not be in the class.Validate the NMCONFIG.PUB.SYS file and run SYSGEN to verify conflict.

(DCCERR 34) **DCC ERROR P-L, Delete Ldev from class failure. (HLIO status SSSSSSSS, ldev LLL).**

Cause: The DTC name of a DTC that was added dynamically or automatically is already configured.

Action: A problem occurred while deleting the ldev from a class.

(DCCWARN 35) **DCC WARNING P-L, Ldev not deleted from class. (HLIO status SSSSSSSS, ldev LLL).**

Cause: The ldev has already been deleted from the class or the class no longer exists on the system.

Action: This is a warning. If it persists, make sure no other system utilities are being used to delete classes or remove devices from classes.

(DCCERR 36) **DCC ERROR P-L, Failed to delete ldev LLL. Ldev still in use.**

Cause: An attempt was made to delete an ldev that is logged on or is SPOOLED.

Action: Logoff the session using the device or stop the spooler on the device and retry the operation.

(DCCERR 38) DCC ERROR P-L, Failed to delete ldev LLL. (HLIO status SSSSSSSS).

Cause: An internal error occurred while deleting an ldev. The ldev is probably unusable.

Action: Do a DTS shutdown and restart. If the problem persists, then reboot the system.

(DCCERR 39) DCC ERROR P-L, Unable to stop spooler on ldev LLL. (Status SSSSSSSS).

Cause: An internal error occurred while stopping the spooler during a DTS shutdown with forced=y.

Action: Do a DTS restart and check the device. If the device is not operating then shutdown and restart DTS.

(DCCERR 40) DCC ERROR P-L, nn dev(s) are owned, shutdown not done.

Cause: While attempting a DTS shutdown, nn ldevs were found to be still logged on or spooled. The shutdown operation was aborted.

Action: Logoff or stop the spooler on the devices that are still in use. Retry the DTS shutdown.

(DCCERR 41) DCC ERROR P-L, LLIO error (Status: SSSSSSSS, path: NMMGRpath)

Cause: A problem exists with the low-level I/O services.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 42) DCC ERROR P-L, Too few non-nailed ldevs found.

Cause: While deleting non-nailed ldevs, there were fewer unused non-nailed ldevs found to delete than requested.

Action: Logoff sessions that are using non-nailed ldevs and retry the operation.

(DCCWARN 43) DCC ERROR P-L, Unexpected procedure label status. (Status SSSSSSSS)

Cause: A internal problem exists with process management.

Action: Contact your Hewlett-Packard support representative.

(DCCERR 44) DCC ERROR P-L, Can't update data in NMCONFIG file. (Status SSSSSSSS) NM Path: NMMGRpath.

Cause: While performing Automatic configuration of a DTC, DCC was not able to add the configuration to the NMCONFIG.PUB.SYS file.

Action: Make sure the NMCONFIG file is not in use by another session. Check that the file is not full. Compress the file to free unused space.

(DCCERR 45) DCC ERROR P-L, Not enough room in NMCONFIG file. (Status SSSSSSSS)

Cause: There is not enough room left in the NMCONFIG.PUB.SYS file to successfully add a new DTC automatically.

Action: Compress the NMCONFIG.PUB.SYS file to free unused space and optionally expand the size with NMMGR. Retry the operation.

(DCCERR 47) DCC ERROR P-L, Time out waiting for DTC boot request.

Cause: While automatically adding a new DTC no boot request was received within the allowed time. The DTC is either powered off or the LAN address specified is not correct.

Action: Make sure the DTC is powered on and the correct LAN address is specified.

(DCCWARN 48) DCC WARNING P-L, (LLIO status SSSSSSSS)

Cause: An internal problem has occurred with low-level I/O.

Action: This is a warning. If it persists contact your Hewlett-Packard support representative.

(DCCWARN 49) DCC WARNING P-L, Ldev LLL is unusable until next DTS restart.

Cause: The ldev was being accessed programmatically when a DTS Shutdown was performed and the forced=y option was specified.

Action: Logoff the session or job that was accessing the device and restart DTS. Perform another DTS shutdown and restart.

(DCCWARN 50) DCC WARNING P-L, Waiting 30 sec for ldevs to become free.

Cause: One or more ldevs were in use when DTS shutdown with the forced=y option specified. DCC is waiting for the reset and/or STOPSPOOL to complete.

Action: No action needed. DCC will proceed automatically.

(DCCWARN 51) DCC WARNING P-L, Dynamic configuration is disabled.

Cause: DCC could not find the Dynamic ID in the config file.

Action: Perform a DTS shutdown and restart. If the warning persists, contact your Hewlett-Packard support representative.

(DCCWARN 52) DCC WARNING P-L, NMCONFIG is previous version. Run NMMGRVER.

Cause: You have installed DTC patches that contain the new Host-Based DTC functionality. DCC has determined that the version of the DTS tree in the NMCONFIG file is still the previous one.

Action: The DTS subsystem will startup normally, but you must run NMMGRVER to update the version of the NMCONFIG file in order to make configuration changes to the DTS configuration.

(DCCERR 53) DCC ERROR P-L, NMCONFIG version mismatch. Can't start DCC.

Cause: DCC has determined that the version of the DTS tree in the NMCONFIG files is not the version supported on the Release of the OS currently installed. DCC could not configure the DTS subsystem.

Action: You must run NMMGRVER to update the version of the DTS tree to the current version. If this fails, you must use NMMGR to create a new NMCONFIG file and rebuild the DTS configuration. Or restore a backup of your configuration that has the correct version configured.

(DCCWARN 100) WARNING: I/O config from last START NORECOVERY will be used.

Cause: A routine message; this indicates that a start recovery is being attempted.

Action: No action is required.

(DCCWARN 101) DCC WARNING P-L, (Startup) can not open NMCONFIG, status SSSSSSSS.

Cause: Cannot open the NMCONFIG.PUB.SYS file.

Action: Check that the file exists and that it is not locked. If the file exists and is not locked, check for file system or hardware problems.

(DCCWARN 102) DCC WARNING P-L, (Startup) can not purge NMCONFIX, status SSSSSSSS.

Cause: The NMCONFIX.PUB.SYS file cannot be purged.

Action: Check that the file exists. If the file exists, check for file system or hardware problems.

(DCCWARN 103) DCC WARNING P-L, (Startup) can not open NMCONFIX, status SSSSSSSS.

Cause: The NMCONFIX.PUB.SYS file exists but it cannot be opened.

Action: Check that the file is not locked. If the file is not locked, check for file system or hardware problems.

(DCCWARN 104) DCC WARNING P-L, (Startup) can not create NMCONFIX, status SSSSSSSS.

Cause: A disk space problem, a file system problem, or a hardware problem exists.

Action: Verify that enough disk space is available. If enough disk space is available, verify that no file system problems exist. Then, verify that no hardware problems exist.

(DCCWARN 105) DCC WARNING P-L, (Startup) can not copy record from NMCONFIX, status SSSSSSSS.

Cause: The NMCONFIX.PUB.SYS does not exist, or a file system or hardware problem exists.

Action: Check that the NMCONFIX.PUB.SYS file exists. If it does not, restore it. If the file exists, check for file system or hardware problems.

(DCCWARN 106) DCC WARNING P-L, (Startup) can not copy record to NMCONFIG, status SSSSSSSS.

Cause: The NMCONFIG.PUB.SYS file does not exist, or a file system or hardware problem exists.

Action: If the file does not exist, create it. If the file exists, check for file system or hardware problems.

(DCCWARN 107) DCC WARNING P-L, (Startup) can not close NMCONFIG, status SSSSSSSS.

Cause: The NMCONFIG.PUB.SYS file does not exist, or a disk space, a file system, or hardware problem exists.

Action: Check that the NMCONFIG.PUB.SYS file exists. If it does not exist, restore it. If the file exists, check for a disk space problem, a file system problem, or a hardware problem.

(DCCWARN 108) DCC WARNING P-L, (Startup) can not close NMCONFIX, status SSSSSSSS.

Cause: The NMCONFIX.PUB.SYS file does not exist, or a disk space, file system, or hardware problem exists.

Action: Check that the NMCONFIX.PUB.SYS exists. If it does not exist, restore it. If the file exists, check for a file system problem or a hardware problem.

DTCCNTRL Error Messages

Two types of error messages can occur when a DTCCNTRL command is issued.

The first type of error message is generated by the command interpreter (CI) process when a DTCCNTRL command is issued incorrectly. CI errors are listed first below.

The second type of DTCCNTRL error message is generated when a DTCCNTRL operation fails (CTLERR messages) or when a warning is generated (CTLWARN messages). These messages are listed below following the CI errors.

CIERR 615 **PARM VALUE MUST BE BETWEEN -32768 AND 32767.**

Cause: The CARD parameter is not an integer. For example, the command was entered as:

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=A;FUNC=STOPBOTH
```

Action: Reenter the command with a valid DTC card number. For a DTC 16, the card number must be 2. For a DTC 48, the card number must be between 1 and 5.

CIERR 10007 **THIS IS NOT A VALID KEYWORD FOR THIS COMMAND. (CIER R10007) PARAMETERS DO NOT MATCH USER COMMAND DEFINITION. (CIE RR2039)**

Cause: An undefined parameter was entered. For example, the command was entered as:

```
DTCCNTRL BTC=DTC.ITG.HP;CARD=4;FUNC=STOPBOTH
```

Action: Reenter the command using valid DTCCNTRL parameters.

CIERR 10015 **THE DTC PARAMETER IS REQUIRED. (CIERR 10015) PARAMETERS DO NOT MATCH USER COMMAND DEFINITION. (CIERR 2039)**

Cause: The DTC parameter was missing when the DTCCNTRL command was entered. For example, the command was entered as:

```
DTCCNTRL CARD=4;FUNC=STARTX25
```

Action: Reenter the command specifying a valid, configured DTC name in the DTC parameter. For example:

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=4;FUNC=STARTX25.
```

CIERR 10015 **THE FUNC PARAMETER IS REQUIRED. (CIERR 10015) PARAMETERS DO NOT MATCH USER COMMAND DEFINITION. (CIERR 2039)**

Cause: The FUNC parameter was missing when the DTCCNTRL command was entered. For example, the command was entered as:

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=4
```

Action: Reenter the command specifying a valid function in the FUNC parameter. For example:

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=4;FUNC=STARTX25
```

Valid functions are STARTX25, STARTPADSUP, STARTBOTH, RC, STOPX25, STOPPADSUP, STOPBOTH, and STATUS.

CIERR 10051 **ENCOUNTERED AN UNEXPECTED END-OF-LINE. (CIE RR10051) PARAMETERS DO NOT MATCH USER COMMAND DEFINITION. (CI ERR2039)**

Cause: More parameters were entered than are defined by the DTCCNTRL command. For example, the command was entered as:

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=4;FUNC=RC;FORCED=Y;RECONF=ALL;A=4
```

Action: Reenter the command without the invalid parameter. For example:

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=4;FUNC=RC;FORCED=Y;RECONF=ALL
```

CTLERR 01 **Failed to open the catalog file DTCCAT.PUB.SYS.**

Cause: The catalog file does not exist or could not be opened at the time the command was executed.

Action: If the catalog file is missing or has been corrupted, try to restore DTCCAT.PUB.SYS from the system backup. If this is not successful, contact your Hewlett-Packard support representative.

CTLERR 02 **Operator capability required to issue this command.**

Cause: A user without the proper capabilities attempted to issue a DTCCNTRL command. OP capability is required.

Action: Obtain the required capabilities and reissue the command.

CTLERR 03 **Invalid function specified in FUNC.**

Cause: The FUNC parameter was not a valid DTCCNTRL function.

Action: Reenter the command specifying a valid function in the FUNC parameter. For example:

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=4;FUNC=STARTX25
```

Valid functions are STARTX25, STARTPADSUP, STARTBOTH, RC, STOPX25, STOPPADSUP, STOPBOTH, and STATUS.

CTLERR 04 **System is not Host-Based X.25.**

Cause: The DTCCNTRL command was issued on a system that is not configured as a host-based X.25 system (either the system is PC-based or it is host-based but is not configured for X.25 connections).

Action: None. If attempting to control X.25 operation on a PC-based system, refer to the documentation for PC-based networks.

CTLERR 05 **Missing parameter: CARD not specified.**

Cause: The DTCCNTRL command was issued with a FUNC parameter that requires a card number, but no CARD parameter was specified. The STARTX25, STARTPADSUP, STARTBOTH, RC, STOPX25, STOPPADSUP, and STOPBOTH functions all require the CARD parameter. CARD is optional only for the STATUS function.

Action: Reissue the command with the correct card number specified in the CARD parameter.

CTLERR 06 **This DTC doesn't contain X25 cards.**

Cause: A DTCCNTRL command was issued specifying the DTC name of a DTC that does not contain any X.25 iX Network Access cards.

Action: Obtain the correct DTC name for the DTC containing the X.25 iX Network Access card and reenter the command using the correct DTC specification.

CTLERR 07 **DTC not accessible. Use FORCED option.**

Cause: The DTCCNTRL command was issued at a time when another user had exclusive access to the DTC (for example, TermDSM was running).

Action: Either reissue the DTCCNTRL command using the FORCED option to force access to the DTC or wait until the DTC is no longer being exclusively accessed.

CTLERR 08 **Non-existing DTC.**

Cause: A DTCCNTRL command was issued for a DTC that is not configured for the host system.

Action: Reissue the command with a correct DTC name specified in the DTC parameter.

CTLERR 09 **Invalid card number.**

Cause: A DTCCNTRL command was issued with an out-of-range card number specified in the CARD parameter.

Action: Reenter the command with a valid DTC card number. For a DTC 16, the card number must be 2. For a DTC 48, the card number must be between 1 and 5.

CTLERR 10 **Stop PAD first.**

Cause: An attempt was made to stop X.25 services prior to PAD services being stopped. PAD services must be stopped first.

Action: Issue a DTCCNTRL command with a function of STOPBOTH to stop both X.25 and PAD services.

Or

Issue a DTCCNTRL command with a function of STOPPADSUP, followed by a second DTCCNTRL command with a function of STOPX25.

CTLERR 11 **PAD switching list download failed.**

Cause: An attempt was made to reconfigure PAD switching list values using the RC function of DTCCNTRL. A problem occurred with the DTC while the PAD support values were being downloaded.

Action: Check the DTC. Correct any problems then reenter the DTCCNTRL command with FUNC=RC to download the reconfigured PAD switching list values.

CTLERR 12 **PAD incoming security download failed.**

Cause: An attempt was made to reconfigure incoming PAD security values for the DTC using the RC function of DTCCNTRL. A problem occurred with the DTC while the new configuration values were being downloaded.

Action: Check the DTC. Correct any problems then reenter the DTCCNTRL command with FUNC=RC to download the reconfigured incoming PAD security values.

CTLERR 13 **PAD access download failed.**

Cause: An attempt was made to reconfigure PAD access using theRC function of DTCCNTRL. A problem occurred with the DTC while PAD access values were being downloaded.

Action: Check the DTC. Correct any problems then reenter the DTCCNTRL command with FUNC=RC to download the reconfigured PAD access values.

CTLERR 14 **DTC Global Data configuration download failed.**

Cause: An attempt was made to reconfigure global data values for the DTC using the RC function of DTCCNTRL. A problem occurred with the DTC while the new configuration values were being downloaded.

Action: Check the DTC. Correct any problems then reenter the DTCCNTRL command with FUNC=RC to download the reconfigured global data values.

CTLERR 15 **Global physical security download failed.**

Cause: An attempt was made to reconfigure the PAD access password for the DTC using the RC function of DTCCNTRL. A problem occurred with the DTC while the new configuration values were being downloaded.

Action: Check the DTC. Correct any problems then reenter the DTCCNTRL command with FUNC=RC to download the reconfigured PAD access password.

CTLERR 16 **SYS-TO-SYS switching download failed.**

Cause: An attempt was made to reconfigure the system-to-system switching information (X.25 link name or number of switched virtual circuits) for the DTC using the RC function of DTCCNTRL. A problem occurred with the DTC while the new configuration values were being downloaded.

Action: Check the DTC. Correct any problems then reenter the DTCCNTRL command with FUNC=RC to download the reconfigured system-to-system switching information.

CTLERR 17 **LUG download failed.**

Cause: An attempt was made to reconfigure local user group (LUG) information (remote X.25 address or security level) for the DTC using the RC function of DTCCNTRL. A problem occurred with the DTC while the new configuration values were being downloaded.

Action: Check the DTC. Correct any problems then reenter the DTCCNTRL command with FUNC=RC to download the reconfigured local user group information.

CTLERR 18 **Start X25 first.**

Cause: An attempt was made to start PAD support or to download card-specific X.25 configuration values but X.25 support is not active.

Action: Start X.25 support using the STARTX25 function of DTCCNTRL then retry the operation. (To start both X.25 and PAD support, use the STARTBOTH function.)

CTLERR 19 **X25 download failed.**

Cause: An attempt was made to start X.25 support. A problem occurred with the DTC while the X.25 support values were being downloaded.

Action: Check the DTC. Correct any problems then re-download. Reenter the command to start X.25 support.

CTLERR 20 **The specified card is not an X.25 card.**

Cause: The card specified in the DTCCNTRL command is not an X.25 iX Network Access car.

Action: Obtain the correct card number for the X.25 iX Network Access card and reenter the command using the correct card number specification.

CTLERR 21 **Invalid RECONF specification. Must be All, X25, Card, Pass, or Logcl.**

Cause: A DTCCNTRL command was entered using the RC function but an invalid option was specified in the RECONF parameter.

Action: Reenter the command with a valid RECONF specification. Valid values are ALL, X25, CARD, PASS, and LOGCL.

CTLERR 22 **Invalid specification for FORCED parameter. Must be y or n.**

Cause: A DTCCNTRL command was entered using the FORCED option but an invalid value was specified in the FORCED parameter.

Action: Reenter the command with a valid FORCED specification. Valid values are Y for "yes" and N for "no".

CTLERR 23 **PAD download failed.**

Cause: An attempt was made to start PAD support. A problem occurred with the DTC while the PAD support values were being downloaded.

Action: Check the DTC. Correct any problems then re-download. Reenter the command to start PAD support.

CTLERR 24 **X25 could not be stopped.**

Cause: The DTC failed while X.25 support was being deactivated.

Action: Correct any problems with the DTC or its system connection then reenter the command to stop X.25 support.

CTLERR 25 **PAD could not be stopped.**

Cause: The DTC failed while PAD support was being deactivated.

Action: Correct any problems with the DTC or its system connection then reenter the command to stop PAD support.

CTLERR 26 **Start PAD first.**

Cause: An attempt was made to download card-specific PAD configuration values but PAD support is not active.

Action: Start PAD support using the STARTPAD function of DTCCNTRL then retry the operation.

CTLERR 27 **Start X25 and PAD first.**

Cause: An attempt was made to download card-specific configuration values but X.25 and PAD support were not active.

Action: Start X.25 and PAD support using the STARTBOTH function of DTCCNTRL then retry the operation.

CTLERR 100 **System error: failed to create a port for DTCPROG, info = !, su b sys=!.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 101 **System error: NDM nm_find_port error, err_num = !, proc_num = !.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 102 **System error: NDM get_sysbase error, err_num = !, proc_num = !.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 103 **System error: bad status received from io_info_list, err_num = !, proc_num = !.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 104 **System error: bad NDM port number returned.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 105 **System error : bad Send_msg status received, info = !, subsys = !.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 106 **System error: bad Extend_receive status received, info = !, subsys = !.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 107 **System error: bad reply received.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLERR 108 **System error : bad error number returned by DTCM.**

Cause: Internal error.

Action: Contact your Hewlett-Packard support representative.

CTLWARN 01 **PAD already stopped.**

Cause: A DTCCNTRL command was entered to stop PAD support but PAD support was not active.

Action: No action required. This message is for information only.

CTLWARN 02 **PAD already started.**

Cause: A DTCCNTRL command was entered to stop PAD support but PAD support was already active.

Action: No action required. This message is for information only.

CTLWARN 03 **X25 already started.**

Cause: A DTCCNTRL command was entered to start X.25 support but X.25 support was already active.

Action: No action required. This message is for information only.

CTLWARN 04 **X25 already stopped.**

Cause: A DTCCNTRL command was entered to stop X.25 support but X.25 support was not active.

Action: No action required. This message is for information only.

FUNC specification is not RC, no configuration will be done.

CTLWARN 05 Cause: A DTCCNTRL command was issued with the RECONF option specified but the function was not RC.

Action: To cause reconfigured values to be downloaded, issue a DTCCNTRL command using the RC function. If no reconfigured values are to be downloaded, no action is required.

Host Migration Tool Status Messages

The following message will be displayed if the migration was successful. If you see any other error messages the migration was not successful. Go to the manual *Using the Node Management Services (NMS) Utilities* for more detailed descriptions and actions to take to fix them.

```
CONVERSION completed successfully.  (NMMGRVERMSG 0)
```

When the Host Migration tool is run, the tool may find configurations discrepancies that it can't resolve. You must correct these discrepancies before the configuration will successfully validate. If the Host Migration tool finds any configuration discrepancies, then you will see the following message:

```
Migration process found configuration discrepencies (NMMGRVERWARN 50)

You can either correct the configuration in the Host-Based configuration or
modify the configuration in the PC-based tree and rerun the tool.
```

If you see this message, the Host migration tool will have also generated one or more of the following messages. Take the action specified to correct the configuration so that the configuration file will successfully validate.

MSG 150 **The Host-Based DTC type does not match the PC-Based DTC type for DTC <DTC node name>**

Cause: The DTC type configured in the Host-Based DTC does not match the DTC type in the PC-Based DTC. The DTC in the PC-Based configuration will not be merged into the Host-based configuration. If the DTC in the Host-based configuration was migrated from the OVDTCMGR, then the TIO devices will be assigned ldev of (-1) and any PAD devices will be assigned ldev of (1). These are invalid ldev numbers for TIO printers and PAD devices and errors will be detected by Validation.

```
DTCCNTRL DTC=DTC.ITG.HP;CARD=A;FUNC=STOPBOTH
```

Action: You can take either of the following actions:

- Run NMMGR to examine and enter the correct ldevs in the configuration for all cards in this DTC in the Host-based configuration.
- Change the configuration of the DTC in the PC-based configuration to the correct type and with the cards and port type configuration that matches the DTC in the Host-based configuration. Then run the Host Migration tool with the command NMMGRVER;parm=77.

MSG 151 **Host Based cardtype does not match the PC-Based cardtype in DTC <DTCname>, for card <x>.**

Cause: The card type configured in the Host-Based DTC does not match the card type in the PC-Based DTC. The card will not be merged into the Host-based tree. The Host-Based DTC configuration for DTC <dtcname> card <x> may have device configurations that are invalid for Host-Based management. If the DTC in the Host-based configuration was migrated from the OVDTCMGR, then the TIO devices will be assigned ldev of (-1) and any PAD devices will be assigned ldev of (1). These are invalid ldev numbers for TIO printers and PAD devices and errors will be detected by Validation.

Action: Run NMMGR to examine and enter the correct ldevs in the configuration for specified card in the DTC with the listed DTC Name in the Host-based configuration.

MSG 152 **Cannot copy DTC <DTCname> from PC-Based to Host based. Duplicate DTC name.**

Cause: The Host Migration tool found a DTC in the Host-Based tree that has the same DTC name as the DTC in the PC-Based tree, but with a different DTC Node Name. The DTC node name of the DTC in the PC-based configuration was not found in the Host-based configuration so the Host migration tool was attempting to create a non-managed DTC in the Host-based configuration.

Action: Run NMMGR and rename the DTC in the Host-based tree to a different name and re-run the Host Migration tool with the command: NMMGRVER;parm=77.

MSG 153 **Host Based device type does not match PC-Based device type in DTC <DTCname>, card x for port yy**

Cause: The port type of the TIO devices in the Host-based configuration does not match the port type of the TIO device in the PC based configuration, i.e., terminal/printer/host type. The TIO device will be assigned ldev of (-1).

Action: Run NMMGR to examine and enter the correct ldev in the configuration for specified port in the DTC with the listed DTC Name in the Host-based configuration.

MSG 154 **No ldev was found for printer in <dtcname>, card x or Port yy**

Cause: The Host Migration tool found a printer device in the Host-based configuration but the corresponding port doesn't have an ldev assigned in the PC-Based configuration. The printer port will be assigned ldev of (-1). This is an invalid ldev number for TIO printers and will be detected by Validation.

Action: Run NMMGR and change the printer ldev to a valid ldev number in the Host-based configuration.

MSG 155 **No ldev was found for PAD device name <PAD name> in DTC <dtcname>, card x.**

Cause: A PAD device with the displayed name is defined on a X.25 card in the PC-Based DTC configuration that is not defined in the Host-Based DTC, the PAD device in the Host-Based configuration will be assigned ldev of (1). This is an invalid ldev numbers for PAD devices and an error will be detected by Validation.

Action: Run NMMGR and change the PAD device ldev to a valid ldev number in the Host Based tree.

MSG 157 **No PAD device name was found for ldev xxx on DTC <dtcname>, card x.**

Cause: A PAD device was configured on the PC-Based DTC that was not configured on the matching DTC in the Host-Based configuration. The ldev will be copied to the Host-based DTC but the PAD device will not have a valid X.25 address assigned. The invalid X.25 address will be detected by Validation

Action: Run NMMGR and assign a valid X.25 address to the device or delete the device.

MSG 158 **Host Based Device type does not match PC-Based device type in DTC <DTCName>, card x for PAD name <PADName>.**

Cause: The type of the PAD devices with the displayed PAD Name in the Host-based configuration does not match the type of the PAD device in the PC based configuration, i.e., padterm/padprint type. The PAD devices will be assigned ldev of (1). This is an invalid ldev numbers for PAD devices and an error will be detected by Validation.

Action: Run NMMGR to examine and enter the correct ldev in the configuration for specified PAD device in the DTC with the listed DTC Name in the Host-based configuration.

MSG 159 **No DTC was found in the PC-Based tree with the matching DTC node name <DTC node name>.**

Cause: The Host Migration tool found a DTC with the displayed DTC Node Name in the Host-based configuration that does not exist in the PC-Based configuration. If the DTC in the Host-based configuration was migrated from the OVDTCMGR, then the TIO devices will be assigned ldev of (-1) and any PAD devices will be assigned ldev of (1). These are invalid ldev numbers for TIO printers and PAD devices and errors will be detected by Validation.

Action: Run NMMGR to examine and enter the correct ldevs in the configuration for all cards in the DTC with the displayed DTC Node Name in the Host-based configuration.

Glossary

A

access port A special interface card in the system cabinet through which the MPE/iX system console is connected.

ADCP Avesta Device Control Protocol. An HP proprietary protocol which provides device control features. ADCP is optimized for communications between a DTC and MPE/iX systems

address A numerical identifier defined and used by a particular protocol and associated software to distinguish one node from another.

address key *See* X.25 **address key**.

address resolution In NS networks, the mapping of node names to IP addresses and the mapping of IP addresses to subnet addresses.

address resolution protocol (ARP) A protocol used to convert an IP address to a low level hardware address. ARP can be used only over a single physical network and is limited to networks that support hardware broadcast.

adjacent A node on a point-to-point network that is connected to another node by a single link with no intervening nodes.

ADP Active Distribution Panel. *See* **MDP**.

AFCP Avesta Flow Control Protocol. An HP proprietary protocol which provides data flow control features. AFCP is optimized for communications between nodes, including DTCs, in an MPE/iX environment.

ARP *See* **address resolution protocol**.

ARPA Advanced Research Projects Agency. It is the former name of the Defense Advanced Research Project Agency (DARPA). The Internet suite of protocols was developed under ARPA guidance.

ARPA Telnet Access An HP product which is a board that can be installed in a DTC 48 and DTC 72MX. The Telnet Access board performs protocol translation. Calls to the IP address of an MPE/iX system are detected by the Telnet Access board and are retransmitted on the LAN using AFCP, allowing connections from terminals on ARPA systems to HP e3000s.

ARPA Telnet Express An HP product which is a standalone hardware platform dedicated to performing protocol translation. Calls to the IP address of an MPE/iX system are detected by the Telnet Express and are retransmitted on the LAN using AFCP, allowing connections from terminals on ARPA systems to HP 3000s.

ASCII American National Standard Code for Information Interchange. A character set using 7-bit code used for information interchange among data processing and data communications systems. The American implementation of International Alphabet No. 5.

asynchronous A device's mode of operation in which a sequence of operations are executed irrespective of time coincidence with any event. Devices that are directly accessible by people (for example, terminal keyboards) operate in this manner.

asynchronous processor board The new 24-port mux board for the DTC 72MX. Allows up to 24 direct and modem connections per board. A DTC 72MX can have up to 3 asynchronous processor boards (for a total of 72 connections).

Attachment Unit Interface AUI. The cable that runs between each node (host, DTC, or other device) and the Medium Attachment Unit (MAU) that connects it to the LAN in a ThickLAN configuration.

autodial A dial link in which the remote node's telephone number is automatically dialed by a modem or other device with this capability.

automatic configuration The addition and configuration of a host-based managed DTC to the HP e3000 system without needing to specify detailed configuration information such as DTC cards/boards and ldevs.

B

backbone LAN A thick LAN cable conforming to the IEEE 802.3 Type 10 BASE 5 Standard.

back-to-back configuration A DTC configuration whereby MPE users connected to one DTC can communicate with a non-MPE/iX system connected to another DTC via the LAN. *See also* **Local Switching**.

backup configuration file A file that contains a copy of the information contained in the configuration file. The backup file, called NMCBACK.*group.account* by default, is updated each time the configuration file is successfully validated.

banner A welcome message displayed on your screen. On the local OpenView workstation a banner appears when a remote connection is established with the OpenView DTC Manager. A banner also can appear when you log on to MPE.

baud The measure of the speed at which information travels between devices, most commonly used in reference to terminal speed settings. Baud represents signal events per second. When one bit represents each signal change, baud is the same as "bits per second."

binary mode A data-transfer scheme in which no special character processing is performed. All characters are considered to be data and are passed through with no control actions being taken.

bit Binary digit. A unit of information that designates one of two possible states, which are represented by either 1 or 0.

block mode A terminal processing mode in which groups, or "blocks," of data are transmitted all at once.

BNC T-Connector A connector used to connect a computer or a component such as a DTC to the LAN in a ThinLAN configuration.

boundary *See network boundary*.

bps Bits per second. The number of bits passing a point per second.

bridge A device that is used to connect LAN segments.

broadcast Communication method of sending a message to all devices on a link simultaneously.

buffer A logical grouping of a system's memory resources used by NS 3000/iX.

byte A sequence of eight consecutive bits operated on as a unit.

C

call In X.25, a call is an attempt to set up communication between two DTEs using a virtual circuit. Also known as a virtual call.

call collision A conflict that occurs at a DTE/DCE interface when there is a simultaneous attempt by the DTE and DCE to set up a call using the same logical channel identifier.

called address When a node sends out a call request packet, the packet contains the address of the destination node. The address of the destination node is the called address.

calling address When a node receives an incoming call packet, the packet contains the address of the sending node. The address of the sending node is the calling address.

carrier A continuous wave that is modulated by an information-bearing signal.

catenet *See* **internetwork**.

CCITT Consultative Committee for International Telephony and Telegraphy. An international organization of communication carriers, especially government telephone monopolies, responsible for developing telecommunication standards by making recommendations. The emphasis is on "recommendations"; no carrier is required to adhere to a CCITT recommendation, although most do so in their own interests.

CIB The channel input/output bus in the backplane of an HP 3000.

circuit-switching network A type of data communications network wherein a physical and exclusive link is maintained between two communicating devices for the call duration. An all-digital, circuit- switching network is often referred to as an X.21 network.

closed user group An X.25 user facility that allows communication to and from a pre-specified group of users and no one else.

compatibility mode A processing mode on HP e3000 Series 900 computers that allows applications written for MPE V/E- based systems to be ported and run without changes or recompilation.

computer network A group of computer systems connected in such a way that they can exchange information and share resources.

configuration 1) The way in which computer equipment is physically interconnected and set up to operate as a system. 2) The layout of the computer system, including the MPE table, memory, and buffer sizes, that tells which peripheral devices are (or can be) connected to the computer and how they can be accessed. 3) The process of defining the characteristics of a network in software.

For MPE/iX-based computers, the operating systems are configured through use of the SYSGEN utility.

Next, the Datacommunications and Terminal Subsystem (DTS) link is configured by using NMMGR (running on the host) and can, in addition, be configured using the OpenView DTC Manager software (running on the OpenView Windows Workstation) depending on the type of network management you use.

A system that is to run network services (NS 3000/iX) is configured through use of NMMGR.

Access to X.25 is configured in two parts. The X.25 MPE/iX System Access software is configured on the host through use of NMMGR. The DTC/X.25 Network Access software residing on the DTC is configured at the OpenView Windows Workstation through use of the OpenView DTC Manager.

configuration file The configuration file contains the information that the network needs in order to operate. This file also contains information necessary for link- level and NetIPC logging. The only file name that the system recognizes is `NMCONFIG.PUB.SYS`

control-X echo Three exclamation marks (`!!!`) output to the terminal screen when the cancel character (normally **[CTRL]-X**) is entered.

control-Y trap A user-written procedure to which control is passed when the subsystem break character (normally **[CTRL]-Y**) is entered during execution of a program with subsystem break enabled.

cross-validate The process of assuring that information contained in two locations is consistent where it is imperative that it be consistent. For example, an automatic cross-validation occurs when you enter SYSGEN to assure that information contained in `NMCONFIG.PUB.SYS` agrees with system configuration data.

CSMA/CD Carrier Sense Multiple Access with Collision Detect, transmission access method used by the IEEE 802.3 LAN standard.

CSN *See* **circuit-switching network**.

CTB The cache transfer bus in the backplane of an HP e3000.

CUG *See* **closed user group**.

D

data Basic elements of information that can be processed or produced by a computer.

Datacommunications and Terminal Controller

See **DTC**.

datagram A self-contained packet that is independent of other packets. It does not require an acknowledgment and it carries information which is sufficient to route it from one DTE to another DTE without relying on earlier exchange between the DTEs.

data overrun Transmitted data that is sent faster than the receiving equipment can receive it. The resultant overflow data is lost. *See also* **flow control**.

Datapac The national public PSN of Canada.

Datex-P The national public PSN of West Germany.

D bit Delivery confirmation bit. Used in the X.25 protocol, the setting of the D bit in DATA packets indicates whether delivery acknowledgment of the packet is required from the local DCE or from the remote DTE. It therefore allows the choice between local and end-to-end acknowledgment.

DCE Data circuit-terminating equipment. The interfacing equipment required in order to interface to data terminal equipment (DTE) and its transmission circuit. Synonyms: data communications equipment, dataset. A modem is an example of a DCE.

DDFA DTC Device File Access Utilities. A set of HP-UX utilities which is used by systems and user written applications to programmatically access devices attached to DTC ports.

DDP Direct Distribution Panel; a distribution panel that serves as the electrical and physical interface between a DTC 72MX mux board (asynchronous processor board) and up to eight asynchronous devices for direct connections. See **MDP** for modem connections.

DDX The national public PSN of Japan.

dedicated printer A printer that can be used only by one host on the LAN—the one specified in the Destination Node Name in that printer's configuration screen.

demodulation The process by which the information-bearing signal is retrieved from a modulated carrier wave. The inverse of modulation.

destination node name In DTS configuration, it is either 1) the name of a host that a user can be connected to by default (if switching is not enabled for that user, or if automatic modem connection is enabled), or 2) the name of the only host that can access a dedicated printer.

device class A collection of devices that have some user-defined relation. Device classes are assigned through use of the NMMGR configuration program.

device-dependent characteristic A file specification for which modifications are restricted because of the type of device on which the file is opened. For example, data directed to terminals must have a blocking factor of one.

device driver A software module that controls a specific type of input/output device.

devicefile A file being input to or output from any peripheral device except a disk. MPE/iX allows operations to be performed on the device itself as if it were a file.

device independence A characteristic of the operating system that allows users to selectively redirect input/output from a program, session, or job without regard to the nature of the device.

device name *See* **PAD name**.

Dial ID protocol A proprietary Hewlett- Packard protocol that provides security checking and address exchange for dial links.

dial link A connection made through public telephone lines.

direct-connect device An asynchronous device that is connected directly to a DTC through an RS-232-C or RS-422 cable, with no intervening communications equipment. Also referred to as a "local connection."

direct connection A leased line, private line, or other non-switched link in a network.

direct dial A dial link through which only one remote node can be reached.

direct-path branching The process of directly accessing any screen in NMMGR by entering a path name in the `Command:` field. The path name must be preceded by an at sign (@).

download The process of loading operating code and configuration files into the DTC's memory. The DTC is downloaded by the MPE/iX host for LANs using host-based network management, and by the PC for DTCs managed by the OpenView DTC Manager.

driver Software that controls input/output devices including NS 3000/iX links.

DTC Datacommunications and Terminal Controller. The DTC is a hardware device, configured as a node on a LAN, that enables asynchronous devices to access HP e3000 Series 900 computers. Terminals can either be directly connected to the DTC, or they can be remotely connected through a Packet Assembler Disassembler (PAD). The DTC can be configured with DTC/X.25 Network Access cards and DTC/X.25 Network Access software. A DTC/X.25 iX Network Link consists of two software modules: the X.25 iX System Access software (running on the host) and the DTC/X.25 Network Access software (running on the DTC).

DTCCNTRL A command file you can use to manage DTS configurations. Using DTCCNTRL, you can dynamically implement DTS changes, automatically add a new DTC, shutdown/restart DTS, and manage/dynamically configure host-based X.25 connections.

DTC 16 HP 2340A product. A DTC that provides 2 slots for asynchronous connections with each slot allowing up to 8 direct connections or 6 modem connections, plus an optional X.25 link supporting up to 32 virtual circuits at speeds of up to 19.2 Kbps.

DTC 16iX HP J2062A product. A DTC terminal server for HP 3000 systems. It allows up to 16 asynchronous (direct and modem) LAN connections to HP 3000 systems.

DTC 16MX HP J2063A product. A DTC terminal server for HP 3000 and Telnet systems. It allows up to 16 asynchronous (direct and modem) LAN connections for the HP e3000 environment and for computer systems running ARPA, such as HP 9000s and third party systems. When managed by the HP e3000, the DTC 16MX is configured and functions exactly like a DTC 16iX. The full functionality of the DTC 16MX is only available when it is managed by the OpenView DTC Manager.

DTC 16RX HP J2064A product. A routable communications server that enables up to 16 asynchronous connections for the HP e3000 environment and computer systems running ARPA, such as HP 9000s and third party systems.

DTC 16RX Manager An application program that resides on the HP 9000 host system and enables you to configure and diagnose the HP DTC 16RX Routable Communications Server.

DTC 16TN HP J2060A product. A DTC terminal server for Telnet systems. It allows up to 16 asynchronous connections to computer systems running ARPA, such as HP 9000s and third party systems.

DTC 48 HP 2345B product. A DTC that provides 6 slots for asynchronous connections, X.25 links, or Telnet Access. Each slot allows up to 8 direct connections or 6 modem connections. A DTC 48 may have up to 3 slots used for X.25 links, each supporting up to 256 virtual circuits at speeds of up to 64 Kbps or one Telnet Access card with 40 Telnet connections to HP e3000 Series 900 connections.

DTC 72MX HP J2070A product. A DTC that provides 3 slots allowing up to 72 asynchronous connections. Each slot accommodates up to 24 direct or modem connections. A DTC 72MX may have up to 3 slots used for X.25 links, each supporting up to 256 virtual circuits at speeds of up to 64 Kbps. It may also use one slot for Telnet Access card with 40 Telnet connections to HP e3000 Series 900 computers.

DTC identifier An identifier used only within NMMGR to define the branch of the configuration file containing information about a particular DTC. The identifier must begin with a letter and can be up to eight characters long.

DTC Manager *See* **OpenView DTC Manager**.

DTC node name A unique name used to identify a DTC on a LAN. The node name format is *nodename.domain.organization*, with each of the three parts having up to 16 characters. The name begins with either a letter or a digit.

DTC station address (802.3 address) A 12-digit hexadecimal number used to identify the DTC as a node belonging to the network configuration. Also called the LAN address or node address.

DTC switching A facility enabling terminal users to select any host system that they want to connect to. DTC switching is available only when the OpenView DTC Manager is used for network management.

DTC/X.25 Network Access The software that resides on the Datacommunications and Terminal Controller (DTC). To configure access to an X.25 network, you must configure two software components: the X.25 iX System Access (residing on the HP 3000 host and configured through use of NMMGR software), and DTC/X.25 Network Access (configured on the OpenView Windows Workstation through use of the OpenView DTC Manager software for PC-based management, and through NMMGR for host-based management).

DTC/X.25 Network Access card The hardware card and channel adapter that provides X.25 Network Access. It resides in the Datacommunications and Terminal Controller (DTC).

DTC/X.25 iX Network Link Software and hardware that provides MPE/iX access to private and public X.25 networks. The X.25 iX System Access software resides on an HP e3000 host and is configured through use of NMMGR. The DTC/X.25 Network Access software resides on the Datacommunications and Terminal Controller and is

configured at the OpenView Windows Workstation for PC-based management and through NMMGR for host-based management.

DTE Data Terminal Equipment. Equipment that converts user information into data-transmission signals or reconverts received data signals into user information. Data terminal equipment operates in conjunction with data circuit-terminating equipment.

DTS Datacommunications and Terminal Subsystem. This consists of all of the Datacommunications and Terminal Controllers (DTCs) on a LAN, their LANIC cards (attached to the host), the LAN cable, and the host and DTC software that controls all related DTS hardware.

DTS restart The startup of the DTS subsystem using the DTCCNTRL command file after DTS has been shut down.

DTS shutdown The shutdown of the DTS subsystem, including the release of all TIO-related resources, using the DTCCNTRL command file.

duplex A transmission method that allows two-way communication. If both ends of the transmission link can transmit simultaneously, it is called full duplex. If only one end can transmit at a time, it is half-duplex transmission.

dynamic configuration The ability to make DTS configuration changes using NMMGR without rebooting the HP e3000 system.

E

entry priority In a point-to-point network, it is a ranking that identifies the most desirable route for data to travel from a given local node to a remote node.

environment A session that is established on a remote node.

escape from data transfer character A character that allows a user who is connected to a host system through the DTC, to break that connection and return to the DTC switching user interface. The default is **[CTRL]-K**. This character is used only on networks managed by the OpenView Windows Workstation.

escape sequence A sequence of characters beginning with the escape character and followed by one or more other characters, used to convey control directives to printers, plotters, or terminals.

Ethernet A Local Area Network system that uses baseband transmission at 10 Mbps over coaxial cable and unshielded twisted pair. Ethernet is a trademark of Xerox Corporation.

event log One of three circular files stored on the OpenView windows workstation. It contains lists of events that are reported by the DTCs for which it is responsible.

extended packet sequence numbering One of the optional Network Subscribed Facilities that provides packet sequence numbering using modulo 128. If not subscribed, modulo 8 is used.

F

facility An optional service offered by a packet switching network's administration and requested by the user either at the time of subscription for network access or at the time a call is made. Also known as user facility.

facility set A facility set defines the various X.25 connection parameters and X.25 facilities that can be negotiated for each virtual circuit on a per-call basis.

fast select An optional packet-switching network facility by which user data can be transmitted as part of the control packets that establish and clear a virtual connection.

FCS Frame Check Sequence. A sequence of bits generated by X.25 at Level 2 that forms part of the frame and guarantees the integrity of its frame's contents. The FCS is also used by the IEEE 802.3 protocol to check the validity of frames.

file equation An assignment statement used to associate a file with a specific device or type of device during execution of a program.

file number A unique number associated with a file when the file is opened. The file number is returned in the FOPEN or HPFOPEN call used to open the file. It can be used to access that file until the file is closed.

file specification The name and location of a file. The full specification for a file includes the file name, group, and account.

file system The part of the operating system that handles access to input/output devices (including those connected through the DTC), data blocking, buffering, data transfers, and deblocking.

flow control A means of regulating the rate at which data transfer takes place between devices to protect against data overruns.

flow control negotiation One of the network subscribed facilities selected at subscription time. This facility allows the Flow Control parameter to be negotiated at call set-up time, as opposed to having a predefined value.

formal file designator A name that can be used programmatically or in a file equation to refer to a file.

FOS Fundamental Operating System. The programs, utilities, and subsystems supplied on the Master Installation Tape that form the basic core of the MPE/iX operating system.

full gateway A full gateway is a node that belongs to more than one network and has one IP address for each network. It uses store and forward to transfer packets between each network that it belongs to.

G

gateway A node that connects two dissimilar network architectures. A gateway can be either a single node (full gateway) or two gateway halves.

gateway half A node that works in conjunction with another node on another network to form an internetwork. The only protocol used by gateway halves is the NS Point-to-Point 3000/iX Link. *See also* **full gateway**.

gateway-half link A link between the two nodes of a gateway-half pair. Each of the two nodes of a gateway-half pair has a configured link (hardware interface card) that is used for the gateway half network interface. The NS Point-to-Point 3000/iX Link is the only link that can be used as a gateway-half link.

gateway-half pair A set of two nodes that are joined by a gateway-half link. Each node in the pair must have a gateway-half network interface configured, using the link.

guided configuration A method of configuring a node in which a subset of the complete NMMGR interface is presented, and defaults of configurable values are used automatically.

H

handshaking A communications protocol between devices or between a device and the CPU. Provides a method of determining that each end of a communications link is ready to transmit or receive data, and that transmission has occurred without error.

hardware handshake Uses modem signals CTS and RTS to pace the data transfer from the DTC to the attached device. (For DTC 72MX only.)

hop count *See* **internet hop count and intranet hop count**

host-based network management A method of managing asynchronous communications for HP e3000 Series 900 computers. All of the control software is configured on a single MPE/iX host and is downloaded to the DTCs that are managed by that host. With host-based management, a permanent relationship exists between each DTC and the host. Terminal users can access only the single MPE/iX system that owns the DTC their terminal is connected to.

host computer The primary or controlling computer on a network. The computer on which the network control software resides. For HP purposes, it can also be used to distinguish the MPE/iX system (host) from the DTC.

HP ARPA Telnet Express A DTC dedicated to providing protocol conversion between Telnet on TCP/IP and AFCP to allow incoming calls from the ARPA environment to HP e3000 systems.

HP block mode A block mode transmission method employed by HP computers where the system controls the block mode handshake. When HP block mode is used, the user program need not concern itself with data transfer protocol.

HP PPN Hewlett-Packard Private Packet Network. Hewlett-Packard's own packet- switching X.25 network, which gives users full control over the administration and security of their data communication.

HP TS8 A terminal server that can support up to eight asynchronous serial connections. When used in back-to-back configuration, users can access HP e3000 MPE/V systems on it through a DTC.

I

idle device timeout A timeout defined by the Configure: CPU command. When the timer lapses, a device connected to the DTC user interface that is still inactive will be disconnected.

IEEE 802.3 A standard for a broadcast local area network published by the Institute for Electrical and Electronics Engineers (IEEE). This standard is used for both the ThinLAN and ThickLAN implementations of the LAN.

IEEE 802.3 multicast address A hexadecimal number that identifies a set of nodes. This address is used for multicast delivery.

IEEE 802.3 nodal address A unique hexadecimal number that identifies a node on an IEEE 802.3 LAN.

initialization string A sequence of control characters used to initialize a terminal, printer, or plotter when a connection is established from a host on the network.

INP Intelligent Network Processor. The card residing in the back of an MPE V-based node that provides a point-to-point or X.25 interface.

interactive communications Processing that allows users to enter commands and data at the terminal and receive an immediate response. Interactive processing occurs in session mode on MPE/iX systems.

internet communication Communication that occurs between networks.

internet hop count The number of full gateways plus the number of gateway-half links that a packet must pass through in moving from source node to destination.

Internet Protocol A protocol used to provide routing between different local networks in an internetwork, as well as among nodes in the same local network. The Internet Protocol corresponds to Layer 3, the Network Layer, of the OSI model. *See also* **IP address**.

internet routing Internet routing involves all the processes required to route a packet from a node on one network to a destination node on another network.

internetwork Two or more networks joined by gateways.

intranet communication Communication that occurs between nodes in a single network.

intranet hop count The number of intermediate nodes that lie between a source and destination node on the same point-to-point network.

intranet routing Intranet routing involves all the processes required to route a packet from one node in a network to another node in the same network.

intrinsic A system routine accessible by user programs. It provides an interface to operating system resources and functions. Intrinsics perform common tasks such as file access and device control.

IP *See* **Internet Protocol**.

IP address Internet Protocol address. An address used by the Internet Protocol to perform internet routing. A complete IP address consists of a network portion and a node portion. The network portion of the IP address identifies a network, and the node portion identifies a node within the network.

IP router A node in an IP network that connects two or more networks and provides address mapping between them. The router selects messages from incoming buffers and places them into the appropriate outgoing message queues.

ISO International Organization of Standards. An international federation of national standards organizations involved in developing international standards, including communication standards.

L

LAN Local Area Network. A collection of data communication systems sharing a common cable whereby each system can communicate directly with another

LAN address *See* **DTC station address**.

LANIC *See* **Local Area Network Interface Controller**

LANIC physical path The physical location (slot number) of the LANIC within the SPU.

LANIC Self-Test A ROM-based program on a LANIC card that tests and reports the status of the LANIC hardware.

LAP Link Access Protocol. The data link protocol specified by older versions (prior to 1980) of X.25 at Level 2 but still permitted and therefore usable. All new implementations of X.25 must use LAP-B, and all old implementations must migrate to LAP-B at a future date.

LAP-B Link Access Protocol – Balanced. The data link protocol specified by the 1980 version of X.25 at Level 2 that determines the frame exchange procedures. LAP-B must also be used over direct-connect NS Point-to-Point 3000/iX Links.

LCI Logical Channel Identifier. Local value on a network node which identifies the channel used to establish a virtual circuit (SVC or PVC) through an X.25 network.

ldev *See* **logical device number**.

leased line A data-grade telephone line leased directly to a subscriber and allocated specifically for the subscriber's needs.

line speed The speed at which data is transferred over a specific physical link (usually measured in bits or kilobits per second).

link name A name that represents a hardware interface card. The link name can contain as many as eight characters. All characters except the first can be alphanumeric; the first character must be alphabetic.

Local Area Network Interface Controller (LANIC) A hardware card that fits into the backplane of the HP 3000 Series 900 computer and provides a physical layer interface for IEEE 802.3 local area networks.

local connection *See* **direct connection**.

local node The computer that you are configuring or that you are logged on to.

local switching A feature of the DTC which permits back-to-back configuration (for connections to an HP e3000 MPE/V host), using two ports of the same DTC.

logging The process of recording the usage of network resources. Events can be logged to both the OpenView workstation and to the MPE/iX host.

logging class A number defining the severity of any given event logged. An operator uses the logging classes to specify which events are to be logged. Class 1 (catastrophic event) is always logged.

logical device number (ldev) A value by which MPE/iX recognizes a specific device. All DTC devices that are configured as nailed devices through the NMMGR configuration have ldev numbers permanently assigned. The DTC devices can then be accessed programmatically through use of their ldev number. Non-nailed devices have ldev numbers that are assigned from a pool of available ldev numbers for the life of their connection to a system. Each nailed port configured in NMMGR must have a unique ldev number.

log off The termination of a job or session.

log on The process of initiating a job or session.

logon device *See* **session-accepting device**.

loopback The routing of messages from a node back to itself.

LUG Local User Group. A list defined for a particular DTC and card that specifies which *remote* nodes this DTC can send data to and also which *remote* nodes this DTC can receive data from. *See also* **Closed User Group**.

M

maintenance mode An NMMGR character mode interface used to manage both network directory and configuration files. It can be used interactively, from within the screen mode interface, or as a set of commands entered via a batch job.

map, network A drawing that shows the topology of the network. For networks managed by the OpenView DTC Manager a network map must be created through use of the OVDraw capability provided with the management software. A network map is also a hardcopy drawing used when planning a network. It shows network topology, node and network names, addresses, network boundaries (for an internetwork map), and link types.

mapping A set of characteristics that describe a route taken by messages to reach a destination node. This set of characteristics is configured with NMMGR at every node on a point-to-point network. One mapping is configured at each node for every other node on the network to which messages will be sent.

MAU Medium Attachment Unit. A device attached to a ThickLAN coaxial cable that provides the physical and electrical connection from the AUI cable to the coaxial cable.

M bit More data bit. Setting this bit in a DATA packet indicates that at least one more DATA packet is required to complete a message of contiguous data.

MDP Modem Distribution Panel. A distribution panel that serves as the electrical and physical interface between a DTC 72MX mux board (asynchronous processor board) and up to eight asynchronous devices for direct or modem connections. Also called **ADP**.

MIB Management Information Base. A database of information about a network node used by SNMP.

MIT Master Installation Tape. A magnetic tape containing the Fundamental Operating System for an HP 3000 Series 900 computer.

modem modulator/demodulator. A device that modulates and demodulates signals. Primarily used for modulating digital signals onto carriers for transmission and for performing the inverse function at the receiving end. Modems are essential for transmitting and receiving digital signals over telephone lines.

modulo Value used as the counting cycle for determining the send sequence number (N(S)) of frames sent across an X.25 network.

modulation The process in which certain characteristics of a carrier signal are altered in accordance with the changes of an information-bearing signal.

MPE/iX MultiProgramming Executive iX The operating system of the HP3000 Series900 computers. The NS 3000/iX network services operate in conjunction with the MPE/iX operating system.

multiplexer MUX. A device that allows multiple communication links to use a single channel.

N

nailed device A device with a permanently assigned ldev. The assignment is established through the system configuration of the MPE/iX host system. Nailed devices can be accessed programmatically through their ldev number. Nailed devices can also be assigned to more than one host.

native mode The run-time environment of MPE/iX. In Native Mode, source code has been compiled into the native instruction set of the HP3000 Series900 computer.

neighbor gateway A gateway that is in the same network as a given node.

NetIPC Network Interprocess Communication. Software that enables programs to access network transport protocols.

network A group of computers connected so that they can exchange information and share resources.

network address This can be either 1) the network portion of an IP address as opposed to the node portion, or 2) when referring to X.25 networks, it is a node's X.25 address.

network boundary The logical division between networks in an internetwork.

network directory A file containing information required for one node to communicate with other nodes in 1) an internetwork, 2) an X.25 network, or 3) a network that contains non-HP nodes. The active network directory on a node must be named NSDIR.NET.SYS.

network interface NI. The collective software that enables data communication between a system and a network. A node possesses one or more network interfaces for each of the networks to which it belongs. Network interface types are LAN802.3, router (point-to-point), X.25, loopback, and gateway half. The maximum number of supported NIs is 12, one of which is reserved for loopback.

network management The collective tasks required to design, install, configure, maintain, and if necessary, change a network.

network map A drawing that shows the topology of the network. For networks managed by the OpenView DTC Manager, a network map must be created using the OVDraw capability provided with the management software.

Network Services NS. Software application products that can be used to access data, initiate processes, and exchange information among nodes in the network. The HP e3000/iX Network Services include RPM, VT, RFA, RDBA, and NFT.

network subscribed facilities A set of parameters that the user chooses when he subscribes to the X.25 network; they include Flow Control Negotiation, Use of D-bit, Throughput Class Negotiation and Extended Packet Sequence Numbering.

NFT Network File Transfer. The network service that transfers disk files between nodes on a network.

NI *See* **network interface**.

NLP Name Lookup Protocol. A protocol used when setting up links between DTCs, as happens when DTCs are used in a back- to-back configuration.

NMCONFIG.PUB.SYS The file that contains all of the network configuration data for the HP e3000 Series 900 computer on which it resides. It includes information about the DTCs that can access the system as well as information about any Network Service (NS) products running on the system. This is the only file name allowed at run-time.

NMDUMP A utility used to format log and trace files.

NMMAINT A utility that lists the software module version numbers for all HP AdvanceNet products, including NS 3000/ iX. It detects missing or invalid software modules.

NMMGR Node Management Services Configuration Manager. A software subsystem that enables you to configure DTC connectivity and network access parameters for an HP 3000 Series 900 computer.

NMMGRVER A conversion program called NMMGRVER.PUB.SYS. It converts configuration files created with NMMGR from an earlier version to the latest format.

NMSAMP1.PUB.SYS A sample configuration file supplied with FOS that can be used as a template for DTS configuration.

NMSTART.PUB.SYS The file which contains maintenance mode commands executed during NMMGR startup.

node A computer that is part of a network. The DTC is also considered to be a node and has its own address.

node address The node portion of an IP address. The IP address consists of a node portion and a network portion.

Node Management Services configuration Manager *See* **NMMGR**.

node name A character string that uniquely identifies each system in a network or internetwork. Each node name in a network or internetwork must be unique; however, a single node can be identified by more than one node name.

node names list A list defined on the OpenView windows workstation and subsequently downloaded to all DTCs for which it is the “owner.” The list specifies all of the HP 3000 Series 900 hosts on the LAN that are accessible from the DTCs.

non-adjacent Describes a node on an NS Point-to-Point 3000/iX network that is separated from a given node by intervening or intermediate node.

non-nailed device A session-accepting device that is not permanently associated with an ldev number at configuration time. When the user at such a device logs on to an MPE/iX system, an ldev is assigned from a pool of ldevs set aside for this purpose at configuration time. The association between a non-nailed device and this assigned ldev exists only for the duration of the session. One advantage of the use of non-nailed device connections is that configuration is simplified, since it is not required that each non-nailed device be individually configured.

NS 3000/iX A Hewlett-Packard data communication product that provides networking capabilities for MPE/iX based HP e3000 minicomputers. NS 3000/iX consists of a link and network services.

NS 3000/iX Link Software and hardware that provides the connection between nodes on a network. Some of the N S3000/iX links available are the ThinLAN 3000/iX Link and its ThickLAN option, the DTC/X.25 iX Network Link, the NS Point-to-Point 3000/ iX Link, and the StarLAN 10 3000/iX link.

NS3000/iX Network Services Software applications that can be used to access data, initiate processes, and exchange information among nodes in a network. The services are RPM, VT, RFA, RDBA, and NFT.

NSDIR.NET.SYS Name of the active network directory file. *See also* **network directory**.

O

octet An eight-bit byte operated upon as an entity.

OpenView HP OpenView Windows is HP's network management environment. It provides the basic services for accessing and managing networks used by the DTC Manager, and other applications, such as Switch/PAD Manager, Hub Manager, etc.

OpenView Admin An OpenView Windows program that enables you to configure how your OpenView Windows applications will function. For example, it enables you to set a default map for the OpenView DTC Manager.

OpenView Draw An OpenView Windows program that is used to draw the network map and to label the components on it.

OpenView DTC Manager An OpenView Windows application that enables you to configure, control, monitor, and troubleshoot the operation of the Datacommunications Terminal Subsystems on the LAN.

OpenView Run An OpenView Windows program that covers most of the control features used by the DTC Manager, including monitoring and diagnostic functions.

OpenView Windows he set of three programs: OV Admin, OV Draw and OV Run, running on the OpenView workstation under MS Windows, that acts as the platform for all OpenView applications, such as DTC Manager.

OpenView Windows Workstation The personal computer that provides software downloads to enable operation of the Datacommunications and Terminal Controller (DTC). The configuration software that runs on this workstation is called the OpenView DTC Manager software.

OSI model Open Systems Interconnection model. A model of network architecture devised by the International Standards Organization (ISO). The OSI model defines seven layers of a network architecture with each layer performing specified functions.

P

packet A block of data whose maximum length is fixed. The unit of information exchanged by X.25 at Level 3. The types of packets are DATA packets and various control packets. A packet type is identified by the encoding of its header.

Packet Exchange Protocol PXP. A transport layer protocol used in NS 3000/iX links to initially establish communication between nodes when NetIPC socket registry is used.

packet-switched network name The name of a data communication network adhering to the CCITT X.25 recommendation. This can be a PDN or a private network such as the HP PPN.

PAD (Packet Assembler/Disassembler A device that converts asynchronous character streams into packets that can be transmitted over a packet switching network (PSN).

PAD name A name of up to eight characters that is associated with a configured PAD device. The PAD name is known to both the DTC (defined by the DTC Manager) and the MPE/iX systems (defined by NMMGR) that the device can access.

PAD profile A terminal or printer profile that specifies the configuration characteristics for PAD-connected devices.

PAD support A software module which can be downloaded to an X.25 board in a DTC. The software is used to manage connections with remote PAD devices.

partner gateway half When gateway halves are used, two gateway halves are required in order to provide communication between two networks. Each is the partner of the other.

path name When configuring with NMMGR, you can type a string in the COMMAND: field on a screen to branch to another screen. Each screen has a unique path name that corresponds to its location in the hierarchy of configuration screens presented by NMMGR.

PDN Public Data Network. A data communication network whose services are available to any user willing to pay for them. Most PDNs use packet switching techniques.

point-to-point A link that connects either two nodes in a NS Point-to-Point 3000/iX network or two gateway halves.

port An outlet through which a device can be connected to a computer, consisting of a physical connection point and controlling hardware, controlling software, and configurable port characteristics. Ports can be thought of as data paths through which a device communicates with the computer.

Precision Architecture The hardware design structure for the HP 3000 Series 900 computer family.

printer name A character string of up to 16 characters specified in the DTC Manager configuration (for networks using OpenView Network Management) to define a printer by name. Can be shared by several printers (port pool).

printer profile A set of configuration characteristics that can be associated with one or more printers through the NMMGR configuration. Printer profile specifications include the printer type, line speed, device class assignment, and other values relevant to printers connected through a DTC.

printer type A collection of characteristics that cause a printer connected to an MPE/iX system to act and react in a specified manner. You can configure a printer to use one of the system- supplied printer types, or you can create custom printer types using Workstation Configurator.

privileged mode A capability assigned to accounts, groups, or users allowing unrestricted memory access, access to privileged CPU instructions, and the ability to call privileged procedures

probe protocol An HP protocol used by NS 3000/iX IEEE 802.3 networks to obtain information about other nodes on the network.

probe proxy server A node on an IEEE 802.3 network that possesses a network directory. A probe proxy server can provide a node with information about other nodes on the same or other networks of an internetwork.

profile A method of grouping device connection specifications and characteristics so that the set of characteristics can be easily associated with groups of like devices. *See also* **printer profile, terminal profile.**

program captive device *See* **programmatic device**.

Programmable Serial Interface PSI. A hardware card that fits into the backplane of the HP 3000 Series 900 computer. It provides a physical layer interface for NS Point-to-Point 3000/iX Links.

programmatic device A device operating under control of a program running on a computer. Programmatic devices can be used for input, output, or both, depending on the device and how it is opened by the controlling program.

protocol A set of rules that enables two or more data processing entities to exchange information. In networks, protocols are the rules that govern each layer of network architecture. They define which functions are to be performed and how messages are to be exchanged.

PSN Packet-Switching Network. Any data communication network in which data is disassembled into packets at a source interface and reassembled into a data stream at a destination interface. A public PSN offers the service to any paying customer.

PSS Packet-Switching System. The national public PSN of the United Kingdom.

PVC Permanent Virtual Circuit. A permanent logical association between two physically separate DTEs that does not require call set-up or clearing procedures.

PXP *See* **Packet Exchange Protocol**.

Q

Q bit Qualified bit. When set in DATA packets the Q bit signifies that the packet's user data is a control signal for the remote device, not a message for its user.

QuickVal A software program that tests whether Network Services are operating correctly between nodes.

R

RDBA Remote Data Base Access. A network service that allows users to access data bases on remote nodes.

reachable network A network that can be accessed (with additional internet hops possibly required) by a particular gateway.

remote connect device An asynchronous device that is indirectly connected to a DTC through a modem and telephone hook-up or through a PAD.

remote node Any network node that is physically separate from the node you are currently using or referring to.

retransmission count (N2) The maximum number of times a frame will be retransmitted following the expiration of the Retransmission Timer, T1.

retransmission timer (T1) The length of time that a transmitter will wait for an acknowledgment from a destination address before attempting to retransmit a frame. When choosing this value, factors like the line speed and maximum frame size should be taken into account.

RFA Remote File Access. A network service that allows users to access file and devices on remote nodes.

routing The path that packets or fragments of a message take through a network to reach a destination node.

RMP Remote Maintenance Protocol. HP proprietary protocol used in DTC management.

RPM Remote Process Management. A network service that allows a process to programmatically initiate and terminate other processes throughout a network from any node on the network.

RS-232-C The Electronic Industries Association (EIA) Level 1 protocol specification that defines electrical circuit functions for 25 connector pins. HP provides two implementations of this standard: a 3-pin version for direct connections up to a distance of 15 meters (50 feet), and a version which makes use of additional circuits and can be used for either modem or direct connections.

RS-422 The Electronic Industries Association (EIA) Level 1 protocol specification implemented by HP in a 5-pin version which can be used for direct device connection up to a distance of 1500 meters (4000 feet).

S

security string An alphanumeric character string that functions as a password for dial links. The security string is used by the Dial IP protocol.

serial device Any device that is attached to and communicates with a computer by means of a serial transmission interface. Terminals, printers, and plotters are among the devices that communicate serially with MPE/iX computers.

serial transmission A method of transferring data in which characters are transmitted one bit at a time and received one bit at a time in the order of transmission. This transmission scheme is employed by devices connected to the MPE/iX systems via the DTC.

session-accepting device A terminal or personal computer running in terminal- emulation mode that is able to establish an interactive (conversational) session with an HP e3000 computer. Also referred to as a logon device.

shared dial A dial link that provides connection to more than one remote system, although to only one at a time.

shared-line access The feature that allows two or more HP 3000 Series 900 hosts to use the same DTC/X.25 Network Access card on a DTC to access an X.25 network.

SIC Serial Interface Card. A card installed in the front of the DTC that acts as an interface between a corresponding Connector Card (CC) and the DTC's processor.

slaved device A device that shares the same DTC port as another device and is connected, to the other device, referred to as its master, by a cable. The actions of the slaved device are controlled by the master device.

SNMP Simple Network Management Protocol. An industry standard for managing networked computers in a multi-vendor environment.

SNMP agent A network node, such as a DTC, that is able to respond to SNMP requests.

SNMP manager A network management platform that is running software which allows it to manage SNMP nodes.

SNP Synchronous Network Processor card; an alternative name for an X.25 board.

spooled device A printer that is accessed through the MPE/iX spooling facility. The spooling facility allows a nonsharable device to be shared among several users by temporarily storing output data on disk and managing the selection of output spool files destined for the spooled device.

start bit A data bit used to signal the start of a character being transmitted in an asynchronous communication mode.

station address A link-level address used by the IEEE 802.3 protocol that is assigned to every node on an IEEE 802.3 network.

stop bit A data bit used to signal the end of a character being transmitted in an asynchronous communication mode.

store-and-forward A technique in which messages are passed from one node to another in a network to reach their destination. Point-to-point networks use the store-and-forward technique to transmit messages.

subnet Another name for a network, especially if the network is part of an internetwork. The word subnet is also a synonym for intranet.

SVC Switched Virtual Circuit. The path through an X.25 network that is established at call set-up time.

switching *See* **DTC switching**.

Switching User Interface The user interface available when DTC switching is enabled that allows terminal users to choose the MPE/iX computer with which they want to establish a communication link.

synchronous A mode of operation or transmission in which a continuous data stream is generated without intervals between characters. The data stream is synchronized by clock signals at the receiver and transmitter. As a result, fast transmission speeds (above 9600 bps) are attainable.

SYSGEN The software program that allows you to configure the operating system on HP 3000 Series 900 computers.

system configuration The method for telling MPE/iX which peripheral I/O devices are attached to the DTC and which parameters are required for system operation.

T

TCP *See* **Transmission Control Protocol**.

telenet A proprietary public data network in the USA.

Telnet Access Card (TAC) A card that resides in the DTC 48 and provides protocol conversion between Telnet and AFCP.

Telnet Express *See* **HP ARPA Telnet Express**.

TermDSM Terminal Online Diagnostic System Manager. A utility that provides diagnostic services for DTC connections by means of a series of commands accessible through the SYSDIAG utility. TermDSM is used only when DTCs are managed by an MPE/iX host system.

terminal name A character string of up to 16 characters specified in the OpenView DTC Manager configuration (for networks using OpenView Network Management) to define a terminal by name. It can be shared by several terminals (pool port).

terminal profile A set of configuration characteristics that can be associated with one or more terminals through the NMMGR configuration. Terminal profile specifications include the terminal type, line speed, device class assignment, and other values relevant to terminals connected through a DTC.

terminal type A collection of characteristics that cause a terminal connected to an MPE/iX system to act and react in a specified manner. You can configure a terminal to use one of the system-supplied terminal types, or you can create custom terminal types using the Workstation Configurator.

ThinLAN 3000/iX A LAN that conforms to the IEEE 802.3 Type 10 BASE 2 standard LAN.

throughput class A value assigned to a given virtual circuit that defines how many network resources should be assigned to a given call. It is determined by the access line speed, packet and window sizes, and the local network's internal mechanisms.

throughput class negotiation One of the Network Subscribed Facilities defined at subscription time. This allows the user to negotiate the Throughput Class at call set-up time.

timer (T3) The length of time that a link can remain in an idle state. After the expiration of the timer, the link is considered to be in a non-active, non-operational state and is automatically reset. The value should be chosen carefully. In particular, it must be sufficiently greater than the Retransmission Timer (T1) so that no doubt exists about the link's state.

topology The physical arrangement of nodes in a network. Some common topologies are bus, star, and ring.

Transmission Control Protocol TCP. A network protocol that establishes and maintains connections between nodes. TCP regulates the flow of data, breaks messages into smaller fragments if necessary (and reassembles the fragments at the destination), detects errors, and retransmits messages if errors have been detected.

Transpac The national public PSN of France.

transparent mode A data transfer scheme in which only a limited number of special characters retain their meaning and are acted on by the system. All other characters are considered to be data and are passed through with no control actions being taken.

transport, network Software that corresponds to layers 3 and 4 of the OSI network architecture model. It sends data out over the communications link, receives incoming data, and routes incoming or outgoing data to the appropriate destination node.

TS8 *See* **HP TS8**.

TTUTIL Also known as the Workstation Configurator. A program, `TTUTIL.PUB.SYS`, on the HP e3000 that is used to create and modify terminal and printer type files.

Tymnet A proprietary public data network in the USA.

typeahead A facility that allows terminal users to enter data before a read is actually posted to the terminal.

U

UPS *See* **uninterruptible power supply**.

unacknowledged frame number (K) The number of frames that can be transmitted without receiving an acknowledgment from the destination address. When this number (K) frame is reached, the same K frames are retransmitted.

unedited mode *See* **transparent mode**.

uninterruptible power supply A hardware device that protects equipment from power failures and contains an internal storage battery to supply reserve power.

V

V.24 The CCITT recommendation that defines the function of the interchange circuits between a DTE and a DCE.

validation The process of ascertaining whether the network transport configuration file has been correctly configured. This is accomplished by using the NMMGR Validate Configuration File screen.

VAN Value-Added Network. A data communication network that uses and pays for facilities belonging to another carrier. The value-added package is then sold to a user.

VC *See* **virtual circuit**.

virtual circuit A logical association between two physically separate DTEs.

Virtual Terminal A network service that allows a user to establish interactive sessions on a node.

VPLUS Software used to generate screens such as those displayed by NMMGR.

V-Series (V.##) CCITT A set of CCITT recommendations related to data communication over a voice-grade telephone network.

VT *See* **Virtual Terminal**.

W

WAN Wide Area Network. A data communications network of unlimited size, used for connecting localities, cities, and countries.

Workstation Configurator A utility available on MPE/iX systems, `TTUTIL.PUB.SYS`, that allows users to create customized terminal and printer types by entering data through a series of VPLUS screens.

X

X.3 The protocol that defines which user facilities should be internationally available from a packet assembler/disassembler (PAD) when this is offered by a public data network.

X.21 The protocol that defines the physical interface between a DTE and a DCE of a public data network where the access to the network is made over synchronous digital lines.

X.25 The protocol that defines the interface between a DTE and a DCE for packet-mode operation on a Public Data Network (PDN).

X.25 address The X.25 address provided by the network administration if you are connected to a public data network (PDN).

X.25 address key An X.25 address key is a label that maps a node's IP address to its X.25 address and its associated X.25 parameters. You have a combined maximum of 1024 X.25 address keys in the SVC and PVC path tables.

X.25 LUG address X.25 address of a node belonging to a LUG.

X.25 iX System Access The software that works in conjunction with the DTC/X.25 Network Access software to provide MPE/ iX access to X.25. The software resides on an HP 3000 host and is configured through use of NMMGR. To configure access to an X.25 network, you must configure two software components: the X.25 iX System Access and

the DTC/X.25 Network Access (residing on the Datacommunications and Terminal Controller and configured at the OpenView Windows Workstation). Together, these two components provide a network connection on HP e3000 systems to private and public X.25 packet-switched networks (PSNs).

X.29 The protocol that defines the interface for data exchange between a packet-mode DTE and a remote Packet Assembly/ Disassembly (PAD) facility over a packet-switching network.

XON/XOFF protocol The flow control used by MPE/iX systems to protect against data overruns. XON/XOFF protocol is controlled by the data recipient who sends an XOFF character (ASCII DC3) to the sender if it is unable to continue to receive data. The sender suspends transmission until it receives an XON character (ASCII DC1).

X.Series (X.##) CCITT recommendations A set of recommendations for data communication networks governing their services, facilities, and terminal equipment operation and interfaces.

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