PCL2 LAN
Controller User's Guide

Order Number: 460665-002

Intel Corporation
3065 Bowers Avenue
Santa Clara, California 95052-8126

In the United States, additional copies of this manual or other Intel liberature may be obtained by writing:

Literature Distribution Center
Intel Corporation
P.O. Box 7641
Mt. Prospect, IL 60056-7641

Or you can call the following toll-free number:

1-800-548-4725

In locations outside the United States, obtain additional copies of Intel documentation by contacting your local Intel sales office. For your convenience, international sales office addresses are printed on the last page of this document. Contact your local sales office to obtain the latest specifications before placing your order.

Intel Corporation makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Intel Corporation assumes no responsibility for any errors that may appear in this document. Intel Corporation makes no commitment to update nor to keep current the information contained in this document. Intel Corporation assumes no responsibility for the use of any circuitry other than circuity embodied in an Intel product. No other circuit patent licenses are implied.

Intel software products are copyrighted by and shall remain the property of Intel Corporation. Use, duplication or disclosure is subject to restrictions stated in Intel's Software License Agreement, or in the case of software delivered to the government, in accordance with the software license agreement as defined in FAR 52.227-7013.

No part of this document may be copied or reproduced in any form or by any means without prior wirtten consent of Intel Corporation. Intel Corporation retains the right to make changes to these specifications at any time, without notice.

The following are trademarks of Intel Corporation and its affiliates and may be used only to identify Intel products. (Registered trademarks are followed by a superscripted ® .)

Above	i860	int$_e$lBOS	MAPNET	RMX/80
ACE51	i	Intel Certified	MCS®	RUPI
ACE96	i	Intelevision	Megachassis	Seamless
ACE186	i®	int$_e$ligent Identifier	MICROMAINFRAME	SLD
ACE196	ICE	int$_e$ligent Programming	MULTI CHANNEL	SugarCube
ACE960	ICE	Intellec®	MULTIMODULE	Tech Direct
Action Media	iCEL	Intellink	MultiSERVER	TooITALK
BITBUS	ICEVIEW	iOSP	ONCE	UPI
COMMputer	iCS	iPAT	OpenNET	Visual Edge
CREDIT	iDBP	iPDS	OTP	VLSiCEL
Data Pipeline	iDIS	iPSC®	PRO750	ZapCode
DVI	iLBX	iRMK	PROMPT	376
ETOX	iMDDX	iRMX®	Promware	386
FaxBACK	iMMX	iSBC®	QUEST	387
Genius	Inboard	iSBX	QueX	4-SITE
i486	Insite	iSDM	Quick-Erase	486
i586	Intel®	iSXM	Quick-Pulse	586
i686	int$_e$l®	Library Manager	Programming	686
i750	Intel386		Ripplemode	

IBM and PC AT are registered trademarks and PC and PC XT are trademarks of International Business Machines Corporation. XENIX, MS-DOS and Microsoft are registered trademarks of Microsoft Corporation. Ethernet is a registered trademark of Xerox Corporation.

Rev.	Revision History	Date
-001	Original Issue	7/87
-002	Software upgrade and name change	9/90

Preface

Reader Level

The PCL2 LAN Controller User's Guide describes how to install and use the OpenNET PCL2 networking software with an IBM PC AT and PC XT computer system. Users of this manual should be familiar with the Disk Operating System (PC-DOS or MS-DOS) and Local Area Networks (LANs).

The information in this manual assumes that the Ethernet network cable and PCL Network Interface Adapter board have been installed, and that the personal computer system being connected to the OpenNET network is currently using the DOS version 3.1 or later (DOS 4.0 is not supported).

Users who have not installed the PCL2NIA should refer to the *PCL2 Hardware Installation Guide* before continuing with the information presented in this manual.

Manual Organization

This manual contains eight chapters, an appendix, a glossary, and an index.

Chapter 1. Introduction

Chapter 1 introduces the Intel OpenNET product family and presents an overview of the PCL2 MS-NET product.

Chapter 2. Software Installation

Chapter 2 describes how to install and configure the Microsoft Networks (MS-NET) networking software for diskette-based or hard-disk based systems. This information includes setting up the PC environment, creating a CONFIG.SYS file, and accessing OpenNET file servers.

Chapter 3. Starting the MS-NET Consumer

Chapter 3 describes how to start the MS-NET software for diskette-based or hard-disk based systems.

Chapter 4. Using the MS-NET Consumer

Chapter 4 explains how to use the MS-NET networking software when connected to file servers and remote printers.

Chapter 5. Starting the MS-NET Server

Chapter 5 expains how to start and exit the server program.

Chapter 6. Using the MS-NET Server

Chapter 6 provides detailed descriptions of file server and print server functions and includes MS-NET command examples.

Chapter 7. Network Management

Chapter 7 describes the commands and procedures used for performing the administrative tasks of network management.

Chapter 8. MS-NET Commands

Chapter 8 provides an alphabetical listing of all MS-NET commands used for controlling connections to remote devices, remote print servers, the local network server, and monitoring the network.

Appendix A. MS-NET Messages

Appendix A describes each of the MS-NET software screen messages.

Glossary

The glossary contains definitions of terms that relate to the OpenNET PCL2 MS-NET product.

Index

The index lists page number references and cross-references for topics and terms used throughout the PCL2 User's Guide.

Notational Conventions

The following mnemonic conventions apply throughout this manual:

- The IBM PC AT and PC XT are referred to as the PC system.
- The OpenNET and NDS-II network systems are referred to as the OpenNET network system.
- PC-DOS or MS-DOS, version 3.1 or later, is referred to as DOS.
- The Microsoft Networks networking software is referred to as MS-NET.

The following syntax notation is used throughout this manual:

NET STATUS	Command keywords appear in uppercase. Note however, that commands may be entered in either uppercase or lowercase.
pathname	Items that must be substituted (such as a value, expression, filename, etc.) are italicized.
[*password*]	Brackets indicate optional items. When entering an optional item, do not type the brackets as part of the command syntax.
<Key>	Command keys are symbolized between angled brackets.

Related Literature

This manual is a self-contained document describing the installation and use of the OpenNET PCL2 system. The following Intel documents contain additional information about the OpenNET network.

- *Xenix Networking Software Installation and Configuration Guide*, order number 135146. Describes how to configure and install the XENIX networking software on the 286/380 and the 286/310 systems.
- *XENIX Networking Software User's Guide*, order number 135147. Describes how to use the XENIX networking software and how to add a workstation to the XENIX system.
- *iRMX® Networking Software User's Guide*, order number 122323. Describes how to use the iRMX networking software and how to add a workstation to the iRMX system.
- *NDS-II Network Resource Manager User's Guide Release 3.0*, order number 135847. Describes how to install and configure the Network Resource Manager (NRM) on the NDS-II network, and explains how to add a workstation to the NRM.
- *NDS-II Network Development System Overview Release 3.0*, order number 121761. Presents an introduction and general description of network development system products.
- *iNDX OpenNET User's Guide*, order number 135848. Describes how to use the iNDX Network Resource Manager (NRM) in an OpenNET environment.
- *VAX/VMS OpenNET Networking Software User's Guide*, order number 480071. Includes information useful to MS-NET PCL2 users who wish to access VAX/VMS systems running OpenNET Networking Software (VMSNET).
- *PCL2 Hardware Installation Guide*, order number 462305. Describes how to install the PCL2 Network Interface Adapter board and software.

***

Contents

Chapter 4. Using MS-NET Software (continued)

Chapter 5. Starting the Server

Chapter 6. Using the MS-NET Server

Chapter 7. Network Management

Chapter 7. Network Management (continued)

Chapter 8. MS-NET Commands

Appendix A. MS-NET Messages

Glossary

Index

Figures

1 Introduction

This chapter describes the OpenNET™ network product family and presents an overview of the PCL2 MS-NET product and an overview of the PC host requirements.

OpenNET ™ Product Family

The OpenNET network product family incorporates a set of system and component level LAN products covering all seven layers of the International Standards Organization (ISO), Open System Interconnect (OSI) model, and the protocols on which they are based. OpenNET network products can interconnect and interoperate not only with each other, but also with the most popular networking products from other vendors.

OpenNET networks provide a high level of interoperability between heterogeneous systems (MS-DOS, PC-DOS, iNDX, XENIX, VAX/VMS and iRMX system versions are available). Thus, users can tailor their networks to meet their specific needs by incorporating any combination of the capabilities of these diverse systems. The OpenNET network application layer protocols implemented by MS-NET software are those adopted by Intel, Microsoft, and IBM. MS-NET software is compatible and will interoperate with PC-NET, XENIX, iNDX, VAX/VMS, and iRMX networking software at the application layer.

OpenNET ™ PCL2 Overview

MS-NET provides an Ethernet/IEEE 802.3 connection between a PC system and the OpenNET network. With MS-NET a PC system can be configured as a workstation in the OpenNET network and share files between the OpenNET Network Resource Manager (NRM), NDS-II (with the OpenNET network upgrade kit installed) NRM, DOS, XENIX, VAX/VMS, and iRMX operating systems.

Data and resource sharing are implemented via transparent remote file access. This allows the user to work with files residing at other systems on the network just as if they were residing locally on the PC.

MS-NET is comprised of a 5-1/4 inch diskette, which in conjunction with the PCL2 Network Interface Adapter (NIA) board, is a complete product for the personal computer system to operate as a workstation on the OpenNET network.

Hardware Overview

The PCL2NIA is an adapter board that provides an Ethernet/IEEE 802.3 connection to the PC system. The board measures 4.15 inches high by 13.32 inches long and attaches to the PC via one of the expansion slots. The PCL2NIA board is an Intel 80186 microprocessor based design and includes the following major components:

- 80186 microprocessor
- 82586 communications controller
- 16KB EPROM
- 256KB of on-board RAM with an 8KB window to the PC system
- 82501 Ethernet serial interface
- 15-pin Ethernet D connector
- Power-up diagnostics

Refer to the *PCL2 Hardware Installation Guide* and the *PCL2NIA Hardware Reference Manual* for additional information.

Software Overview

The PCL2 MS-NET software is packaged on a 5-1/4 inch double sided, double density diskette. This diskette contains all the software necessary to operate MS-NET 1.1 on the PCL2NIA.

The PCL2NIA board performs all network communication functions for the first four layers of the ISO/OSI model shown in Figure 1-1. The remaining layers (five through seven) reside with the MS-NET software on the PC system.

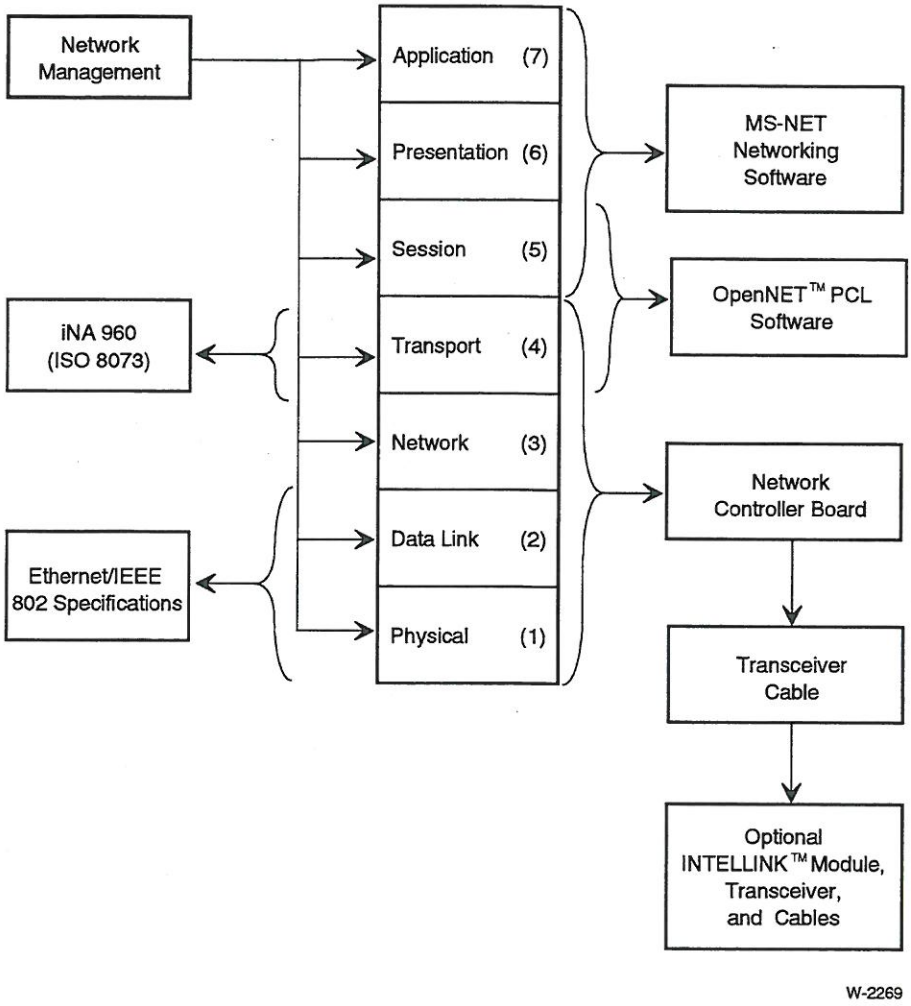


Figure 1-1. ISO/OSI MS-NET Implementation

***

Software Installation 2

This chapter explains how to install and configure the MS-NET software and describes the commands used to connect to a remote server and printer.

Users who have not installed the PCL2 Network Interface Adapter (NIA) board and software should refer to the *PCL2 Hardware Installation Guide* before continuing with the material in this manual.

Copying the MS-NET Software

Before installing the MS-NET software, make a working copy of the software and file the master in a safe place as a backup. The following sections describe how to copy the software to diskette-based and fixed disk-based systems.

Diskette Based Systems

To copy the MS-NET software to a floppy diskette, perform the following steps.

1. Insert the DOS system diskette, version 3.1 or higher, into diskette drive A and turn on the power to the PC system. The Disk Operating System (DOS) will automatically load and start.
2. Insert the diskette labeled "PCL2/DOS System Diskette" into drive B. This diskette was created during the installation procedure described in the *PCL2 Hardware Installation Guide*.
3. Take the DOS diskette out of drive A and store it in a safe location. Insert the diskette labeled "MS-NET" into drive A.
4. Enter the following command to copy the files from the master diskette onto the diskette labeled "PCL2/DOS System Diskette" in drive B:

   ```
   A:>COPY  A:*.*  B:*.*<Enter>
   ```

   This command copies all of the files from the master diskette onto the "PCL2/DOS System Diskette" in drive B.

5. Remove the diskette in drive A and reinsert the DOS system diskette, version 3.1 or higher, into drive A. Copy the file ANSI.SYS from the DOS diskette onto the DOS system diskette labeled "PCL2/DOS System Diskette" in drive B, with the following command:

   ```
   A:>COPY A:ANSI.SYS B:<Enter>
   ```

   This file must be present on the "PCL2/DOS System Diskette" in order for the MS-NET software to function properly.

6. Store the master MS-NET diskette in a safe environment.

Fixed Disk Based Systems

To copy the MS-NET software to a fixed disk, perform the following steps.

1. Turn on the PC system power and wait until the PC loads and starts the Disk Operating System (DOS) from the fixed disk. The version of DOS located on the fixed disk must be version 3.1 or higher.

2. Change the current default directory to the PCL2 directory. The PCL2 directory was created during the installation procedure described in the *PCL2 Installation Guide*.

   To change the current directory to the directory named PCL2, enter the following command:

   ```
   C:\>CD  \PCL2<Enter>
   ```

3. To copy the MS-NET software to the PCL2 directory on the fixed disk, place the MS-NET software diskette into drive A and enter:

   ```
   C:\>COPY  A:*.*  C:\PCL2\*.*<Enter>
   ```

4. Ensure that the DOS file ANSI.SYS is in the DOS root directory. This file must be present in order for the MS-NET software to function properly.

5. For DOS 3.2 or higher, please ensure that the program SHARE.EXE is copied into the PCL2 directory from the "PCL2/DOS System Diskette." This program is important for correct Server operation.

6. Store the master MS-NET software diskette in a safe environment.

Setting Up the PC Environment

This section details all the necessary configuration parameters needed for MS-NET. This section also describes how to define users on different servers for use with MS-NET.

Please be sure that all of the installation instructions detailed in the *PCL2 Hardware Installation Guide* have been executed correctly.

Creating a CONFIG.SYS File

The CONFIG.SYS file is a special configuration file that the Operating System reads when it first loads DOS on the PC system. This section explains how to create a CONFIG.SYS file.

1. For floppy disk users only:

   Using a text editor, create a file called CONFIG.SYS on the "PCL2/DOS System Diskette". Using the editor, enter the following:

   ```
   DEVICE = path\ANSI.SYS<Enter>
   LASTDRIVE = Z<Enter>
   FILES = 20<Enter>
   BUFFERS = 20<Enter>
   ```

   DEVICE = path\ANSI.SYS installs the ANSI device driver, which interprets the escape sequences used by many MS-NET programs. Replace path with the drive and directory path containing the ANSI.SYS command file.

   LASTDRIVE = Z extends the number of drive names that DOS recognizes. By default, DOS recognizes five drive names, A through E. Extending the number of drives enables the PC system to use all 26 drive names, A through Z.

   FILES = 20 indicates the number of files that can be open at one time.

   BUFFERS = 20 extends the number of disk buffers that DOS uses to hold data as it is read from or written to disk. The default number of buffers is two on a PC XT and three on a PC AT. Increasing this number to 20 ensures smoother, quicker flow of data.

2. For fixed disk users only:

   The CONFIG.SYS file should already exist in the DOS root directory. Using a text editor, edit the CONFIG.SYS file to include the following DOS configuration commands:

   ```
   DEVICE = path\ANSI.SYS<Enter>
   LASTDRIVE = Z<Enter>
   FILES = 20<Enter>
   BUFFERS = 20<Enter>
   ```

   The descriptions for these commands are the same as presented in step 1.

3. Update the CONFIG.SYS file to include these editing changes.

Accessing OpenNET™ File Servers

Access to an OpenNET NRM, XENIX, iRMX, VAX/VMS, or DOS file server from a PC is limited to only those users who are defined at the file server. Each type of file server has its own method of defining users.

NRM File Servers

Adding the PC user on the OpenNET NRM file server is done by the network administrator. The procedure for doing this is the same as adding any other NRM user. The USERDEF utility at the NRM adds user names to the user definition file (UDF) at the NRM. The administrator will assign a home directory to be used when connecting the PC system to the file server.

A more detailed description on adding the PC system to the NRM can be obtained from the *NDS-II Network Resource Manager User's Guide Release 3.0*, the *iNDX OpenNET User's Guide*, or by contacting the OpenNET NRM administrator.

XENIX File Servers

Adding the PC user on the XENIX file server is done by the administrator of the XENIX server system. The MKUSER utility at the XENIX server is used to add a PC user to the system. The user definition is stored in the "/etc/passwd" file at the server. The administrator will assign a home directory to be used when connecting the PC system to the file server.

A more detailed description on adding the PC system to the XENIX file server can be obtained from the *XENIX Networking Software Installation and Configuration Guide*, and by contacting the XENIX system administrator.

iRMX® File Servers

Adding the PC user on the iRMX file server is done by the administrator of the iRMX system. The PASSWORD utility at the iRMX server is used to add a PC user to the system. The user definition is stored in the user definition file (UDF) at the iRMX server. The network administrator assigns a home directory to the PC when connecting the PC system to the file server.

A more detailed description on adding the PC system to the iRMX file server can be obtained from the *iRMX® Networking Software User's Guide*, and by contacting the iRMX system administrator.

VAX/VMS File Servers

Adding the PC user on the VAX/VMS file server must be done by the administrator of the VAX/VMS system. The AUTHORIZE utility at the VAX/VMS server is used to add a PC user to the system.

A more detailed description on adding the PC system to the VAX/VMS file server can be obtained from the *VAX/VMS OpenNET Networking Software User's Guide*, and by contacting the VAX/VMS system administrator.

DOS File Servers

Defining DOS users for a DOS file server or remote printer is explained in Chapter 6 of this manual.

***

Starting the MS-NET Consumer 3

This chapter explains the invocation and start-up of the MS-NET consumer software to enable it to function as a workstation of a remote server.

Starting MS-NET Software

To start the MS-NET consumer software, follow either the procedure described in the section titled Diskette Based Systems or the procedure given in the section titled Fixed Disk Based Systems.

Diskette Based Systems

Insert the PCL2 System Diskette into drive A of the PC system. Turn on the PC system power and boot the DOS operating system, version 3.1 or later.

To invoke the OpenNET PCL software, enter the following command:

```
A:\>NET START RDR name<Enter>
```

Where:

name is the name assigned to the PC system.

Fixed Disk Based Systems

Turn on the PC system power and boot the DOS operating system, version 3.1 or later. Change to the PCL2 directory by entering the following command:

```
C:\>CD  \PCL2<Enter>
```

To invoke the MS-NET software, enter:

```
C:\PCL2>NET START RDR name<Enter>
```

Where:

name is the name assigned to the PC system.

NET START RDR Command

The NET START RDR command loads the software driver, NETBIOS, the transport software, INAPCL2.MEM (for PCL2NIA), INAPCL2A.MEM (for PCL2ANIA) or INAR31A.MEM and the MS-NET software.

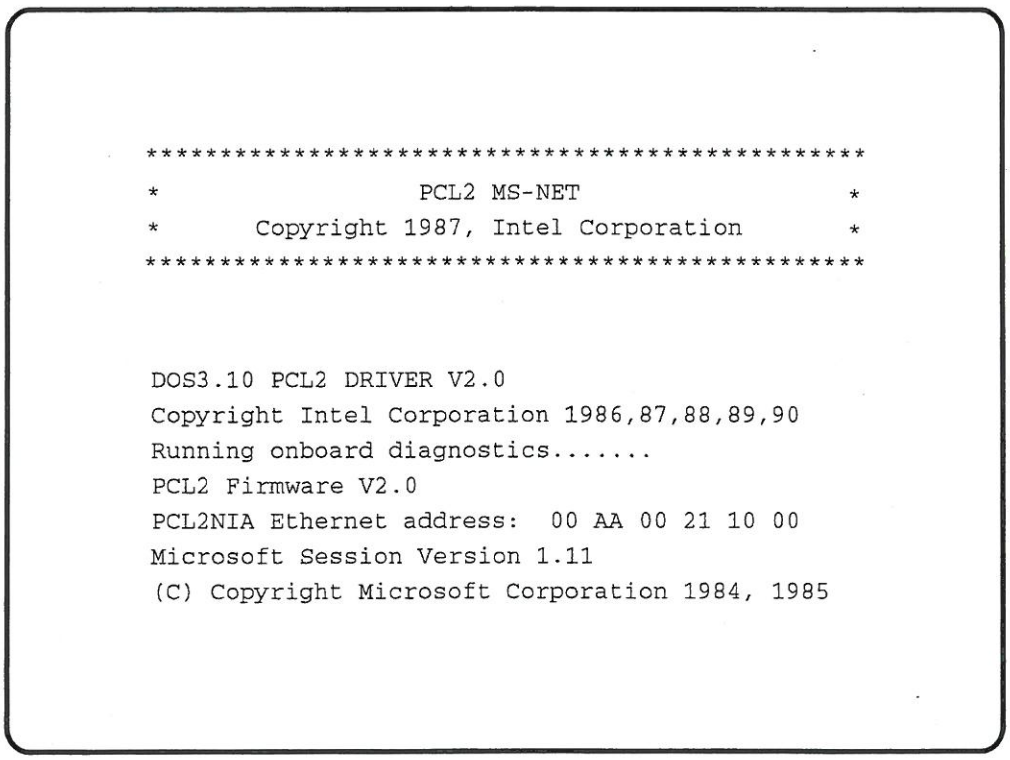
When the command is entered, MS-NET looks for the MSNET.INI macro file. This file contains the command invocations for loading the software.

After the software has been successfully invoked, the Initialization Screen shown in Figure 3-1 appears. The PC system is now configured and ready for use as a workstation on the OpenNET network.

MS-NET Startup Example

The following command invokes the MS-NET software on a PC system defined as MFNG_PCAT_BOB.

```
C:>NET START RDR MFNG_PCAT_BOB
```



W-2270

Figure 3-1. Initialization Screen

***

Using MS-NET Software 4

This chapter describes how to use MS-NET and DOS commands with remote files. If the MS-NET software is not yet installed and initialized, refer to Chapters 2 and 3 before proceeding.

Connecting to File Servers

This section explains how to use MS-NET to connect a PC to a remote file server or printer. Network connections are accomplished by using the NET USE command.

When the NET USE command is entered, the requests for remote resources are sent over the network to the appropriate server. Logical devices (i.e., floppy drives and hard disks) at the PC system can now be associated with directories at a remote file server and can transparently access the server's files.

The format for using the NET USE command to connect with a remote server follows:

```
NET USE device: \\servername\username [password]
```

Where:

device	is the letter of an unused logical device on the PC system.
servername	is the network name of the file server with which the user wants to connect. The servername must exist in the NETADDR file before it can be used.
username	is the name of the user defined at the server.
password	is optional. The password is determined by the network administrator and is used to restrict unauthorized access. When a password is entered on the command line, it is echoed to the screen. If the user wishes that the password not be echoed to the screen, enter and asterisk (*) in the password field. This will stop the echoing of the password.

The file server verifies the given PC system user name and password (if used). If the PC system is defined as a qualified user at the server, the PC system is attached to the home directory associated with the user name specified in the NET USE command. Thereafter, files can be referenced within that directory using the logical device name as the prefix.

Example Of Connecting To A File Server

The following example connects drive G of the user BOB to a remote file server MKTG_NRM.

```
C:>NET USE G: \\MKTG_NRM\BOB [password]
```

MS-NET displays the following message after successfully connecting to the server:

```
Command completed successfully.
```

To switch to drive G, enter:

```
C:>G:<Enter>
```

The PC system's prompt changes to indicate attachment to drive G as shown below:

```
G:\>
```

Files located in BOB's home directory at the file server can now be accessed and changed in the same manner as they would be on a floppy diskette or hard disk located at BOB's own PC.

Connecting to a Remote Printer

To use a printer at a file server, the local print device is connected to the remote printer. This is accomplished with the NET USE command.

The format for the NET USE command, when connecting a remote printer is:

```
NET USE printdevice: \\servername\username [password]
```

Where:

printdevice is one of the following device names: PRN, LPT1, LPT2, or LPT3.

servername is the name of the server to which the printer is attached.

username is the network name of the file server with which the user wants to connect. The servername must exist in the NETADDR file before it can be used.

password is optional. The password is determined by the network administrator and is used to restrict unauthorized access. When a password is entered on the command line, it is echoed to the screen.

Example Of Connecting To A Remote Printer

The following command connects the local print device PRN for the user BOB to a remote printer at the server MKTG_NRM:

```
C:>NET USE PRN:\\MKTG_NRM\BOB
```

Specifying Drive Names

The specified drive of the NET USE command may be a "real" drive such as A, or it may be a "virtual drive", (that is, a drive that does not physically exist), such as F or Z. When connecting to the server using virtual drives, the real drives can be saved for work on real diskettes.

PC systems with one or two real diskette drives, usually refer to the drives as A and B. A hard disk (real) is referred to as drive C. Since twenty-six (26) drives were previously assigned to the PC system when the CONFIG.SYS file was created, any or all of the virtual drives (drives D through Z) can be used to connect to the OpenNET network.

The following sample commands connect drive D of the user JOHN, and drive E of the user BOB to the server MKTG_NRM:

```
C:>NET USE D: \\MKTG_NRM\JOHN
C:>NET USE E: \\MKTG_NRM\BOB
```

If an attempt is made to connect to an undefined drive, the following message is displayed:

```
Invalid device.
```

To determine the number of drives that are available, check the LASTDRIVE entry in the CONFIG.SYS file. (Refer to the "Creating a CONFIG.SYS File" section of Chapter 2 for additional information.)

Listing Remote Connections

The following command lists all remote servers that are connected to the PC and gives the respective drive assignments:

```
C:>NET USE
```

Figure 4-1 is an example of a typical screen produced by the NET USE command.

```
                Local           Network
Status          Device          Name
-------------------------------------------------------------------------------
                Q:              \\APPS_XENIX_1\BOB
                T:              \\MFNG_RMX2\WORLD
                LPT1            \\DPT_PC_SERV\HPLASER

Command completed successfully.
```

W-2271

Figure 4-1. Sample NET USE Screen

Using DOS Commands

Once connected to a remote server, almost any DOS command or program may be used. The exceptions are commands and programs that physically manipulate the drives.

The following DOS commands do not work with remote resources:

- BACKUP
- CHKDSK
- DISK COPY
- FORMAT
- JOIN
- RECOVER
- SYS

All other DOS commands are transparent to the network user. The DOS command is prefaced with the drive letter of the logical drive connection to the file server.

When attempting to use any of the above DOS commands with a remote file, directory or disk, the following error message appears on the screen:

```
Cannot COMMAND a Network drive.
```

Where:

COMMAND represents the name of the invalid command.

Example Of Listing A Remote Directory

Use the DIR command to list the contents of a remote directory. For example, assume drive G is connected to the remote server MKTG_NRM for the user BOB. To list the contents of drive G, enter:

```
C:>DIR G:<Enter>
```

Using Programs With Remote Data

A remote data file can be used with any application program that runs under DOS. Use the application as if it is located on a diskette in one drive and the related data diskette is in another drive.

Some applications only read and write to files that are located in a specific drive. When trying to use such an application with a remote data file, an error message is displayed. The message indicates that the disk is not ready or that the file does not exist. This problem can be solved by using the DOS ASSIGN command to map the actual drive to the required drive.

The format of the ASSIGN command follows:

```
ASSIGN x = y
```

Where:

x is the drive required by the application.

y is the drive actually being used to access the remote data file.

The ASSIGN command file must be located in the PCL2 directory. For example, an application is executed that performs operations only to files in drive B, but the file that is needed is in a remote directory connected to drive G. Use the following command:

```
C:>ASSIGN B = G<Enter>
```

This command takes all reads and writes destined for drive B and sends them to drive G.

If the application does not run properly, or an error message is displayed when starting the application, the cause may be an old version of DOS. If this happens, use the ASSIGN command to assign the remote device to the appropriate drive.

To cancel all drive assignments, enter:

```
C:>ASSIGN<Enter>
```

Using a Remote Printer

To print a file at a remote printer, use the NET PRINT command along with the name of the print device connected to the server. The file is placed in the server's printer spool directory and then sent to the printer.

The format for using the NET PRINT command is as follows:

```
NET PRINT pathname printdevice
```

Where:

pathname specifies the name of the file to print.

printdevice is the name of the print device linked to the remote printer; that is, the device name that was used in the NET USE command.

Example NET PRINT Command

To print the file STATUS.DOC on a remote printer that is linked to print device PRN, enter:

```
C:>NET PRINT STATUS.DOC PRN<Enter>
REMOTE PRINTING FROM WITHIN APPLICATIONS
```

A few application programs use INT 17H to print files to a printer. These files are lacking an end of file indicator (EOF). Using this type of printing scheme on the network results in the following:

- The file is not displayed in the print queue of the server.
- The start of printing is delayed until the application is exited.

To remedy this problem, simultaneously press the <Ctrl> + <Alt> + <PrtSc> keys after the file has been sent to the printer. This procedure generates the EOF indicator and the print file is immediately queued for printing. The user must be careful not to press the <Ctrl> + <Alt> + <PrtSc> keys before the complete file is sent, since doing so will break the file into separate print jobs.

Disconnecting a Remote Printer

Disconnecting a print device from a remote printer is accomplished with the /d switch option of the NET USE command. Following is the format for using the NET USE command to disconnect from a remote printer:

```
NET USE printdevice: /D
```

Where:

printdevice is the name of the print device linked to the remote printer; that is, the device name that was used in the NET USE command.

To disconnect the print device PRN from a remote printer, enter:

```
C:>NET USE PRN: /D<Enter>
```

Disconnecting a File Server

A user may connect to only one remote server per device. This means that a user must disconnect any drive assigned to a remote server before the drive can be used to connect with another server. However, different drives can be connected to different directories at the same time.

To disconnect a drive connected to a server, use the NET USE command with the /D switch option. The format is as follows:

```
NET USE device: /D
```

Where:

device is the letter of the drive device used to connect with the remote server.

A drive cannot be disconnected while it is in use. If an attempt is made to disconnect while using the drive, the following message appears on the screen:

```
Cannot disconnect from current drive.
```

Switch to the drive where the MS-NET software is located and then repeat the disconnect command.

Example of Disconnecting a Remote Server

To disconnect drive G from the server NRM, first switch to the drive containing the MS-NET software, as shown in the example below:

```
G:\>C:<Enter>
```

Then, to disconnect drive G from the server, enter:

```
C:>NET USE G: /D<Enter>
```

Temporary Disconnections

Occasionally, the need may arise to temporarily disconnect from network resources to connect devices to the user's own diskettes, directories, or printers. For example, if the printer device PRN is connected to a network printer, that device name cannot be used for the user's own printer.

The NET PAUSE command permits a user to temporarily disconnect devices from the network. The NET PAUSE command has the following format:

```
NET PAUSE [DISK REDIRECTION] [PRINT REDIRECTION]
```

Where:

DISK REDIRECTION	temporarily enables the drive devices to access the user's own disks or directories. DRDR may be used as a valid abbreviation for DISK REDIRECTION, as indicated with the underscores.
PRINT REDIRECTION	temporarily enables the user to connect a local printer to the device used to link to a remote printer. PRDR may be used as a valid abbreviation for PRINT REDIRECTION, as indicated by the underscores.

Example NET PAUSE Command

To temporarily disconnect drive devices from the network, enter:

```
C:>NET PAUSE DRDR<Enter>
```

To temporarily disconnect print devices from the network, enter:

```
C:>NET PAUSE PRDR<Enter>
```

Restarting After a Net Pause

Use the NET CONTINUE command to reconnect to the network after a temporary disconnection of a device from the network. Enter the following to execute the NET CONTINUE command:

```
NET CONTINUE [DISK REDIRECTION] [PRINT REDIRECTION]
```

Where:

DISK REDIRECTION	reconnects drive devices to the network. DRDR is a valid abbreviation for DISK REDIRECTION, as indicated by the underscores.
PRINT REDIRECTION	reconnects the device used to link with a remote printer. PRDR may be used as a valid abbreviation for a PRINT REDIRECTION command, as shown with underscores.

Example of Reconnecting Devices to the Server

To resume using the drive devices after a NET PAUSE command, enter:

```
C:>NET CONTINUE DRDR<Enter>
```

To resume using the print devices after a NET PAUSE command, enter:

```
C:>NET CONTINUE PRDR<Enter>
```

Creating Read-Only Files

At times files need to be labeled at a server as read-only files. The DOS ATTRIB command is used to mark the files as read-only. This ensures that other users of the network are not be able to write to the marked files, which would destroy the original contents of the file.

Set or reset the read-only attribute of files located at a remote server using the following ATTRIB command format:

```
[d:path] ATTRIB [+R] [-R] pathname
```

Where:

d:path	specifies the drive (d:) and *path* that contains the ATTRIB command file.
ATTRIB	displays the current attribute setting of the specified file.
+R	sets a read-only attribute for the file.
-R	removes the read-only attribute of the file.
pathname	specifies the name and location of the file to mark.

Example ATTRIB Command

The following example sets the read-only attribute of a remote file STATUS.DOC at a remote file server drive G.

```
C:>ATTRIB +R G: \STATUS.DOC<Enter>
```

Similarly, the ATTRIB command is used in the following example to remove the read-only attribute:

```
C:>ATTRIB -R G: \STATUS.DOC<Enter>
```

Getting Help for Net Commands

Information about using network commands can be obtained from on-line help files. The word HELP is inserted as part of the command in order to receive the help information about a command.

For example, to receive information about the NET PRINT command, enter:

```
C:>NET PRINT HELP<Enter>
```

or

```
C:>NET HELP PRINT<Enter>
```

***

Starting the Server 5

The MS-NET Server is a program that allows remote users to access the PC system's resources, such as files and local printers. This chapter explains how to start up the Server.

Setting Up the Print Spooler

If the PC system has a printer that will be used as a network printer, the PC must have a spool directory to store temporary files while printing. This may have been done when installing the software, as explained in the *PCL2 Hardware Installation Guide*.

To create the spool directory, enter:

```
C:\>MKDIR \SPOOL<Enter>
```

Note that this assumes a fixed-disk system. For diskette based systems, the spool directory should be created on the drive containing the "PCL2/DOS System Diskette".

SPOOL is the default spool directory. To use an alternate, create the directory and alter the MSNET.INI file to include the following:

```
SERVER /S:pathname
```

Here, *pathname* is the drive and complete pathname of the desired spool directory.

Invoking the Server

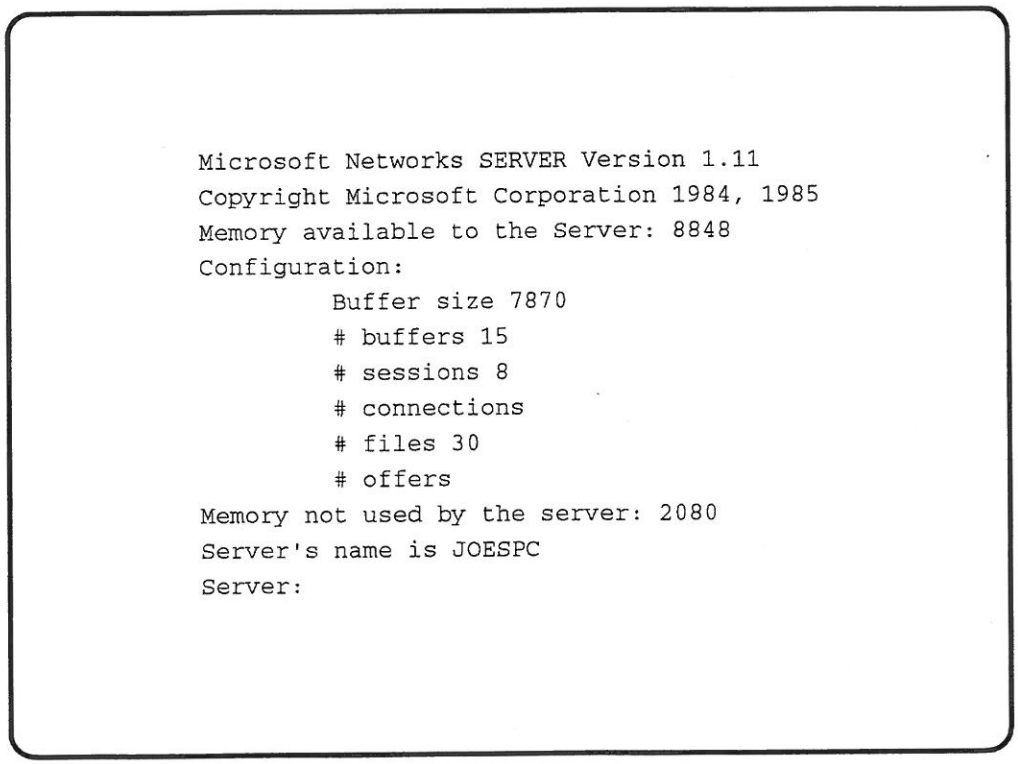
To invoke the Server, type the following from DOS:

```
C:\>NET START SERVER computername<Enter>
```

Here, *computername* is the node name for the PC system on the network. If the spool directory has not been set up, the system displays a warning message:

```
Spool directory C:\SPOOL does not exist
```

Unless a network printer is desired on the system, the Server will function normally. After invoking the Server, a Server configuration screen similar to the screen shown in Figure 5-1 appears.



W-2272

Figure 5-1. Network Server Screen

Exiting the Server

The SERVER: prompt indicates that the server is running. At this point, only the following NET Server commands are recognized:

- NET ERROR
- NET FILE
- NET HELP
- NET PRINT CANCEL
- NET PRINT KILL
- NET PRINT OFF/ON
- NET PRINT RESTART
- NET SEPARATOR
- NET SHARE
- NET START SRV
- NET STATUS
- NET STOP

To execute DOS commands, the Server must first be halted. This is accomplished with the NET STOP command as shown below:

```
Server: NET STOP<Enter>
```

This shuts down the Server and the DOS prompt appears. NET STOP can be used to halt the Server temporarily or to exit the Server completely. To restart the Server from DOS, enter the NET RESTART command, as follows:

```
C:\>NET RESTART<Enter>
```

***

Using the MS-NET Server 6

The MS-NET Server program provides access to local PC resources by remote OpenNET users and other MS-NET users. The Server is a dedicated application — that is, only Server operations can be performed when the Server is running. In particular, the user cannot perform DOS functions and cannot use the system as a workstation when running the Server.

The Server is comprised of two applications:

- **File Server** — provides remote users with access to designated subtrees of the local DOS file system.
- **Print Server** — provides remote users with access to a local printer.

In the following, the PC system is assumed to have the MS-NET Server installed and running.

The MS-NET File Server

The MS-NET File Server is used to provide remote users with access to the PC system's directories and files. The File Server has the following features:

- Access can be restricted to subtrees of the file system (a subtree consists of all the files and nested directories contained in a given directory).
- Access can be password protected.
- Access to a given directory can be tagged with a combination of the following permissions: read (files can be read), write (files can be modified) and create (files can added to the directory).

Sharing Directories and Files

With the Server running, directories are made available for access over the network using the NET SHARE command. Access to a particular directory implies access to

all the files (and subdirectories) contained in that directory. The syntax for NET SHARE in this instance (NET SHARE has other invocations) is shown below:

```
NET SHARE shortname=[d:][pathname] [password] [/[R][W][C]]
```

Where:

shortname is a name to be used to identify the shared directory. The shortname is used by remote users to refer to the directory on the Server without designating a drive or using an explicit pathname.

d: is the drive that contains the shared directory.

pathname is the pathname of the shared directory.

password is an optional password.

/RWC designates the access permission for the shared directory as follows:

- *R* **read permission** — users can read and copy files in the directory subtree.
- *W* **write permission** — users can write to, modify and delete files in the directory subtree.
- *C* **create permission** — users can create files in the directory subtree.

Note that if the access parameters are left out, the Server assumes all three accesses are permitted (/RWC).

For example, suppose the following command was issued to the Server:

```
Server: NET SHARE LETTERS=C:\WP\LETTERS
```

A remote MS-NET user could access the C:\WP\LETTERS directory by referring to it as LETTERS as in the following:

```
C:\>TYPE D:MEMO
```

This example assumes the remote user has assigned D: as the designator for the Server system.

Using a resources's shortname allows the Network Manager to change the location of a shared resource without affecting the users. For example, assume a standard set of customer letters has been changed and the new letters need to be available to all network users. Substitute a different subdirectory for LETTERS by changing the SHARE command to:

```
Server: NET SHARE LETTERS=C:\WP\LETTERS2
```

The change would be transparent to the network users, who would still use LETTERS to access the directory.

Removing a Shared Directory

To remove a directory from access by the network, use the delete version of the NET SHARE command:

```
NET SHARE shortname /D
```

For example, to remove the directory ACCOUNTS from the network:

```
Server: NET SHARE ACCOUNTS /D
```

Once this is done, ACCOUNTS is no longer accessible to workstations on the network.

Listing Shared Resources

To list the resources shared by the local system, use the NET SHARE command without parameters:

```
Server: NET SHARE
```

Figure 6-1 shows an example of the listing. This listing shows all the directories designated as shared. Note that a shared printer is indicated by *** in the Access/Status column.

```
Access/     Network     DOS             Names
Status      Name        Name            Using Device
-------------------------------------------------------
RWC         ACCOUNTS    \ACCOUNTS       ???????????
R           SALES       \SALES
RW          PAY         \ACCOUNTS\PAY   ???????????
***         LASER       LPT1:           ???????????
```

W-2273

Figure 6-1. Example NET SHARE Listing

The MS-NET Print Server

If the PC system has a local printer, it can be enabled as a network printer. Here, other workstations can send files to the *network printer*, to be printed under the management of the Server. Files are printed on a first-in first-out basis and are stored temporarily in a directory set aside as the *spool* directory (the Print Server is sometimes called a *print spooler*). The set of files waiting to be printed is called the *print queue*. A file sent to the network printer is often called a *print job*.

In the following, it is assumed that the spool directory has been established as explained in Chapter 5.

Enabling a Network Printer

To enable a printer for network printing, use the following form of the NET SHARE command:

```
NET SHARE shortname=printdevice
```

Where:

shortname is a name used to identify the shared printer.

printdevice is the DOS tag for the printer: PRN, LPT1, LPT2 or LPT3.

For example, the following enables printer LPT2 to be a network printer:

```
Server: NET SHARE LASER=LPT2
```

Remote users identify this printer as LASER.

Disabling the Network Printer

To disable the printer from network printing, use the /D option of the NET SHARE command:

```
NET SHARE shortname /D
```

For instance, to remove the printer offered in the preceding example:

```
Server: NET SHARE LASER /D
```

Listing the Print Queue

To list the files in the print queue, use the NET PRINT command without parameters:

```
Server: NET PRINT
```

Figure 6-2 shows a sample print queue listing. The printer status (ON/OFF and BUSY/IDLE) is displayed first, followed by a list of all files in the spool directory.

```
Printer is on
Printer is busy
PQ1001 (PRN) SALESPC  5636 In reply to your
PQ1002 (PRN) JACKSPC  2259 Western Region:
```

W-2274

Figure 6-2. Print Queue Listing

The first column in the listing contains the name assigned to the file in the printer queue (PQ1001, PQ1002 etc.), the printdevice name, and the name of the workstation that sent the file to the printer.

The second column is the size of the file in bytes. The third column is the first few words of the file.

Deleting a File from the Queue

The NET PRINT KILL command removes a file from the printer queue. To remove a file from the queue:

```
NET PRINT KILL filename [...]
```

Where:

filename is the name of the spool file to remove from the queue. Multiple files can be specified — separate the filenames with spaces.

For example, the files shown in Figure 6-2 can be removed from the print queue as follows:

```
Server: NET PRINT KILL PQ1001 PQ1002<Enter>
```

To delete a file that has already started printing, use the NET PRINT CANCEL command.

Canceling a Print Job

The NET PRINT CANCEL command stops (and removes from the queue) the job that is currently printing. To stop the current job from printing:

```
Server: NET PRINT CANCEL<Enter>
```

Stopping and Starting the Printer

The NET PRINT OFF and NET PRINT ON commands are used to stop and then start the printer. This can be used to clear a paper jam or add paper. To stop the printer, type:

```
Server: NET PRINT OFF<Enter>
```

To start the printer again, type:

```
Server: NET PRINT ON<Enter>
```

If a job was in progress when the printer was stopped, the print job will be restarted (at the beginning of the file).

Printing Banner Pages

Banner pages are single pages printed to separate print jobs. The printing of banner pages can be turned ON and OFF with the NET PRINT SEPARATOR command. To print separator pages between jobs, enter:

```
Server: NET SEPARATOR ON<Enter>
```

The separator page feature remains in effect until turned OFF. To turn OFF this feature:

```
Server: NET SEPARATOR OFF<Enter>
```

Restarting a Print Job

Use the NET PRINT RESTART command to stop the file that is currently printing and restart it in the back of the queue for reprinting:

```
Server: NET PRINT RESTART<Enter>
```

***

Network Management 7

Chapter 7 provides information about the administrative tasks of network management and includes information about managing users, monitoring the network and configuring the MS-NET software. The NET STOP, NET STATUS, NET RESTART, and NET FILE commands facilitate the administrative tasks of the network manager.

Managing Users

This section gives information on adding workstations to the network, making backups of server files, and how to solve common networking problems.

A Server must be stopped before adding or removing workstations from the NETADDR file and before performing the echo diagnostics test. The NET STOP command is used for stopping Servers. Since the shutting down of a Server breaks all connections with the Server, users should be warned of impending shut downs. Issuing a NET STATUS command prior to a NET STOP command ensures that no one is connected to the Server before shutting it down. The NET RESTART command is used to restart a Server.

Adding Workstations

This section assumes that the networking hardware and software has been installed on the system to be added to the network. The Ethernet address of the new system is needed before it can be added to the network. Refer to the *PCL2 Hardware Installation Guide* if additional information is required.

Before a workstation can be added to the network, all network Servers must be stopped and the network name and address of the new user added to the NETADDR file of each network workstation. The NET STOP command is used to stop each Server.

The NET STOP command halts the Server at which the command is typed and cuts off all current connections between that Server and the network. Before stopping a server, network users should be warned of the impending shutdown. Use the NET STATUS command to ensure that no active connections remain.

The NET STOP command, entered at each Server, is as follows:

```
Server:>NET STOP<Enter>
```

After the NET STOP command has been entered, the Server responds with the following message:

```
Shutdown pending
```

When the DOS prompt (>) returns, the Server has been successfully shut down.

After all Servers are stopped, the NETADDR file can be edited to add the name and address of the new workstation. The NETADDR file can have a maximum of 72 entries. Each entry has the following format:

name:ADDRESS=*network address*

Where:

name represents the network name of the workstation. Names can be a maximum of 15 characters in length and can be any combination of letters, numbers or special characters that do not include asterisks or spaces. The name must be entered into the NETADDR file in upper case characters.

network address is a 34-character string that defines the network address of the new system and has the following format:

```
ØXportØAØØØØØØØ1addrØØØØØØ
```

port is 0001 for PC workstations, 1000 for iRMX, and 8000 for NRM, XENIX and VAX/VMS workstations.

addr is the 12-character, unique Ethernet address assigned to each system when the PCL2NIA is installed. The XPORT command is used to obtain the Ethernet address of the new system. Refer to the *PCL2 Installation Guide* if additional information is needed.

After the name and network address of the new workstation have been added to the NETADDR file, copy the updated file to each PC Server so that all NETADDR files are replaced by the updated file.

To restart the network, issue the NET RESTART command at each Server, as shown below:

```
C:>NET RESTART<Enter>
```

If an attempt is made to re-boot DOS (by pressing and holding the <Ctrl> + <Alt> + <Del> keys) while a Server is running, the following error message is displayed:

```
Press <Ctrl> + <Alt> + <Del> again to reboot
```

This mechanism is a built-in protection against accidentally re-booting the system while workstations are connected to the Server. If the intent is to restart DOS, press the <Ctrl> + <Alt> + <Del> keys again; otherwise, pressing any other key causes the Server prompt to reappear.

When the "Server:" prompt is displayed, the Server program is running and ready for network use.

Backing Up the Server

It is important to make backup copies of all Server files on a regular basis. In the event that Server files are ever damaged or lost, the DOS COPY command can be used to restore most of the data.

Troubleshooting

The Network Manager is responsible for keeping the network running smoothly. User problems are frequently directed to a Network Manager. This section identifies common network problems and their probable solutions.

The user has trouble connecting a workstation to the network. First, check the following:

- The NETADDR file contains the correct network name and address.
- The Net Use command is typed correctly.

- The resource has been shared.
- The shortname of the shared resource and the pathname used in the NET USE command are the same.

If the connection attempt is still unsuccessful, run the echo diagnostics test between the workstation and the Server in question. Note any error messages that are displayed and consult the network vendor.

`Files are sent to the printer queue, but nothing is being printed.`

Make sure that the printer is plugged in and receiving power. Ensure that the printer's on/off switch is in the on position and is functioning correctly. Use the NET PRINT command to make sure that the printer device driver is activated. To activate the printer device driver, type:

```
NET PRINT ON<Enter>
```

`A "Duplicate name on network" error message is received.`

This means that the assigned workstation name is already in use. This often happens when workstations are named with the first name of their primary user. To avoid duplicate names of this nature, incorporate the first initial of the user's last name in the network name, as in "johns," for John Smith's workstation.

Assign a different name to the workstation and change the NETADDR file at the workstation and all related Servers.

`An "Invalid device" error message is received.`

The "lastdrive=" entry in the workstation's CONFIG.SYS file is incorrect. Edit the CONFIG.SYS file so that the line reads "lastdrive=z". The workstation is then able to use drive names A through Z.

`A "Not a valid name" error message is received.`

The name given with the NET START command line in the workstation's AUTOEXEC.BAT file is incorrect. The name that follows "net start redirector" is the correct network name for the workstation.

`A "Command operands incorrect" error message is received.`

The NET START command line in the workstation's AUTOEXEC.BAT file is incorrect. The most common causes are two names on the command line, a space within the specified name, or a name with a length exceeding 15

characters. Correct the entry in the AUTOEXEC.BAT file, or if necessary, change the NETADDR file on each system that communicates with the misnamed workstation.

`The "System error" message is received at a workstation.`

Run the echo diagnostics test between the workstation in question and a Server. Note any error messages that appear, and then call the network vendor.

Appendix A lists all workstation error messages and explains probable causes and cures.

Monitoring the Network

Network management responsibilities include having knowledge about how the network is being used. This includes information about public directories, the shortnames used to access public directories, passwords and permissions. The NET STATUS and NET FILE commands are used by the Network Manager when monitoring the network.

Network Status

The NET STATUS command displays information about the network, such as which directories are currently offered for public use, the shortnames of public directories, password and permission settings, and which directories are being accessed by how many users. The NET STATUS command is also useful for finding the name of the printer spool directory and for monitoring the overall state of the network.

To display network information, enter the NET STATUS command at the "Server:" prompt, as shown below:

```
Server: NET STATUS<Enter>
```

Figure 7-1 illustrates the output screen for the NET STATUS command. Each element displayed on the screen is described following the Figure.

```
Server's net name is  NAME
Print spool directory is \DIRNAME
Printer driver is installed

Shared Resources:

Access/      Network      DOS
Status       Name         Name      Names Using Device
-------------------------------------------------------

    .            .           .           .
    .            .           .           .
    .            .           .           .

Print queue=FILENAME (PRINTDEVICE)
Open spool files=<SPLnnn(DEVICE:)>
Config: Buffer size= xxxx #buffers x #sessions x
#connections x #files x #offers x
Number of open files= x
```

W-2275

Figure 7-1. NET STATUS Output Screen

The following list explains each line of Figure 7-1:

`Server's net name is` *NAME*

NAME is replaced by the network name of the Server.

`Print spool directory is \`*DIRNAME*

DIRNAME is replaced with the name of the directory where files waiting to be printed are placed.

`Printer driver is installed`

Indicates the required software that sends the files to the printer is installed.

`Access/Status`

This column shows which permissions are granted for each directory listed. If the offered resource is a printer, this column contains three asterisks (***).

`Network Name`

This column lists the shortname for each directory.

`DOS Name`

This column gives the actual drive specification and pathname for each directory.

`Names Using Device`

This column lists the names of the workstations currently connected to a listed resource.

`Print queue=`*`FILENAME (PRINTDEVICE)`*

Lists the names of the files waiting to be printed, followed by the device name of the printer in parentheses.

`Open spool files=<SPL`*`nnn(DEVICE:)`*`>`

Lists the files currently being sent to the printer. These files are still open. When transmission from the workstation to the Server is complete, the files are placed in the print queue.

`Config: Buffer size=`*`xxxx`* `#buffers` *`x`* `#sessions` *`x`*
`#connections` *`x`* `#files` *`x`* `#offers` *`x`*

Shows the size of the Server buffer (in bytes), the number of buffers, the number of workstations that can use the Server at the same time, the maximum number of connections to the Server, the total number of Server files that can be in use by workstations at the same time, and the maximum number of offers (shared resources) that can be made by the Server. Additional information about buffers and sessions is found in the section titled "Configuring the Network."

`Number of open files=x`

Displays the number of files that are currently open. Open files are discussed in the section titled "Configuring the Network."

File Status

The NET FILE command is used to check the status of a specific file or all shared files currently being used. The command displays a list of the current users and any record locks that exist on the files. If a shared file has been left open with records locked, the locked records cannot be used by other network users until the Network Manager closes the file by issuing a NET FILE command.

The NET FILE command can only be entered at the Server that shares the disk or directory containing the files in question. The NET FILE command has the following syntax:

`Server:NET FILE [d:path\filename] [/C]`

Where:

d:path\filename	Displays status information for the file specified.
/C	This option is used to close an open or locked file. Entering the NET FILE command without specifying parameters displays information for all open files.

Configuring MS-NET

Several configurable options are available that affect network operation. The best settings for each option varies depending on the network. For example, a small network that has only a few users connected at any one time might be configured for fast performance by having most of the available memory dedicated to a few large buffers. On the other hand, a large network with many simultaneous users might prefer a configuration that allows for a large number of small buffers.

The options for configuring the network are set in the MSNET.INI file, which is kept at each Server and workstation. The MSNET.INI file contains a list of the programs that will be run when the following network commands are used:

- NET CONTINUE
- NET NAME
- NET PAUSE
- NET RESTART
- NET START REDIRECTOR
- NET START SERVER
- NET USE
- all HELP commands

The MSNET.INI File

The MSNET.INI file is made up of commands and lists of program names, as shown in Figure 7-2 on the following page. When a command is entered at a workstation, the MSNET.INI file is searched for the command. When the command is found, the programs that are listed beneath the command are executed. As an example, the NET START REDIRECTOR command lists the following programs that are executed:

- NETBIOS
- MINSES
- REDIR
- SETNAME

Figure 7-2 illustrates the NET START REDIRECTOR command portion of the MSNET.INI file.

```
start redirector $1      commands
start rdr $1
chknet
xport
session netaddr
redir
setname $1
```

W-2276

Figure 7-2. MSNET.INI File

Configuring the Redirector

The Redirector is comprised of a group of programs that send network resource requests from the workstation to the network. The "net start redirector" command line of a workstation's AUTOEXEC.BAT file starts these programs.

When the Redirector default configuration is not chosen, a list of configuration options is included in the MSNET.INI file. The Redirector configuration options can be used to specify the following:

- The maximum number of connections the workstation can have.
- The maximum number of Servers with which the workstation can communicate.
- The printer buffer sizes.

The optional configuration parameters are listed in the "redir" line of the MSNET.INI file. The "redir" line has the following syntax:

```
redir [/l:n /s:n /px:n]
```

Where:

`/l:n` Specifies the maximum number of simultaneous connections that a workstation may have to all Servers.

`/s:n` Specifies the maximum number of Servers that a workstation may be connected to at one time. The default is two Servers.

`/px:n` Specifies the size, in bytes, of the printer device buffer for LPTx (Where x is 1, 2, or 3). The default is 128 bytes.

The following sample redir command line allows 10 simultaneous connections with up to 4 Servers per workstation. The buffer size for the printer device called LPT1 is 500 Kbytes.

```
redir /l:10 /s:4 /p1:500
```

Configuring the Server

When the default Server configuration is not used, several options can be set in the "server" line of the Server's MSNET.INI file.

Use the configuration options to specify:

- An initialization file that is read whenever the Server is started. The initialization file contains commands to be executed each time the Server is started.
- The printer spool directory.
- The number of the Server files that can be in use at the same time.
- The number of workstations that can simultaneously use the Server.
- The buffer size used for each workstation connected to the Server.
- The maximum number of entries in the Server's connection table.
- The number of offers permitted on the Server.

The options listed below are set in the "server" line in the MSNET.INI file. The options may be used in any combination and in any order. The syntax of the "server" command line is as follows:

```
server [/i:filename /s:spooldir /f:files /n:sessions
                                /mb:buffersize /c:n /o:n]
```

Where:

`/i:filename` Designates an initialization file that is read whenever the Server is started.

`/s:spooldir` Specifies the printer spool directory.

`/f:files`	Identifies the number of Server files that can be open at the same time.
`/n:sessions`	Defines the number of workstations that can simultaneously use the Server. The maximum is 30.
`/mb:buffersize`	Designates the size, in bytes, of buffers used to send and receive messages. The minimum is 4K; the maximum is 20K.
`/c:n`	Designates the maximum number of entries in the Server's connection table. The default value is three times the number of sessions.
`/o:n`	Designates the number of shared resources the Server may have at one time.

Optimizing Server Performance

This section explains how to use the Server configuration options to enhance network performance. Any combination of options may be used; however, each system has inherent limits to the configurations it can support, because the available memory for Server configuration is fixed. If any options are set to levels that the system cannot support, all Server options are automatically adjusted to an acceptable configuration.

/i The Initialization File

The initialization file is designated by the /i option on the "server" command line of the MSNET.INI file. The commands entered into the initialization file are executed each time the Server is started. The initialization file may contain any command that can be entered at the "Server:" prompt.

The following sample line in the MSNET.INI file causes the file OFFERS to be read whenever the Server starts:

```
server /i:offers
```

The file OFFERS might appear as follows:

```
net share eng=c:\engineer\status
net share printer=prn:
```

By setting this /i option, the printer and the STATUS file are automatically shared each time the Server is started.

/s The Printer Spool Directory

The printer spool directory is used to store files waiting to be printed on the Server's printer. The /s option on the "server" line is followed by the complete pathname, including the drive name, of the spool directory. The default is the SPOOL directory on the current drive.

The following example specifies a printer spool directory named SPOOL on drive C:

```
server /s:c:\spool
```

/f The Number of Open Files

The /f option specifies the number of files on the Server that can be open at the same time. Unless a large number of workstations are using a Server (25 to 32), this entry should not be changed.

/n and /mb Memory Allocation

Before changing the default parameters, using the /n and /mb options described below, find out how much memory is available by examining the screen displayed when the Server starts. Figure 7-3 shows a sample Server screen that is displayed when the Server is started.

/n The Number of Sessions

Sessions are created whenever a workstation connects to a Server. The /n option specifies the maximum number of sessions permitted at a Server. The number of allowable sessions should be at least as large as the number of workstations that use the Server at one time.

Each session requires at least one buffer for temporary data storage. When the /n option is used to specify the number of sessions, the program tries to maintain 1.5 buffers for each session. If insufficient memory is available to support 1.5 buffers per session, the program either decreases the size of the buffers (if the buffer size has not been specified), or it decreases the number of buffers.

```
Microsoft Networks SERVER Version 1.11
Memory available to the Server: xxxx
Configuration:
     Buffer size
     # buffers xx
     # sessions xx
     # connections xx
     # files xx
     # offers x
Memory not used by the Server: xxxx
Server's name is computername
Server:
```


W-2277

Figure 7-3. The Server Screen

The following example increases the number of sessions from eight to ten. The "server" line in the MSNET.INI file is changed to read:

```
server /n:10 [options]
```

Where:

options refers to any other options already set.

/mb Memory Buffer Size

Each session has at least one buffer. The size of each buffer is specified (in bytes) with the /mb option. Larger buffers mean faster operation because data is transferred in larger blocks. If a significant portion of memory is left over when the Server is started, reconfigure the buffer sizes to take advantage of the unused memory. Divide the number of buffers into the amount of unused memory, and then add the quotient to the original buffer size:

$$\text{New Buffer Size} = \frac{\text{unused memory}}{\text{\# of buffers}} + \text{original buffer size}$$

For example, assume that the amount of unused memory is 7184 and that 15 buffers of 7392 bytes each are being used. The calculation is as follows:

$$7890 = \frac{7184}{15} + 7392$$

To use the new, larger buffer size, place the following information in the "server" line in the Server's MSNET.INI file:

```
server /n:8 /mb:7870
```

Reducing the amount of unused memory and increasing the network buffer size results in faster command execution when transferring large amounts of data over the network (e.g., Copy command).

/c The Number of Connection Table Entries

The Server connection table specifies how many Server resources can be in use at one time. The default value of the connection table is three times the number of sessions.

To increase the number in the connection table from 20 to 50, change the "server" line to read:

```
server /c:50
```

Overriding Network Configurations

To override configuration options that are entered in the MSNET.INI file, enter new options on the "Net Start" command line when the Server or Redirector is started. For example, to designate 20 sessions instead of a number specified in the MSNET.INI file, enter the following command when the network is started.

```
NET START name /n:20
```

Where:

name	is the name of the Server being started.
/n:	specifies the option for the number of sessions.
20	specifies the number of sessions to be 20.

Only the options specified in the MSNET.INI file can be overriden in this manner. Permanent default configuration option changes should be entered in the MSNET.INI file. This feature is recommended for situations that only require a temporary override of a specified option.

***

MS-NET Commands 8

This chapter describes the MS-NET Consumer and MS-NET Server commands. Each command is listed in alphabetical order and includes the command syntax, a description of the command and some examples of command usage.

The following commands are used to control connections to remote OpenNET devices:

NET CONTINUE	Resumes redirection after a NET PAUSE.
NET PAUSE	Halts disk or printer redirection (for example, to directly access local resources).
NET START RDR	Invokes the network software (redirector).
NET USE	Opens a connection to a resource (print server or file server) on a remote system.

The following commands control connections to remote print servers:

NET FORMFEED	Switches the indicator OFF/ON to send a formfeed character at the end of each printfile.
NET PRINT	Prints a file on a remote printer. May also be used to monitor the print queue status of a remote (or the local) print server.
NET PRINT CANCEL	Stops the current print job on a remote queue (does not requeue the file).
NET PRINT KILL	Removes a job from a remote print queue.
NET PRINT ON/OFF	Halts (OFF) the current print job (for example, to add paper). NET PRINT ON resumes printing (after a NET PRINT OFF).

NET PRINT RESTART	Stops the current print job on a remote queue and requeues the file.
NET SEPARATOR	Switches ON/OFF the printing of separator pages at a remote print server. A separator page is a page printed between print jobs.

The following commands are used to monitor the operation of the system and network:

NET ERROR	Displays a list of the most recent network errors.
NET FILE	Displays the status of current remote users (of the local file or print server. Also used to close open files and files with locked records.
NET NAME	Displays the network name assigned to the local PC system.
NET STATUS	Displays status information about current connections to remote file and print servers.

The following commands control the operation of the local PC network server:

NET RESTART	Restarts the network server (after a NET STOP).
NET SHARE	Controls the local resources to be shared over the OpenNET. Resources include access to a given sub-tree (of directories and files) and access to a local printer. Access control includes permission to read or modify a file, or create a directory entry (create a file). Shared resources may also be password protected.
NET START SRV	Starts the network server.
NET STOP	Halts the network server.

There is also the following miscellaneous command:

NET HELP	Displays on-line information on the NET CONTINUE, NAME, PAUSE, PRINT and START commands.

NET CONTINUE

The NET CONTINUE command restarts the disk redirection or print redirection programs after they have been temporarily stopped from functioning with the NET PAUSE command. Use this command with the consumer only.

Syntax

```
NET CONTINUE [DISK REDIRECTION] [PRINT REDIRECTION]
```

or

```
NET CONTINUE [DRDR] [PRDR]
```

Where:

DISK REDIRECTION	reconnects the drive devices to the network.
PRINT REDIRECTION	reconnects the print device being used to link with a remote printer.

Description

The NET CONTINUE command, when used with the options described, enables the restarting of the disk redirection or print redirection program after temporarily halting either of these programs with the NET PAUSE command. This command restores the disk redirection or print redirection programs to the same status as they were before they were temporarily stopped.

Examples

1. Restarts the print redirection program. Assume the printer port LPT1 is redirected to a network printer. The printer redirection was temporarily stopped for using the local printer connected to LPT1. To resume the printer redirection so that print requests are again redirected to network printer, enter the following command:

```
C:>NET CONTINUE PRDR<Enter>
```

NET CONTINUE (continued)

Examples (continued)

2. Restarts the disk redirection The best way to illustrate this concept is by assuming the existance of a computer with two floppy disk drives (A: and B:) and one hard disk drive (C:). Disk drive B: is redirected to a network disk by using the disk redirection program. To use disk drive B: as a floppy disk drive, the disk redirection was temporarily stopped so that requests to drive B: are no longer redirected to the network disk. To use the network disk as drive B: again, enter the following command:

```
C:>NET CONTINUE DRDR<Enter>
```

NET ERROR

The NET ERROR command is used to display the fifteen most recent network errors and the times that they occurred. Use this command with the server only.

Syntax

```
NET ERROR [/D]
```

Where:

/D	when invoked, deletes the error list once it is displayed.

Description

The NET ERROR command displays the last fifteen errors occurring on the network. If the number of network errors exceeds fifteen, the oldest network error will be deleted to make room for the newest error. The /D switch deletes the error list.

Example

1. To display the last fifteen errors occuring on the network, enter the following command:

```
Server: NET ERROR<Enter>
```

NET FILE

This command displays the current users and record-locks file status. The /C option closes files that have been left open or that have locked records. Use this command with the server only.

Syntax

```
NET FILE [d:path\filename][/C]
```

Where:

d:path\filename	when invoked, displays file status information for the file specified by drive, path and filename.
/C	when invoked, this option will close either an open file or a file with locked records.

Description

The NET FILE Cmmand is only used by the Server that shares a network file. The locked portions of a file cannot be used by other computers on the network. The network manager can close the file with this command. Use this command without a filename to display status information of all open files on the network.

Examples

1. To check the status of all open files, enter the following command:

   ```
   NET FILE<Enter>
   ```

   A list of all the open files, user and each files record locks will be displayed.

2. To check the status of a specific file, for example C:\PCL2\ENGINE, enter the following command:

   ```
   NET FILE C:\PCL2\ENGINE<Enter>
   ```

3. To close a file, namely C:\PCL2\MACHINE.DAT that is open, enter the following command:

   ```
   NET FILE C:\PCL2\MACHINE.DAT /C<Enter>
   ```

NET FORMFEED ON/OFF

This command sends formfeed requests to the printer at the end of each print file to position the paper at the top of the next form.

Syntax

```
NET FORMFEED ON
NET FORMFEED OFF
```

Where:

ON	when invoked, sets the indicator to send a formfeed request to the printer at the end of each print file.
OFF	when invoked, sets the indicator to prevent sending a formfeed request to the printer at the end of each print file.

Description

A formfeed request is sent to the printer at the end of each printfile when the indicator is set to ON. This causes a blank page to be printed at the end of each print file. This will continue until the indicator is turned to OFF. When this command is used without options, the system responds with the current command status of OFF or ON. The initial setting is ON.

Examples

1. Turn the indicator ON to send formfeed requests to the printer. For example:

```
Server: NET FORMFEED ON<Enter>
```

2. Turn the indicator OFF to stop sending formfeed requests to the printer. For example:

```
Server: NET FORMFEED OFF<Enter>
```

NET HELP

Displays a help file containing information about a specified network command. Use this command with either the consumer or the server.

Syntax

```
NET HELP command
```

or

```
NET command HELP
```

Where:

command can be any one of the following commands:

- CONTINUE
- NAME
- PAUSE
- PRINT
- START
- USE

Description

The NET HELP command displays information about a specified command. Information can also be displayed by typing the command first, then the word HELP.

Example

```
C:>NET USE HELP<Enter>
```

or

```
C:>NET HELP USE<Enter>
```

or at the server prompt

```
Server: NET HELP USE<Enter>
```

NET NAME

Displays the network name assigned to the PC system. Use this command with the consumer only.

Syntax

```
NET NAME
```

Description

The NET NAME command displays the network name assigned to the PC system.

Example

Displays the name assigned to the PC system.

```
C:>NET NAME<Enter>
```

NET PAUSE

Temporary halt of network and print redirection programs. Use this command with the consumer only.

Syntax

```
NET PAUSE [DISK REDIRECTION] [PRINT REDIRECTION]
```

or

```
NET PAUSE [DRDR] [PRDR]
```

Where:

DISK REDIRECTION	Temporarily halts disk redirection, enabling access to the user's own disks or directories.
PRINT REDIRECTION	Temporarily halts print redirection, enabling the user to connect to the local printer.

Description

The NET PAUSE command enables the user to temporarily disconnect devices from the network and use the device locally with the PC system. NET PAUSE does not delete the network names specified with the NET USE command, nor does it delete user names specified with the NET START command. To continue the disk redirection or print direction again, use the NET CONTINUE command.

Examples

1. This command can be used to pause the redirection of a disk drive. Consider the floppy drive A: being redirected to a network disk by using the disk redirector program. To use floppy drive A:, enter the following command to pause the disk redirection:

```
C:>NET PAUSE DRDR<Enter>
```

Examples (continued)

2. To pause the redirection of a printer. Consider a network printer is used as the printer port LPT1 using the printer redirection program. To use the local printer connected to port LPT1, enter the following command to pause the printer redirection:

```
C:>NET PAUSE PRDR<Enter>
```

NET PRINT

Prints files on a remote printer. Use this command with the consumer only.

Syntax

```
NET PRINT [path printdevice] [servername] [printdevice]
```

Where:

path printdevice	prints a file on a remote printer linked to the specified print device.
servername	displays the printer queue of the specified server.
printdevice	displays the printer queue for the network printer linked to the local print device at the PC system.

Description

The NET PRINT command enables the user to print files on a remote network printer without tying up the PC system. Before sending a file to be printed, the PC system must first be linked to the remote printer using the NET USE command.

The NET PRINT command can also be used to display the printer queue at the Server and for a network printer that has been attached to the local print device.

Examples

1. Prints the file STATUS.DOC, which is located in drive A of the local PC, at a remote printer.

   ```
   C:>NET PRINT A:STATUS.DOC PRN<Enter>
   ```

2. Displays the printer queue at the server MKTG_NRM.

   ```
   C:>NET PRINT \\MKTG_NRM<Enter>
   ```

3. Displays the printer queue for the network printer.

   ```
   C:>NET PRINT PRN<Enter>
   ```

NET PRINT CANCEL

Stops the current print job from printing. Use this command with the server only.

Syntax

```
NET PRINT CANCEL
```

Description

This command cancels the current print job.

Example

This command cancels the current print job in the print queue.

```
Server: NET PRINT CANCEL<Enter>
```

NET PRINT KILL

This command removes a print job from the print queue. Use this command with the server only.

Syntax

```
NET PRINT KILL filename [filename] [...]
```

Where:

filename	identifies the file to be removed from the print queue. More than one filename may be removed at one time.

Description

This command removes a requested print file from the print queue.

Example

Removes the file named ENG, whose name was assigned by the server print spooler, from the print queue.

```
Server: NET PRINT KILL ENG<Enter>
```

NET PRINT ON/OFF

This command is used to turn the printing off and on. Use this command with the server only.

Syntax

```
NET PRINT OFF
NET PRINT ON
```

Description

The NET PRINT OFF/ON command is used to temporarily stop a print job, such as might be necessary to clear a paper jam or change printer paper. When the printing is turned on again, the job that was interrupted will resume printing.

Examples

1. Turns the printing of jobs off.

```
Server: NET PRINT OFF<Enter>
```

2. Turns the printing of jobs on.

```
Server: NET PRINT ON<Enter>
```

NET PRINT RESTART

This command is used to stop and restart a print job. Use this command with the server only.

Syntax

```
NET PRINT RESTART
```

Description

This command stops the current print job and re-enters the job at the end of the print queue for reprinting at a later time.

Example

Stops printing of the current job and re-queues it in the print queue.

```
Server: NET PRINT RESTART<Enter>
```

NET RESTART

This command restarts the Server programs. Use this command with the consumer only.

Syntax

```
NET RESTART
```

Description

This command is used to restart the Server programs after the Server programs have been stopped with a NET STOP command. Once the Server prompt is displayed, the network is running once again.

Example

Restarts the network Server.

```
C:>NET RESTART<Enter>
```

NET SEPARATOR ON/OFF

Causes a separator page to be printed between print jobs. Use this command with the server only.

Syntax

```
NET SEPARATOR ON
NET SEPARATOR OFF
```

Where:

ON	when invoked, sets the indicator to print a separator page between print jobs.
OFF	when invoked, sets the indicator to prevent printing a separator page between print jobs.

Description

A separator page is printed between each print job when the indicator is set to ON. Separator pages will continue to print between print jobs until the indicator is turned to OFF. When this command is used without options, the system responds with the current command status of OFF or ON. The initial setting is ON.

Examples

1. Turns the indicator ON to print a separator page.

```
Server: NET SEPARATOR ON<Enter>
```

2. Turns the indicator OFF for not printing a separator page.

```
Server: NET SPEARATOR OFF<Enter>
```

NET SHARE

Makes available to the network all the directories named in path and the printer designated by printdevice. Use this command with the server only.

Syntax

```
NET SHARE shortname=d:path [password] /[R][W][C]
NET SHARE shortname=printdevice
NET SHARE shortname /D
```

Where:

shortname	represents the name identifying the shared directory. Workstations must use the shortname when accessing the directory.
d:path	is the complete drive and path of the directory to be shared.
password	is optional and represents any combination of a maximum of eight characters, symbols or numbers.
R	allows reading of files.
W	allows writing to files. This option should be used only in conjunction with the /R option.
C	allows creation of files in the offered directory.
printdevice	is either LPT1, LPT2, LPT3 or PRN.
/D	cancels the offer of sharing a file or printdevice.

NET SHARE (continued)

Description

A listing of the shared resources can be obtained by entering NET SHARE. A printer is defined as either LPT1, LPT2, LPT3, or PRN.

Examples

1. This command logs the directory named \ENGINEER on drive C with a short name of ENG, with read and write permissions and a password of STATUS.

```
NET SHARE ENG=C:\ENGINEER STATUS /RW<Enter>
```

2. Assigns the printer LPT2 to the network as "printer".

```
NET SHARE PRINTER=LPT2<Enter>
```

3. Cancels sharing the directory known by the network as ENG.

```
NET SHARE ENG /D<Enter>
```

NET START REDIRECTOR

Invokes the OpenNET PCL network software. Use this command to start the consumer.

Syntax

```
NET START REDIRECTOR name
NET START RDR name
```

Where:

name	represents the name assigned to the PC system.
RDR	is a valid abbreviation for REDIRECTOR.

Description

The NET START REDIRECTOR invokes the MS-NET software. NET START causes DOS to open the macro file MSNET.INI and invoke the software using command invocations found in the MSNET.INI file.

The NET START REDIRECTOR command can be placed in an AUTOEXEC.BAT file.

Example

Starts the MS-NET redirector on the system named MFNG_PCAT_BOB.

```
C:>NET START RDR MFNG_PCAT_BOB<Enter>
```

NET START SERVER

The NET START SERVER command starts the network Server.

Syntax

```
NET START SERVER name
NET START SRV name
```

Where:

name	is the name assigned to the PC system.
SRV	is a valid abbreviation for SERVER.

Description

Use this command to start the network server programs.

Example

Starts the network Server on the system named MFNG_PCAT_BOB.

```
C:>NET START SRV MFNG_PCAT_BOB<Enter>
```

NET STATUS

This command is used to give the status of the server. Use this command with the server only.

Syntax

```
NET STATUS
```

Description

The NET STATUS command displays the number of virtual circuits that are open to directories, along with any pathnames, shortnames and permissions of those directories. The names of the computers using shared directories or shared printers are also displayed. This command also states the printer spool file name and the status of the printer.

Example

```
Server: NET STATUS<Enter>
```

NET STOP

This command is used to stop a network Server. Use this command with the server only.

Syntax

```
NET STOP
```

Description

Use this command to stop the server. When the NET STOP command is invoked, control returns to DOS and the MS-DOS prompt is displayed.

Example

```
Server: NET STOP<Enter>
```

NET USE

Opens a connection between a drive on the PC and a resource at a remote server. Use this command with the consumer only.

Syntax

```
NET USE
NET USE device: \\servername\username [password] [/D]
NET USE printdevice: \\servername\username  [password] [/D]
```

Where:

device	is the name of an unused drive on the PC system.
servername	is the network name of the file server with which to connect.
username	is the name of the user associated with the remote directory to which the user is attached.
password	is optional. Access to some directories or printers may be restricted to only those users who know the password.
printdevice	is one of the following print devices connected to the local PC: LPT1, LPT2, LPT3 or PRN. Only one print device can be linked at the same time.
/D	is used to disconnect the PC from the server or printer.

Description

The NET USE command opens a connection between the PC and the server or printer specified in the command. When the NET USE command is entered without arguments, all currently established network connections are listed.

NET USE (continued)

Examples

1. Displays the list of resources connected to the PC.

```
C:>NET USE<Enter>
```

2. Connects drive G to the remote home directory of the user BOB at the server named MKTG_NRM.

```
C:>NET USE G: \\MKTG_NRM\BOB<Enter>
```

3. Links the local print device PRN to a remote printer at the server named MKTG_NRM via the user account BOB.

```
C:>NET USE PRN: \\MKTG_NRM\BOB<Enter>
```

4. Disconnects drive G from the network.

```
C:>NET USE G: /D<Enter>
```

5. Disconnects a print device from the network printer.

```
C:>NET USE PRN: /D<Enter>
```

***

MS-NET Messages A

The following is a list of messages that may appear on the screen while using MS-NET software.

`Attempt to use local name`

There was an attempt to connect to a remote resource but incorrectly specified the PC system's network name as the name of the server. Try the command again using the name of the server.

`Can't open address file`

When the MS-NET software tried to open the NETADDR file, it received an error message from DOS. Reset the PC system and try the command again. Ensure that the NETADDR file exists in the current directory.

`Can't read transport status`

The transport cannot report status from the transport software. Refer to the *PCL2 Installation Guide* for additional information.

`Cannot disconnect from current drive`

An attempt was made to disconnect from the current drive. Switch to another drive, and try the command again.

`Command completed successfully`

This message appears each time a network command is issued and successfully completed.

`Command operands incorrect`

A network command has been typed that is incorrect. Either too many or too few operands have been included. Check the syntax of the command by typing NET HELP.

`Command parameters incorrect`

A command parameter has been mistyped. Check the syntax of the command by typing NET HELP.

`Connection refused`

The following conditions result in a connection refusal:

- An invalid password was used when trying to connect to a shared resource.
- A connection request was made to a resource that has not been shared.
- The redirector program has not been started with the NET START RDR command.
- The remote node is not correctly specified in the NETADDR file.
- The home directory of the remote server does not exist or has permissions that are too restrictive.

Ask the network administrator for a list of shared resources and their passwords.

`Device is not redirected`

A printer has been specified of which the user is not connected. Connect to a remote printer using the NET USE command before using the remote printer.

`Drive in use`

A drive letter in the NET USE command has been specified that has already been used. Check the list of drives by typing NET USE.

`Enter Password:`

An asterisk was used in a NET USE command to specify that the password should be typed in. Enter the password to continue operation.

`Error writing to` *`filename`*

An error occurred while writing to the specified file. The print command will not complete successfully. Check the remote computer and try the command again.

`File not found:` *`filename`*

The NET command could not find the file required to complete the requested operation. Check that the required files have been created correctly.

`File not found`

The file requested to be printed could not be found. Use the DIR command to verify that the file exists and that its name is typed correctly.

`Illegal address file`

The address file is missing or illegal. Be sure that the NETADDR file on the disk is correct.

`Incorrect DOS version`

The user is attempting to install MS-NET software with an inappropriate version of DOS. Use DOS version 3.1 or later.

`Incorrect number of operands`

There was no keyword specified in the NET command. Check the command syntax by typing NET HELP.

`Invalid computer name`

There has been an attempt to connect to a machine that does not have an entry in the NETADDR file.

`Invalid device`

A device name has been mistyped.

`Invalid shortname or password`

The path name or password has been entered incorrectly. Ask the network administrator for the list of shared resources and their passwords.

`Name/address table overflow`

There are too many entries in the NETADDR file. The maximum is 72 entries.

`Network already started`

An attempt was made to start the network after it had been started. To restart, reinitialize the computer.

`Network error`

An unexpected error was reported from the network. the requested command cannot be completed.

`Network not installed`

The install check for the network has failed. The appropriate hardware and software must be installed to run MS-NET networking software.

or

The NET PRINT command was used without starting the network. Use the NET START REDIRECTOR command or restart the DOS operating system, and try the command again.

`Network not started`

There was an attempt to run a command without first starting the network. Use the NET START REDIRECTOR command or restart the DOS operating system, and try the command again.

`Network path not found`

The network path requested does not exist. Check the network path.

`No entries in list`

The NET USE command has been typed but the user has not connected to any network resources.

`Queue is empty`

The remote computer's print queue is empty. All print request have been printed or deleted.

`System error`

This message indicates some kind of network failure. Check with the network administrator to be sure that the workstation has been set up correctly.

***

Glossary

Buffer	A temporary storage place in computer memory.
Consumer	A node (workstation) attached to the network, that is accessing resources from another node (server) on the network.
Core Protocol	The Core File Sharing Protocol jointly developed by Intel, Microsoft, and IBM, which provides the basic set of file access functions across the network. This protocol is used by the MS-NET software and supported by the XENIX and iRMX system networking software.
Ethernet Address	The unique physical address of a network node in an Ethernet-based network. This address is assigned by the manufacturer of the network interface card.
Interconnectability	The ability to connect two systems in a network and exchange data. An interconnection provides a data path between the systems.
Interoperability	The ability of two or more network systems to understand and use the data passed through the network connection.
Local	A computer resource where commands are being entered. For example, a local directory (or file) resides on the computer being used; whereas, a remote directory or file resides at another (remote) computer.
Network	A group of nodes (systems) connected and configured such that they may share resources.
Network Administrator	The person who is responsible for configuring and maintaining the network. The network administrator has privileges (such as access to all files) not available to other users.

Network Controller	A board inserted into an expansion slot of the PC system.
Node	A system attached to the network. Each node has one and only one network address and is identified by that address.
Node Name	The unique and logical name assigned to a network node. Normally, a password is associated with the name.
OpenNET	The name of Intel's networking architecture and product family. The OpenNET network incorporates products at all seven layers of the ISO OSI reference model.
Remote	The environment beyond the local environment of a node (e.g., file resident on another node).
Server	A node attached to the network that enables other network nodes (workstations) to access its local files.
Transparency	The ability to access remote resources in exactly the same manner as local resources. MS-NET software provides transparent remote file sharing.
User	The entity on whose behalf all processes execute and all accesses are made. Users are defined in the NETADDR file and in the respective user definition files located on remote file servers.
Workstation	A network node that is accessing resources from another node on the network. Also called a consumer.

***

Index

Request For Reader's Comments

Intel's Technical Publications Departments attempt to provide publications that meet the needs of all Intel Product users. This form lets you participate directly in the publication process. Your comments will help us correct and improve our publications. Please take a few minutes to respond.

Please restrict your comments to the usability, accuracy, organization, and completeness of this publication. If you have any comments on the product that this publication describes, please contact your Intel representative.

1. Please describe any errors you found in this publication (include page number).

2. Does this publication cover the information you expected or required? Please make suggestion for improvement.

3. Is this the right type of publication for your needs? Is it at the right level? What types of publications are needed?

4. Did you have any difficulty understanding descriptions or wording? Where?

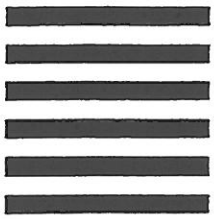
5. Please rate this publication on a scale of 1 to 5 (5 being the best rating). _____

Name_____Date_____
Title_____
Company Name/Department_____
Address_____
City_____State_____Zipcode_____
(Country)_____Phone_____

Please check here if you require a written reply ☐

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 79 HILLSBORO OR



POSTAGE WILL BE PAID BY ADDRESSEE

ICD TECHNICAL PUBLICATIONS HF3-72
INTEL CORPORATION
5200 NE ELAM YOUNG PARKWAY
HILLSBORO OR 97124-9978

Please fold here and close the card with tape. Do not staple.

WE'D LIKE YOUR COMMENTS....

This document is one of a series describing Intel products. Your comments on the other side of this form will help us produce better manuals. Each reply will be reviewed. All comments and suggestions become the property of Intel Corporation.

If you are in the United States and are sending only this card, postage is prepaid.

If you are sending additional material or if you are outside the United States, please insert this card and any enclosures in an envelope. Send the envelope to the above address, adding "United States of America" if you are outside the United States.

Thanks for your comments.

International Sales Offices

AUSTRALIA
Intel Australia Pty. Ltd.
Unit 13
Allambie Grove Business Park
25 Frenchs Forest Road East
Frenchs Forest, NSW 2086

BRAZIL
Intel Semicondutores do Brazil LTDA
Av. Paulista, 1159-CJS 404/405
01311 - Sao Paulo - S.P.

CANADA
Intel Semiconductor of Canada, Ltd.
4585 Canada Way, Suite 202
Burnaby V5G 4L6
British Columbia

Intel Semiconductor of Canada, Ltd.
2650 Queensview Drive
Suite 250
Ottawa K2B 8H6
Ontario

Intel Semiconductor of Canada, Ltd.
190 Attwell Drive
Suite 500
Rexdale M9W 6H8
Ontario

Intel Semiconductor of Canada, Ltd.
620 St. Jean Boulevard
Pointe Claire H9R 3K2
Quebec

CHINA/HONG KONG
Intel PRC Corporation
15/F, Office 1, Citic Bldg.
Jian Guo Men Wai Street
Beijing, PRC

Intel Semiconductor Ltd.
10/F East Tower
Bond Center
Queensway, Central
Hong Kong

DENMARK
Intel Denmark A/S
Glentevej 61, 3rd Floor
2400 Copenhagen NV

FINLAND
Intel Finland OY
Ruosilantie 2
00390 Helsinki

FRANCE
Intel Corporation S.A.R.L.
1, Rue Edison-BP 303
78054 St. Quentin-en-Yvelines
Cedex

WEST GERMANY
Intel Semiconductor GmbH
Dornacher Strasse 1
8016 Feldkirchen bei Muenchen

Intel Semiconductor GmbH
Hohenzollern Strasse 5
3000 Hannover 1

Intel Semiconductor GmbH
Abraham Lincoln Strasse 16-18
6200 Wiesbaden

Intel Semiconductor GmbH
Zettachring 10A
7000 Stuttgart 80

INDIA
Intel Asia Electronics, Inc.
4/2, Samrah Plaza
St. Mark's Road
Bangalore 560001

ISRAEL
Intel Semiconductor Ltd.
Atidim Industrial Park-Neve Sharet
P.O. Box 43202
Tel-Aviv 61430

ITALY
Intel Corporation Italia S.p.A.
Milanofiori Palazzo E
20090 Assago
Milano

JAPAN
Intel Japan K.K.
5-6 Tokodai, Tsukuba-shi
Ibaraki, 300-26

Intel Japan K.K.
Daiichi Mitsugi Bldg.
1-8889 Fuchu-cho
Fuchu-shi, Tokyo 183

Intel Japan K.K.
Bldg. Kumagaya
2-69 Hon-cho
Kumagaya-shi, Saitama 360

Intel Japan K.K.
Kawaasa Bldg., 8-9F
2-11-5, Shinyokohama
Kohoku-ku, Yokohama-shi
Kanagawa, 222

Intel Japan K.K.
Ryokuchi-Eki Bldg.
2-4-1 Terauchi
Toyonaka-shi, Osaka 560

Intel Japan K.K.
Shinmaru Bldg.
1-5-1 Marunouchi
Chiyoda-ku, Tokyo 100

Intel Japan K.K.
Green Bldg.
1-16-20 Nishiki
Naka-ku, Nagoya-shi
Aichi 450

KOREA
Intel Technology Asia, Ltd.
16th Floor, Life Bldg.
61 Yoido-Dong, Youngdeungpo-Ku
Seoul 150-010

NETHERLANDS
Intel Semiconductor B.V.
Postbus 84130
3099 CC Rotterdam

NORWAY
Intel Norway A/S
Hvamveien 4-PO Box 92
2013 Skjetten

SINGAPORE
Intel Singapore Technology, Ltd.
101 Thomson Road #21-05/06
United Square
Singapore 1130

SPAIN
Intel Iberia S.A.
Zurbaran, 28
28010 Madrid

SWEDEN
Intel Sweden A.B.
Dalvagen 24
171 36 Solna

SWITZERLAND
Intel Semiconductor A.G.
Zuerichstrasse
8185 Winkel-Rueti bei Zuerich

TAIWAN
Intel Technology Far East Ltd.
8th Floor, No. 205
Bank Tower Bldg.
Tung Hua N. Road
Taipei

UNITED KINGDOM
Intel Corporation (U.K.) Ltd.
Pipers Way
Swindon, Wiltshire SN3 1RJ