DECnet–DOS

User's Guide

Order No. AA–EB45C–TV

April 1988

This manual describes how to set up and use DECnet–DOS. It details the DECnet–DOS commands used for performing network tasks.

Supersession/Update Information:	This is a new manual.
Operating System and Version:	PC DOS V3.10 PC DOS V3.20 PC DOS V3.30 VAXmate MS–DOS V3.10
Software Version:	DECnet–DOS V2.0 DECnet–VAXmate V2.0

digital

AA-EB45C-TV
First Edition, August 1985
Second Edition, April 1986
Third Edition, April 1988

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Preface

Introduction to DECnet–DOS

DECnet–DOS software communication products enable individual computer systems, such as your personal computer, to communicate with one another in a **network**. The individual systems within a network are called **nodes**.

The term "DECnet–DOS" refers to the following products:

- DECnet–DOS, Version 2.0, running on supported IBM personal computer systems using the PC DOS operating system. For a list of all supported personal computers, both IBM systems and IBM compatibles, and supported operating systems, see the *DECnet–DOS Software Product Description*.

- DECnet–VAXmate, Version 2.0, for the VAXmate personal computers running the VAXmate MS–DOS Version 3.10 operating system.

The term "DOS" refers to the following operating systems:

- MS–DOS running on the VAXmate personal computer.

- IBM Personal Computer DOS (PC DOS) running on supported IBM personal computers and IBM compatibles. For a list of all supported personal computers, both IBM systems and IBM compatibles, and supported operating systems, see the *DECnet–DOS Software Product Description*.

Manual Objectives

The *DECnet–DOS User's Guide* describes the DECnet–DOS software product and the utilities you can use with DECnet–DOS.

The guide assumes that you are familiar with the use of IBM personal computers, VAXmate workstations, and the MS–DOS operating system.

Intended Audience

This manual is intended for users who want to expand the capabilities of their personal computers and workstations in order to share data and resources with other DECnet systems.

Structure of This Manual

This manual consists of nine chapters, seven appendixes and a glossary:

Chapter 1	Introduces the capabilities of DECnet–DOS. It also defines some basic concepts within a DECnet environment and introduces the DECnet–DOS utilities.
Chapter 2	Describes how to use the Network File Transfer (NFT) utility to access files on other nodes in the network.
Chapter 3	Describes how to use the SETHOST utility on IBM personal computers to connect to another node in the network so that you can access that node's resources.
Chapter 4	Describes how to use the SETHOST utility on VAXmate workstations to connect to another node in the network so that you can access that node's resources.
Chapter 5	Describes how to use scripts for SETHOST. This chapter also includes some sample scripts you can use with SETHOST.
Chapter 6	Describes how to use the Network Device Utility (NDU) to set up disk drives and use printers on remote nodes.
Chapter 7	Describes how to use the DECnet–DOS Mail utility for sending mail messages and text files to other nodes in the network.
Chapter 8	Describes how to use the File Access Listener (FAL) utility for providing (or limiting) remote file access to your node from other nodes in the network.
Chapter 9	Describes how to use the DECnet–DOS Job Spawner as a foreground task to detect incoming connection requests from other nodes in the network.

Appendix A	Lists the error messages you can receive while using NFT.
Appendix B	Lists the error messages you can receive while using SETHOST.
Appendix C	Lists the error messages you can receive while using NDU.
Appendix D	Illustrates keyboards for the IBM Personal Computer XT, IBM Personal Computer AT, and VAXmate workstation. It also shows the IBM Enhanced Personal Computer keyboard. This appendix also includes tables describing the various keyboard mappings that are available. This appendix also describes how to use international character sets with SETHOST and provides tables of the available character sets.
Appendix E	Describes how to use NFT in a windows environment.
Appendix F	Describes how to use FAL in a windows environment.
Appendix G	Describes how modem control is implemented for DECnet–DOS. This information is intended for the reader who needs a very detailed and technical description of modem control logic.
Glossary	Contains a list of DECnet–DOS terms.

NOTE

The DECnet–DOS Network Control Program (NCP) and Network Test Utility (NTU) were included in previous versions of the *DECnet–DOS User's Guide*. However, NTU has been combined with NCP to create one NCP utility for network management. The NCP utility is described in the *DECnet–DOS Network Management Guide*, a new manual in the DECnet–DOS documentation set.

Graphic Conventions Used in This Document

The following graphic conventions are used in this manual:

Convention	Meaning
`Special type`	This special type indicates system output or user input. System output is in black; user input is in red
UPPERCASE	Represents acceptable abbreviations, for example **DEL**ETE. The abbreviations are displayed as bold characters.
UPPERCASE	Uppercase in commands and examples indicates that you should enter the characters as shown (enter either uppercase or lowercase).
italics	Lowercase italics in commands and examples indicate that either the system supplies or you should supply a value.
{ }	Braces indicate that you are required to specify one (and only one) of the enclosed options. Do not type the braces when you enter the command.
[ ]	Square brackets indicate that the enclosed data is optional. (If a vertical list of options is enclosed, you can specify only one option.) Do not type the brackets when you enter the command.
( )	Parentheses enclose a set of options that must be specified together.
vertical list of options	A vertical list of options not enclosed within braces, brackets, or parentheses indicates that you may specify any number of options (or in some cases none if defaults apply.)
(*key*)	Indicates that you should press the specified key. (CTRL/*x*) indicates that you should hold down the CONTROL key while you press the *x* key, where *x* is a letter. Note that unless otherwise specified, you should end every command line by pressing (RET).

1

Overview of DECnet–DOS

This chapter introduces:

- DECnet terms and concepts.
- Network capabilities provided by DECnet–DOS.
- The DECnet–DOS utilities you can use.

1.1 DECnet Terms and Concepts

Digital's DECnet products connect individual computer systems, such as your personal computer, together in flexible configurations called **networks**. Individual systems in a network, called **nodes**, share resources and exchange information, files, and programs.

There is a different DECnet product for each Digital operating system. For example:

- DECnet–VAX is used on VAX computers running the VAX/VMS operating system.
- PRO/DECnet is used on Professional computers running the P/OS operating system.
- DECnet–DOS is used on the IBM Personal Computer, the IBM Personal Computer XT, or the IBM Personal Computer AT running the PC DOS operating system.
- DECnet–VAXmate is used on the VAXmate personal computer running the VAXmate MS–DOS operating system.

Figure 1–1 shows a DECnet–DOS node in a DECnet network.

Figure 1–1: A Sample DECnet Network

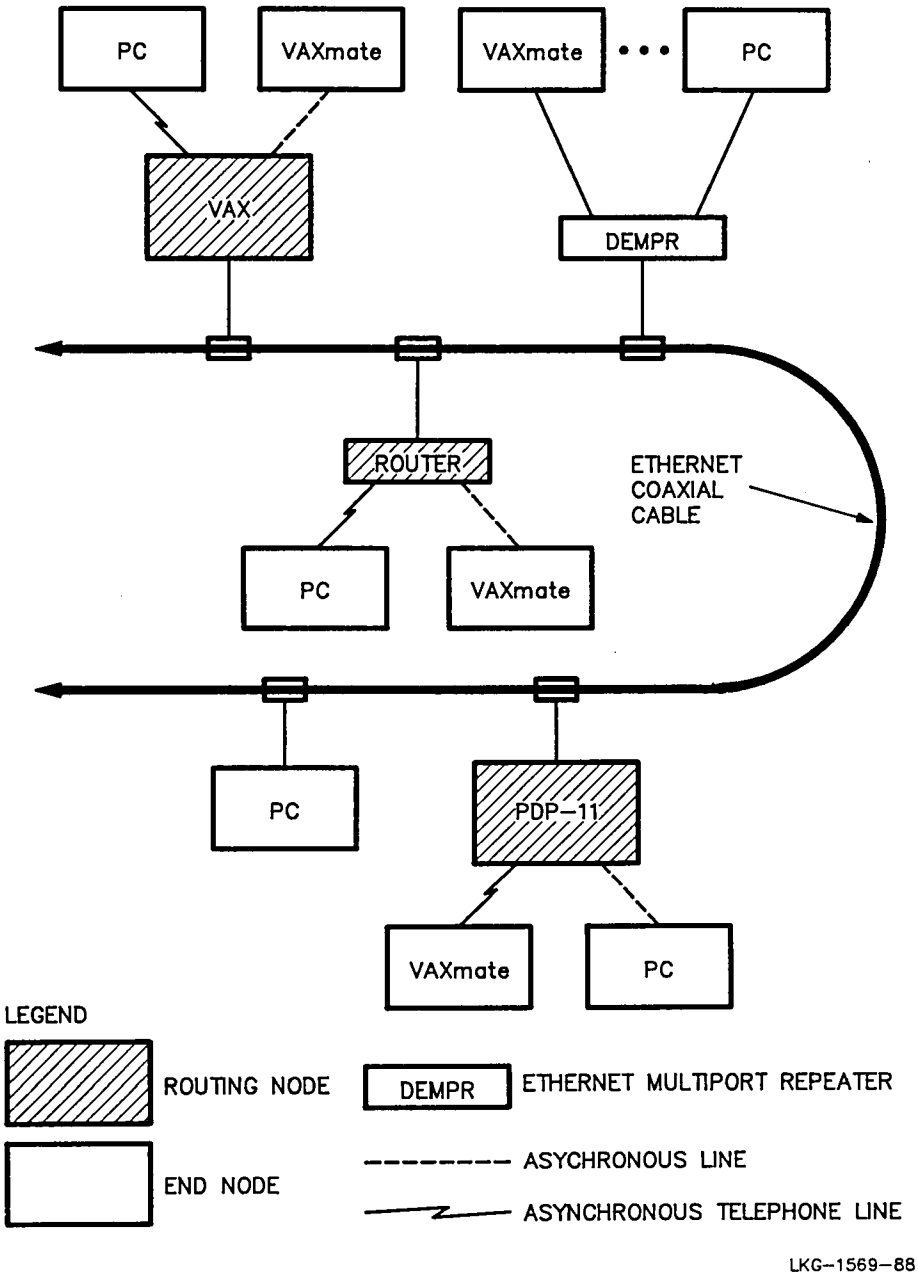


Figure 1–1 shows an **end node** connected to a VAX computer. In a DECnet–DOS environment, an end node can also be called the **local node** and the **executor node**.

- An **end node** can receive and transmit information for its own use only. It cannot receive and then automatically forward information intended for other nodes.

- A **local node** is the node you are working on when you enter commands at the keyboard.

- An **executor node** is a node that performs network management functions. This node enables you to obtain information about the network.

From the vantage point of the personal computer shown in Figure 1–1, the other network nodes in the diagram are called **remote nodes**. Two other terms define the VAX node in particular:

- **Adjacent node**

  An adjacent node is a node that is physically connected to your local node by a single line.

- **Routing node**

  The adjacent node shown in Figure 1–1 is a routing node. A routing node automatically forwards (or routes) information, files, and programs between nodes in the network. This allows the end node to copy data to and from any other node in the network. An end node cannot automatically receive and then forward data intended for another node.

In a DECnet–DOS environment, you can set up your node as either:

1. An asynchronous DECnet Phase IV end node, using Digital Data Communications Message Protocol (DDCMP) over the asynchronous serial communications port, or

2. An Ethernet Phase IV end node, using an Ethernet communications controller and Ethernet hardware to connect to a local area network (LAN).

1.2 DECnet–DOS Capabilities

DECnet–DOS provides the following capabilities:

- **Network management**, which allows you to control, monitor, and test DECnet–DOS software. You can reconfigure your node as the need arises. Network management is described in detail in the *DECnet–DOS Network Management Guide*.

NOTE

The DECnet–DOS Network Control Program (NCP) and the Network Test Utility (NTU) were part of this user's guide in previous versions of DECnet–DOS. NTU has been incorporated into NCP to create one utility for network management. NCP is now documented in the *DECnet–DOS Network Management Guide*.

- **Remote file access**, which allows you to access files on remote nodes. You can store and retrieve information on remote nodes. By storing the most current version of a file on a remote node, you eliminate the need for keeping a version of the file on each node.

- **File transfer**, which allows you to exchange files with other nodes. This speeds up the information flow between organizations and decreases the amount of paperwork.

- **Resource sharing**, which eliminates the need for duplicating resources at each node. With resource sharing, many nodes can use the same printers, storage facilities, and processing capabilities.

- **Virtual terminal support**, which allows you to log on to a host computer and use your terminal as if it were a terminal directly connected to the host.

- **Mail**, which allows you to send messages to other nodes in the network.

- **Task-to-task programming**, which allows you to write and use your own task-to-task programs. For more detailed information about programming for DECnet–DOS, refer to the *DECnet–DOS Programmer's Reference Manual*.

1.3 DECnet–DOS Utilities

The following list summarizes the DECnet–DOS utilities.

- **Network Control Program (NCP)**

  NCP allows you to perform network management and test the network hardware and software. Some NCP testing is run as a part of the installation procedure before you can use your personal computer as a node in the DECnet network.

  NOTE

  NCP and the Network Test Utility (NTU) were part of this user's guide in previous versions of DECnet–DOS. NTU has been incorporated into NCP to create one utility for network management. NCP is now documented in the *DECnet–DOS Network Management Guide*.

- **Network File Transfer (NFT) utility**

  NFT allows you to transfer files between your local node and remote nodes within the DECnet network. It also provides other file-related services. NFT is discussed in Chapter 2 of this guide.

  NFT is available as both a command line utility and a Class A MS-Windows utility. This means that you can issue NFT commands from a command line, or you can use NFT in a windows environment. The NFT commands and functions are essentially the same in both environments, but they have a very different appearance when you use the windows version. The windows version of NFT is discussed in Appendix E of this guide.

- **SETHOST utility**

  SETHOST, with network virtual terminal services, allows you to log on to a host node. SETHOST lets you use your personal computer or workstation as if it were directly connected to the host node, giving you access to the host's resources. DECnet–DOS SETHOST is discussed in Chapter 3 of this guide.

  There is also a DECnet–VAXmate version of SETHOST. The DECnet–VAXmate version differs slightly from the DECnet–DOS version. DECnet–VAXmate SETHOST is discussed in Chapter 4 of this manual.

- **Network Device utility (NDU)**

  NDU allows you to define virtual disk drives and virtual printers on remote systems.

NDU capabilities include:

- Defining disks on a remote system and using them as if they were directly connected to your computer. Defining remote virtual disks lets you share the disks with other users in the network.

- Allowing you to direct text to a remote node to be queued later for printing.

NDU is discussed in Chapter 6 of this guide.

- **DECnet–DOS Mail utility**

  The Mail utility lets you send mail messages and text files across the network. The Mail utility is described in Chapter 7 of this guide.

- **File Access Listener (FAL)**

  FAL provides access to your computer from other nodes in the network. It is discussed in Chapter 8 of this guide.

  FAL is available as both a command line utility and a Class A MS-Windows utility. This means that you can issue FAL commands from a command line, or you can use FAL in a windows environment. FAL functions the same way in both environments, but it has a very different appearance when you use the windows version. The windows version of FAL is discussed in Appendix F of this guide.

- **Job Spawner**

  The Job Spawner allows your computer to act as a server for multiple service functions. The Spawner can activate FAL or the Data Test Receiver (DTR) to run on your node. (Both FAL and DTR are included in your installation kit.)

  You may also design and write your own server programs to be run by the Spawner. For more information about writing your own programs, refer to the *DECnet–DOS Programmer's Reference Manual*.

  The Job Spawner is discussed in Chapter 9 of this guide.

You can start any of the DECnet–DOS utilities from the MS-Windows environment. Two of the utilities operate as Class A applications, which means that they are fully functional in the windows environment. Six of the utilities operate as Class B applications, which means that they work the same way as if you started them from the command line, but they appear as part of a window. Two utilities operate as Class C applications, which means that even though you start a utility from a window, it takes over the entire screen and you no longer see any of the

windows. When you exit from a Class C application, you return to the window environment you were using previously.

Table 1–1 lists the window classifications and the utilities that operate in each area.

Table 1–1: Windows Classifications for DECnet–DOS Utilities

Window Classification	DECnet–DOS Utility
Class A	FAL NFT
Class B	DTR DTS Job Spawner Mail NCP NDU
Class C	DECnet Menus SETHOST

Note that the Data Test Receiver (DTR) and the Data Test Sender (DTS) are described in the *DECnet–DOS Programmer's Reference Manual.* The DECnet Menus utility is a step-by-step introduction to the DECnet–DOS utilities. This Menus utility is described in the *DECnet–DOS Getting Started* manual.

2

Using NFT to Access Local and Remote Files

The Network File Transfer (NFT) utility is a network program that allows you to access remote files. NFT provides access to files on any DECnet system that is running a File Access Listener (FAL). NFT also supports numerous file attributes.

After you install the DECnet–DOS software, you can use NFT to:

- Append two or more files.
- Copy files between the local and remote nodes.
- Delete local and remote files.
- List files located on a local or remote directory.
- List directories that are located on a local or remote node.
- Define and display access control information.
- Run batch or command files on remote nodes.
- Display the contents of a local or remote file on your screen.
- Print files on remote printers.

This chapter describes:

- Running NFT (see Section 2.1).
- Specifying access control information (see Section 2.2).

- File specifications (see Section 2.3).
- Types of file systems (see Section 2.4).
- Typing NFT commands (see Section 2.5).
- Getting help (see Section 2.6).
- File operations (see Section 2.7).
- The NFT commands and their syntax in alphabetical order (see Section 2.8).

You can use NFT in two different ways: from the command line, or in a windows environment (if you are using MS-Windows). NFT runs under MS-Windows as a Class A application. Use the file NFT.EXE if you want to run NFT as a windows application. This file contains both windows and non-windows versions of NFT. If you are not running windows and you want to save disk storage space, you should only use the file NFTNOWIN.EXE.

The windows version of NFT provides the same functions as command line NFT, but the appearance is very different. This chapter describes how to use NFT from the command line. For information on how to use NFT as a windows application, see Appendix E.

2.1 Running the NFT Utility

You perform NFT functions by using one of the following methods:

- Single command method:

```
C:\>NFT command RET
C:\>
```

NOTE

When you run NFT in single command mode, an ERRORLEVEL of 0 is returned for success. A 1 is returned for failure.

- Single command method using a batch file:

  A batch file (also called a command file or a script file) contains all the NFT commands that you want to use to complete a series of NFT operations. By using a batch file, you need issue only one command to process all of the other commands.

To use a batch file, you must enter a left angle bracket (<) followed by the file name. Then press (RET). For example:

```
C:\> NFT <COMMANDS.DAT (RET)
```

In this example, the COMMANDS.DAT file contains all of the NFT commands you want to process.

- Multiple command method:

```
C:\> NFT (RET)
NFT> command (RET)
NFT> command (RET)
NFT> EXIT (RET)
C:\>
```

You can use (CTRL/Z) (RET) to exit from NFT. To do this:

1. Type the letter Z while you hold down the CONTROL key.
2. Press (RET).

2.2 Defining Remote Node Access Information

Access control information is security information that allows you to access a specified remote node with the privileges of a specific user. This information includes:

- **User name**

  A character string consisting of 1 to 39 alphanumeric characters that identifies the user at the remote node.

- **Password**

  A character string consisting of 1 to 39 alphanumeric characters.

- **Account**

  A character string consisting of 1 to 39 alphanumeric characters.

You must follow the node name or node address (*area.node*) with the user name, password and account enclosed in quotation marks (" "). Each field must be separated by a space. You must then follow the entire string with a double colon (::). The following is an example of a node name with access control information:

```
LONDON"SMITH OPEN"::
```

You can specify default access control information using the NCP command DEFINE NODE, or you can specify the information directly to NFT during an NFT operation. (For more information about NCP commands, refer to the *DECnet–DOS Network Management Guide*.)

When you specify the information during an NFT operation and you are using a multiple command method or a batch method, NFT temporarily stores the information in a table for use in any following command dealing with the same node.

The access control information you specify during an NFT session is not saved when you exit from NFT. Therefore, if you run NFT at another time, you cannot use any access control information previously specified in any NFT command. However, you can use any access control information you previously specified using NCP. If NCP provides defaults and you specify your own values with NFT, the values you specify are used.

2.2.1 Defining Access Control Information with NFT

There are two ways to specify access control information during an NFT operation:

- By accessing a remote node for the first time.
- By using the SET command.

NFT temporarily stores access control information for up to ten nodes.

In the following example, you access a remote node by requesting a directory listing of files located on the VMS node LONDON, user name SMITH, password OPEN.

```
NFT>DIRECTORY LONDON"SMITH OPEN":: (RET)
```

NFT displays the list of files located in the requested directory, including the block size of each file, and the time and date the file was last modified or created. Note that password information is shown in output as "password" to protect it from casual observation.

```
Directory of: LONDON"SMITH password"::SYS$SYSROOT:[SMITH]

FILE1.TXT;1        12      01-MAR-85  16:01:51
FILE2.TXT;1        34      02-SEP-83  14:20:35
FILE3.TXT;1        22      09-JUL-77  12:15:22

NFT>
```

NFT stores the access control information for node LONDON in its temporary table.

You use the SET command to specify and then save a user name, password and account as well as specific disk and/or directory information. In the following example, you specify the user name and password for node MADRID. In addition, you specify the name of the subdirectory ARENA.FILES.

```
NFT> SET MADRID"ARENA BULL"::[ARENA.FILES] (RET)
```

NFT stores the access information for node MADRID in its temporary table.

2.2.2 Using Default Access Control Information

Once you specify access control information using NFT, you can use the node name alone in subsequent file operations during the same NFT session. NFT uses the access control information you previously specified for the node name. This is the **default** access control information.

For example, if you request a directory listing of node LONDON using only the node name, NFT displays the same list of files as the first time you accessed the node. When you type a node name alone, you must follow the name with a double colon. For example:

```
NFT> DIRECTORY LONDON:: (RET)
Directory of: LONDON"SMITH password"::SYS$SYSROOT:[SMITH]

FILE1.TXT;1          12    01-MAR-85  16:01:51
FILE2.TXT;1          34    02-SEP-83  14:20:35
FILE3.TXT;1          22    09-JUL-77  12:15:22

NFT>
```

When you type a node name alone, NFT follows this procedure to determine the access control information:

1. First NFT checks to determine if you specified the access control information earlier in the same NFT session. If you did, that access control information is used.

2. If you did not specify it earlier in the same session, NFT checks to determine if you specified it using NCP. If you did, that access control information is used.

3. If you did not specify access control information either using NCP or earlier in the same NFT session, NFT assumes that the remote node does not require the information and attempts the current operation.

2.2.3 Changing the Default Access Control Information

You can change the default access control information by typing different access control information for the same node name in an NFT operation. In this case, NFT replaces the original access control information in its temporary table with the new information.

For example, if you request a directory listing of files on remote node LONDON, but specify a different user name and password, NFT displays a list of files for the new user:

```
NFT>DIRECTORY LONDON"DOC PEN":: (RET)

Directory of: LONDON"DOC password"::SYS$SYSROOT:[DOC]

ABC.TXT;1           10     07-SEP-85  12:10:49
DEF.TXT;1           29     12-JAN-86  15:20:32
GHI.TXT;1           47     03-MAR-86  14:10:05

NFT>
```

Now if you request a directory listing using the node name alone, NFT displays this new list of files associated with node LONDON.

```
NFT>DIRECTORY LONDON:: (RET)

Directory of: LONDON"DOC password"::SYS$SYSROOT:[DOC]

ABC.TXT;1           10     07-SEP-85  12:10:49
DEF.TXT;1           29     12-JAN-86  15:20:32
GHI.TXT;1           47     03-MAR-86  14:10:05

NFT>
```

You can also change the access control information using the SET command. In fact, when you use the SET command to specify default access control information, you can only replace the information in the NFT table using another SET command. For example, to change the access control information for node MADRID, type:

```
NFT>SET MADRID"SPANISH DANCE":: (RET)
```

Now if you request a directory listing using the node name alone, NFT displays the new list of files associated with node MADRID.

```
NFT>DIRECTORY/BRIEF MADRID:: (RET)

Directory of: MADRID"SPANISH password"::SYS$SYSROOT:[SPANISH]

LAW.DOC;1     RULE.DOC;2

NFT>
```

2.2.4 Displaying Access Control Information

The SHOW command displays access control information that you specify during an NFT session. For example:

```
NFT> SHOW (RET)

LONDON"DOC password"::
MADRID"SPANISH password"::
```

2.3 File Specifications

A complete file name is called a **file specification**. A file specification provides the computer system with all the information it requires to identify a unique file. Each operating system in the network has its own set of rules for naming files. For example, when you name a local DOS file, you must follow the standard DOS operating system format:

- A **drive name**. (This is optional if you are using the default drive name.)
- A **path name**. (This is optional.)
- A **file name** of up to eight alphanumeric characters.
- A **file type** of up to three alphanumeric characters, separated from the file name with a period. (This is optional.)

The following example specifies a file named SURVEY.CRD. The file is located on drive A in the subdirectory SUE, which is located in the subdirectory USERS:

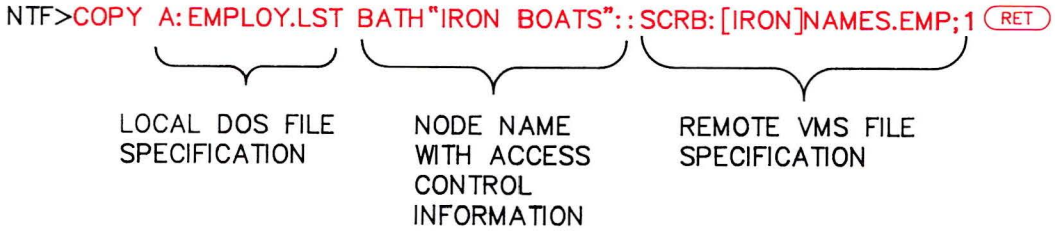
```
A:\USERS\SUE\SURVEY.CRD
```

When you access a file on a remote node, you must use a file specification that conforms to the conventions required by the remote node. For example, some operating systems require a version number as part of the file specification:

```
LONDON::CHAP1.DOC;2
```

Example 2–1 shows how to copy a local DOS file called EMPLOY.LST to a remote VMS node named BATH. The file is stored on the remote node as NAMES.EMP;1 (Version 1).

Example 2–1: Copying a File to a Remote Node



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2.3.1 Specifying Remote Files

DECnet–DOS can copy files to and from nodes running different operating systems. Refer to Table 2–1 for a list of file specifications that you can use with different operating systems.

Table 2–1: Operating Systems and File Specifications

Operating System	File Specification
VAX/VMS	*dev*:[*dir*]*file-name.typ*;*ver*
TOPS–20	*dev*:[*dir*]*file-name.typ.ver*
TOPS–10	*dev*:[*dir*]*file-name.typ*
RSX	*dev*:[*dir*]*file-name.typ*;*ver*
P/OS	*dev*:[*dir*]*file-name.typ*;*ver*
DOS	*dev*:*dir**dir*\...*file-name.typ*
ULTRIX–32	*dir*/*dir*/.../*file-name.typ*
ULTRIX–32M	*dir*/*dir*/.../*file-name.typ*
RSTS/E	*dev*:[*dir*]*file-name.typ*

NOTE

Most systems accept square brackets [ ] or angle brackets < > to delimit a directory name, and a period (.) or a semicolon (;) to delimit version. NFT accepts all of these delimiters.

If any portion of these file specification formats is omitted, NFT assumes a default. File specifications of any format other than those listed in Table 2–1 are considered **foreign** to DECnet–DOS NFT. When you type a foreign file specification, you must enclose it in quotation marks (" "). For example:

```
NFT> COPY BOSTON::"DK2:[100,100]NAMES.DAT" (RET)
```

This directs NFT to copy the RSTS/E file from the remote node BOSTON to the local node, allowing unacceptable characters (such as a comma) in the directory name.

Most file specifications are not foreign.

2.3.2 Using Wildcards

Wildcards allow you to specify more than one file at a time. There are three wildcards you can use:

- A question mark (?) or a percent sign (%) matches any single character in the same position that the question mark or the percent sign occupies. For example, you can use TEST?.DOC to specify the following files:

  TEST1.DOC
  TEST2.DOC
  TESTA.DOC
  TESTB.DOC

- An asterisk (*) matches part or all of a file specification. For example, you can use *.DOC to specify the same list of TEST files. In this example, the asterisk replaces any file name with a file type of DOC.

You can also use a combination of wildcards. For example, you can use TEST?.* to specify the following files:

TEST1.DOC
TEST2.DOC
TESTX.TXT
TESTY.TXT
TESTZ.TRY

Note that some remote systems do not support all three wildcards. Also, there may be wildcards which are supported on some remote systems but not supported by NFT.

2.3.3 Using Question Marks, Percent Signs, and Asterisks as Wildcards

Local and remote files can contain question marks, percent signs, or asterisks as wildcards. NFT cannot change the names of the files when wildcards are used. As an example, you can type:

```
COPY TEST?.* BOSTON::*.*
```

If you want to rename the files included in the remote file specification, you cannot use wildcards. For example, you cannot type:

```
COPY TEST?.* BOSTON::FARA?.*
```

Wildcards can also be used with the DELETE, TYPE, and DIRECTORY commands. For example:

```
DELETE LONDON::*.*.*
```

This command deletes all files in the user's default directory on the node LONDON.

2.4 Types of Files and Systems

Files can be one of two data types:

- Image

  An image file is a file whose data is copied without any interpretation or data change. In other words, the file is copied and received as a carbon copy of itself. The most common example of this type of file is an executable file.

- ASCII

  An ASCII file is a file whose records end with a carriage return/line feed (CR/LF) pair.

The algorithm that FAL uses to determine whether a file is image or ASCII (when copying the file from your personal computer to a remote node without switches) is the following: if the first 512 bytes contain a carriage return/line feed (CR/LF), the file must be ASCII. Otherwise, it must be image. Using this rule, note that some image files may appear to be ASCII files.

Systems can be one of two types:

- Stream

  With a stream system, a file is a series of continuous characters.

Most stream systems, including the DOS operating system, do not support such attributes as fixed or variable length records. If a file with these attributes is copied to the local system, the attributes are lost.

- Nonstream

  With a nonstream system, file data is in specific record formats. Some examples of these formats are: fixed length, variable length, and variable with fixed length control (VFC).

  Fixed length records are all the same size. The size is fixed when you create the file, and you cannot change it.

  Variable length records can be of different lengths, up to a maximum size that you specify. The maximum size is fixed when you create the file, and you cannot change it.

  VFC records include a fixed length control field that precedes the variable length data. This format allows you to add data that labels the contents of the variable length portion of the record.

Refer to Table 2–2 for the changes that occur when you copy a file from a remote node.

Table 2–2: Copying Files from a Remote Node

Data Type	System Type	Record Attributes	How Stored
IMAGE	Not applicable	Ignored	As received from the remote node.
ASCII	Stream	Ignored	As received from the remote node with embedded carriage control.
ASCII	Nonstream	Other than implied CR/LF, PRN or FTN.	As received from the remote node.
ASCII	Nonstream	Implied CR/LF pair	CR/LF added to each record.
ASCII	Nonstream	PRN or FTN	Data converted correctly.

NFT converts embedded carriage control characters by default. You can cancel this conversion with the /NOCONVERT switch.

Although NFT can usually determine whether a file is ASCII, you should use the /IMAGE switch when you copy a non–ASCII file to a remote node. Refer to Table 2–3 for the changes that occur when you copy a file to a remote node.

Table 2–3: Copying Files to a Remote Node

Data Type	System Type	Record Attributes	How Sent
ASCII	Stream	None	Unchanged. Records are determined by LFs.
ASCII	Nonstream	Variable, implied CR/LF	Carriage return/line feed pair is dropped. Records are determined by LFs.
IMAGE	Stream	None	Unchanged.
IMAGE	Nonstream	Fixed: 128 bytes	Unchanged.

2.5 Typing NFT Commands

To type an NFT command, enter it at the NFT command prompt. The NFT commands consist of three parts:

- The command verb and switch
- The source file specification
- The destination file specification

A file specification may be local (no node name included) or remote (node name included).

Example 2–2 defines the parts of an NFT command.

Example 2–2: An NFT Command

LKG–1911–88

Except for the node name and file specification (or the command verb and switch), you must separate one part of the command from another with a space or tab.

You can abbreviate command verbs and switches to a character string that is unique to that verb. For example, you can type C for the COPY command, or /VA for the /VARIABLE switch. However, for clarity and consistency, all examples in this chapter show the full command syntax.

When you are using the LINE FEED key (LF) to continue a command on another line and you need to add a space (to separate the last word on the first line from the first word on the second line), you must enter the space immediately before or after the line feed.

If you need help with a command or switch, remember to type the HELP command followed by an optional command name or switch.

2.5.1 Command Prompts

In many cases, if you type a command verb alone, NFT prompts you for further information. For example, if you want to append one or more files to the end of an existing file and you type the APPEND command verb alone, NFT prompts you for the required information as shown in this example:

```
NFT> APPEND (RET)
File(s)? LONDON"SMITH OPEN"::WRIT:[SMITH]FILB.TXT;3 (RET)
To? FILA.TXT (RET)
NFT>
```

Command prompts are discussed in the applicable command descriptions.

2.5.2 Command Switches

Some operating systems store files with attributes that indicate the type of file and the format of the file's records. A DOS file does not include attributes. Therefore, when you copy a file from the local system to another system that stores attributes (such as VAX/VMS), you can use switches to indicate the type of file you are copying and the type of system it is coming from. NFT provides defaults for file attributes. You can use switches to change these defaults.

You can also use switches to modify command verbs. Switches are global in effect and must immediately follow the command verb in the command line. The same switch can have a different effect, depending on whether you are copying a file to or from a remote node.

A valid switch for several NFT commands is /NOLOG. This switch requests that NFT not print a notification line after the APPEND, COPY, DELETE, PRINT, and SUBMIT operations. It is ignored for all other commands.

If you use a valid switch that has no effect on certain commands, such as /NOLOG, NFT does not display a message. However, if you use a switch that NFT does not accept, such as /PRINT with a remote input file, NFT displays a message.

Tables 2–4, 2–5, and 2–6 list valid NFT switches.

Table 2–4: Valid Switches for Copying Files from a Remote Node

Switch	Function
/ASCII	No data interpretation is performed on ASCII files coming from a stream file system. For ASCII files being copied from a nonstream file system, data handling is determined by the remote file system and by the remote file's record format and record attributes. This switch is valid only with the COPY and APPEND commands. You can also use the /ASCII switch to perform character set conversion: /ASCII:*src-charset*:*dest-charset* where *src-charset* and *dest-charset* are one of the following character set values: DUTCH FINNISH FRCAN FRENCH GERMAN ISO ITALIAN MCS NORDAN SPANISH SWEDISH SWISS UK US

Table 2–4 (Cont.): Valid Switches for Copying Files from a Remote Node

Switch	Function
/IMAGE	Requests that NFT copy the file from the remote system as it is (binary data) with no conversion of any kind. This switch is valid only with the COPY and APPEND commands. **NOTE** If neither /ASCII nor /IMAGE is indicated, the information that was passed from the remote node will be used to copy the file. This is also the default.
/BLOCK	Copies files as image mode files, with no regard to record structure. This allows you to move files that have undefined formats or files with very long record lengths. When you indicate /BLOCK, it forces the following attributes: /IMAGE mode, /FIXED length, and /MRS of 512. **You must use /BLOCK when you are copying files from a VMS system that were written by the VAX/VMS Services File Server.** **NOTE** When you use this switch, do not include any other switches.
/NOCONVERT	If the file is copied from a node with an RMS file system, and the record attributes for the file are either FTN (FORTRAN carriage control) or PRN (print file carriage control), the carriage control characters within each logical record are normally expanded before the record is written to the local file. This switch turns that feature off. (For details on /NOCONVERT, refer to the *VAX–11 RMS Reference Manual* or other appropriate system manuals.) This switch is valid only with the COPY and APPEND commands.
/NOLOG	Requests that NFT not print a notification line after the APPEND, COPY, DELETE, PRINT, and SUBMIT operations.

Table 2–5: Valid Switches for Copying Files to a Remote Node

Switch	Function
/ASCII	Tells NFT that the file has records that end, by default, with a carriage return/line feed pair. This switch is valid only with the COPY and APPEND commands. If the first record does not end with a CR/LF pair, an image copy of the file is made.
/IMAGE	Requests that NFT copy the file to the remote system as it is (binary data) with no conversion of any kind. The default record format is FIXED and the default maximum record size (MRS) is 128 bytes. You can change these defaults with the /VARIABLE (or /VFC) and /MRS switches. The last record can be shorter than the previous records. This switch is valid only with the COPY and APPEND commands. **NOTE** If neither /ASCII nor /IMAGE is indicated, the file is examined. If the first 512 bytes contain CR/LF, the file is copied as ASCII. If the first bytes do not contain CR/LF, the file is copied as an image file.
/FIXED	Indicates that the records within the file are all the same length. By default, the length is 128 bytes, but you can change the length with the /MRS switch. This switch is valid only with the COPY command.
/VARIABLE	If you are copying a file to an RMS file system, this switch resets the record format (RFM) to variable length records, with a maximum record size of 0 (no maximum). You can change the maximum record size with the /MRS switch. This switch is valid only with the COPY command.
/VFC = *nnn*	If you are copying a file to an RMS file system, this switch sets the record format (RFM) to variable length with fixed control headers of length *nnn*, where *nnn* = 0 to 255 bytes. The default header size is 2. The first *nnn* bytes become the header record. If you are copying the file to a stream system, this switch has no effect. **NOTE** If neither /FIXED nor /VFC is indicated, the default is /VARIABLE.
/ALLOCATION = *nnn*	If you are creating a new file on a remote system, this switch requests that the remote system set the allocation quantity (in blocks) for the new file to *nnn*. The default is 0, which causes allocation as needed. This switch is valid only with the COPY command. The valid range is 0 to 2147483647.

Table 2–5 (Cont.): Valid Switches for Copying Files to a Remote Node

Switch	Function
/BLOCK	Copies files as image mode files, with no regard to record structure. This allows you to move files that have undefined formats or files with very long record lengths. When you indicate /BLOCK, it forces the following attributes: IMAGE mode, FIXED length, and an MRS of 512. **NOTE** When you use this switch, do not include any other switches.
/CC = *xxx*	Sets record attributes for files you are copying to RMS file systems only. If you are copying files to a stream system, such as TOPS–20, the record attributes are ignored. The variable *xxx* represents one of the following: None – No record attributes. FTN – Records contain FORTRAN carriage control. Records that contain FORTRAN carriage control are not native to DOS systems. For details on FTN, refer to the *VAX–11 RMS Reference Manual* or other appropriate system manuals. CR – (Default) Records have an implied carriage return/line feed. PRN – Records contain a fixed header with print carriage control. This is used with the /VFC switch. Records that contain print carriage control are not native to DOS systems. For details on PRN, refer to the *VAX–11 RMS Reference Manual* or other appropriate system manuals. It is assumed that if you specify an explicit record attribute for the output file, the file data already conforms to that specification. In this case, NFT does no conversion. This switch is valid only with the COPY and APPEND commands.
/DELETE	Is valid only with the /PRINT switch. It requests that NFT delete the copied file from the remote node after the file is copied and printed. This switch is valid only with the COPY and APPEND commands.
/LSA	Indicates to a remote node that records are line sequenced ASCII. LSA files are valid for remote systems. They are not native to DOS systems. For details on LSA record attributes, refer to the appropriate TOPS–10 and TOPS–20 DECnet documentation.

Table 2–5 (Cont.): Valid Switches for Copying Files to a Remote Node

Switch	Function
/MACY11	Indicates that the file is to be written on the remote node in MACY11 format. This switch is valid only with the APPEND and COPY commands. MACY11 files are only valid for remote systems. They are not native to DOS systems. For details on MACY11 record attributes, refer to the appropriate TOPS–10 and TOPS–20 DECnet documentation.
/MRS = *nnn*	Sets the maximum record size, where *nnn* is 0 to 32767. The default MRS for VARIABLE is 0. This means no maximum for VARIABLE file copies. The default MRS for FIXED files is 128. This switch is valid only with the COPY command.
/NOLOG	Requests that NFT not print a notification line after the APPEND, COPY, DELETE, PRINT, and SUBMIT operations.
/NOSPAN	Requests that records not span blocks. It is valid for RMS file systems only. This switch is valid only with the COPY command.
/PRINT	Allows you to print a file on the remote node's default printer after the file copy is complete. This switch is valid only with the COPY and APPEND commands.
/SUBMIT	Allows you to queue a batch file to be executed at the remote node after the file copy operation is complete. This switch is valid only with the COPY and APPEND commands.

Table 2–6: Valid Switches for the DIRECTORY Command

Switch	Function
/BRIEF	Requests that NFT display file names only. The names are displayed on the screen four to a line.
/FULL	Requests that NFT display complete file information for one or more files. The information for each file includes: the file name; the file size (in blocks); the owner of the file; the date and time the file was last modified or created; the type of file organization, record format, and record attributes; and the type of protection assigned to the file.

2.6 Using the HELP Command

If you need assistance in selecting NFT commands and switches, use the HELP command. Type:

```
NFT>HELP (RET)
```

The system responds with:

```
Help is available on the following
commands:

APPEND          COPY        DELETE    DIRECTORY
EXIT            HELP        PRINT     SET
SHOW            SUBMIT      TYPE

switches:

/ALLOCATION   /ASCII     /BLOCK   /BRIEF
/CC           /DELETE    /FIXED   /FULL
/IMAGE        /LSA       /MACY11  /MRS
/NOCONVERT    /NOLOG     /NOSPAN  /PRINT
/SUBMIT       /VARIABLE  /VFC
```

To obtain information about the SHOW command, for example, type:

```
NFT>HELP SHOW (RET)
```

To obtain information about the /ASCII switch, type:

```
NFT>HELP /ASCII (RET)
```

2.7 File Operations

NFT allows you to manipulate files on accessible DECnet nodes.

You can include lists of up to 10 file specifications in the APPEND, COPY, and TYPE commands. For example, you can append one to ten input files to a single output file. When you specify a list of files, the following rules apply:

- You cannot include more than ten file specifications in a list.
- You cannot use wildcards (asterisk or question mark) in a list of files.
- You must separate items in the list with commas.

- These commands use temporary defaults when you enter a command line that contains more than one input file specification. Temporary defaults are used for:

  - Node name.
  - Device name.
  - Directory name.
  - File name and file type.

  If a file specification includes a device and/or directory name, these names are applied to subsequent file specifications within the list. For example:

```
NFT>COPY BOSTON::DBA1:[ADAMS]TEST1.DAT, (LF)
TEST2.DAT,TEST3.DAT (RET)
```

  This command copies three test files all from directory ADAMS on the device DBA1.

2.7.1 Appending Files

To copy one or more files to the end of an existing file, use the APPEND command. You can append the following combination of files:

- A local file to a remote file.
- A remote file to a local file.

NOTE

You cannot append a local file to a local file, or a remote file to a remote file.

For example, to append the remote file FILB.TXT, located on the VAX node LONDON, to the local file FILA.TXT, type:

```
NFT>APPEND LONDON"SMITH OPEN"::WRIT:[SMITH]FILB.TXT;3 FILA.TXT (RET)
```

The two files are now:

- The local file, FILA.TXT, which includes the contents of FILA.TXT and FILB.TXT.
- The remote file, FILB.TXT;3, which is the original copy of FILB.TXT on node LONDON.

If you are appending more than one file to the end of another file, separate the file specifications with a comma. For example:

```
NFT>APPEND LONDON"SMITH OPEN"::WRIT:[SMITH]FILB.TXT;3,FILC.TXT;2 (LF)
FILA.TXT (RET)
```

Remember to use (LF) to continue a command line.

2.7.2 Copying Files

To copy files between your node and a remote node, use the COPY command.

When you copy a remote file to the local node, you must use the correct remote file specification. The following example copies a remote file named NEWS.DOC;10 from a VMS node called LONDON to the local node. The remote file is located in the directory SMITH on device WRIT. The file is given the new name FLASH.DOC when it is copied to the local node.

```
NFT>COPY LONDON"SMITH OPEN"::WRIT:[SMITH]NEWS.DOC;10 FLASH.DOC (RET)
```

You can also copy a file from a remote node to a local node without specifying a local file name. For example:

```
NFT>COPY LONDON"SMITH OPEN"::WRIT:[SMITH]NEWS.DOC;10 (RET)
```

By default, the local file is named NEWS.DOC, the same as the original file.

When you copy a local file to a remote node, you must specify the local file name and the remote node name. You can also specify the remote file name in a format supported by the remote operating system. For example, to copy a DOS file called FILEA.TXT from drive B on the local node to directory SMITH on the LONDON node, type:

```
NFT>COPY B:FILEA.TXT LONDON"SMITH OPEN"::WRIT:[SMITH]FILEA.TXT;3 (RET)
```

2.7.3 Deleting Files

To delete a file or a group of files, use the DELETE command. The following example deletes all versions of a file named TEST1.TST from a remote VAX node named GENEVA.

```
NFT>DELETE GENEVA::TEST1.TST;* (RET)
```

If you want to delete only one file, enter the name and the type for the file. If there is only one version of that file on the remote node, NFT will delete it. You do not need to include the version number. If there are multiple versions of the same file, NFT will delete only the latest (or highest) version of the file.

To delete a file which is not the latest version of that file, you must indicate the specific version number you want to delete. For example:

```
NFT>DELETE RAMONA::FINDER.TXT;3 (RET)
```

This command deletes version 3 of the file FINDER.TXT on the remote node RAMONA.

2.7.4 Displaying Directory Information

To display a list of local or remote file specifications on your screen, use the DIRECTORY command. The names are displayed in the format used by the specified node. For example, to list file specifications from a directory on the remote VAX node LONDON, type:

```
NFT>DIRECTORY/BRIEF LONDON:: (RET)
```

The system responds with:

```
Directory of: LONDON"SMITH password"::SYS$SYSROOT:[SMITH]

APNDXA.DOC;3     CHAP1.DOC;2     CHAP2.DOC;13     DATA.DAT;9
NEWS.DOC;10      MEMO.TXT;1      TEST2.TST;6      TEST3.TST;2
TEXT.DOC;8
```

You can also list either a single file specification or use wildcards to specify a group of file specifications. The following example lists the group of files with a file type of TST:

```
NFT>DIRECTORY/BRIEF LONDON::*.TST (RET)
Directory of: LONDON"SMITH password"::SYS$SYSROOT:[SMITH]

TEST2.TST;6      TEST3.TST;2
```

2.7.5 Printing Files

To print a local file on a remote printer, use the /PRINT switch with the COPY or APPEND command. For example, to copy FILEA.TXT from the local node to the remote node LONDON and then print the file at the remote node, type:

```
NFT>COPY/PRINT FILEA.TXT LONDON::FILEA.TXT;1 (RET)
```

Be aware that you cannot print a remote file on the local printer using the /PRINT switch. If you try, the file is copied to the local node, and NFT displays the following warning message:

```
Warning: Cannot print files on local printer.
```

However, you can print a remote file on the local printer by copying it to the printer device.

You can also print a remote file on a remote printer. To do this, use the PRINT command. You must specify the name of a file that already exists on the remote node. For more information about PRINT, refer to Section 2.8.

2.7.6 Typing a File's Contents

To display the contents of a file on your screen, use the TYPE command. For example:

```
NFT>TYPE TEXAS::PS:<SMITH>FILE1.DOC;2 (RET)
```

2.7.7 Running Command Files

A command or batch file contains a list of command strings. To execute the commands within a remote command file on the remote node, use the NFT SUBMIT command followed by the name of the remote command file. By typing commands in one batch file, you can run the file many times without retyping the commands.

You can also use the /SUBMIT switch to execute commands in a local file on a remote node. This switch is only valid with the APPEND and COPY commands. When you use /SUBMIT with either of these commands, the copied file is queued to the remote node's batch system (once the copy operation is complete).

The following example is a batch file called DUMP.CTL.13 on the TOPS–20 remote node TEXAS. The batch file is located on the device PS: in the directory JONES.

```
@PRINT PS:<SMITH>FILE1.DOC;2
@PRINT PS:<SMITH>*.BAK
```

This file:

1. Prints the file called FILE1.DOC;2 located in the SMITH directory.

2. Prints all files with a file type of .BAK in the same directory.

To run this command file, type:

```
NFT>SUBMIT TEXAS::PS:<JONES>DUMP.CTL.13 (RET)
```

The file is placed in the batch queue on node TEXAS.

You can only use SUBMIT to run a remote command file. To run a local command file (from the MS–DOS prompt), use a left angle bracket (<) followed by the command file name. For example:

```
C:\>NFT <COMMANDS.DAT (RET)
```

This example only works when you are using the single command method from the MS–DOS prompt. It does not work for the multiple command method.

2.7.8 Logging File Operations

When you enter an NFT copy command (such as COPY or APPEND), NFT displays a notification that it has opened the specified files. In the following example, NFT logs the copy operation and notifies you as it opens the specified files.

```
NFT>COPY INTRO.DOC LONDON"SMITH OPEN":: (RET)
```

NFT responds with:

```
Copying file: INTRO.DOC to LONDON"SMITH password"::DISK01:[SMITH]INTR
O.DOC;1 [148 bytes at 389 bytes/second]
NFT>
```

The notification line is displayed in two parts:

- The first part includes all of the text up to the record count in brackets. It is displayed as soon as both the remote and local files are successfully opened.
- The second part is the record count (*x* bytes at *x* bytes per second) at the end of the line. This part is displayed when the copy operation is complete.

You can suppress the logging message for the APPEND, COPY, DELETE, PRINT, and SUBMIT commands by using the /NOLOG switch.

2.8 NFT Command Summary

NFT provides you with command verbs that allow you to manipulate files located on local and remote nodes. Table 2–7 lists each NFT command and its function. The remainder of the chapter discusses each command in alphabetical order.

Table 2–7: Valid NFT Commands

Command	Function
APPEND	Appends files from the local node to an existing file on the remote node, or copies and appends files from the remote node to an existing file on the local node.
COPY	Copies files from the local node to the remote node or from the remote node to the local node.
DELETE	Deletes a local or remote file.
DIRECTORY	Lists files located in a specified local or remote directory.
EXIT	Exits from an NFT operation and returns control to the DOS operating system. (You can also exit by entering CTRL/Z RET.)
HELP	Displays information about NFT commands and switches on the screen.
PRINT	Allows you to queue a file that exists on a remote node to be printed at that remote node.
SET	Allows you to set remote file access defaults for the current NFT session.
SHOW	Displays access control information for remote files.
SUBMIT	Submits a batch file to be run on a remote node.
TYPE	Displays the contents of a local or remote file on the screen.

APPEND

The APPEND command adds the contents of one or more input files to the end of an existing output file. You can append either ASCII or binary files to or from remote nodes.

Depending on its position in a command, a file specification is either input (source) or output (destination).

Format

APPEND[*/switch*] *input-file output-file*

or

APPEND[*/switch*]
File(s)? *input-file*
To? *output-file*

where

/switch

is a valid APPEND switch. The effect of a switch depends upon whether you are copying a file to or from a remote node. The valid APPEND switches are:

/ASCII
/DELETE
/IMAGE
/NOLOG
/PRINT
/SUBMIT

input-file

specifies one or more input files to be copied. The file name consists of up to eight characters. The file type consists of up to three characters.

If you specify multiple input files, you must insert a comma between the file specifications. NFT then appends the multiple files to the output file.

output-file

specifies the file to which the file(s) are to be appended.

NOTE

You cannot append one local file to another or one remote file to another.

Remarks

The local file specification has one of two forms. In its longest form, it consists of the drive name, directory path, file name, and file type. For example:

```
A:USERS\SUE\SURVEY.CRD
```

In its shortest form, it consists of the file name and file type. This form assumes that the file is in the current default DOS directory. For example:

```
SURVEY.CRD
```

The remote file specification has one of two forms. In its longest form, it consists of node name and access control information followed by a file specification appropriate to the remote node. For example:

```
LONDON"SMITH OPEN"::WRIT:[SMITH]FILEA.TXT;3
```

In its shortest form, it consists of a node name followed by a file specification appropriate to the remote node. For example:

```
LONDON::FILEA.TXT;3
```

If you append more than one input file to create a single output file, the attributes of the output file are determined by the attributes of the first input file that you specify in thecommand. If the attributes of the input files differ, the append operation seems to succeed, but the output file may be incorrect.

Example

```
NFT>APPEND/PRINT FILE1.COM ESTHER::FILE2.COM;1 (RET)
```

This command appends the local file FILE1.COM to the remote file FILE2.COM;1, located at node ESTHER. The resulting output file is printed.

You can also use the /SUBMIT switch with this command. /SUBMIT causes the file you just created to be queued to the remote node's batch system, once the append operation is complete.

COPY

The COPY command creates a new file or a new version of a file at the destination node. You can use the COPY command to copy files from the local node to the remote node, and from the remote node to the local node.

When using the COPY command, you should note the following:

- If a wildcarded COPY command issued from a remote VAX to the personal computer indicates a file specification which matches a directory specification on the VAX, the directory files are copied to the personal computer. These files do not contain any useful information and can be deleted.
- If a COPY command is issued from a remote ULTRIX system to a personal computer (using a default output file specification) and the ULTRIX file specification contains directories, then the resulting personal computer file will be named incorrectly.

Format

COPY[*/switch*] *input-file output-file*

or

COPY[*/switch*]
File(s)? *input-file*
To? *output-file*

where

/switch

is a valid COPY switch. The effect of a switch depends on whether you are copying a file to or from a remote node.

The valid switches when you are copying a file to a remote node are:

/ALLOCATION = *nnn*
/ASCII
/BLOCK
/CC = *xxx*
/DELETE

/FIXED = *nnn*
/IMAGE
/LSA
/MACY11
/MRS = *nnn*
/NOLOG
/NOSPAN
/PRINT
/SUBMIT
/VARIABLE
/VFC = *nnn*

The valid switches when you are copying files from a remote node are:

/ASCII
/BLOCK
/IMAGE
/NOCONVERT
/NOLOG

input-file

specifies the input file(s) to be copied. If you specify more than one input file, you must separate them by commas.

output-file

specifies the name(s) of the output file(s).

Remarks

The local file specification has one of two forms. In its longest form, it consists of the drive name, directory path, file name, and file type. For example:

```
A:\USERS\SUE\SURVEY.CRD
```

In its shortest form, it consists of the file name and file type. This form assumes that the file is in the current default DOS directory. For example:

```
SURVEY.CRD
```

The remote file specification has one of two forms. In its longest form, it consists of node name and access control information followed by a file specification appropriate to the remote node. For example:

```
LONDON"SMITH OPEN"::WRIT:[SMITH]FILEA.TXT;3
```

In its shortest form, it consists of a node name followed by a file specification appropriate to the remote node. For example:

```
LONDON::FILEA.TXT;3
```

You can use the COPY command to:

- Copy a single file.

  This operation copies a single file from one node to another. For example:

  ```
  NFT>COPY SAM.TXT LONDON::SAM.TXT (RET)
  ```

- Copy a list of files.

  This operation copies more than one input file to the same number of output files.

  NOTE

  If you specify multiple names, you must separate the file names by commas. There is a limit of 10 file names for each list.

  Remember that you cannot use wildcards when you use file name lists.

  For example:

  ```
  NFT>COPY LONDON::SAM.TXT,SHAMI.TXT SAM.TXT,SHAMI.TXT (RET)
  ```

- Copy multiple files using wildcards.

  This operation also copies more than one input file to the same number of output files. However, using this method, you can specify more than one file without typing more than one file specification. For example, COPY *.SUM LONDON::*.SUM copies all files with a file type of SUM from the local node to node LONDON. The files are copied with the same file names and file types.

If you are copying a local file to a remote node, you can include the /PRINT switch or the /SUBMIT switch. These switches cause the file you just copied to be queued to the remote node's printer or batch system, once the copy operation is complete.

Use caution when copying files from operating systems allowing long file names and nonalphanumeric characters. NFT truncates all file names to eight characters, and all file types to three characters. For example, NFT copies a remote file named THISISMYFILENAME.RIGHTHERE;1 as THISISMY.RIG;1.

Furthermore, the DOS operating system overwrites existing files of the same name. Therefore, if you copy a file called THISISMYOTHER FILENAME.RIGHTHERE;1, NFT truncates it to THISISMY.RIG;1, and DOS overwrites the first file with the same name. This is also true when you are copying multiple versions of the same file.

Examples

```
NFT>COPY/PRINT/DELETE PAGE1.TXT LONDON::PAGE1.TXT;1 (RET)
```

This command copies the local file PAGE1.TXT to the remote node LONDON. The file is printed on the remote printer, and then deleted from the remote node.

The output file specification can be omitted. In this case, the file specification is made the same as the input file specification. For example:

```
NFT>COPY/PRINT/DELETE PAGE1.TXT LONDON:: (RET)
```

DELETE

The DELETE command deletes one or more specified local or remote files.

Format

DELETE[/NOLOG] *file-spec*

or

DELETE[/NOLOG]
File(s)? *file-spec*

where

file-spec

is any valid local or remote file specification.

Examples

```
NFT>DELETE LONDON::TAX.LST;3 (RET)
```

This command deletes the file TAX.LST;3 from the remote VMS node LONDON.

```
NFT>DELETE ROME::*.DOC;* (RET)
```

This command deletes all versions of all files with a file type of DOC located on node ROME.

You can delete multiple files only by using wildcards. You cannot use a list of file specifications in the DELETE command.

DIRECTORY

The DIRECTORY command displays a list of local or remote file names, including the size (in blocks) and the time and date the file was last modified or created.

When using the DIRECTORY command, you should note the following:

1. If you use the DIRECTORY command to specify multiple subdirectories and some of those directories are protected, you will see an error message. However, the error message does not display the volume or the directory name.

2. When you use the DIRECTORY command with a remote node designation and no other information (such as DIRECTORY REMNODE::), NFT uses the default file specification of *.*. This produces the correct results on all remote systems except for ULTRIX. On an ULTRIX system, this command will only list the files that have a period in their names. To avoid this, issue the command using the following format:

   DIRECTORY REMNODE::*

Format

DIRECTORY[*/switch*] [*file-spec*]

where

/switch

is either /BRIEF or /FULL. The /BRIEF switch causes NFT to display file names only. The /FULL switch causes NFT to display file names and file attributes. The default is no switch, which means that NFT displays file names, sizes, and creation dates.

file-spec

is any valid local or remote file specification. If you omit the file specification, NFT assumes the local disk and the current default directory.

Examples

```
NFT>DIRECTORY LONDON::TAX.LST;4 (RET)

Directory of: LONDON"SMITH password"::SYS$SYSROOT:[SMITH]

TAX.LST;4 20 09-JUL-85 12:30:52
```

This command displays the file name TAX.LST;4 located on node LONDON. The display includes the file's size and the time and date the file was last modified or created.

```
NFT>DIRECTORY/FULL LONDON::REPORT.DAT;4 (RET)

Directory of: LONDON"SMITH password"::SYS$SYSROOT:[SMITH]

REPORT.DAT;4
Size:   8/9                Owner:  [910,20]
Created:     22-MAR-85 15:38:36
File organization:      Sequential
Record Format:          Variable length, maximum 128 bytes
Record Attributes:      Carriage return carriage control
File protection:        System: RWED, Owner:RWED, Group:RW, World:R
```

This command displays complete information for the file REPORT.DAT;4 on the remote node LONDON. The information includes the following:

- The size of the file (in blocks).
- The owner.
- The type of file organization.
- The type of record format used in the file.
- The type of record attributes contained in the file.
- The type of protection assigned to the file.

All of this information is displayed when you use the /FULL switch for files on a remote node. If you request a DIR/FULL listing for a file on the local node, you will see only the size of the file and the time and date the file was last modified or created.

```
NFT>DIRECTORY/BRIEF LONDON:: (RET)

Directory of: LONDON"SMITH password"::SYS$SYSROOT:[SMITH]

APNDXA.DOC;3     CHAP1.DOC;2     CHAP2.DOC;13    DATA.DAT;9
NEWS.DOC;10      MEMO.TXT;1      TEST2.TST;6     TEST3.TST;2
TEXT.DOC;8
```

This command lists all file names on the NODE LONDON. The list does not include sizes, times, or dates. If a file name consists of more than 19 characters, NFT truncates the name to 8 characters in the directory listing.

EXIT

The EXIT command causes you to exit from NFT and returns control to the DOS operating system.

Format

EXIT

Example

```
NFT>EXIT (RET)
```

This command causes you to exit from the NFT utility. You can also enter (CTRL/Z) and then (RET) to exit from NFT.

HELP

The HELP command displays information on your screen about NFT commands and switches.

Format

HELP *command-verb*

or

HELP */switch*

where

command-verb

is any valid NFT command verb.

/switch

is any switch acceptable to NFT command verbs. It must be separated from the command by a space.

Examples

```
NFT>HELP (RET)
```

This command displays a summary of all NFT commands.

```
NFT>HELP SHOW (RET)
```

This command displays a summary of the SHOW command.

```
NFT>HELP /ASCII (RET)
```

This command displays a summary of the effects of the /ASCII switch.

PRINT

The PRINT command queues a remote file to be printed on a remote printer. (Note that the remote node cannot be another DECnet–DOS node.)

You must indicate the file to be printed. The file will be printed on the system default printer.

Format

PRINT[*/switch*] *file-spec*

or

PRINT[*/switch*]
File(s)? *file-spec*

where

/switch

is a valid PRINT switch. The valid PRINT switches for printing a file on a remote node are:

/DELETE
/NOLOG

file-spec

is any valid remote file specification.

Examples

```
NFT>PRINT LONDON::TAX.LST;3 (RET)
```

This command queues the file TAX.LST;3 (located on the remote VMS node LONDON) to be printed on the default system printer of that node.

```
NFT>PRINT ROME::CHAPTER1.MEM (RET)
```

This command queues the file CHAPTER1.MEM on node ROME to be printed on ROME's default system printer. Note that you cannot use wildcards or lists with the PRINT command.

SET

The SET command allows you to set default access control information as well as disk and directory information for up to ten nodes. After you set this information, you can type the node name only, followed by two colons. NFT checks its default access control information table for a record matching the specified node name. If it finds a match, NFT uses this information for network access.

There are no valid switches for the SET command.

Format

SET *node-spec*::[*file-spec*]

or

SET
Node? *node-spec*::[*file-spec*]

where

node-spec

is a remote node name and access control information, followed by two colons.

file-spec

is the file specification string. It includes the disk and/or directory information for the remote node. It does not include the file name and version number.

Examples

```
NFT> SET LONDON"SMITH OPEN"::SYS$USER_DISK:[USER.FILES] (RET)
```

This command sets default access control information for node LONDON. The information includes the disk that the file is on, SYS$USER_DISK, and the name of the subdirectory, USER.FILES.

```
NFT> SET PARIS"JONES NEW":: (RET)
```

This command sets default access control information for node PARIS. This information includes only the user name JONES and the password NEW.

SHOW

The SHOW command displays the temporary default table of remote access information for the specified node. The password is not displayed on the screen. Instead, the character string *password* is displayed in its place.

There are no valid switches for the SHOW command.

Format

SHOW [*node-name*::]

where

node-name::

is a valid remote node name. If no node name is specified, NFT displays the contents of the access control information table for all nodes known to the NFT temporary default table.

Remarks

If NFT does not find the specified node name in the table, it checks to see if you typed default remote access control information using NCP. If you did, NFT displays the access control information. If NFT does not find the node name in its own table or with NCP, NFT displays:

```
No defaults match: node-name::
```

Examples

```
NFT>SHOW (RET)
```

This command displays the contents of the access control information table for all nodes known to the NFT temporary default table. This command does not display defaults you set using NCP.

```
NFT>SHOW LONDON:: (RET)
```

This command displays the access control information for node LONDON.

SUBMIT

The SUBMIT command requests that the specified command file be run on the remote node. The specified remote node must support command file submission and execution, and it cannot be another DECnet–DOS node.

Format

SUBMIT[/NOLOG] *remote-filespec*

or

SUBMIT[/NOLOG]
File(s)? *remote-filespec*

where

remote-filespec

has two formats. In its longest form, it consists of node and access control information followed by a file specification required by the remote node. (See Section 2.2 for details on access control information.) In its shortest form, it consists of a node name followed by a file specification appropriate to the remote node. For example, NODE::FILE.TYP;3.

Remarks

Command files contain one or more commands that are recognized and run by the remote node's operating system. This means that the format of the commands within the file must conform to the standards of the remote system.

Example

```
NFT>SUBMIT PARIS::BACKUP.COM (RET)
```

This command requests that the file BACKUP.COM be run on the remote node PARIS. Note that you cannot use wildcards or a list of file specifications in the SUBMIT command.

TYPE

The TYPE command displays the contents of a local or remote file on your screen. You should use this command for ASCII files only.

Format

TYPE *file-spec*

or

TYPE
File(s)? *file-spec*

where

file-spec

is any valid local or remote file specification.

Example

```
NFT> TYPE LONDON::PREFACE.DOC (RET)
```

This command displays the contents of the file PREFACE.DOC located on the remote node LONDON.

3

Using SETHOST on a Personal Computer Workstation

This chapter describes the SETHOST utility. SETHOST is a network virtual terminal utility that connects your system to a **host** node, and allows your system to act like (emulate) a terminal connected to the host node.

See Chapter 4 for information about using SETHOST with DECnet–VAXmate.

This chapter provides the following information about SETHOST:

- Overview of SETHOST (see Section 3.1).
- Starting SETHOST (see Section 3.2).
- Leaving SETHOST (see Section 3.3).
- Using SETHOST (see Section 3.4).
- Using Set-Up screens (see Section 3.5).
- Descriptions for each SetUp screen (see Sections 3.6 through 3.13).
- Environment Variables (see Section 3.14).

3.1 Overview of SETHOST

In the DECnet–DOS networking environment, SETHOST provides VT200-series terminal emulation. You can connect to another computer using one of the following methods:

- Through DECnet using the CTERM protocol (over an asynchronous communications port or Ethernet) to any host in the DECnet network.
- Through LAT over Ethernet to any local host.
- Through the asynchronous communications port (COM1 or COM2).

Each time you log onto a host, the connection you make is called a "session." Using SETHOST, you can create and maintain multiple sessions. You can have a maximum of four sessions active at one time. The following are the different types and numbers of sessions you can choose from:

- COM1 port – one session only.
- COM2 port – one session only.
- Network terminal services – four sessions maximum, using LAT or CTERM.

3.1.1 Accessing Remote Hosts

There are three ways to connect to a remote host system. Each has its own characteristics.

1. LAT

   LAT is a local area transport protocol that uses Ethernet to provide access to other LAT services. LAT is available for Ethernet configurations only. It supports Terminal Data Management System (TDMS) applications, and it allows you to use multiple sessions.

   Since LAT is designed for use with Ethernet, it does not use DECnet. The host that you connect to echoes the characters that you type. You should use LAT as your network connection if you need to access TDMS applications.

2. CTERM

   CTERM is a wide area virtual terminal protocol that is layered on DECnet. It is available for both Ethernet and asynchronous Digital Data Communications Message Protocol (DDCMP) configurations. CTERM does not provide support for TDMS applications.

Since CTERM is designed for use with DECnet, it provides direct access from your personal computer to the entire DECnet network. CTERM, not the host, echoes the characters that you type, and it allows you to use multiple sessions.

3. Asynchronous communication port

   The asynchronous communication port (which can be either COM1 or COM2) provides an asynchronous connection. You can use this port to connect your terminal line to a terminal server. If you do not select either LAT or CTERM as a network service, SETHOST defaults to the COM1 asynchronous communications port. This port also provides support for TDMS.

You should also note that if you are running DECnet over one of the communication ports and you attempt to use SETHOST over the same port, SETHOST will report a "Comm Port not available" error. You can make this port available to SETHOST by issuing the Network Control Program (NCP) command SET LINE STATE OFF. (For more information about NCP and NCP commands, refer to the *DECnet–DOS Network Management Guide*.)

When SETHOST connects your node to another node, it checks to see if you have a LAT driver or a CTERM driver installed. If both drivers are installed, SETHOST tries to connect you using the fastest method possible. If a LAT connection is available, then SETHOST tries to connect you to the network using LAT. If LAT is not available, then SETHOST uses CTERM to make the connection.

You can specify the host you want to connect to by including the host's node name when you enter the SETHOST command. You can also define the host and the type of network connection you want to access by using the Communications Set-Up screen (refer to Section 3.5 for more information about Set-Up screens and Section 3.7 for information about the Communications Set-Up screen).

To create SETHOST connections using CTERM, the host node must support terminal emulation from remote nodes and run Phase IV or Phase IV + of the DECnet software on one of the following operating systems:

- VAX/VMS, Version 4.0 or later
- RSX–11M–PLUS, Version 3.0 or later
- RSX–11M, Version 4.2 or later
- Micro–RSX, Version 3.0 or later
- TOPS–10, Version 7.03 or later

- TOPS–20, Version 6.1 or later
- ULTRIX–32, Version 1.1 or later
- ULTRIX–32M, Version 1.1

To create SETHOST connections using LAT, the host node must be running the same protocol version of the LAT software that you are using on your node.

3.1.2 Help for SETHOST

SETHOST provides a list of help text when you type SETHOST HELP at the MS–DOS prompt. To view the help text, enter the following command:

```
C:\> SETHOST HELP (RET)
```

3.2 Starting SETHOST

3.2.1 Selecting a Keyboard

There are files in the DECnet directory that describe the various keyboard mappings. The files all start with the letters KBD and have the file type .HLP. (For example, KBDAT.HLP would be the keyboard mapping file for the IBM Personal Computer AT keyboard.) The .HLP files contain an illustration of the keyboard and a description of the keys and their functions.

The files that start with KBD and have a file type of .KBD are the keyboard mapping files that control the way the personal computer keys map to a particular terminal emulator function. There is a corresponding .HLP file for each .KBD file that describes the mapping for each type of keyboard. For example, KBDAT.HLP is the keyboard help file that corresponds to the KBDAT.KBD mapping file. Both types of files are text files that you can print out and review.

When you run SETHOST for the first time, SETHOST chooses a keyboard mapping for you. You can check the Keyboard Set-Up menu to confirm that SETHOST selected the correct keyboard, and you can select a new mapping if necessary. See Appendix D for more information about keyboards.

NOTE

If you need to conserve disk space, you need to store only the keyboard map and help files that you will be using.

3.2.2 Starting a Session

To start a SETHOST session, type SETHOST at the system prompt. For example:

```
C:>SETHOST (RET)
```

The system displays the following information:

```
SETHOST Version 2.0
Copyright (c) 1987, 1988 by Digital Equipment Corporation

Press Shift Prev or Shift F9 for Previous Session
Press Shift Next or Shift F10 for Next Session
Press Ctrl F9 to hotkey to MS-DOS, Press Ctrl F10 to Exit
Press F3 (Set-Up) to enter Set-Up
```

NOTE

You can also start SETHOST from a window, if you are using MS-Windows. However, SETHOST is only a Class C windows application. This means that once you start SETHOST, it takes over your screen and all of the windows information disappears. To issue SETHOST commands, you must use the keyboard keys. You can no longer use the mouse.

3.2.3 Sample Formats for Starting a Session

The following examples illustrate different formats of the SETHOST command that you can use to start a SETHOST session.

1. SETHOST

   This format uses all of the SETHOST defaults, since nothing else is specified.

2. SETHOST *name*

   This format starts a SETHOST session on a specific node or LAT service.

3. SETHOST CTERM: *node-name*

   This format starts a SETHOST session on a specific node, using a CTERM connection.

4. SETHOST COM2:

   This format starts a SETHOST session using the COM2 port.

5. SETHOST LAT: *service-name* /SCRIPT = ALLIN1.SCR

   This format starts a SETHOST session on a specific node using a LAT connection and calling in the script file ALLIN1.SCR.

6. SETHOST LAT: SERVICE1 SERVICE2 SERVICE3 SERVICE4

   This format starts a SETHOST session with SERVICE1 first. It also places the LAT service names you have indicated in the Communications Set-Up screen. Now, if you look at the Communications Set-Up screen, you will see all of these services listed as Session 1 through Session 4 under the heading, CURRENT SETTINGS.

NOTE

Command line parameters override any saved Set-Up settings.

3.3 Leaving SETHOST

To leave SETHOST, follow these steps:

1. Log off the host system. When log-off is complete, SETHOST displays the following information if you were using LAT or CTERM.

```
Press Shift Prev or Shift F9 for Previous Session
Press Shift Next or Shift F10 for Next Session
Press Ctrl F9 to hotkey to MS-DOS, Press Ctrl F10 to Exit
Press Set-Up (F3) to select a new Session
Press Return or Enter to re-connect to ORIOLE...
```

   In this case, ORIOLE is the node or service you were using when you logged off the system.

2. Press CTRL/F10. You return to the prompt that you were using previously.

NOTE

To be consistent with earlier versions of SETHOST, "SETHOST *name*" returns you to the command line if it is the only session listed in the communications Set-Up screen.

3.4 Using SETHOST

The SETHOST terminal emulator is a standard DECnet–DOS application that offers many Set-Up parameters or selections that you can change or set depending on your needs. SETHOST lets your personal computer behave like VT52, VT100, or VT200 7- and 8-bit control terminals that support the following character sets:

- DEC Multinational Character Set (MCS)
- ISO (International Standards Organization) Latin-1 character set
- 7-bit National Replacement Character Sets (NRC), such as British, French, German, and so on.

For information about the specific international character sets you can use, refer to Appendix D.

The SETHOST emulator allows you to save Set-Up parameters in a Set-Up configuration file. SETHOST reads this file whenever you start the program. By default, the file is named SETHOST.DAT and is stored in the DECnet directory. (You can also use your own configuration files, each of which can specify different settings. To use a different configuration file, you must include the /S = switch and the file name on the command line when you first start SETHOST.)

When you start the SETHOST emulator, it looks for the default Set-Up configuration file (SETHOST.DAT) in the DECnet directory. If you specify a different configuration file name, SETHOST looks for that file in your current directory. If it does not find the file in the current directory, SETHOST continues to look in the other directories specified in your path list of directories. Once SETHOST locates the configuration file, it uses the values in the file to configure the emulator with the initial values of all the Set-Up selections.

If SETHOST does not find any configuration files, it then configures the emulator using the factory default settings. (The default settings are to use the COM1 port at 9600 baud.)

In order to use the Set-Up screens to create your configuration files, you must first start a SETHOST session. To start a session, type SETHOST at the system prompt. For example:

```
C:>SETHOST (RET)
```

The system displays the following information:

```
SETHOST Version 2.0
Copyright (c) 1987, 1988 by Digital Equipment Corporation

Press Shift Prev or Shift F9 for Previous Session
Press Shift Next or Shift F10 for Next Session
Press Ctrl F9 to hotkey to MS-DOS, Press Ctrl F10 to Exit
Press F3 (Set-Up) to enter Set-Up
```

Once you see this information on the screen, you can press F3 to enter Set-Up and use the Set-Up screens. (Refer to Sections 3.6 through 3.13 for detailed information about using each Set-up screen.)

3.4.1 Using Non-Default Configuration Files

You can specify your own configuration file to use when you start the SETHOST emulator, instead of using the SETHOST.DAT file. Once you have created your configuration file, you can use a switch on the SETHOST command line that will force SETHOST to use your file instead of the default.

The command line syntax looks like this:

SETHOST/S = *startup.ext*

The *startup* variable is the name of the file you have created. The *ext* is the file type. You can assign any 3-character string as the file type.

As an example, if you have a configuration file named MYSETUP.FIL, you would enter the name with the SETHOST command as follows:

```
C:\>SETHOST/S=MYSETUP.FIL (RET)
```

This command would cause SETHOST to start using the settings in MYSETUP.FIL.

3.4.2 Using Scripts

The SETHOST utility provides a script processor that lets you use scripts for executing commands. A script is a text file that contains the commands you want to use to perform a function, such as automatically logging on to a host system. The scripts automatically execute each command to simulate an interactive session on a host terminal. This is useful if you want to log into a host system automatically, or if you want to connect to a remote system to retrieve information. Using scripts is similar to using a Set-Up file; but the script can include commands, whereas a Set-Up file only includes parameters to use for configuring your terminal emulator session.

The command line syntax for using a script file looks like this:

SETHOST/SCRIPT = *login.scr*

The *login* variable is the name of the script file you have created. The *scr* variable is the file type.

For more detailed information on creating scripts and using script commands, refer to Chapter 5.

3.5 Using Set-Up Screens

The SETHOST emulator offers eight different Set-Up screens that offer various selections for changing the following information:

- Terminal characteristics
- Screen displays
- Communications environment
- Keyboard operations
- Printer characteristics
- Tab settings
- Telephone answering characteristics
- General terminal settings

Each Set-Up screen is divided into three sections:

1. A top section indicating the available Set-Up screens.
2. A middle section reflecting information about the Set-Up screen you are currently using.
3. A bottom section describing the Set-Up keys you can use to change or select information.

Table 3–1 describes each of the Set-Up screens.

Table 3–1: SETHOST Set-Up Screens

Set-Up Screen	Description
Actions	Contains selections relating to resetting the terminal, clearing the screen, clearing communications, saving and recalling Set-Up settings, setting default parameters, and showing status.
Communications	Contains selections for defining the communications environment, including the communications port and disconnect delays, speed, parity, stop bits, XOFF information, and transmit/receive information.
Display	Contains selections for defining screen display, such as columns, auto wrap, background, and cursor style.
General	Contains commonly used general operating selections, such as local echo, character sets, and terminal type (VT200, VT100, VT52).
Keyboard	Contains selections for defining keyboard operating characteristics, such as keypad, cursor keys, margin bell, answerback, keyclick, and keyboard map.
Printer	Contains selections for defining printer operations, such as print size, type of printer, and print terminator.
Tabs	Contains selections for defining the tab settings.
Telephone	Lets you determine how telephone answering is done. You can also enter the telephone numbers you want to use with a modem.

From each Set-Up screen you can do the following:

- View the current selections and settings.
- Change the current settings to suit your needs .
- Use PgDn (or Next Screen) or PgUp (or Previous Screen) to access any of the other Set-Up screens.

All settings can be saved or recalled from Set-Up files.

3.5.1 Saving and Recalling Set-Up Files

After you select the desired Set-Up settings, you can save and recall them from the default file, SETHOST.DAT, or any other file that you specify.

When you start the SETHOST emulator, it uses the values contained in SETHOST.DAT or the specified file to initialize settings.

The SETHOST emulator also lets you create files for saving Set-Up settings. After making the desired Set-Up changes, you select the Save Set-Up Parameters selection from the Actions screen. You can then create Set-Up files with settings that are tailored to your own preferences or for use with different applications.

You can select any of these files while running the SETHOST emulator by choosing the Recall Set-Up Parameters selection from the Actions screen.

3.5.2 Saving Selection Settings

To save all your SETHOST Set-Up selections, follow these steps:

1. Select the Actions screen.
2. Select the Save Set-Up Parameters.
3. Press End (or Select) to make a selection from the right column.

   Either the default file name SETHOST.DAT or the name of the most recently created save file is displayed in the right column.
4. Follow one of these steps to save your selections:
   - Select the SETHOST.DAT file.
   - Select the currently displayed file.
   - Type in a new file name.

   NOTE

   If you select a currently displayed file, the new values you set replace the existing values in that file.
5. Press RET to save your selections in the new or selected file.

3.5.3 Recalling Selection Settings

To recall SETHOST selection settings under Set-Up, follow these steps:

1. Select the Actions screen.

2. Select the Recall Set-Up Parameters.

3. Press (Select) to make a selection from the right column.

   Either the default file name SETHOST.DAT or the name of the most recently created save file is displayed in the right column.

4. Follow one of these steps to recall your selections:

   - Select the SETHOST.DAT file.
   - Select the currently displayed file.
   - Enter a file name that will contain Set-Up values.

5. Press (RET) to recall your saved Set-Up selections from the selected file.

3.5.4 Using SETHOST Function Keys

The function keys have fixed meanings for the SETHOST emulator. Table 3–2 lists these function keys and their descriptions. (This table also includes special keyboard keys that you can use to make selections from each Set-Up screen.)

NOTE

On the LK250 keyboard, the 20 function keys are (F1) through (F20). On the Personal Computer keyboard (and others that have only 10 function keys), the first 10 function keys are (F1) through (F10). You can use the second set of 10 function keys, however, because (ALT/F1) through (ALT/F10) correspond to (F11) through (F20).

Table 3–2: SETHOST Function Keys

Function Key	Description/Function
F1 (Hold)	Freezes the screen. None of the characters you type are displayed on the screen until you press F1 again. (On an LK250 keyboard, pressing HOLD also lights the Hold indicator.)
	Pressing Shift/F1 starts an autotyping operation. That is, SETHOST sends the characters in a file as if you typed them on your keyboard.
	Pressing CTRL/F1 starts or stops logging the SETHOST session to a disk file.
F2 (Print Screen)	Sends the screen text to the printer.
	Pressing CTRL/F2 toggles Auto Print mode. That is, the first time you press it, Auto Print is turned on and SETHOST begins printing the session on your local printer; pressing CTRL/F2 again turns off Auto Print mode.
F3 (Set-Up)	Enters (and exits) Set-Up.
	Pressing CTRL/F3 closes session logging.
F4 (Data/Talk)	Use this key only if a modem is installed. For more information, refer to your individual modem user's guide.
	Pressing Shift/F4 dials a telephone number stored in the Telephone Set-Up menu.
F5 (Break)	Transmits a break (if you enabled break a in Set-Up).
	Pressing Shift/F5 initiates a communications line disconnect.
	Pressing CTRL/F5 sends an answerback message as defined in Set-Up.
F6	Pressing Shift/F6 initiates a COMPOSE sequence. On the LK250 keyboard, COMPOSE performs this function.
F7	Pressing Shift/F7 flips the screen to the left.
F8	Pressing Shift/F8 flips the screen to the right.
F9	Pressing Shift/F9 connects you to the previous service you were using.
	Pressing CTRL/F9 lets you use MS–DOS. When you type EXIT while using MS–DOS, you are returned to your SETHOST session.

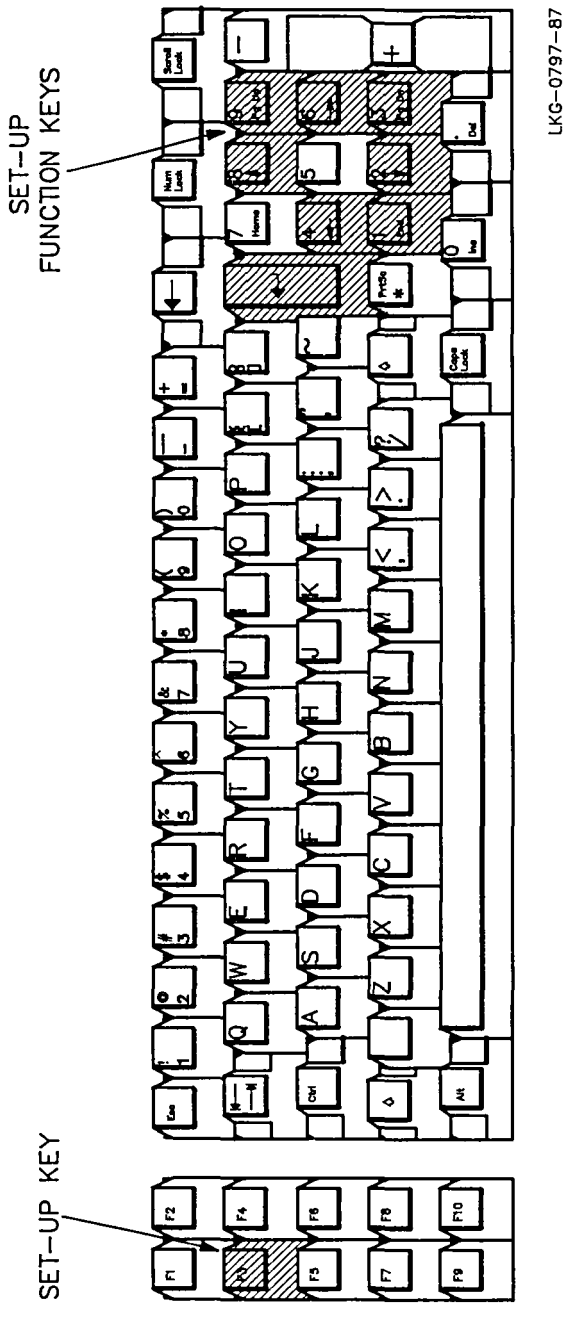
Table 3–2 (Cont.): SETHOST Function Keys

Function Key	Description/Function
F10 (Exit)	Pressing this key while holding down the CONTROL key (CTRL/F10) exits you from the SETHOST emulator. This action also returns you to the MS-Windows screen you were using, if you started SETHOST from MS-Windows. Pressing Shift/F10 connects you to the next service you were using.
ALT/F1 (ESC)	(F11 on the LK250 keyboard) Generates an escape character when in VT52 and VT100 modes. In VT200 modes, ALT/F1 sends an escape sequence which indicates to a VAX application that you have pressed the F11 key.
ALT/F2 (BS)	(F12 on the LK250 keyboard) Generates a backspace character when in VT52 and VT100 modes. In VT200 modes, ALT/F2 sends an escape sequence which indicates to a VAX application that you have pressed the F12 key.
ALT/F3 (LF)	(F13 on the LK250 keyboard) Generates a line feed character when in VT52 and VT100 modes. In VT200 modes, ALT/F3 sends an escape sequence which indicates to a VAX application that you have pressed the F13 key.
PgDn	Displays the next Set-Up screen. (On the LK250 keyboard, press Next.)
PgUp	Displays the previous Set-Up screen. (On the LK250 keyboard, press Prev.)
Right Arrow Left Arrow End	Allows you to make a selection from either side of the Set-Up screen (depending on which column you are using and which item is highlighted).
Up Arrow or Down Arrow	Pressing Up Arrow or Down Arrow moves you either up or down the list of selections in either column.

3.5.5 Using SETHOST Keyboard Keys in Set-Up Screens

A description of the keys you can use with Set-Up appears at the bottom of each screen. Figure 3–1 highlights these keys as well as the special function keys that are available.

Figure 3–1: SETHOST Set-Up and Function Keys for PCs



3.5.6 Changing Settings

To choose a Set-Up screen and change a setting, follow these steps:

1. Select the desired Set-Up screen by pressing (Pg Dn) or (Pg Up) ((Next) or (Prev) on an LK250 keyboard).

2. After the desired screen is displayed, press (Up Arrow) or (Down Arrow) to view different selections.

   The current settings are displayed in the left column. The setting selections are displayed in the right column.

NOTE

The Actions Set-Up screen displays a set of prompts or directions instead of settings in the right column. Follow those directions.

3. Press (Right Arrow) to move to the right column and select a setting. You can also press (End) or (Select).

   The selection in the left column is now bolded to indicate which selection you are setting.

4. Use (Up Arrow) or (Down Arrow) to highlight the desired setting.

5. Press (Left Arrow) to enter this setting. You can also press (End) or (Select).

   The new setting is now highlighted in the left column.

NOTE

Some settings take effect immediately; others take effect when you leave Set-Up.

3.5.7 Leaving Set-Up

Before you leave Set-Up, be sure to save any changes you have made by using the Save Set-Up Parameters option from the Actions screen.

To leave Set-Up, press the F3 key (Set-Up) again.

The following sections describe each Set-Up screen and its options.

3.6 Actions Screen

After you enter Set-Up, the first screen that SETHOST displays is the Actions screen.

The Actions screen provides options that allow you to clear your screen, adjust or reset the terminal emulator, save or recall the Set-Up setting, and display the status of your terminal.

Table 3–3 defines the Actions Set-Up selections.

Table 3–3: Actions Set-Up

Current Setting	Description and Available Selections
Reset Terminal	Resets many operating settings to the power up default state. Does not affect communications, NRC (National Replacement Characters) and multinational modes, or user-defined keys.
Clear Display	Clears the screen and sends the cursor to home position when you leave Set-Up.
Clear Communications	Clears communication lines immediately and stops any print operation in progress. It also ends printer controller mode. Does not affect network communications.
Recall Set-Up Parameters	Replaces all existing Set-Up settings with values you saved in a default file called SETHOST.DAT or in a file you specify. When you select this option, the default file name appears in the right column. If you want to change the file name, press [Select]. You can now edit the current file name or enter a new file name for your Set-Up values. Press [RET] when you are done.
Save Set-Up Parameters	Saves the Set-Up settings in a default file called SETHOST.DAT or in a file you specify. You can also change the current file name by pressing [Select] and entering a new file name. Press [RET] when you are done.
Set Default Set-Up Parameters	Replaces all current Set-Up settings with factory default settings.
Show Status	Displays information on the state of such items as modems, file sending or receiving, and communications ports. When you select this option, information similar to the following is displayed (the information will vary depending on your individual configuration): Receive File: Idle Send File: Idle Printer: Normal Print Mode Telephone: Manual Answer Insert/Replace: Replace Keyboard Map: KBDAT.KBD Character Set: ASCII DEC Multinational Communications: Network: MYNODE

Table 3–3 (Cont.): Actions Set-Up

Current Setting	Description and Available Selections
To MS–DOS	Lets you leave the SETHOST emulator temporarily while you use the MS–DOS operating system. When you finish using MS–DOS commands, you can return to your session by typing EXIT at the MS–DOS prompt. If there is not enough memory to run COMMAND.COM, a message is displayed.
Exit SETHOST	Allows you to leave the emulator and return to the prompt you were using previously. If you were using MS-Windows, you return to the window you were using previously.

3.6.1 Displaying Status Information

Status information is available only from the SETHOST Actions screen. It is a reporting area only. When you select this option, SETHOST displays the following information:

Receiving or sending a file	Idle or In Progress.
Printing	Normal Print Mode, Auto Print Mode, Printer Controller Mode.
Modem usage	Data Set Ready (DSR) or No Data Set Ready (DSR).
Telephone modes	Manual or Automatic Answer.
Insert/Replace mode	[No screen display]
Keyboard Map	Displays the name of the current keyboard-mapping file. If there is no file of that name located in your DECnet directory or in your directory path, SETHOST displays this message: `"File not found"` SETHOST will then default to a keyboard mapping for the IBM Personal Computer XT.
Character Set	Character sets currently in use.
Communications	Comm Port 1, Comm Port 2, or Network Terminal Service.

3.6.2 Receiving Characters from the Host into a File

Show Status in the Actions screen indicates whether session logging is active or idle.

To receive or log characters from the host into a file using session logging, follow these steps:

1. Enter CTRL/F1. SETHOST displays this prompt on the bottom line:

   ```
   Receive file-name:
   ```

2. Type in a file name for storing characters that will be logged in from a host.

   If the file name already exists, SETHOST displays another prompt asking you to do one of the following:

   - Replace an existing file.
   - Append to an existing file.
   - Cancel the file logging.

   You will see "Receive: On" displayed on line 25 of your screen.

3. Enter CTRL/F1 to stop characters from logging into the file. You will see "Receive: Off" displayed on line 25 of your screen.

4. Enter CTRL/F3 to close the receive file.

3.6.3 Autotyping Characters to the Host

Show Status in the Actions screen indicates whether autotyping is active or idle.

When a file is autotyped to VMS, you must first enable HOSTSYNC under VMS. For example:

```
$ SET TERMINAL/HOSTSYNC RET
```

This prevents data overruns on a VMS host.

To autotype characters to the host from a file as if you entered them from the keyboard, follow these steps:

1. Enter Shift/F1. SETHOST displays this prompt on the bottom line:

   ```
   Send file-name:
   ```

2. Type in the name of the file that will be autotyped to the host.

   File autotyping stops when the end of the file is reached.

   You can also enter (Shift/F1) again to stop autotyping the file.

3.7 Communications Screen

The Communications screen contains selections for defining the communications environment (including the communications port and disconnect delays), speed, parity, stop bits, XOFF information, and transmit/receive information.

Normally a terminal can only connect to a host using a serial port. SETHOST allows you to connect to a host using either a serial port or the Ethernet communications port. These ports connect your personal computer to different network terminal services, depending on which services are defined in the service table. (A service table contains a list of the various nodes that are available for communication in the network.)

Table 3–4 defines the Communications Set-Up settings and their available selections.

Table 3–4: Communications Set-Up

Current Settings	Description and Available Selections
Comm Port 1: Data Leads Only	Provides a selection of communication port settings (Comm Port 1 or Comm Port 2) and network communications. The following selections are available for the communications ports: Comm Port 1: Data Leads Only (default) Comm Port 1: Full Modem Control Comm Port 2: Data Leads Only Comm Port 2: Full Modem Control Comm Port 2: Hayes Modem Network Communications Port If you select the Network Communications Port, the service type and a list of available sessions are displayed in the left column. You can choose one of the following service types for the Network Communications Port: LAT – attempts LAT connections only CTERM – attempts CTERM connections only NET – connects to the network the fastest way by trying LAT first, then CTERM if the LAT connection is not successful. You can also select a specific service to use during a session. You can have a maximum of 4 sessions. Use the arrow keys to select the session for which you want to assign a service. Then press End (or Select). A list of available service selections appears in the right column. Use the arrow keys again to select a specific service, then press End (or Select) to assign that service to a session number.
Disconnect Delay	If you are using modem control, this option selects the amount of time before the workstation disconnects from the communications line if the carrier detect is lost. The following selections are available: Disconnect, 2-second delay (default) Disconnect, 60-ms delay Most countries except the United Kingdom use the 2-second delay; the United Kingdom uses the 60-millisecond (ms) delay.

Table 3–4 (Cont.): Communications Set-Up

Current Settings	Description and Available Selections
XOFF	Selects the XOFF point or disables the automatic XON/XOFF flow control. For most applications you should set XOFF at 64 or 256. If you set XOFF greater than 256 and have a buffer overflow problem, set XOFF to the next lower value. The XOFF point can have one of the following values: 64 (default) 256 512 1024 No XOFF If you select No XOFF, the characters are received continuously from the host and some of those characters may be lost.
Speed	Selects the rate at which characters are received or transmitted. The default is 9600 baud. The speed can have one of the following values: 50 300 2400 75 600 3600 110 1200 4800 134.5 1800 9600 (default) 150 2000 19200
Data Bits and Parity	Selects the character format used for communication with a host computer. The following selections are available: 8 bits – No Parity (default) 8 bits – Even Parity 8 bits – Even Parity – No Check 8 bits – Odd Parity 8 bits – Odd Parity – No Check 7 bits – No Parity 7 bits – Even Parity 7 bits – Even Parity – No Check 7 bits – Odd Parity 7 bits – Odd Parity – No Check 7 bits – Mark Parity 7 bits – Space Parity
Stop Bits	Selects the number of stop bits (1 or 2) used for communicating with the host. The default is 1 stop bit.

Table 3–4 (Cont.): Communications Set-Up

Current Settings	Description and Available Selections
Transmit = Receive	Characters can be received and transmitted at the same rate, or at differing transmit and receive rates. These settings are usually equal. As a default, the transmit rate is set equal to the receive rate. You can also set the transmit rate to 1200.

3.7.1 Selecting a Network Terminal Service

To select a service to use for a network connection, follow these steps:

1. Move to Session 1 in the left column.

2. Press (Right Arrow) to display a list of available services. The services will appear in the right column, under the heading SELECTIONS.

3. Highlight the service you want to access by using the up or down arrow keys.

4. Press (Left Arrow) to enter the highlighted service as an assigned service.

   The service you selected now appears in the left column.

   The service is marked as inactive until you leave Set-Up. Once you leave Set-Up, the service becomes active and is available for use.

5. Repeat steps 1 through 4 to select any other services you desire, up to a limit of four.

Services should be assigned in the order in which you want to access them. When you leave Set-Up, Service 1 is always the first one activated. To change services, press (Shift/F10) ((Shift/Next)) or (Shift/F9) ((Shift/Prev)).

3.8 Display Screen

The Display screen contains selections for defining screen display characteristics, such as the number of columns, auto wrap, background, and cursor style.

Table 3–5 defines the Display Set-Up selections and their available options.

Table 3–5: Display Set-Up

Current Setting	Description and Available Selections
Columns	Selects an 80- or 132-column screen for text. A change to this setting takes effect when you exit Set-Up. The default setting is 80 columns. If you select 132 columns, you should note that standard PC video adapters can display only 80 columns at a time. This means that the screen must be panned to display the rest of the data. To flip to the left side of the screen, press (Shift/F7). To flip to the right side of the screen, press (Shift/F8). If your video adapter supports 132-column mode, see Section 3.14 for information about defining SETHOST environment variables.
Auto Wrap	Selects whether text automatically wraps on the screen. The following selections are available: Auto Wrap On Auto Wrap Off Auto Wrap On causes characters that reach the right margin to automatically display in the first character position of the next line. Auto Wrap Off causes characters that go beyond the right margin to overwrite the last character position of the current line. This is the default.
Background	Selects either a dark background or a light background as the screen display type. The default is Dark Background.
Cursor Style	Selects either a block cursor or an underline cursor as the style of cursor. The default is Block Cursor.
Cursor Type	Selects either a visible cursor or an invisible cursor. The default is Visible Cursor.
Video Adapter	Selects the type of video adapter you are using. The choices are either Monochrome or Color. If you select Color, you can determine the degree of intensity for the character display. Black would be the darkest and intense white would be the lightest.

Table 3–5 (Cont.): Display Set-Up

Current Setting	Description and Available Selections
Background Color	Selects the background color. The following choices are available: Black Blue Green Cyan Red Magenta Brown White
Reverse Color	Selects the color for reverse video. The same color choices are available for this setting as for Background Color.
Bold Color	Selects the bold color. The following choices are available: Black / Dark Gray Blue / Light Blue Green / Light Green Cyan / Light Cyan Red / Light Red Magenta / Light Magenta Brown / Yellow White / Intense White
Foreground Color	Selects the foreground color. The same color choices are available for this setting as for Bold Color.
Underline Color	Selects the underline color. The same color choices are available for this setting as for Bold Color.

3.8.1 Displaying Line Attributes

On some PC video adapters in text mode, some line attributes are displayed differently for double width and double height/double width.

Double width characters appear as the character followed by a space. For example:

```
t e s t
```

Double height/double width characters appear as the character followed by a space, with a blank line inserted before the next line of characters. For example, the word "test" entered on two separate lines would appear like this:

```
t e s t

t e s t
```

Since double height takes up two lines, the text on the first line is followed by a blank second line.

3.8.2 Displaying Character Attributes

Characters intended to be underlined will appear without underlining on a color adapter but will be in a different color than foreground text. You can change the underline color on the Display Set-Up screen.

On a monochrome adapter, characters intended to be underlined will appear as underlined. However, if the characters are also in reverse video, they will appear in reverse video with no underlining.

3.9 General Screen

The General screen contains commonly used general operating selections such as local echo, character sets, and terminal type (VT200, VT100, or VT52).

Table 3–6 defines the General Set-Up selections and their available options.

Table 3–6: General Set-Up

Current Setting	Description and Available Options
Line Mode	Lets you select the mode of operation. You can select either On-Line or Local. On-Line allows your workstation to communicate with the host. This is the default. Local stops communication between your workstation and the host. Data entered at the keyboard goes directly to the workstation screen only.
Local Echo	Enables or disables the local echo setting. You can select either Local Echo Off or Local Echo On. Local Echo Off directs characters from the keyboard to a host only. The host in turn may or may not send the characters back to the screen. This is the default. Local Echo On directs characters from the keyboard to the screen as well as to the host. Use this option if the host does not send characters back to the screen.
New Line	Selects whether the RETURN key generates a carriage return only or a combination carriage return and line feed. You can select one of the following: No New Line (default) New Line No New Line generates a carriage return only. Received carriage returns do not cause a new line operation. New Line generates a carriage return and a line feed. Received carriage returns cause a new line operation. **NOTE** When SETHOST is in numeric keypad mode, this setting affects the ENTER key in the same way it does the RETURN key.

Table 3–6 (Cont.): General Set-Up

Current Setting	Description and Available Options
Character Mode	Determines the category of character set mappings to use for your terminal. Two selections are available: Multinational Mode (default) NRC Mode If you choose Multinational Mode, you then choose one of the two available multinational character sets. NRC mode allows you to choose one of the National Replacement Character Sets. **NOTE** See Appendix D for important information about using character sets on computers sold in some European countries.
Character Set	Lets you choose the specific character set. If you selected Multinational as the Character Mode, you can choose either of the following 8-bit character sets. They both include the 7-bit ASCII character set. ISO Latin-1 Character Set DEC Multinational Character Set (default) If you selected NRC as the Character Mode, you can choose any of the following National Replacement Character Sets. ASCII Character Set (default) British Character Set French Character Set German Character Set Italian Character Set Spanish Character Set Finnish Character Set Swedish Character Set Norwegian/Danish Character Set Swiss Character Set Canadian Character Set Dutch Character Set
Terminal Emulation	Lets you identify the type of terminal you want to emulate. The following selections are available: VT200 with 8-bit controls VT200 with 7-bit controls (this is the default) VT100 VT52

Table 3–6 (Cont.): General Set-Up

Current Setting	Description and Available Options
User-Defined Keys	Lets you determine whether a host can change user-defined key (UDK) definitions. The following selections are available: User-Defined Keys Locked User-Defined Keys Unlocked When you select Locked, the UDKs cannot be changed. When you select Unlocked, the UDKs can be changed. The default is Unlocked.
User Features	Lets you determine whether a host can change certain user features. The following selections are available: User Features Locked User Features Unlocked IF you select Locked, certain features cannot be changed. If you select Unlocked, certain user features can be changed. The default is Unlocked. The user features that can be locked or unlocked include the following: Auto Repeat Light/Dark Screen Tab Stops Keyboard Lock (LK250 keyboard only) **NOTE** Some software applications expect to control these user features. If this applies to your particular software application, you should select User Features Unlocked.

3.10 Keyboard Screen

The Keyboard screen contains selections for defining keyboard operating characteristics such as keypad keys, cursor keys, margin bell, answerback, keyclick, and keyboard map.

Table 3–7 defines the Keyboard Set-Up selections and their available options.

Table 3–7: Keyboard Set-Up

Current Setting	Description and Available Selections
Keypad Mode	Sets the terminal keypad for using either numbers or control codes. Two selections are available: Numeric Keypad Application Keypad The numeric keypad option sends numbers from the numeric keypad. This is the default. The application keypad option sends escape sequences from the numeric keypad.
Cursor Keys	Selects the kind of control codes sent. It is disabled if the terminal is in VT52 mode. Two selections are available: Normal Cursor Keys Application Cursor Keys The normal cursor key option sends ANSI cursor control sequences for the cursor keys (such as up, down, left, and right). This is the default. The application cursor option sends application program control functions for the cursor keys.
Margin Bell	Determines whether the terminal sounds a bell tone when the text cursor approaches the right margin. You can select either Margin Bell or No Margin Bell. The default is Margin Bell.
Warning Bell	Determines whether the terminal generates a bell tone such as for operator errors, mail messages, or system messages. You can select either Warning Bell or No Warning Bell. The default is Warning Bell.
Break	Enables or disables the BREAK key function. You can select either Break or No Break. The default is Break.
Auto Answerback	Selects whether an answerback message is automatically sent to a host computer after a communication line connection is established. You can choose either No Auto Answerback or Auto Answerback. The default is Auto Answerback.

Table 3–7 (Cont.): Keyboard Set-Up

Current Setting	Description and Available Selections
Answerback	Selects whether your answerback message entry is displayed on the screen. You can choose one of the following options: Answerback Concealed Answerback Not Concealed If you select Answerback Concealed, your answerback message is not displayed on the screen, so it will not be revealed. You can only reset this option to Not Concealed by entering a new answerback message. If you select Answerback Not Concealed, your answerback message is displayed on the screen as you enter it. This is the default.
Answerback String	Allows an answerback message entry. The emulator sends an answerback message when it receives an ENQ (inquiry control character), or if you or the host sends a CTRL/BREAK. In the case of ENQ, the message you enter is sent to a host without affecting screen data or requiring further operator action. When you make this selection, a cursor displays in the right column. You can enter any keyboard character to represent your answerback string. The limit is 30 characters.
Keyboard Lock (LK250 only)	Determines the function of the LOCK key. Two options are available: Caps Lock Shift Lock Caps Lock sends uppercase characters for the alphabetic keys only. If you select Shift Lock, the alphabetic keys send uppercase characters, while the numeric and symbol keys send the top characters. Pressing the LOCK key turns on the lock indicator on the keyboard. To clear the lock function, simply press the LOCK key again.

Table 3–7 (Cont.): Keyboard Set-Up

Current Setting	Description and Available Selections
Auto Repeat (LK250 only)	Determines whether keystrokes automatically repeat when you press and hold down a key. The following options are available: No Auto Repeat Slow Auto Repeat Normal Auto Repeat Fast Auto Repeat No Auto Repeat sends only one character when you press and hold down a key. The other selections send the character repeatedly if you press and hold down a key. Sending stops when the key is released. The default is No Auto Repeat. **NOTE** If you are in VT100 mode and you are running EDT under VMS and holding down a key, autorepeating stops. It resumes only when you release the key and then press it again. To prevent this from happening, type these DCL commands: $ SET TERMINAL/DEVICE = VT200 $ SET TERMINAL/INQUIRE
Keyclick (LK250 only)	Determines the volume of your keyclicks. The following options are available: No Keyclick Soft Keyclick Normal Keyclick Loud Keyclick

Table 3–7 (Cont.): Keyboard Set-Up

Current Setting	Description and Available Selections
Keyboard Map	Determines the keyboard map to use. The following options are available. The files that specify the keyboard maps (.KBD) and describe them (.HLP) appear in parentheses. You can find these files in the DECnet directory. IBM XT keymap (KBDXT.KBD and KBDXT.HLP) IBM AT keymap (KBDAT.KBD and KBDAT.HLP) IBM Enhanced PC/PS2 keymap (KBDEPC.KBD and KBDEPC.HLP) Digital LK250 keymap (KBDLK.KBD and KBDLK.HLP) Laptop keymap (KBDLAP.KBD and KBDLAP.HLP) Generic keymap (KBDGEN.KBD and KBDGEN.HLP) Use the Laptop keymap if your keyboard does not have a separate numeric keypad and you must use the Num Lock key to type numeric keypad keys on the main keyboard. Use the Generic keymap if no other keymap applies. **NOTE** Selecting the Digital LK250 keymap when you do not have that keyboard attached can cause your PC to hang when it sends commands to the keyboard.

3.10.1 Custom Keyboard Mapping

If your computer does not have one of the standard keyboards that SETHOST supports, you can customize your own keyboard definition. That is, you can "map" the keys on your keyboard to the functions of a standard Digital keyboard.

3.10.1.1 Keyboard Mapping Files

Files in the DECnet directory that start with "KBD" and have a file type of "KBD" are keyboard mapping files that control the way the personal computer keys map to particular terminal emulator functions. There is a corresponding .HLP file for each .KBD file that describes the mapping for each type of keyboard.

For example, KBDAT.KBD and KBDAT.HLP are the keyboard mapping and help files for the IBM Personal Computer AT keyboard. Both types of files are ASCII text files that you can print out and review.

When you select a keyboard, SETHOST uses the contents of the corresponding mapping file to map keys to functions. To define your own keyboard mapping, you replace one of the .KBD files with your own. You can do this most easily by selecting the existing .KBD file that most closely matches your keyboard and modifying it with any ASCII text editor on your system.

The .KBD files contain two types of records. The first record in the file is a "flag" record. It consists of a single digit (0, 1, or 2), followed by comments for readability.

- 0 – Do not replace interrupt 9 keyboard handler.
- 1 – Replace interrupt 9 keyboard handler.
- 2 – Replace interrupt 9 keyboard handler and trap the Num Lock key.

Each record after the first contains the mapping information for one key, and it consists of these elements:

- The key code, four hexadecimal digits. This is the code that uniquely identifies the key on your keyboard. It consists of two parts. The first two digits are the key number (scan code), and the last two contain either zeroes or the code of the ASCII character that corresponds to the key.
- An equal sign (=) follows the scan code.
- The function code. This code, which contains four hexadecimal digits, uniquely identifies a keyboard function, such as ENTER or PRINT SCREEN.
- The rest of the line consists of comments that help you to understand the codes. The comments have no effect on the mapping.

3.10.1.2 Mapping Your Keyboard

This is how to map the keys of your keyboard if it is not the same as any of the standard keyboards.

1. Choose a .KBD file to use as the basis for your own mapping file by determining which of the standard keyboards most closely matches yours.

2. Find the key code for each key on your keyboard that you want to map. You can do this by running the program KBDCODE.EXE, then pressing the keys whose key codes you want to see on your screen.

3. Find the code for the function you want the key to perform, either in the .KBD file or in Figure 3–3, which shows the standard Digital keyboard functions.

4. Create or change the mapping file record for the key.

5. Save the mapping file with the name that corresponds to the keyboard you select in SETHOST.

6. Run SETHOST. It will use your new keyboard mapping.

Figure 3–2 shows the first few records of a sample keyboard mapping file.

Figure 3–2: Sample Keyboard Mapping File

```
2               ; replace int9 and trap num lock key
3B00=0100  ; PC KF1        = DEC KHOLD     Hold Screen
3C00=0101  ; PC KF2        = DEC KPTEXT    Print Screen
5500=0102  ; PC KF2S       = DEC KPSIXEL   Not available
5F00=0103  ; PC KF2C       = DEC KPAUTO    Auto Print set/reset
3D00=0104  ; PC KF3        = DEC KSETUP    Set-up
3E00=0105  ; PC KF4        = DEC KDATA     Data mode for modem
```

Figure 3–3 shows the standard Digital keyboard functions.

Figure 3–3: Standard Digital Keyboard Functions

This is a list of the Function codes used by SETHOST.

Function Name	Value	Explanation
Local Function Keys		
KHOLD	0100	Hold Screen
KPTEXT	0101	Print Screen (Text mode)
KPSIXEL	0102	Print Screen (Graphics mode) - Not available
KPAUTO	0103	Auto Printing on/off
KSETUP	0104	Enter/Exit Set-Up Screen
KDATA	0105	Data mode for modem
KDIAL	0106	Dial modem from Telephone Set-Up Screen
KTALK	0107	Talk mode for modem
KBREAK	0108	Break
KDISCON	0109	Disconnect communications line
KANSBK	010A	Send Answerback string
PF1 - PF4 Function Keys		
KPF1	010B	PF1
KPF2	010C	PF2
KPF3	010D	PF3
KPF4	010E	PF4
Miscellaneous Function Keys		
KCOMPOSE	0111	Compose Character
KSCROLL	0112	Not available
KCOL132R	0113	Rightmost 80 of 132 columns
KCOL132L	0114	Leftmost 80 of 132 columns
KRON	0115	Receive file on
KROFF	0116	Receive file off
KSEND	0117	Send file on/off

Figure 3–3 (Cont.): Standard Digital Keyboard Functions

```
"Function" Function Keys

     KF1          0120    F1
     KF2          0121    F2
     KF3          0122    F3
     KF4          0123    F4
     KF5          0124    F5
     KF6          0125    F6
     KF7          0126    F7
     KF8          0127    F8
     KF9          0128    F9
     KF10         0129    F10
     KF11         012A    F11
     KF12         012B    F12
     KF13         012C    F13
     KF14         012D    F14
     KF15         012E    F15
     KF16         012F    F16
     KF17         0130    F17
     KF18         0131    F18
     KF19         0132    F19
     KF20         0133    F20

KF1 Shifted through KF20 Shifted

     KF1S         0134    Shifted F1
     KF2S         0135    Shifted F2
     KF3S         0136    Shifted F3
     KF4S         0137    Shifted F4
     KF5S         0138    Shifted F5
     KF6S         0139    Shifted F6
     KF7S         013A    Shifted F7
     KF8S         013B    Shifted F8
     KF9S         013C    Shifted F9
     KF10S        013D    Shifted F10
     KF11S        013E    Shifted F11
     KF12S        013F    Shifted F12
     KF13S        0140    Shifted F13
     KF14S        0141    Shifted F14
     KF15S        0142    Shifted F15
     KF16S        0143    Shifted F16
     KF17S        0144    Shifted F17
     KF18S        0145    Shifted F18
     KF19S        0146    Shifted F19
     KF20S        0147    Shifted F20
```

Figure 3–3 (Cont.): Standard Digital Keyboard Functions

Editing Keypad

KFIND	0150	Find
KINS	0151	Insert Here
KREMOV	0152	Remove
KSEL	0153	Select
KPREV	0154	Previous Screen
KNEXT	0155	Next Screen
KSESPREV	0156	Previous Session
KSESNEXT	0157	Next Session
KUP	0158	Up Arrow
KDOWN	0159	Down Arrow
KLEFT	015A	Left Arrow
KRIGHT	015B	Right Arrow

Numeric Keypad

KNUM0	0160	0
KNUM1	0161	1
KNUM2	0162	2
KNUM3	0163	3
KNUM4	0164	4
KNUM5	0165	5
KNUM6	0166	6
KNUM7	0167	7
KNUM8	0168	8
KNUM9	0169	9
KNUMMINUS	016A	Minus
KNUMCOMMA	016B	Comma
KNUMDOT	016C	Dot
KNUMENT	016D	Enter

More Miscellaneous Function Keys

KNUMSTAR	016E	Star near or on the numeric keypad
KUPS	016F	Shifted Up Arrow
KDOWNS	0170	Shifted Down Arrow
KHOTKEY	0171	To DOS
KEXIT	01FE	Exit SETHOST
KNO_INPUT	FFFF	No input - SETHOST ignores any key assigned to this

3.11 Printer Screen

The Printer screen contains selections for defining printer operations such as print size, type of printer, and print terminator.

Table 3–8 defines the Printer Set-Up selections and their available options.

Table 3–8: Printer Set-Up

Current Setting	Description and Available Selections
Printer Connection	Determines whether the printer is connected or disconnected.
Print Area	Determines how much of the screen is printed during a text print operation. Two options are available: Print Full Page (default) Print Scroll Region Print Full Page prints the entire screen. This is the default. Print Scroll Region prints only the area of the screen that is defined as a scrolling region.
Printer Type	Lets you select the printer you want to use. You can choose either a DEC printer or any other non-DEC printer.
Print File Name	Allows you to send the screen text to a file. When you select this setting, the cursor flashes in the right column, indicating that you should enter a file name. You can enter either the default name (PRN) or any other file name you want to use. Once you exit Set-Up, you can press the PRINT SCREEN key to send the text to a file.
Print Mode	Selects the operating mode for the printer. The following selections are available: Normal Print Mode Auto Print Mode Printer Controller Mode The Normal Print Mode only sends information to the printer when you invoke print functions from the keyboard. The Auto Print Mode prints the current text line when the terminal receives a line feed, form feed, or vertical tab code from a host. The Printer Controller Mode causes the printer port to treat the device that is connected to it as a terminal, while SETHOST monitors traffic. (The printer and host computer transfer data without displaying the data on the screen.)

Table 3–8 (Cont.): Printer Set-Up

Current Setting	Description and Available Selections
Print Terminator	Lets you determine whether a form feed character is sent at the end of a print screen operation. You can choose either Form Feed or None (for no terminator).

3.12 Tabs Screen

The Tabs screen contains selections for defining the tab settings.

Table 3–9 defines the Tab Set-Up selections and their available options.

Table 3–9: Tab Set-Up

Current Setting	Description and Available Selections
Clear All Tabs	Clears all tab settings. When you select this option, the current tab settings are displayed at the bottom of your screen. The tab settings are indicated by capital T's. When you press (Select), all of the current settings are removed.
Set 8 Column Tabs	Sets tabs every 8 columns, starting with column 9. When you press (Select), tabs are set every 8 columns and are indicated with capital T's.
Set Tab Interval	Lets you determine the interval between tabs. When you select this option, the right column displays an interval prompt with the default value of 8. You can change the default by entering a new value. To have the new value take effect, press (Select). The tabs are automatically reset at the value you specified.
Manually Set Tabs	Allows you to change individual tab stops, rather than having the stops at uniform intervals. When you select this option, instructions appear in the right column. You can set or clear any tab stop by pressing the T key. When you complete your tab settings, press (Select). The tab intervals are updated on the screen in front of you.

3.12.1 Setting Tabs Manually

To set tabs manually for the SETHOST emulator, follow these steps:

1. Select the Manually Set Tabs option by using the up or down arrow key.

2. Press End (or Select).

   A blinking cursor now appears in the tabs ruler at the bottom of your Tabs Set-Up screen.

3. Use Right Arrow or Left Arrow to position the cursor on the desired tab stop setting.

4. Press T to set the tab.

   Pressing T again will clear the tab stop. (The T key acts as a toggle switch for setting and clearing tabs.)

5. Press End (or Select) to end manual tab setting.

3.13 Telephone Screen

The Telephone screen lets you determine how telephone answering is accomplished. You can also enter telephone numbers that you want to use with a modem.

Table 3–10 defines the Telephone Set-Up selections and their available options.

Table 3–10: Telephone Set-Up

Current Setting	Description and Available Selections
Modem Answer Selection	Lets you determine how the modem will be answered. You can choose either manual telephone answering or automatic telephone answering. Automatic answering is done by the emulator. Manual Answer leaves the modem in talk mode after disconnecting from the host. This allows you to answer the incoming call. Manual Answer is required for normal telephone operation. It is the default. Auto Answer leaves the modem in data mode after disconnecting from the host. This allows the terminal to answer the incoming call automatically.
A–J =	Indicates that ten telephone numbers (A–J) can be stored for automatic dialing. Each time you select a letter from the left column, that letter appears in the right column, while the cursor flashes to prompt you for entering a phone number. To change or enter a phone number, select the letter that represents the number you want to change. Press (Select) to move to the right column and type over the old number or enter a new number. Press (Select) or (Return) when you are done. The number now appears in the left column, next to its corresponding letter. Repeat this process for each phone number you want to change or enter. You can save these settings by using the Save Parameters option (in the Actions screen) before you exit Set-Up.

3.13.1 Using Telephone Selections

Before you can use the Telephone Set-Up selections, you must first select and save the following information from the Communications screen:

- "Comm Port 1: Data Leads Only," "Comm Port 2: Data Leads Only," or "Comm Port 2: Hayes Modem," depending on which port your modem is connected to. If you specify the Hayes modem, SETHOST adds the Hayes modem pulse dialing command to the beginning of telephone numbers.

- The appropriate transmit and receive speeds.

For more information on telephone settings, refer to your modem user's guide.

3.14 Environment Variables

You can define "environment variables" in SETHOST to tailor its operation to your specific environment. You define these variables with the following SET commands.

SET NVTDTR = "1"	Tells SETHOST to drop DTR modem signal when SETHOST exits. This means the modem connection will be terminated when SETHOST exits.
SET NVTVID = "1"	Disables the reset of the video hardware by INT 10H. Useful if you want to run with a non-standard video mode.
SET NVTMONO = "*bit-pattern*" SET NVTCOLOR = "*bit-pattern*"	Lets you control all the video attributes that SETHOST uses except for blink. The first 8 characters are the foreground attributes (0–F) and the second 8 are the background attributes (0–F). The attributes are in the following order: normal reverse bold reverse bold underline underline reverse underline bold underline bold reverse
SET NVT80 = "*file-name*" SET NVT132 = "*file-name*"	File names of routines to use to switch between 80- and 132-column modes. NVT132 is used for switching to 132-column mode and NVT80 is used for switching back to 80 columns.

4

Using SETHOST on a VAXmate Workstation

This chapter describes the SETHOST utility for use with DECnet–VAXmate. VAXmate users should note that the SETHOST utility was formerly known as VT240 when used on a VAXmate workstation. The VT240 emulator has been replaced by SETHOST. For all terminal emulator operations, this chapter will use only the utility name of SETHOST.

This chapter provides the following information about SETHOST:

- Overview of SETHOST (see Section 4.1).
- Starting SETHOST (see Section 4.2).
- Leaving SETHOST (see Section 4.3).
- Using SETHOST (see Section 4.4).
- Using Set-Up screens (see Section 4.5).
- Descriptions for each Set-Up screen (see Section 4.6 though 4.13).

4.1 Overview of SETHOST

When your personal computer emulates a terminal, you can perform many standard terminal functions of that host and gain access to the host's resources as if your personal computer were a terminal directly connected to the host.

In the DECnet–DOS networking environment, SETHOST provides VT200-series terminal emulation. You can connect to the network using one of the following methods:

- Through DECnet using the CTERM protocol (over an asynchronous communications port or Ethernet) to any host in the DECnet network.
- Through LAT over Ethernet to any local host.
- Through the asynchronous communications port (COM1 or COM2).

Each time you log onto a host, the connection you make is called a "session." Using SETHOST, you can create and maintain multiple sessions. You can have a maximum of four sessions active at one time. The following are the different types and numbers of sessions you can choose from:

- COM1 port – one session only.
- COM2 port – one session only.
- Network terminal services – four sessions maximum, using LAT or CTERM.

4.1.1 Accessing Remote Hosts

There are three ways to connect to a remote host system. Each has its own characteristics.

1. LAT

   LAT is a local area transport protocol that uses Ethernet to provide access to other LAT services. LAT is available for Ethernet configurations only. It supports Terminal Data Management System (TDMS) applications, and it allows you to use multiple sessions.

   Since LAT is designed for use with Ethernet, it does not use DECnet. The host that you connect to echoes the characters that you type. You should use LAT as your network connection if you need to access TDMS applications.

2. CTERM

   CTERM is a wide area virtual terminal protocol that is layered on DECnet. It is available for both Ethernet and asynchronous Digital Data Communications Message Protocol (DDCMP) configurations. CTERM does not provide support for TDMS applications.

Since CTERM is designed for use with DECnet, it provides direct access from your personal computer to the entire DECnet network. CTERM, not the host, echoes the characters that you type, and it allows you to use multiple sessions.

3. Asynchronous communication port

   The asynchronous communication port (which can be either COM1 or COM2) provides an asynchronous network connection. You can use this port to connect your terminal line to a terminal server. If you do not select the COM2 VAXmate Integral Modem Option or either LAT or CTERM as a network service, SETHOST defaults to the COM1 asynchronous communications port.

You should also note that if you are running DECnet over one of the communication ports and you attempt to use SETHOST over the same port, SETHOST will report a "Comm Port not available" error. You can make this port available to SETHOST by issuing the Network Control Program (NCP) command SET LINE STATE OFF. (For more information about NCP and NCP commands, refer to the *DECnet–DOS Network Management Guide*.)

When SETHOST connects your node to another node, it checks to see if you have a LAT driver or a CTERM driver installed. If both drivers are installed, SETHOST tries to connect you using the fastest method possible. If a LAT connection is available, then SETHOST tries to connect you to the network using LAT. If LAT is not available, then SETHOST uses CTERM to make the connection.

You can specify the host you want to connect to by including the host's node name when you enter the SETHOST command. You can also define the host and the type of network connection you want to access by using the Communications Set-Up screen (refer to Section 4.5 for more information about Set-Up screens and Section 4.7 for information about the Communications Set-Up screen).

4.1.2 DECnet–VAXmate SETHOST Features

DECnet–VAXmate SETHOST offers you two video modes: Fast Text Only and Text and Graphics. The Text and Graphics mode is used for ReGIS graphics applications, such as DECslide and DECgraph.

The DECnet–VAXmate SETHOST emulator allows you to:

- Run host applications (including ReGIS applications).
- Receive or send information to or from a host using files.
- Save and recall Set-Up selection settings using Set-Up configuration files.

4.1.3 Help for SETHOST

SETHOST provides a list of help text when you type SETHOST HELP at the MS-DOS prompt. To view the help text, enter the following command:

```
C:\>SETHOST HELP (RET)
```

4.2 Starting SETHOST

This section describes how to start SETHOST, including the formats of the SETHOST command.

4.2.1 Starting a Session

To start a SETHOST session, type SETHOST at the system prompt. For example:

```
C:>SETHOST (RET)
```

The system displays the following information:

```
SETHOST Version 2.0
Copyright (c) 1987, 1988 by Digital Equipment Corporation

Press Shift Prev or Shift F9 for Previous Session
Press Shift Next or Shift F10 for Next Session
Press Ctrl F9 to hotkey to MSDOS, Press Ctrl F10 to Exit
Press F3 (Set-Up) to enter Set-Up
```

NOTE

You can also start SETHOST from a window, if you are using MS-Windows. However, SETHOST is only a Class C windows application. This means that once you start SETHOST, it takes over your screen and all of the windows information disappears. To issue SETHOST commands, you must use the keyboard keys. You can no longer use the mouse.

4.2.2 Sample Formats for Starting a Session

The following examples illustrate different formats of the SETHOST command that you can use to start a SETHOST session.

1. SETHOST

   This format uses all of the SETHOST defaults, since nothing else is specified.

2. SETHOST *name*

   This format starts a SETHOST session on a specific node or LAT service.

3. SETHOST CTERM: *node-name*

   This format starts a SETHOST session on a specific node, using a CTERM connection.

4. SETHOST COM2:

   This format starts a SETHOST session using the COM2 port.

5. SETHOST LAT: *service-name* /SCRIPT = ALLIN1.SCR

   This format starts a SETHOST session on a specific node, using a LAT connection and calling in the script file ALLIN1.SCR.

6. SETHOST LAT: SERVICE1 SERVICE2 SERVICE3 SERVICE4

   This format starts a SETHOST session with SERVICE1 first. It also places the LAT service names you have indicated in the Communications Set-Up screen. Now, if you look at the Communications Set-Up screen, you will see all of these services listed as Session 1 through Session 4 under the heading, CURRENT SETTINGS.

NOTE

Command line parameters will override any saved Set-Up settings.

4.3 Leaving SETHOST

To leave SETHOST, follow these steps:

1. Log off the host system. When log-off is complete, SETHOST displays the following information if you were using LAT or CTERM.

```
Press Shift Prev or Shift F9 for Previous session
Press Shift Next or Shift F10 Next session
Press Ctrl F9 to hotkey to MS-DOS, Press Ctrl F10 to exit
Press Set-Up (F3) to select a new Session
Press Return to reconnect to ALONE...
```

   In this case, ALONE is the node or service you were using when you logged off the system.

2. Enter CTRL/F10. You return to the prompt or window that you were using previously.

4.4 Using SETHOST

To use SETHOST, the host node must support terminal emulation from remote nodes and run Phase IV or Phase IV + of the DECnet software on one of the following operating systems:

- VAX/VMS, Version 4.0 or later
- RSX–11M–PLUS, Version 3.0 or later
- RSX–11M, Version 4.2 or later
- Micro–RSX, Version 3.0 or later
- TOPS–10, Version 7.03 or later
- TOPS–20, Version 6.1 or later
- ULTRIX–32, Version 1.1 or later
- ULTRIX–32M, Version 1.1

To create SETHOST connections using LAT, the host node must be running the same protocol version of the LAT software that you are using on your node.

The SETHOST terminal emulator is a standard DECnet–VAXmate application that offers many Set-Up parameters or selections that you can change or set depending on your needs. SETHOST lets your workstation behave like VT52, VT100, or VT200 7- and 8-bit control terminals that support both DEC and ISO Latin-1 character sets.

The SETHOST emulator allows you to save Set-Up parameters in a Set-Up configuration file. SETHOST reads this file whenever you start the program. By default, the file is named SETHOST.DAT and is stored in the DECnet directory. (You can also use your own configuration files, each of which can specify different settings. To use a different configuration file, you must include the /S = switch and the file name on the command line when you first start SETHOST.)

When you start the SETHOST emulator, it looks for the default Set-Up configuration file (SETHOST.DAT) in the DECnet directory. If you specify a different configuration file name, SETHOST looks for that file in your current directory. If it does not find the file in the current directory, SETHOST continues to look in the other directories specified in the path list of directories. Once SETHOST locates the configuration file, it uses the values in the file to configure the emulator with the initial values of all the Set-Up selections.

You can also direct SETHOST to run a different Set-Up configuration file when you start it. If SETHOST does not find any configuration files, then it configures the emulator using the factory default settings. (The default settings are to use the COM1 port at 9600 baud.)

In order to use the Set-Up screens to create your configuration files, you must first start a SETHOST session. To start a session, type SETHOST at the system prompt. For example:

```
C:>SETHOST (RET)
```

The system displays the following information:

```
SETHOST Version 2.0
Copyright (c) 1987, 1988 by Digital Equipment Corporation

Press Shift Prev or Shift F9 for Previous Session
Press Shift Next or Shift F10 for Next Session
Press Ctrl F9 to hotkey to MS-DOS, Press Ctrl F10 to Exit
Press F3 (Set-Up) to enter Set-Up
```

Once you see this information on the screen, you can press (F3) to enter Set-Up and use the Set-Up screens. (Refer to Sections 3.6 through 3.13 for detailed information about using each Set-Up screen.)

4.4.1 Using Non-Default Configuration Files

You can specify your own configuration file to use when you start the SETHOST emulator, instead of using the SETHOST.DAT file. Once you have created your configuration file, you can use a switch on the SETHOST command line that will force SETHOST to use your file instead of the default.

The command line syntax looks like this:

SETHOST/S = *startup.ext*

The *startup* variable is the name of the file you have created. The *ext* is the file type. You can assign any 3-character string as the file type.

As an example, if you have a configuration file named MYSETUP.FIL, you would enter the name with the SETHOST command as follows:

```
C:\>SETHOST/S=MYSETUP.FIL (RET)
```

This command would cause SETHOST to start using the settings in MYSETUP.FIL.

4.4.2 Using Scripts

The SETHOST utility provides a script processor that lets you use scripts for executing commands. A script is a text file that contains the commands you want to use to perform a function, such as automatically logging on to a host system. The scripts automatically execute each command to simulate an interactive session on a host terminal. This is useful if you want to log into a host system automatically, or if you want to connect to a remote system to retrieve information. Using scripts is similar to using a Set-Up file; but the script can include commands, whereas a Set-Up file only includes parameters to use for configuring your terminal emulator session.

The command line syntax for using a script file looks like this:

SETHOST/SCRIPT = *login.scr*

The *login* variable is the name of the script file you have created. The *scr* variable is the file type.

For more detailed information on creating scripts and using script commands, refer to Chapter 5.

4.5 Using Set-Up Screens

The SETHOST emulator provides eight different Set-Up screens that offer various selections for changing the following information:

- Terminal characteristics
- Screen displays
- Communications environment
- Keyboard operations
- Printer characteristics
- Tab settings
- Telephone answering characteristics
- General terminal information

Each Set-Up screen is divided into three sections:

1. A top section indicating the available Set-Up screens.
2. A middle section reflecting information about the Set-Up screen you are currently using.
3. A bottom section describing the Set-Up keys you can use to change or select information.

Table 4–1 describes each of the Set-Up screens.

Table 4–1: SETHOST Set-Up Screens

Set-Up Screen	Description
Actions	Contains selections relating to resetting the terminal, clearing the screen, clearing communications, saving and recalling Set-Up settings, setting default parameters, and showing status.
Communications	Contains selections for defining the communications environment, including the communications port and disconnect delays, speed, parity, stop bits, XOFF information, and transmit/receive information.
Display	Contains selections for defining screen display, such as columns, auto wrap, background, and cursor style.
General	Contains commonly used general operating selections, such as local echo, character sets, and terminal type (VT200, VT100, VT52).
Keyboard	Contains selections for defining keyboard operating characteristics, such as keypad, cursor keys, margin bell, answerback, and keyclick.
Printer	Contains selections for defining printer operations, such as print size, type of printer, and print terminator.
Tabs	Contains selections for defining the tab settings.
Telephone	Lets you determine how telephone answering is done. You can also enter the telephone numbers you want to use with a modem.

From each Set-Up screen you can do the following:

- View the current selections and settings.
- Change the current settings to suit your needs.
- Use (Next Screen) or (Previous Screen) to access any of the other Set-Up screens.

All settings can be saved or recalled from Set-Up files.

4.5.1 Saving and Recalling Set-Up Files

After you select the desired Set-Up settings, you can save and recall them from the default file, SETHOST.DAT, or any other file you specify.

When you start the SETHOST emulator, it uses the values contained in SETHOST.DAT or the specified file to initialize settings.

The SETHOST emulator also lets you create files in which you save Set-Up settings. After making the desired Set-Up changes, you select the Save Set-Up Parameters selection from the Actions screen. You can then create Set-Up files with settings tailored to your own preferences or for use with different applications.

You can select any of these files while running the SETHOST emulator by choosing the Recall Set-Up Parameters selection from the Actions screen.

4.5.2 Saving Selection Settings

To save all your Set-Up selections, follow these steps:

1. Select the Actions screen.
2. Select the Save Set-Up Parameters option.
3. Press (Select) to make a selection from the right column.

   Either the default file name SETHOST.DAT or the name of the most recently created save file is displayed in the right column.
4. Follow one of these steps to save your selections:
   - Select the SETHOST.DAT file.
   - Select the currently displayed file.
   - Type in a new file name.

   NOTE

   If you select a currently displayed file, the new values you set replace the existing values in that file.
5. Press (RET) to save your selections in the new or selected file.

4.5.3 Recalling Selection Settings

To recall SETHOST selection settings under Set-Up, follow these steps:

1. Select the Actions screen.
2. Select the Recall Set-Up Parameters option.

3. Press (Select) to make a selection from the right column.

   Either the default file name SETHOST.DAT or the name of the most recently created save file is displayed in the right column.

4. Follow one of these steps to recall your selections:

   - Select the SETHOST.DAT file.
   - Select the currently displayed file.
   - Type in a file name to contain Set-Up values.

5. Press (RET) to recall your saved Set-Up selections from the selected file.

4.5.4 Using SETHOST Function Keys

The top row function keys have fixed meanings for the SETHOST emulator. The labels in parentheses refer to the labels on the standard United States legend strip. Table 4–2 lists these function keys and their descriptions. (This table also includes special keyboard keys that you can use to make selections from each Set-Up screen.)

Table 4–2: SETHOST Function Keys

Function Key	Description/Function
(F1) (Hold)	Freezes the screen. None of the characters you type are displayed on the screen until you press (F1) again. Pressing (HOLD) also lights the Hold indicator.
	Pressing (Shift/F1) starts an autotyping operation. That is, SETHOST sends the characters in a file as if you typed them on your keyboard.
	Pressing (CTRL/F1) starts or stops logging the SETHOST session to a disk file.
(F2) (Print Screen)	Sends the screen text to the printer.
	Pressing (CTRL/F2) toggles Auto Print mode. That is, the first time you press it, Auto Print is turned on and SETHOST begins printing the session on your local printer; pressing (CTRL/F2) again turns off Auto Print mode.
(F3) (Set-Up)	Enters (and exits) Set-Up.
	Pressing (CTRL/F3) closes session logging.

Table 4–2 (Cont.): SETHOST Function Keys

Function Key	Description/Function
F4 (Data/Talk)	Use this key only if a modem is installed. For more information, refer to your individual modem user's guide.
F5	Transmits a break (if you enabled break in Set-Up). Pressing Shift/F5 initiates a communications line disconnect. Pressing CTRL/F5 sends an answerback message as defined in Set-Up.
CTRL/F9	Lets you use MS–DOS. When you type EXIT while using MS–DOS, you are returned to your SETHOST session.
F10 (Exit)	Pressing this key while holding down the CONTROL key (CTRL/F10) exits you from the SETHOST emulator. This action also returns you to the MS-Windows screen you were using, if you started SETHOST from MS-Windows.
F11 (ESC)	Generates an escape character when in VT52 and VT100 modes. In VT200 modes, F11 sends an escape sequence which indicates to a VAX application that you have pressed the F11 key.
F12 (BS)	Generates a backspace character when in VT52 and VT100 modes. In VT200 modes, F12 sends an escape sequence which indicates to a VAX application that you have pressed the F12 key.
F13 (LF)	Generates a line feed character when in VT52 and VT100 modes. In VT200 modes, F13 sends an escape sequence which indicates to a VAX application that you have pressed the F13 key.
COMPOSE	Initiates a COMPOSE sequence.
Next	Displays the next Set-Up screen.
Shift/Prev	Connects you to the next service you were using.
Prev	Displays the previous Set-Up screen.
Shift/Prev	Connects you to the previous service you were using.
Right Arrow Left Arrow End	Allows you to make a selection from either side of the Set-Up screen (depending on which column you are using and which item is highlighted).
Shift/Left Arrow	Flips the screen to the left.

Table 4–2 (Cont.): SETHOST Function Keys

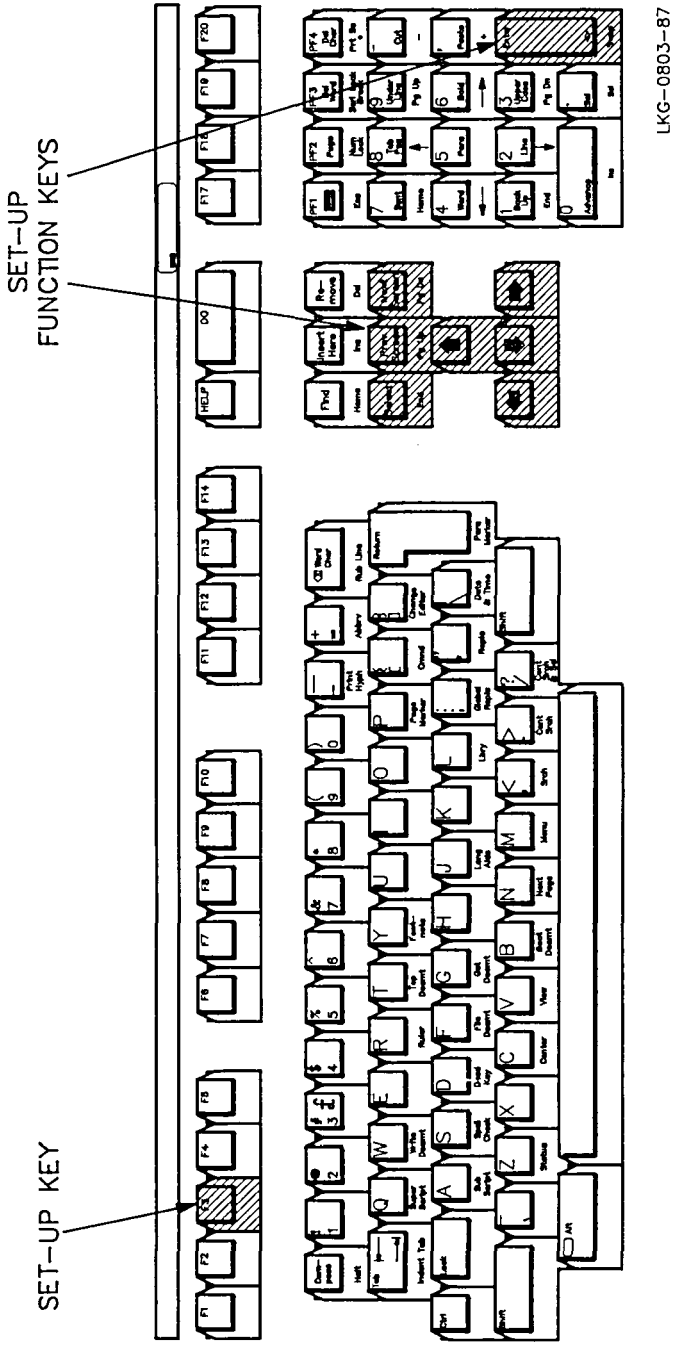
Function Key	Description/Function
Shift/Right Arrow	Flips the screen to the right.
Up Arrow or Down Arrow	Pressing Up Arrow or Down Arrow moves you either up or down the list of selections in either column.

4.5.5 Using SETHOST Keyboard Keys

You can make selections on Set-Up screens with the keyboard keys. (If you started SETHOST from an MS-Windows environment, you can use only the keyboard for making selections. You cannot use the mouse.)

A description of the keys you can use with Set-Up appears at the bottom of each screen. Figure 4–1 highlights these keys as well as the special function keys that are available.

Figure 4–1: SETHOST Set-Up and Function Keys for VAXmates



4.5.6 Changing Settings

To choose a Set-Up screen and change a setting, follow these steps:

1. Select the desired Set-Up screen by pressing (Next) or (Prev).

2. After the desired screen is displayed, press (Up Arrow) or (Down Arrow) to view different selections.

   The current settings are displayed in the left column. The setting selections are displayed in the right column.

NOTE

The Actions Set-Up screen displays a set of prompts or directions instead of settings in the right column. Follow those directions.

3. Press (Select) to move to the right column and select a setting.

   The selection in the left column is now bolded to indicate which selection you are setting.

4. Use (Up Arrow) or (Down Arrow) to highlight the desired setting.

5. Press (Select) to enter this setting.

   The new setting is now highlighted in the left column.

NOTE

Some settings take effect immediately; others take effect when you leave Set-Up.

4.5.7 Leaving Set-Up

To leave Set-Up, press the F3 key (Set-Up) again. The following sections describe each Set-Up screen and its options.

4.6 Actions Screen

After you enter Set-Up, the first screen that SETHOST displays is the Actions screen. This screen provides options that allow you to clear your screen, adjust or reset the terminal emulator, clear communications information, save or recall the Set-Up settings, and display the status of your terminal.

Table 4–3 defines the Actions Set-Up selections.

Table 4–3: Actions Set-Up

Current Setting	Description and Available Selections
Reset Terminal	Resets many operating settings to the power up default state. Ends ReGIS. Does not affect communications, NRC (National Replacement Characters) and multinational modes, or user-defined keys.
Clear Display	Clears the screen and sends the cursor to home position when you leave Set-Up.
Clear Communications	Clears communication lines immediately and stops any print operation in progress. It also ends printer controller mode. Does not affect network terminal service communications.
Recall Set-Up Parameters	Replaces all existing Set-Up settings with values you saved in a default file called SETHOST.DAT or in a file you specify. When you select this option, the default file name appears in the right column. If you want to change the file name, press (Select). You can now edit the current file name or enter a new file name for your Set-Up values. Press (RET) when you are done.
Save Set-Up Parameters	Saves the Set-Up settings in a default file called SETHOST.DAT or in a file you specify. You can also change the current file name by pressing (Select) and entering a new file name. Press (RET) when you are done.
Set Default Set-Up Parameters	Replaces all current Set-Up settings with factory default settings.
Show Status	Displays information on the state of such items as modems, file sending or receiving, and communications ports. When you select this option, information similar to the following is displayed (the information will vary depending on your individual configuration): Receive File: Idle Send File: Idle Printer: Normal Print Mode Telephone: Manual Answer Insert/Replace: Replace Keyboard: STDUS.KEY Character Set: ASCII DEC Multinational Communications: Network: PELEP

Table 4–3 (Cont.): Actions Set-Up

Current Setting	Description and Available Selections
To MS–DOS	Lets you leave the SETHOST emulator temporarily while you use the MS–DOS operating system. When you finish using MS–DOS commands, you can return to your session by typing EXIT at the MS–DOS prompt. If there is not enough memory to run COMMAND.COM, a message is displayed. If there is enough memory to run COMMAND.COM but not enough memory to use other MS–DOS commands, you are returned to the emulator Set-Up.
Exit SETHOST	Allows you to leave the emulator and return to the prompt you were using previously. If you were using MS-Windows, you return to the window you were using previously.

4.6.1 Displaying Status Information

Status information is available only from the SETHOST Actions screen. It is a reporting area only. When you select this option, SETHOST displays the following information:

Receiving or sending a file	Idle or In Progress.
Printing	Normal Print Mode, Auto Print Mode, Printer Controller Mode.
Modem usage	Valid only if the optional integral modem is installed, and you selected the integral modem. DSR or No DSR.
Telephone modes	Valid only if the optional integral modem is installed, and you selected the integral modem. Manual or Automatic Answer.
Insert/Replace mode	[No screen display.]
Keyboard	Keyboard file currently in use.
Character Set	Character sets currently in use.
Communications	Comm Port 1, Comm Port 2, or Network Terminal Service.

4.6.2 Receiving Characters from the Host into a File

Show Status in the Actions screen indicates whether session logging is active or idle.

To receive or log characters from the host into a file using session logging, follow these steps:

1. Enter (CTRL/F1). SETHOST displays this prompt on the bottom line:

   ```
   Receive file-name:
   ```

2. Type in a file name for storing characters that will be logged in from a host.

   If the file name already exists, SETHOST displays another prompt asking you to do one of the following:

   - Replace an existing file.
   - Append to an existing file.
   - Cancel the file logging.

3. Enter (CTRL/F1) to stop characters from logging into the file.

4. Enter (CTRL/F3) to close the receive file.

4.6.3 Autotyping Characters to the Host

Show Status in the Actions screen indicates whether autotyping is active or idle.

When a file is autotyped to VMS, you must first enable HOSTSYNC under VMS. For example:

```
$SET TERMINAL/HOSTSYNC (RET)
```

This prevents data overruns on a VMS host.

To autotype characters to the host from a file as if you entered them from the keyboard, follow these steps:

1. Enter (Shift/F1). SETHOST displays this prompt on the bottom line:

   ```
   Send file-name:
   ```

2. Type in the name of the file that will be autotyped to the host.

File autotyping stops when the end of the file is reached.

You can also enter Shift/F1 again to stop autotyping the file.

4.7 Communications Screen

The Communications screen contains selections for defining the communications environment (including the communications port and disconnect delays), speed, parity, stop bits, XOFF information, and transmit/receive information.

Normally a terminal can only connect to a host using a serial port. SETHOST allows you to connect to a host using either a serial port or the ThinWire Ethernet port. These ports connect your workstation to different network terminal services, depending on which services are defined in the service table. (A service table contains a list of the various nodes that are available for communication in the network.)

Table 4–4 defines the Communications Set-Up selections and their available options.

Table 4–4: Communications Set-Up

Current Settings	Description and Available Selections
Comm Port 1: Data Leads Only	Provides a selection of communication port settings (Comm Port 1 or Comm Port 2) and network communications. The following selections are available for the communications ports: Comm Port 1: Data Leads Only (default) Comm Port 1: Full Modem Control Comm Port 2: Data Leads Only Comm Port 2: Full Modem Control Comm Port 2: Integral Modem Network Communications Port If you select the Network Communications Port, the service type and a list of available sessions are displayed in the left column. You can choose one of the ofllowing service types for the Network Communications Port: LAT – attempts LAT connections only CTERM – attemps CTERM connections only NET – connects to the network the fastest way by trying LAT first, then CTERM if the LAT connection is not successful. You can also select a specific service to use during a session. You can have a maximum of 4 sessions. Use the arrow keys to select the session for which you want to assign a service. Then press (Select). A list of available service selections appears in the right column. Use the arrow keys again to select a specific service, then press (Select) to assign that service to a session number.
Disconnect Delay	If you are using modem control, this option selects the amount of time before the workstation disconnects from the communications line if the carrier detect is lost. The following selections are available: Disconnect, 2-second delay (default) Disconnect, 60-ms delay Most countries except the United Kingdom use the 2-second delay; the United Kingdom uses the 60-millisecond (ms) delay.

Table 4–4 (Cont.): Communications Set-Up

Current Settings	Description and Available Selections
XOFF	Selects the XOFF point or disables the automatic XON/XOFF flow control. For most applications you should set XOFF at 64 or 256. If you set XOFF greater than 256 and have a buffer overflow problem, set XOFF to the next lower value. The XOFF point can have one of the following values: 64 (default) 256 512 1024 No XOFF If you select No XOFF, the characters are received continuously from the host and some of those characters may be lost.
Speed	Selects the rate at which characters are received or transmitted. The default is 9600 baud. The speed can have one of the following values: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 9600 (default), 19200
Data Bits and Parity	Selects the character format used for communication with a host computer. The following selections are available: 8 bits – No Parity (default) 8 bits – Even Parity 8 bits – Even Parity – No Check 8 bits – Odd Parity 8 bits – Odd Parity – No Check 7 bits – No Parity 7 bits – Even Parity 7 bits – Even Parity – No Check 7 bits – Odd Parity 7 bits – Odd Parity – No Check 7 bits – Mark Parity 7 bits – Space Parity
Stop Bits	Selects the number of stop bits (1 or 2) used for communicating with the host. The default is 1 stop bit.

Table 4–4 (Cont.): Communications Set-Up

Current Settings	Description and Available Selections
Transmit = Receive	Characters can be received and transmitted at the same rate, or at differing transmit and receive rates. These settings are usually equal. As a default, the transmit rate is set equal to the receive rate. You can also set the transmit rate to 1200.

4.7.1 Selecting a Network Terminal Service

To select a service to use for a network connection, follow these steps:

1. Move to Session 1 in the left column.

2. Enter (Select) to display the available services. These will appear in the right column, under the heading SELECTIONS.

3. Highlight the service you want to access by using the up or down arrow keys.

4. Press (Select) again to enter the highlighted service as an assigned service.

   The service you selected now appears in the left column.

   The service is marked as inactive until you leave Set-Up. Once you leave Set-Up, the service becomes active and is available for use.

5. Repeat steps 1 through 4 to select any other services you desire, up to a limit of four.

Services should be assigned in the order in which you want to access them. When you leave Set-Up, Service 1 is always the first one activated. To change services, press the Shift/Next or Shift/Prev keys.

4.8 Display Screen

The Display screen contains selections for defining screen display characteristics, such as number of columns, auto wrap, background, and cursor style.

Table 4–5 defines the Display Set-Up selections and their available options.

Table 4–5: Display Set-Up

Current Setting	Description and Available Selections
Columns	Selects an 80- or 132-column screen for text. A change to this setting takes effect on exiting Set-Up. The default setting is 80 columns. If you select 132 columns, you should note that fast text can only display 80 columns at a time. This means that the screen must be panned to display the rest of the data. In Graphics Mode, the font size changes so that all 132 columns can be seen.
Auto Wrap	Selects whether text automatically wraps on the screen. The following selections are available: Auto Wrap On Auto Wrap Off Auto Wrap On causes characters that reach the right margin to automatically display in the first character position of the next line. Auto Wrap Off causes the characters that go beyond the right margin to overwrite the last character position of the current line. This is the default.
Background	Selects either a dark background or a light background as the screen display type. The default is Dark Background.
Cursor Style	Selects either a block cursor or an underline cursor as the style of cursor. The default is Block Cursor.
Cursor Type	Selects either a visible cursor or an invisible cursor. The default is Visible Cursor.
Monochrome	Selects the type of monitor you are using. The choices are either Monochrome or Color. If you select Color, you can determine the degree of intensity for the character display. Black would be the darkest and intense white would be the lightest.
M0 Background Color	Lets you determine the setting for background color. The following choices are available: M0: Black M0: Gray M0: Blue M0: Light Blue M0: Red M0: Light Red M0: Magenta M0: Light Magenta M0: Green M0: Light Green M0: Cyan M0: Light Cyan M0: Brown M0: Light Yellow M0: White M0: Intense White

Table 4–5 (Cont.): Display Set-Up

Current Setting	Description and Available Selections
M1 Reverse Video	Lets you determine the setting for reverse video. The same color choices are available for this setting as for M0.
M2 Bold Text	Lets you determine the setting for bold text. The same color choices are available for this setting as for M0. (If the setting is Monochrome, this is the shade of the text.)
M3 Foreground Color	Lets you determine the setting for the foreground color. The same color choices are available for this setting as for M2. (If the setting is Monochrome, this is the shade for bold text.)
Video Mode	Determines how characters are displayed on your screen. Two selections are available: Fast Text Only Video Mode Text and Graphics Video Mode Fast Text Only selects an 80 X 25 text mode. This is the default. Text and Graphics selects an 800 X 250 ReGIS graphics mode. If you choose this selection, the following options are available: Graphics Cursor Macro Report Print Background Print Image For the graphics cursor, you can choose either visible or Invisible. For Macro Report, you can either send the contents of a macro report in response to the ReGIS Report Macrograph command R(M...), or you can choose not to send the contents of the report. For Print Background, you can choose to either print or not print the background color. (This option has no effect on monochrome print mode.) For Print Image, you can choose one of the following: A compressed print image of 6 x 3 inches An expanded print image of 12 x 8 inches A rotated print image (an image printed in 8 x 12 inches and rotated 90 degrees)

4.8.1 Using Video Modes

The Fast Text Only mode operates faster than the ReGIS Text and Graphics mode. However, each mode displays the following information differently:

- ReGIS graphics
- 132 columns
- Line attributes

When operating SETHOST in Text and Graphics mode, 132-column displays appear exactly as they would on a VT200-type terminal.

When operating SETHOST in Fast Text Only mode, all 132 columns cannot be viewed at the same time. Only the first 80 of the 132 columns appear on your screen.

To view the remaining columns, use one of these key combinations:

(Shift/Right Arrow) Displays columns 53–132

(Shift/Left Arrow) Displays columns 1–80

4.8.2 Displaying Line Attributes

When using SETHOST in Text and Graphics mode, all line attributes appear as they would on a VT200-type terminal.

When using SETHOST in Fast Text Only mode, some line attributes are displayed differently for double width and double height/double width.

Double width characters appear as the character followed by a space. For example:

```
t e s t
```

Double height/double width characters appear as the character followed by a space, with a blank line inserted before the next line of characters. For example, the word "test" entered on two separate lines would appear like this:

```
t e s t

t e s t
```

Since double height takes up two lines, the text on the first line is followed by a blank second line.

4.8.3 Displaying Character Attributes

All of the character attributes for a VT200-type terminal are supported, with this exception:

When operating in Fast Text Only mode, characters intended to be underlined will appear without the underlining.

4.9 General Screen

The General screen contains commonly used general operating selections, such as local echo, character sets, and terminal type (VT200, VT100, or VT52).

Table 4–6 defines the General Set-Up selections and their available options.

Table 4–6: General Set-Up

Current Setting	Description and Available Options
Line Mode	Lets you select the mode of operation. You can select either On-Line or Local. On-Line allows your workstation to communicate with the host. This is the default. Local stops communication between your workstation and the host. Data entered at the keyboard goes directly to the workstation screen only.
Local Echo	Enables or disables the local echo setting. You can select either Local Echo Off or Local Echo On. Local Echo Off directs characters from the keyboard to a host only. The host in turn may or may not send the characters back to the screen. This is the default. Local Echo On directs characters from the keyboard to the screen as well as to the host. Use this option if the host does not send characters back to the screen.
New Line	Selects whether the RETURN key generates a carriage return only or a combination carriage return and line feed. You can select one of the following: No New Line (default) New Line No New Line generates a carriage return only. Received carriage returns do not cause a new line operation. New Line generates a carriage return and a line feed. Received carriage returns cause a new line operation.

Table 4–6 (Cont.): General Set-Up

Current Setting	Description and Available Options
	NOTE When SETHOST is in numeric keypad mode, this setting affects the ENTER key in the same way it does the RETURN key.
Character Mode	Determines the category of character set mappings to use for your terminal. Two selections are available: Multinational Mode (default) NRC Mode If you choose Multinational Mode, you then choose one of the two available multinational character sets. NRC mode allows you to choose one of the National Replacement Character Sets.
Character Set	Lets you choose the specific character set. If you selected Multinational as the Character Mode, you can choose either the following 8-bit character sets. They both include the 7-bit ASCII character set. ISO Latin-1 Character Set DEC Multinational Character Set (default) If you selected NRC as the Character Mode, you can choose any of the following National Replacement Character Sets. ASCII Character Set (default) British Character Set French Character Set German Character Set Italian Character Set Spanish Character Set Finnish Character Set Swedish Character Set Norwegian/Danish Character Set Swiss Character Set Canadian Character Set Dutch Character Set
Terminal Emulation	Lets you identify the type of terminal you want to emulate. The following selections are available: VT200 with 8-bit controls VT200 with 7-bit controls (this is the default) VT100 VT52

Table 4–6 (Cont.): General Set-Up

Current Setting	Description and Available Options
User-Defined Keys	Lets you determine whether a host can change user-defined key (UDK) definitions. The following selections are available: User-Defined Keys Locked User-Defined Keys Unlocked When you select Locked, the UDKs cannot be changed. When you select Unlocked, the UDKs can be changed. The default is Unlocked.
User Features	Lets you determine whether a host can change certain user features. The following selections are available: User Features Locked User Features Unlocked IF you select Locked, certain features cannot be changed. If you select Unlocked, certain user features can be changed. The default is Unlocked. The user features that can be locked or unlocked include the following: Auto Repeat Light/Dark Screen Tab Stops Keyboard Lock **NOTE** Some software applications expect to control these user features. If this applies to your particular software application, you should select User Features Unlocked.

4.10 Keyboard Screen

The Keyboard screen contains selections for defining keyboard operating characteristics, such as keypad keys, cursor keys, margin bell, answerback, and keyclick.

Table 4–7 defines the Keyboard Set-Up selections and their available options.

Table 4–7: Keyboard Set-Up

Current Setting	Description and Available Selections
Keypad Mode	Sets the terminal keypad for using either numbers or control codes. Two selections are available: Numeric Keypad Application Keypad The numeric keypad option sends numbers from the numeric keypad. This is the default. The application keypad option sends escape sequences from the numeric keypad.
Cursor Keys	Selects the kind of control codes sent. It is disabled if the terminal is in VT52 mode. Two selections are available: Normal Cursor Keys Application Cursor Keys The normal cursor key option sends ANSI cursor control sequences for the cursor keys (such as up, down, left, and right). This is the default. The application cursor option sends application program control functions for the cursor keys.
Margin Bell	Determines whether the terminal sounds a bell tone when the text cursor approaches the right margin. You can select either Margin Bell or No Margin Bell. The default is Margin Bell.
Warning Bell	Determines whether the terminal generates a bell tone such as for operator errors, mail messages, or system messages. You can select either Warning Bell or No Warning Bell. The default is Warning Bell.
Break	Enables or disables the BREAK key function. You can select either Break or No Break. The default is Break.

Table 4–7 (Cont.): Keyboard Set-Up

Current Setting	Description and Available Selections
Auto Answerback	Selects whether an answerback message is automatically sent to a host computer after a communication line connection is established. You can choose either No Auto Answerback or Auto Answerback. The default is Auto Answerback.
Answerback	Selects whether your answerback message entry is displayed on the screen. You can choose one of the following options: Answerback Concealed Answerback Not Concealed If you select Answerback Concealed, your answerback message is not displayed on the screen, so it will not be revealed. You can only reset this option to Not Concealed by entering a new answerback message. If you select Answerback Not Concealed, your answerback message is displayed on the screen as you enter it. This is the default.
Answerback String	Allows an answerback message entry. The emulator sends an answerback message when it receives an ENQ (inquiry control character), or if you or the host sends a CTRL/BREAK. In the case of ENQ, the message you enter is sent to a host without affecting screen data or requiring further operator action. When you make this selection, a cursor displays in the right column. You can enter any keyboard character to represent your answerback string. The limit is 30 characters.
Keyboard Lock	Determines the function of the LOCK key. Two options are available: Caps Lock Shift Lock Caps Lock sends uppercase characters for the alphabetic keys only. If you select Shift Lock, the alphabetic keys send uppercase characters, while the numeric and symbol keys send the top characters. Pressing the LOCK key turns on the lock indicator on the keyboard. To clear the lock function, simply press the LOCK key again.

Table 4–7 (Cont.): Keyboard Set-Up

Current Setting	Description and Available Selections
Auto Repeat	Determines whether keystrokes automatically repeat when you press and hold down a key. The following options are available: No Auto Repeat Slow Auto Repeat Normal Auto Repeat Fast Auto Repeat No Auto Repeat sends only one character when you press and hold down a key. The other selections send the character repeatedly if you press and hold down a key. Sending stops when the key is released. The default is No Auto Repeat. **NOTE** If you are in VT100 mode and you are running EDT under VMS and holding down a key, autorepeating stops. It resumes only when you release the key and then press it again. To prevent this from happening, type these DCL commands: $ SET TERMINAL/DEVICE = VT200 $ SET TERMINAL/INQUIRE
Keyclick	Determines the volume of your keyclicks. The following options are available: No Keyclick Soft Keyclick Normal Keyclick Loud Keyclick

4.11 Printer Screen

The Printer screen contains selections for defining printer operations, such as print size, type of printer, and print terminator.

Table 4–8 defines the Printer Set-Up selections and their available options.

Table 4–8: Printer Set-Up

Current Setting	Description and Available Selections
Print Area	Determines how much of the screen is printed during a text print operation. Two options are available: Print Full Page (default) Print Scroll Region Print Full Page prints the entire screen. This is the default. Print Scroll Region prints only the area of the screen that is defined as a scrolling region.
Printer Type	Lets you select the printer you want to use. You can choose either a DEC printer or any other non-DEC printer.
Print File Name	Allows you to send the screen text to a file. When you select this setting, the cursor flashes in the right column, indicating that you should enter a file name. You can enter either the default name (PRN) or any other file name you want to use. Once you exit Set-Up, you can press the PRINT SCREEN key to send the text to a file.
Print Mode	Selects the operating mode for the printer. The following selections are available: Normal Print Mode Auto Print Mode Printer Controller Mode The Normal Print Mode only sends information to the printer when you invoke print functions from the keyboard. The Auto Print Mode prints the current text line when the terminal receives a line feed, form feed, or vertical tab code from a host. The Printer Controller Mode causes the printer port to treat the device that is connected to it as a terminal, while SETHOST monitors traffic. (The printer and host computer transfer data without displaying the data on the screen.)
Print Terminator	Lets you determine whether a form feed character is sent at the end of a print screen operation. You can choose either Form Feed or None (for no terminator).

4.12 Tabs Screen

The Tabs screen contains selections for defining the tab settings.

Table 4–9 defines the Tab Set-Up selections and their available options.

Table 4–9: Tab Set-Up

Current Setting	Description and Available Selections
Clear All Tabs	Clears all tab settings. When you select this option, the current tab settings are displayed at the bottom of your screen. The tab settings are indicated by capital T's. When you press (Select), all of the current settings are removed.
Set 8 Column Tabs	Sets tabs every 8 columns, starting with column 9. When you press (Select), tabs are set every 8 columns and are indicated with capital T's.
Set Tab Interval	Lets you determine the interval between tabs. When you select this option, the right column displays an interval prompt with the default value of 8. You can change the default by entering a new value. To have the new value take effect, press (Select). The tabs are automatically reset at the value you specified.
Manually Set Tabs	Allows you to change individual tab stops, rather than having the stops at uniform intervals. When you select this option, instructions appear in the right column. You can set or clear any tab stop by pressing the T key. When you complete your tab settings, press (Select). The tab intervals are updated on the screen in front of you.

4.12.1 Setting Tabs Manually

To set tabs manually for the SETHOST emulator, follow these steps:

1. Select the Manually Set Tabs option using the up or down arrow key.

2. Press (Select).

   A blinking cursor now appears in the tabs ruler at the bottom of your Tabs Set-Up screen.

3. Use (Right Arrow) or (Left Arrow) to position the cursor on the desired tab stop setting.

4. Press (Enter) to set the tab.

NOTE

If you want to erase a tab stop, position the cursor on the tab setting using (Right Arrow) or (Left Arrow), then press (Enter).

5. Press (Select) to end manual tab setting.

4.13 Telephone Screen

The Telephone screen lets you determine how telephone answering is accomplished. You can also enter telephone numbers that you want to use with a modem.

Table 4–10 defines the Telephone Set-Up selections and their available options.

Table 4–10: Telephone Set-Up

Current Setting	Description and Available Selections
Modem Answer Selection	Lets you determine how the modem will be answered. You can choose either manual telephone answering or automatic telephone answering. Automatic answering is done by the emulator.
	Manual Answer leaves the modem in talk mode after disconnecting from the host. This allows you to answer the incoming call. Manual answer is required for normal telephone operation. It is the default.
	Auto Answer leaves the modem in data mode after disconnecting from the host. This allows the terminal to answer the incoming call automatically.
A–J =	Indicates that ten telephone numbers (A–J) can be stored for automatic dialing.
	Each time you select a letter from the left column, that letter appears in the right column, while the cursor flashes to prompt you for entering a phone number.
	To change or enter a phone number, select the letter that represents the number you want to change. Press (Select) to move to the right column and type over the old number or enter a new number. Press (Select) or (Return) when you are done. The number now appears in the left column, next to its corresponding letter. Repeat this process for each phone number you want to change or enter.
	You can save these settings by using the Save Parameters option (in the Actions screen) before you exit Set-Up.

4.13.1 Using Telephone Selections

Before you can use the Telephone Set-Up selections, you must first do the following:

- Install the Integral Modem Option (this is not available for all countries).
- Select and save the following information from the Communications screen:
  - The integral modem selection
  - The appropriate transmit and receive speeds

For more information on telephone settings, refer to your modem user's guide.

5

SETHOST Scripts

A script is a text file with commands that allow SETHOST to perform many operations automatically. For example, a script can hold an interactive session with a host computer.

This chapter describes SETHOST scripts and the script language.

5.1 Starting a Script

You specify the initial script when you start SETHOST:

SETHOST/SCRIPT = *file-name*

The *file-name* is the name of the script file you want to start the session. The default extension for script files is SCR; so, you need not specify the extension if the script file name ends with .SCR. For example, to use the script file LOGIN.SCR, you can type:

```
SETHOST/SCRIPT=LOGIN(RET)
```

5.2 General Concepts

It is common to perform the same set of operations each time you use a remote host, such as connecting, logging in, reading and sending mail, and perhaps running an application.

To do this, you learn a procedure, then type the same commands and look for the same results each time you use the system. You learn that there is a small amount of variation between one session and the next.

A script does the same thing. You design it to type the required commands and look for the variations in output. A SETHOST script is a sequence of commands in a language designed specifically for describing interactive terminal sessions.

5.3 Session Log Files

When you start up SETHOST with a script session, the script processor always opens a session log file in which it writes a record of the script session. You can use this file to help track down problems in scripts.

The session log file has the same file name as the initial script file, with the extension LOG. So, if your initial script in the session is FIRST.SCR, the session log file for the session is FIRST.LOG.

There is a second type of log file, one that is under your control. The OPEN and CLOSE commands in the script language let you store session information in log files. When this chapter discusses log files, it refers to those under your control.

5.4 Script Language

A script is a file containing commands. The script file is a text file that you can create with any text editor. Each line in the script file can contain one command or a label. Or, it can be empty.

The SETHOST script language has six kinds of commands:

1. Communication Commands

   The communication commands define the environment that you set up between your computer and the communication line.

   The communication commands are:

   BAUD RATE
   DATA BITS
   DISCONNECT
   XON/XOFF
   NO XON/XOFF
   NTS
   PARITY
   PORT
   STOP BITS
   RX BAUD
   TX BAUD

2. Control Commands

   The control commands define the sequence of operation in a script. They are:

   CASE
   CASE END
   END ON ERROR
   EXIT EMULATOR
   EXIT EMULATOR ON
   EXIT SCRIPT
   EXIT SCRIPT ON
   GOTO
   NO SKIP ON
   ON ERROR
   SKIP
   SKIP ON

3. Data Commands

   The data commands manipulate and monitor data going to and coming from the communication line. The data commands are:

   BREAK
   CLEAR LINE
   DIAL
   DTR CLEAR
   DTR SET
   HANG UP
   PURGE TYPE
   SEND
   TYPE UNTIL
   WAIT FOR

4. Display/Print Commands

   The display/print commands control your screen and printer. They are:

   DEBUG
   DISPLAY
   ECHO
   FPRINT
   NO DEBUG
   NO ECHO
   PRINT SCREEN
   PRINTER OFF
   PRINTER ON

5. File Commands

   The file commands perform operations on files. They are:

   CHAIN
   CLOSE
   LOAD
   OPEN
   SCRIPT
   SEND FROM

6. Other Commands

   The rest of the script commands perform miscellaneous functions:

   COMMENT
   KEYBOARD OFF
   KEYBOARD ON
   <label>
   PAUSE
   RETRY
   SET
   SYSTEM
   TIMEOUT
   TIMER
   TIMER OFF

5.4.1 Command Line

Each line in the script file can contain one command or a label. Or, it can be empty. Lines in a script file cannot be longer than 80 characters.

Empty lines have no effect on script execution, but they can make scripts more readable.

Label lines have no effect on script execution unless the script processor is executing a GOTO command.

All other lines are command lines.

A command line consists of a command name, such as ON ERROR or NO ECHO, followed by a required colon (:). Some commands also have optional or required operands following the colon.

Two commands, CASE and ON ERROR, extend over several lines.

Command names and other keywords can contain spaces to make them more readable; they are shown in this chapter with spaces. However, the spaces are not required, so "ON ERROR" is equivalent to "ONERROR." Case also has no effect, so "On Error" and "onerror" are the same as "ON ERROR."

5.4.2 Strings

Some script commands operate on text strings, and the value of a string can be part of the command. Look at this example of a command format that appears later in this chapter:

DISPLAY: *string*

When *string* appears in a format, it represents a string of characters that begins immediately after the colon. Furthermore, unless the description states otherwise, you can represent special characters, such as control characters, in the command. In the following example, the string is 8 characters long. The first character is a space and the last character is a carriage return character (represented by 4 characters, two of which are angle brackets).

```
DISPLAY: Hello!<CR>
```

5.4.2.1 Special Characters

When descriptions for *string* do not indicate otherwise, you can include special characters in two ways:

1. You can use angle brackets to enclose the decimal value of the character. For example, <3> specifies a Control-C character, and <13> specifies a carriage return character.

2. You can use the symbols for special characters in Table 5–1.

Table 5–1 shows the non-printable characters, control characters, function keys, and keypad keys that you can use in script commands.

Table 5–1: Special Characters Used in Script Commands

Category	Character/Key	Script Representation
Control Characters	Control-A	<CTRL/A>
	Control-B	<CTRL/B>
	Control-C	<CTRL/C>
	.	.
	.	.
	.	.
	Control-Z	<CTRL/Z>
Function Keys	F6	<F6>
	F7	<F7>
	.	.
	.	.
	.	.
	F15	<F15> or <HELP>
	F16	<F16> or <DO>
	.	.
	.	.
	.	.
	F20	<F20>
Keypad Keys	PF1	<PF1>
	PF2	<PF2>
	PF3	<PF3>
	PF4	<PF4>
	Keypad 0	<KP0>
	Keypad 1	<KP1>
	.	.
	.	.
	.	.
	Keypad 9	<KP9>
	-	<KPMINUS>
	,	<KPCOMMA>
	.	<KPPERIOD>
	Enter	<KPENTER>
	Find	<FIND>
	Insert Here	<INSERTHERE>
	Next	<NEXT>
	Prev	<PREV>
	Remove	<REMOVE>
	Select	<SELECT>
Non-Printable Characters	Carriage Return	<CR>, <RET>, or <RETURN>
	Delete	<DEL>
	Escape	<ESC>
	Form Feed	<FF>
	Line Feed	<LF>
	Tab	<TAB>

5.4.3 Variables

Variables are named data items whose values can be set and tested in a script session. The maximum number of variables in a script session is 80, including the two standard variables, Error_Number and Error_Message. However, the SET command can delete variables when they are no longer required, so they can be replaced by new ones.

All variables are character strings, whether their values are numeric or alphanumeric. For example, the variable Error_Number always contains a numeric value, but the value "0" is a 1-character string, and it is not equivalent to "00" in a test for equality.

The SET and READ commands create, change the value of, and delete variables. The CASE command tests the value of variables.

The READ command can store up to 74 characters. However, the maximum practical size of a variable is determined by the format of a command line. See the CASE, READ, and SET commands.

5.4.4 Error Processing

All script commands return a status after executing. The variables Error_Number and Error_Message contain the results. All values other than zero (0) are errors.

0 – Command Successfully Completed
1 – Illegal Command
2 – Timeout
3 – Non-numeric parameter
4 – Invalid Parameter
5 – Incompatible Settings
6 – Unimplemented command
7 – Service not available
8 – Cannot find file
9 – END ON ERROR not found
10 – ON ERROR not found
11 – CASE END not found
12 – MS–DOS command failed
13 – Print Error
14 – Label not found
15 – Logfile already open
16 – No logfile open
17 – File Transfer Error
18 – Variable not found
19 – Comm Port not available
20 – Nested ON ERROR routines not allowed

When an error occurs, the script processor takes immediate action, depending on the type of error and the commands you code in the script.

5.4.4.1 Timeout Handling

Several script commands make use of a built-in script processor timer. If those commands do not complete within the number of seconds specified by the timer, a timeout results.

Timeout error conditions require special processing, because the error concerns timing rather than an obvious problem. So, the SETHOST script language allows you more control for timeout error conditions.

First, you can code script commands that help avoid timeout errors. The TIMER and TIMER OFF commands allow you to tailor the timeout period for a particular operation. The TIMER OFF command turns off the timer completely so that a timeout error cannot occur, for example.

The second method of controlling timeout error processing is the RETRY command. It causes a rerun of part of the script if a timeout occurs, and it retries the segment of the script the number of times specified in the command.

If a timeout error still occurs after the script segment is rerun as the result of a RETRY command, the script processor treats it as any other error.

5.4.4.2 Error Handling

The SETHOST script language allows you to set up error "handlers." An error handler is a segment of code that executes as a result of the script processor detecting an error condition. Error handlers begin with the ON ERROR command and end with the END ON ERROR command. When execution of a script reaches an ON ERROR command, the script processor marks the location, then skips over the segment. If an error condition occurs, the script processor transfers control to the most recently marked error handler.

That means that a script can handle errors in exactly the way required by the current situation. For example, look at these script segments:

```
    ...
COMMENT:    Set up an error handler for the log-in
COMMENT:    that will call another script to log in
COMMENT:    elsewhere if there is a real timeout.
    ON ERROR:
    CASE: error_number
          "2" SCRIPT: tryalt
    DEFAULT: GOTO $report_error
```

```
    CASE END:
    END ON ERROR:
COMMENT:    If it times out, we will try up to
COMMENT:    5 times.
    RETRY:5
    SCRIPT: login1
COMMENT:    The called script, LOGIN1.SCR, returns an
COMMENT:    error in error_number, so a timeout will
COMMENT:    run the ON ERROR segment above.
COMMENT:    For the rest of the remote session, set
COMMENT:    up an empty error handler.  If there is
COMMENT:    a timeout, the script processor will
COMMENT:    execute an implicit EXIT SCRIPT.
    ON ERROR:
    END ON ERROR:
    RETRY:0
    SEND: run time_report<CR>
    SEND: logout<CR>
    EXIT SCRIPT:
```

After an error handler (ON ERROR) executes, control returns to the statement following the one that caused the handler to be invoked. This allows execution of a script to continue if the ON ERROR segment was able to get around the error. The error handler can, however, transfer control elsewhere, or it can end the script and even the SETHOST session if necessary.

When a script starts executing, either because it is the initial script or because it received control in a SCRIPT or CHAIN command, there is no current error handler until execution reaches an ON ERROR command. If an error occurs, and there is no current error handler, the script processor executes an implicit EXIT SCRIPT command, which returns control to either the calling script (if there is one) or to SETHOST.

The following sections detail the error processing for each of the commands.

5.4.5 Commands

This section describes the SETHOST script processor commands in alphabetical order. Each command description includes either an example of the command or a pointer to the location of an example.

BAUD RATE

The BAUD RATE command sets the rate at which characters are both received and transmitted.

Format

BAUD RATE: *speed*

Remarks

The BAUD RATE command sets the rate at which characters are both received and transmitted.

The value of *speed* must be one of the following:

50	300	2400
75	600	3600
110	1200	4800
134	1800	9600
150	2000	19200

The BAUD RATE command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

The RX BAUD and TX BAUD commands are exactly the same as this command.

See the PORT command.

Example

```
PORT: Data-1
PARITY: None
DATA BITS: 8
STOP BITS: 1
BAUD RATE: 2400
DIAL:B
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings

BREAK

The BREAK command transmits a break signal.

Format

BREAK: *break-length*

where

break-length

specifies the duration of the break signal in tenths of a second,

or

break-length

is one of the keywords SHORT or LONG.

Remarks

SHORT specifies a length of 0.24 seconds.

LONG specifies a length of 3.5 seconds.

The BREAK command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

```
Break:35
BREAK: LONG
BREAK:Short
```

The first two examples are equivalent.

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings

CASE

The CASE command selects an action depending on the contents of a variable.

Format

CASE: *variable*
    "*string*" *command*
    "*string*" *command*
    "*string*" *command*
        ... ...
    "*string*" *command*
DEFAULT: *command*
CASE END:

Remarks

The CASE command extends over several lines. The first line contains the CASE command itself and the name of the controlling variable. CASE END marks the end of the CASE command, and it is required.

If there is a DEFAULT command, it must appear immediately before CASE END.

The *variable* must exist before the CASE command executes. That is, the *variable* must have a value that was assigned to it by a SET or READ command. The *variable* can also be one of the standard variables named Error_Number or Error_Message.

CASE compares the value of each "*string*" with the value of *variable*. The comparison is exact; that is, uppercase letters are not equal to the corresponding lowercase letters.

The *command* paired with the first matching "*string*" (if any) is executed.

The *command* can be any script command other than ON ERROR and CASE.

If there is a DEFAULT command and there is no match between any "*string*" and the *variable*, the *command* associated with the DEFAULT command is executed.

If there is no DEFAULT command and there is no match between any "*string*" and the *variable*, control transfers to the command following CASE END.

If the CASE command executes a *command* that returns control, then control transfers to the command following CASE END.

Example Coding

1. This example waits for the user to enter a day of the week. The input is stored in the *variable* day-of-week.

```
READ: day-of-week
CASE: day-of-week
    "MO" GOTO: $readmail
    "mo" GOTO: $readmail
    "WE" EXIT SCRIPT:
    "we" EXIT SCRIPT:
DEFAULT: SCRIPT:sendfile
CASE END:
```

   If the user types "MO" or "mo", control transfers to the label $readmail in the same script. If the user types "WE" or "we", the current script ends. If the user types anything else, the script SENDFILE.SCR is called. Because string comparison is exact, the script should tell the user to type only the first two characters of the day. That is, the script should anticipate the user's input. In this example of day of the week, a numeric value of "1" to "7" could be less likely to result in a mismatch.

2. This script expects that the variable file-status was assigned a value by the script that called this one. If that was not the case, then the CASE command fails with error 11.

```
CASE: file-status
    "missing" GOTO: $create_file
    "ready" SEND FROM:output.txt
DEFAULT: EXIT SCRIPT:
CASE END:
```

   If the value in file-status is "missing", control transfers to the label $create_file in this script. If the value is "ready", the script sends the characters from the file OUTPUT.TXT out on the communication line. Otherwise, control returns to the script that called this one, or to SETHOST if this is not a called script.

Results

0 – Command Successfully Completed
11 – CASE END not found
18 – Variable not found

CASE END

The CASE END command terminates the multiple-line CASE command.

Format

CASE END:

Example Coding

```
CASE: file-status
    "missing" GOTO: $create_file
    "ready" SEND FROM:output.txt
DEFAULT: EXIT SCRIPT:
CASE END:
```

Results

0 – Command Successfully Completed

CHAIN

The CHAIN command opens a new script file and transfers control to the first command in the file.

Format

CHAIN: *file-name*

Remarks

Control transfers unconditionally to the first command in the script file named *file-name*.

Control does not return to the script that executes the CHAIN command even if the chained script ends with an EXIT SCRIPT command.

See the description of the SCRIPT and EXIT SCRIPT commands.

The default extension of the script file is SCR.

Example Coding

Both of the following CHAIN commands transfer control to CONNECT1.SCR:

```
CHAIN: CONNECT1.SCR
CHAIN: connect1
```

The following example shows three scripts. The first script calls the second (SCRIPT2) with a SCRIPT command. SCRIPT2 transfers control to SCRIPT3 with a CHAIN command. The last command in SCRIPT3 is EXIT SCRIPT. It causes control to transfer to the line following the outstanding SCRIPT command.

```
COMMENT:  Start of SCRIPT1
...
SCRIPT: script2
COMMENT:  Control comes here from SCRIPT3
...
COMMENT:  End of SCRIPT1
```

```
COMMENT:  Start of SCRIPT2
...
COMMENT:  We prepared some variables. Now, we give up
COMMENT:    control to SCRIPT3.
CHAIN: script3
COMMENT:  Control cannot get here if the CHAIN command succeeded.
COMMENT:  End of SCRIPT2

COMMENT:  Start of SCRIPT3
...
COMMENT:  We did the important work, so now we return.  We do not
COMMENT:  know or care where control is transferred to.
EXIT SCRIPT:
COMMENT:  End of SCRIPT3
```

Results

0 – Command Successfully Completed
8 – Cannot find file

CLEAR LINE

The CLEAR LINE command clears all data from the communication line buffer.

Format

CLEAR LINE:

Remarks

The CLEAR LINE command discards all characters that have been received but not displayed on the screen or interpreted by the script processor.

Example Coding

In this example, the script allows the user to type until the string "//BYE" is typed. Then, the script discards all undisplayed characters received from the communication line, sends a LOGOUT command, and returns control to the script that called it.

```
TYPE UNTIL://BYE
CLEAR LINE:
NO ECHO:
SEND:LOGOUT<CR>
EXIT SCRIPT:
```

Results

0 – Command Successfully Completed

CLOSE

The CLOSE command ends the capture of data by the log file opened with the OPEN command.

Format

CLOSE:

Remarks

The command closes the file and makes it available.

See the OPEN command.

Example Coding

In this example, the script opens a log file, which then captures the output to the screen until the user enters CTRL/C. The log file is then closed and the script continues.

```
OPEN:log1.log
TYPE UNTIL:<3>
CLOSE:
```

Results

0 – Command Successfully Completed
16 – No logfile open

COMMENT

The COMMENT command causes the remainder of the command line to be ignored.

Format

COMMENT: *comment-text*

Remarks

You can use COMMENT commands to make your scripts more understandable to others.

Example Coding

```
...
ON ERROR:
COMMENT:      If it is not one of these errors,
COMMENT:      I do not know what is wrong, so quit.
CASE: error_number
  "15" GOTO: $still open
  "4"  GOTO: $strange name
  DEFAULT: EXIT EMULATOR:
CASE END:
COMMENT:      We cannot get here.
END ON ERROR:
```

Results

0 – Command Successfully Completed

DATA BITS

The DATA BITS command specifies the number of data bits per character in communication line text.

Format

DATA BITS: 7

or

DATA BITS: 8

Remarks

The DATA BITS command specifies the number of data bits per character in communication line text.

The DATA BITS command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

```
PORT: Data-1
PARITY: None
DATA BITS: 8
STOP BITS: 1
BAUD RATE: 2400
DIAL:B
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings

DEBUG

The DEBUG command displays each line of the script before it is executed.

Format

DEBUG:

Remarks

The DEBUG command displays each line of the script on the screen before it is executed.

Use the NO DEBUG command to stop the display.

Example Coding

You generally use the DEBUG command only in scripts that you are developing. It allows you to trace the execution of the script so that you can see the details of its execution. Normally, you would remove DEBUG commands when you are satisfied that the script is performing correctly.

In this example, for instance, if NO ECHO is active, you would not see any of the text received from the communication line. But the DEBUG command shows you commands as they execute, so you can see whether both SEND commands execute or just one.

```
DEBUG:
NO SKIP ON:hello
SEND:hello back<CR>
SEND:logout<CR>
NO DEBUG:
```

Results

0 – Command Successfully Completed

DIAL

The DIAL command turns on the DTR signal and dials a phone number.

Format

DIAL: *dial-string*

Remarks

The DIAL command turns on the DTR signal between the computer and the modem, then sends a *dial-string* to the modem.

The DIAL command "compresses" *dial-string* before sending it by removing spaces, tab characters, and hyphens (-).

The DIAL command is equivalent to a DTR SET command followed by a SEND command that sends a "compressed" *dial-string* to the modem.

If you need to send embedded spaces, tab characters, or hyphens in the *dial-string*, use the SEND command instead of DIAL.

If *dial-string* is a single letter from A to J, DIAL sends the corresponding Set Up phone number string to the modem.

The DIAL command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

The first example shows a usual combination of communication parameters.

```
PORT: Data-1
PARITY: None
DATA BITS: 8
STOP BITS: 1
BAUD RATE: 2400
DIAL: 1 617 555-1212
```

This more extensive example shows the DIAL command used in a complete script.

```
COMMENT:    This script dials a computer, turns DECnet on, and
COMMENT:    establishes a DDCMP connection.
    ON ERROR:
        COMMENT:    This ON ERROR segment is empty because we
        COMMENT:    do not care if the NCP command fails. (It
        COMMENT:    could fail because DECnet is not installed.)
    END ON ERROR:
COMMENT:    SETHOST cannot use the COM1 port if DECnet is using it,
COMMENT:    so tell DECnet to go away.
    SYSTEM:NCP SET LINE STATE OFF
COMMENT:    Set the communication parameters correctly.
    PORT: Data-1
    BAUD RATE: 2400
$dialit:
COMMENT:    Dial the number.
COMMENT:    Assume it's a Scholar in 'verbose' mode.
    DIAL:<ctrl/b>T1-800-555-1212!
    ON ERROR:
        DISPLAY: <CTRL/G>Other end did not answer!<CR><LF>
        PAUSE: 0:0:5
        EXIT EMULATOR:
    END ON ERROR:
    WAIT FOR:Attached
    ON ERROR:
    END ON ERROR:
COMMENT:    The called script (LOGIN.SCR) logs you in or
COMMENT:    executes an EXIT EMULATOR command.
COMMENT:    If it returns, we are at the "$ " prompt.
    SCRIPT: login
COMMENT:    The following VMS DCL command will turn the
COMMENT:    terminal line into a DECnet (DDCMP) line.
    SEND:set terminal/switch=DECnet/protocol=DDCMP/automatic<CR>
COMMENT:    2400 seconds is 4 minutes.  VMS will time out
COMMENT:    if it sees no response in 4 minutes, so there
COMMENT:    is no need to wait any longer than that.
    TIMER: 2400
    ON ERROR:
        GOTO: $other end did not start DECnet
    END ON ERROR:
COMMENT:    VMS will send the escape sequence below to tell
COMMENT:    us that it is trying to start up DECnet.  If we
COMMENT:    do not see it, we go to the above ON ERROR segment.
    WAIT FOR:<ESC>[&p
COMMENT:    If we get here, we must have seen the escape sequence.
COMMENT:    So, we use NCP to turn the line state back on.
COMMENT:    If the NCP command fails, we assume it's because
COMMENT:    DECnet is not installed, so we have a special routine
COMMENT:    that installs DECnet.
```

```
    ON ERROR:
        GOTO: $install DECnet and retry setting line state on
    END ON ERROR:
    SYSTEM:NCP set line state on
    EXIT EMULATOR:
$other end did not start DECnet:
    DISPLAY:Other end did not start DECnet in time.<CR><LF>
    DISPLAY:Would you like to hang up and try again?
    READ: answer
    CASE: answer
        "Y" GOTO: $retry
        "y" GOTO: $retry
    DEFAULT: EXIT EMULATOR:
    CASE END:
$retry:
COMMENT:    Hang up the phone and start over.
COMMENT:    Leave DTR off for 4 seconds to make sure
COMMENT:    it really hung up.
    DTR CLEAR:
    PAUSE: 0:0:4
    DTR SET:
    GOTO: $dialit
$install DECnet and retry setting line state on:
COMMENT:    Note the assumption that the DECnet directory
COMMENT:    is on drive C and in directory \DECnet.
    ON ERROR:
        COMMENT:    If anything fails, just give up.
        EXIT EMULATOR:
    END ON ERROR:
    SYSTEM:SCH
    SYSTEM:DNP C:\DECnet
    SYSTEM:NCP set line state on
    EXIT EMULATOR:
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings

DISCONNECT

The DISCONNECT command specifies the length of time to wait before disconnecting after losing the carrier.

Format

DISCONNECT: 2

or

DISCONNECT: 60

Remarks

When the modem carrier signal stops, it usually means that further communication is not possible without making a new connection. The DISCONNECT command allows you to specify how long to wait before hanging up automatically.

DISCONNECT:2 specifies a 2-**second** wait.

DISCONNECT:60 specifies a 60-**millisecond** wait.

The DISCONNECT command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

```
PORT: Data-1
PARITY: None
DATA BITS: 8
STOP BITS: 1
BAUD RATE: 2400
DISCONNECT: 2
DIAL:E
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings

DISPLAY

The DISPLAY command writes a string of characters to the user's screen.

Format

DISPLAY: *string*

Remarks

The DISPLAY command sends the *string* to the screen with no formatting other than what is contained in the *string* itself. Spaces and tab characters that follow the colon (:) are part of the *string*.

The DISPLAY command does not affect the contents of the log file.

The *string* can contain control characters to perform screen formatting.

This command does not send anything to the communication line.

Example Coding

This example shows the result of executing DISPLAY commands on the format of the screen:

```
COMMENT:    Note: The first line clears the screen
    DISPLAY:<ESC>[2J
    DISPLAY:Abcd
    DISPLAY:Efghi
    DISPLAY: Jklmno
    DISPLAY:<CR><LF>Pqrst
```

Note the positioning of the output. The asterisk (*) shows the position of the cursor on the screen after the DISPLAY commands execute:

```
AbcdEfghi Jklmno
Pqrst*
```

Results

0 – Command Successfully Completed

DTR CLEAR

The DTR CLEAR command turns off the DTR signal between the computer and modem.

Format

DTR CLEAR:

Remarks

The DTR CLEAR command turns off the DTR signal between the computer and modem. Most modems hang up when the DTR signal is turned off.

The DTR CLEAR command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

This segment of a script shows the end of a session on a remote host and the beginning of a second one.

```
...
SEND:logout<CR>
DTR CLEAR:
DIAL:J
...
```

Results

0 – Command Successfully Completed
5 – Incompatible Settings

DTR SET

The DTR SET command turns on the DTR signal between the computer and modem.

Format

DTR SET:

Remarks

The DTR SET command turns on the DTR signal between the computer and modem.

The DTR SET command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

The following script segment sets up a Hayes-compatible modem to answer a call. It turns off the timer, then waits until the caller connects and sends "HELLO." It then sets the timer to allow timeouts, and continues.

```
...
DTR SET:
SEND:ATS0=1<CR>
TIMER OFF:
WAIT FOR:HELLO
TIMER: 15
...
```

This example uses a Scholar modem in "verbose" mode.

```
...
DTR SET:
SEND:<CTRL/B>
WAIT FOR:Ready
SEND:T18005551212!
...
```

DTR SET

Results

0 – Command Successfully Completed
5 – Incompatible Settings

ECHO

The ECHO command causes all characters received through the communication line to be sent to the screen.

Format

ECHO:

Remarks

Until an ECHO command executes in a script session, the only characters that appear on the screen are those displayed by DEBUG and DISPLAY commands in the script. That is, when a script session starts, the default is NO ECHO.

The ECHO command causes all characters received over the communication line to be sent to the screen.

The NO ECHO command reverses the action of ECHO. That is, it stops the display of characters on the screen except for those displayed by DEBUG and DISPLAY.

Example Coding

This script segment finishes logging in to a host. The user sees nothing, because the default is NO ECHO. After the log-in, the script uses the ECHO command to let the user continue interactively.

```
...
WAIT FOR:Password:
SEND:mypassword<CR>
WAIT FOR:$
DISPLAY:Connected and logged in<CR>
ECHO:
...
```

Results

0 – Command Successfully Completed

END ON ERROR

The END ON ERROR command marks the end of an ON ERROR segment.

Format

END ON ERROR:

Remarks

The ON ERROR and END ON ERROR commands mark the beginning and end of a segment of script code to be executed when the script processor detects an error.

ON ERROR and END ON ERROR must occur in pairs.

See the ON ERROR command.

Results

0 – Command Successfully Completed
10 – ON ERROR not found

EXIT EMULATOR

The EXIT EMULATOR command ends processing of both the current script and SETHOST.

Format

EXIT EMULATOR:

Remarks

EXIT EMULATOR disconnects any links established during the session, closes all files opened during the session, and ends the execution of SETHOST.

Example Coding

This script segment gives the user the choice of ending the script and returning to SETHOST or ending both the script and the SETHOST session:

```
...
$get_answer:
DISPLAY:<CR><LF>Type C to continue, Q to leave SETHOST:
READ: action
CASE: action
  "C" EXIT SCRIPT:
  "Q" EXIT EMULATOR:
DEFAULT: GOTO:$get_answer
CASE END:
```

Results

Not applicable.

EXIT EMULATOR ON

The EXIT EMULATOR ON command ends processing of both the current script and SETHOST if a specific string of characters is received from the communication line.

Format

EXIT EMULATOR ON: *string*

Remarks

The EXIT EMULATOR ON command waits until *string* is received over the communication line or the command times out.

If the script processor detects the *string*, it ends the script and session in the same way as the EXIT EMULATOR command. See EXIT EMULATOR.

If the EXIT EMULATOR ON command times out, the timeout error condition occurs.

See the RETRY and ON ERROR commands and Section 5.4.4, Error Processing, for more information.

Example Coding

In this example, the script has tried to connect to a remote node. If the string "not reachable" is detected, the SETHOST session ends. Otherwise, the EXIT EMULATOR ON command times out. The empty ON ERROR segment causes control to pass to the SEND command, and the script continues.

```
...
ON ERROR:
END ON ERROR:
EXIT EMULATOR ON:not reachable
SEND:<CR>
...
```

Results

2 – Timeout

EXIT SCRIPT

The EXIT SCRIPT command immediately ends processing for the current script.

Format

EXIT SCRIPT:

Remarks

The EXIT SCRIPT command ends processing of the current script.

If a SCRIPT command was executed during the current session and it is still outstanding when the EXIT SCRIPT command executes, control returns to the line following the most recently executed SCRIPT command.

If there are no outstanding SCRIPT commands, the script processor terminates, and the user can continue the terminal session in SETHOST.

See the SCRIPT command.

Example Coding

These examples show how scripts can call one another and pass information in script variables:

```
COMMENT:  ------------------------------------------------
COMMENT:  Start of FIRST.SCR
COMMENT:  ------------------------------------------------
...
COMMENT:  Get the host name
$get_host:
    DISPLAY:Enter host name or QUIT:
    READ: host_name
    CASE: host_name
        "QUIT" EXIT EMULATOR:
        "quit" EXIT EMULATOR:
    CASE END:
```

```
$get_method:
COMMENT:    Call script depending on method
    DISPLAY:Type M to use modem, D to use DECnet:
    READ: method
    CASE: method
        "M" COMMENT: SCRIPT: MODEM
        "D" COMMENT: SCRIPT: DECNET
    DEFAULT: GOTO: $get_method
    CASE END:
COMMENT:  If host was invalid for method, give user a chance
COMMENT:  to try again. If host was down, quit.
    CASE: result
        "noconnect" GOTO: $get_host
        "nohost" EXIT SCRIPT:
    CASE END:
...
COMMENT:  ------------------------------------------------
COMMENT:  Start of MODEM.SCR
COMMENT:  ------------------------------------------------
...
    CASE: host_name
        "WUMBLE" SCRIPT: CALLW
        "WUMBL2" SCRIPT: CALLW2
        "OFFICE" SCRIPT: CALLO
    DEFAULT: SET: host_name nohost
    CASE END:
    EXIT SCRIPT:
COMMENT:  ------------------------------------------------
COMMENT:  Start of DECNET.SCR
COMMENT:  ------------------------------------------------
...
    CASE: host_name
        "SERGE"  SCRIPT: DSERG
        "INFO" SCRIPT: DINFO
        "WUMBLE" SCRIPT: DWUMB
    DEFAULT: SET: host_name nohost
    CASE END:
    EXIT SCRIPT:
```

Results

None.

EXIT SCRIPT ON

The EXIT SCRIPT ON command ends processing of the current script if a specific string of characters is received.

Format

EXIT SCRIPT ON: *string*

Remarks

The EXIT SCRIPT ON command waits until *string* is received over the communication line or the command times out.

If the script processor detects the *string*, it ends processing of the current script in the same way as the EXIT SCRIPT command. See EXIT SCRIPT.

If the EXIT SCRIPT ON command times out, the timeout error condition occurs.

See the RETRY and ON ERROR commands and Section 5.4.4, Error Processing, for more information.

Example Coding

```
$restart:
COMMENT:  Set up empty error handler so script will fall through
COMMENT:  if report times out.
    ON ERROR:
    END ON ERROR:
COMMENT:  Run the program on the host.
    SEND:run report1<CR>
COMMENT:  Return to calling script when report completes.
    EXIT SCRIPT ON:end of report
COMMENT:  If we get here, it means that something is wrong because
COMMENT:  the report is taking too long.  We will try it again.
COMMENT:  Set up an error handler to quit SETHOST if we cannot recover.
    ON ERROR:
        EXIT EMULATOR:
    END ON ERROR:
COMMENT:  Send a Control-C and wait for the $.  If we get it, start over.
    SEND:<3>
    WAIT FOR:$
    GOTO: $restart
```

EXIT SCRIPT ON

Results

0 – Command Successfully Completed
2 – Timeout

FPRINT

The FPRINT command prints a file on the local printer.

Format

FPRINT: *file-name*

Example Coding

This script segment creates a file using the output of a program on the host, then prints the file on the local printer. Error handling is not shown.

```
PRINTER ON: sched.txt
SEND:run showschedule<CR>
WAIT FOR:$
PRINTER OFF:
FPRINT: sched.txt
```

Results

0 – Command Successfully Completed
8 – Cannot find file
13 – Print Error

GOTO

The GOTO command transfers control to a labeled line in the current script.

Format

GOTO: *label*

Remarks

The GOTO command transfers control to the first occurrence of a line in the current script that contains *label*.

A *label* must begin with a dollar sign character ($). The script processor removes and ignores embedded spaces and tab characters before matching *label* with labels in the script.

See <label>.

Example Coding

This script segment shows the use of GOTO commands to control a complex procedure:

```
...
COMMENT:  Get the host name
$get_host:
    DISPLAY:Enter host name or QUIT:
    READ: host_name
    CASE: host_name
        "QUIT" EXIT EMULATOR:
        "quit" EXIT EMULATOR:
    CASE END:
$get_method:
COMMENT:    Call script depending on method
    DISPLAY:Type M to use modem, D to use DECnet:
    READ: method
    CASE: method
        "M" COMMENT: SCRIPT: MODEM
        "D" COMMENT: SCRIPT: DECNET
    DEFAULT: GOTO: $get_method
    CASE END:
```

```
COMMENT:  If host was invalid for method, give user a chance
COMMENT:  to try again. If host was down, quit.
    CASE: result
        "noconnect" GOTO: $get_host
        "nohost" EXIT SCRIPT:
    CASE END:
...
```

Results

0 – Command Successfully Completed
14 – Label not found

HANG UP

The HANG UP command is the same as the DTR CLEAR command. It turns off the DTR signal between the computer and modem.

Format

HANG UP:

Remarks

The HANG UP command is the same as the DTR CLEAR command. It turns off the DTR signal between the computer and modem.

The HANG UP command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

This script segment shows the end of a modem session and the beginning of a new one:

```
...
SEND:logout<CR>
HANG UP:
DIAL:J
...
```

Results

0 – Command Successfully Completed
5 – Incompatible Settings

KEYBOARD OFF

The KEYBOARD OFF command causes SETHOST to start ignoring CTRL/C and CTRL/F10 keystrokes during script processing.

Format

KEYBOARD OFF:

Remarks

The KEYBOARD OFF command causes SETHOST to ignore input of CTRL/C and CTRL/F10 from the keyboard. This prevents the user from executing an EXIT SCRIPT command from the keyboard.

If the keyboard is off when a READ or TYPE UNTIL command executes, the keyboard is temporarily turned on during execution of the command.

If the user enters CTRL/C or CTRL/F10 while KEYBOARD OFF is in effect, the keystroke may be recognized later if a KEYBOARD ON command executes, because keystrokes are stored temporarily in a "typeahead buffer" and may still be there when keyboard input is again accepted.

Example Coding

This script segment sends the contents of a file after disabling the keyboard. When the file has been sent, the user is again able to end the session from the keyboard.

```
...
KEYBOARD OFF:
SEND FROM: data.txt
KEYBOARD ON:
...
```

Results

0 – Command Successfully Completed

KEYBOARD ON

The KEYBOARD ON command causes SETHOST to accept keystrokes again during script processing.

Format

KEYBOARD ON:

Remarks

The KEYBOARD ON command enables keyboard input. This is the default.

If the keyboard is off when a READ or TYPE UNTIL command executes, the keyboard is temporarily turned on during execution of the command.

Example Coding

This script segment sends the contents of a file after disabling the keyboard. When the file has been sent, the user is again able to end the session from the keyboard.

```
...
KEYBOARD OFF:
SEND FROM: data.txt
KEYBOARD ON:
...
```

Results

0 – Command Successfully Completed

<Label>

A <label> names the line it appears on.

Format

label:

Remarks

The *label* identifies the line it occupies as a possible destination for GOTO commands in the same script.

A *label* must begin with a dollar sign character ($). The script processor removes and ignores embedded spaces and tab characters before matching a label in a GOTO command with labels in the script.

The *label* must be the only thing on the line, and it must be followed by a colon.

The same *label* may appear on more than one line in a script. However, the GOTO command always refers to the first occurrence of a label in the script, so later occurrences of the same label have no effect on execution of the script.

Example Coding

These are all valid labels:

```
$get file:
$Thisisalonglabelandveryhardtoread:
$DO IT AGAIN:
$READ:
```

Results

Does not change Error_Number or Error_Message.

LOAD

The LOAD command reads a SETHOST Set-Up file and makes the settings in it the current settings.

Format

LOAD: [*file-name*]

Remarks

The *file-name* is optional. If it does not appear, the LOAD command looks for SETHOST.DAT as the default. If it does not find SETHOST.DAT, the LOAD command ends with an error.

If *file-name* appears but the file is not found, the LOAD command ends with an error.

The effect of the LOAD command is equivalent to recalling Set-Up parameters in SETHOST.

Example Coding

This script segment loads a Set-Up file, then dials the first telephone number stored in it.

```
LOAD: modem1.dat
DIAL:A
WAIT FOR:Attached
...
```

Results

0 – Command Successfully Completed
8 – Cannot find file

NO DEBUG

The NO DEBUG command stops displaying script lines before execution.

Format

NO DEBUG:

Remarks

The NO DEBUG command reverses the effect of a DEBUG command.

NO DEBUG is the default when SETHOST begins.

Example Coding

See the DEBUG command.

Results

0 – Command Successfully Completed

NO ECHO

The NO ECHO command turns off the display of characters received over the communication line.

Format

NO ECHO:

Remarks

The NO ECHO command reverses the action of ECHO. That is, it stops the display of characters on the screen except for those displayed by DEBUG and DISPLAY.

Example Coding

See the ECHO command.

Results

0 – Command Successfully Completed

NO SKIP ON

The NO SKIP ON command executes the next line in the script if a specific string of characters is received.

Format

NO SKIP ON: *string*

Remarks

The NO SKIP ON command waits until *string* is received over the communication line or the command times out.

If the script processor detects the *string*, it transfers control to the next line.

If the NO SKIP ON command times out, control transfers to the line following the next line.

A timeout error cannot occur, because timeout is a normal result of the NO SKIP ON command.

Example Coding

This example runs a program on the remote host after making sure that the data file is there. First, it sends a command to find the file. If it receives the string "no files found" from the host, it creates a copy of the file from a back-up, then runs the program. Otherwise, it skips the line with the "copy" command and just runs the program.

```
SEND:directory myfile.dat<CR>
NO SKIP ON:no files found
SEND:copy myfile.bak myfile.dat<CR>
SEND:run dailywork<CR>
```

See the SKIP ON command for more examples.

Results

0 – Command Successfully Completed

NO XON/XOFF

The NO XON/XOFF command causes the script processor not to use the XON/XOFF protocol.

Format

NO XON/XOFF:

Remarks

When a script session starts, the default setting is XON/XOFF: 64. Use the NO XON/OFF command if the script processor should ignore XON and XOFF characters.

See the XON/XOFF command.

Example Coding

```
NO XON/XOFF:
```

Results

0 – Command Successfully Completed
5 – Incompatible Settings

NTS

The NTS command specifies a Network Terminal Service.

Format

NTS: *service*

Remarks

The NTS command specifies a Network Terminal Service that the script session will connect to.

The *service* can be a LAT service name or a DECnet node name.

If there is an NTS command, there must also be a PORT command or a SETHOST Set-Up parameter that specifies NETWORK, LAT, or CTERM in a PORT command.

When the NTS command executes, it ends with an error if the PORT command in effect does not specify NETWORK, LAT, or CTERM.

See the PORT command.

The NTS command is optional if the SETHOST Set-Up parameters specify LAT, CTERM, or NET and a valid service.

If the PORT command specifies LAT, the NTS *service* must be a LAT service.

If the PORT command specifies CTERM, the NTS *service* must be a valid DECnet node name.

Example Coding

```
PORT: LAT
NTS: LAN_SVC_1

PORT: cterm
NTS: hisvax
```

NTS

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings
7 – Service not available

ON ERROR

The ON ERROR command marks the beginning of an error processing segment of script code.

Format

ON ERROR:

Remarks

The ON ERROR and END ON ERROR commands mark the beginning and end of a segment of script code to be executed when the script processor detects an error.

ON ERROR and END ON ERROR must occur in pairs.

The ON ERROR command marks the next line as the first line to be executed when an error occurs in the current script.

Execution of another ON ERROR command sets a new location for error handling.

Until an ON ERROR command executes in the current script, no error handling is defined.

The lines between ON ERROR and END ON ERROR are ignored by the script processor unless they execute as the result of an error, and control transfers to the line following the END ON ERROR command.

When the ON ERROR segment executes as the result of an error condition and execution reaches the END ON ERROR command, control returns to the command following that which caused the error.

The ON ERROR segment can contain GOTO commands to avoid return to the command following that which caused the error.

If a command in an ON ERROR segment ends with an error, the script processor executes an implicit EXIT SCRIPT command.

It is an error to transfer control to a line within an ON ERROR segment from outside the segment. The results are undefined.

ON ERROR

The ON ERROR segment can contain SCRIPT commands to call other scripts as subroutines. If control returns from the called script, the ON ERROR segment continues.

See Section 5.4.4: Error Processing.

See the RETRY command for information on timeout error handling.

Example Coding

See Section 5.4.4: Error Processing.

Results

0 – Command Successfully Completed
9 – END ON ERROR not found

OPEN

The OPEN command readies a log file to capture all text received from the communication line that is sent to the screen.

Format

OPEN: *file-name*

Remarks

If the file is not found, the OPEN command creates it.

If the file is found, the OPEN command opens it at the end of file (EOF) position. That is, new text will be appended to the end of the existing file.

After the OPEN command executes, all characters received from the communication line that are sent to the screen are also stored in the log file.

A script session can open no more than one log file at a time. However, it can execute a CLOSE command and then another OPEN command to continue logging to a different file.

The default extension for log files is LOG. So, if *file-name* does not have an extension, the OPEN command looks for or creates a file named *file-name*.LOG.

This log file is separate from the session log file that is always created automatically by the script processor. Do not use a *file-name* that conflicts with the session log file.

Example Coding

This script allows the user to start and stop logging of the remote session by pressing CTRL/P repeatedly. Each time logging begins, the text received from the communication line is appended to the file REMOTE.TXT.

```
...
    DISPLAY:<CR><LF> Press CTRL/P to toggle session logging
$loop:
    TYPE UNTIL:<CTRL/P>
    OPEN: remote.txt
    DISPLAY:Session logging ON<CR><LF>
    TYPE UNTIL:<CTRL/P>
```

```
CLOSE:
DISPLAY:Session logging OFF<CR><LF>
GOTO: $loop
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
15 – Logfile already open

PARITY

The PARITY command sets the type of parity checking on the communication line.

Format

PARITY: *parity-type*

where

parity-type

is one of the following:

NONE
EVEN
EVEN NO CHECK
ODD
ODD NO CHECK
MARK
SPACE

Remarks

The PARITY command specifies the type of parity checking that SETHOST performs on the communication line.

The PARITY command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

In this example, the first PARITY command starts checking for ODD parity. The second turns off parity checking.

```
PARITY: odd

PARITY: none
```

PARITY

The following example shows how parity checking is set as part of setting other communication parameters:

```
PORT: Data-1
PARITY: None
DATA BITS: 8
STOP BITS: 1
BAUD RATE: 2400
DIAL:B
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings

PAUSE

The PAUSE command suspends processing for a specified time.

Format

PAUSE: *length-of-pause*

Remarks

The PAUSE command causes processing of the script to be suspended for the specified length of time, after which execution continues with the next line.

The format of *length-of-pause* is *hh*:*mm*:*ss*, where *hh*, *mm*, and *ss* represent hours, minutes, and seconds. You can omit numbers on the right, in which case the script processor treats them as zeroes, as in the examples that follow.

Example Coding

This first set of examples explains the format of the *length-of-pause* value.

```
COMMENT: Suspend processing for 1 hour, 12 minutes, 32 seconds
PAUSE: 1:12:32

COMMENT: Suspend processing for 9 hours, 16 minutes
PAUSE: 9:16

COMMENT: Suspend processing for 13 minutes, 2 seconds
PAUSE: 0:13:2

COMMENT: Suspend processing for 5 hours
PAUSE: 5

COMMENT: Suspend processing for 5 seconds
PAUSE: 0:0:5
```

This example shows a script segment that periodically checks for new mail on a remote system and prints it out on the local printer.

```
$check_for_mail:
COMMENT: Call LOGIN.SCR to log in to host
 SCRIPT: login
COMMENT: Send the MAIL command
 SEND:mail<CR>
COMMENT: If the string "message" appears, go read the mail.
COMMENT: Otherwise, go to $Nomail to get out of MAIL.
 SKIP ON:message
 GOTO: $Nomail
COMMENT: I have mail, so turn on the printer, extract all the
COMMENT: messages to the terminal (comm line),
COMMENT: and turn the printer off.
 PRINTER ON:
 SEND:extract/all sys$output<CR>
 PRINTER OFF:
$Nomail:
COMMENT: Finished. Get out of MAIL and then log out.
 SEND:exit<CR>
 SEND:logout<CR>
COMMENT: Wait one hour, then check mail again.
 PAUSE: 1:00:00
 GOTO: $check_for_mail
```

This script segment shows a common use for the PAUSE command — timing output so the user can read it.

```
...
DISPLAY:              INSTRUCTIONS<CR><LF>
DISPLAY: <CR><LF>
DISPLAY: After you have logged in, the system<CR><LF>
DISPLAY: will ask for your name, employee number,<CR><LF>
DISPLAY: and department. If the information you<CR><LF>
DISPLAY: enter is valid, the system presents a<CR><LF>
DISPLAY: menu that gives you choices for the rest<CR><LF>
DISPLAY: of the session. <CR><LF>
PAUSE: 0:0:10
DISPLAY: <CR><LF>
DISPLAY: After you select the session option, you<CR><LF>
DISPLAY: will see a set of instructions like this<CR><LF>
DISPLAY: one. You can refer to the instructions<CR><LF>
DISPLAY: at any time by typing HELP. <CR><LF>
PAUSE: 0:0:10
...
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter

PORT

The PORT command tells the script processor how to communicate with the host computer.

Format

PORT: *method*

where

method

is one of the following:

DATA–1
MODEM–1
DATA–2
MODEM–2
INTEGRAL–2
CTERM
LAT
NETWORK

Remarks

The PORT command tells the script processor how to communicate with the host computer. If there is no PORT command, the SETHOST Set-Up defaults are used.

DATA–1 means Port 1, data leads only.

MODEM–1 means Port 1, full modem control.

DATA–2 means Port 2, data leads only.

MODEM–2 means Port 2, full modem control.

INTEGRAL–2 means Port 2, integral modem.

CTERM specifies the DECnet CTERM protocol.

LAT specifies the LAT protocol.

PORT

NETWORK specifies use of the LAT protocol, but if that fails, then CTERM.

See the NTS command.

Example Coding

```
PORT: NETWORK

PORT: Data-1
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
19 – Comm Port not available

PRINT SCREEN

The PRINT SCREEN command prints the current screen on the local printer.

Format

PRINT SCREEN: [*file-name*]

Remarks

If there is a *file-name*, the PRINT SCREEN command writes the contents of the screen to the named file instead of the printer.

If there is a *file-name* and the file already exists, this command appends the screen contents to the end of the file. Otherwise, it creates a new file with the name specified in *file-name*.

Example Coding

The first PRINT SCREEN command sends the contents of the screen to the local printer. The second uses a file named SCRN1.

```
PRINT SCREEN:

PRINT SCREEN: scrn1
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
13 – Print Error

PRINTER OFF

The PRINTER OFF command turns off echo printing.

Format

PRINTER OFF:

Remarks

Reverses the action of the PRINTER ON command.

PRINTER OFF is the default when the script session starts.

See the PRINTER ON command.

Example Coding

```
PRINTER OFF:
```

Results

0 – Command Successfully Completed

PRINTER ON

The PRINTER ON command turns on echo printing.

Format

PRINTER ON: [*file-name*]

Remarks

After the PRINTER ON command executes, all text received from the communication line is sent to the local printer.

The PRINTER ON command does not affect the appearance of the screen.

If there is a *file-name*, the PRINTER ON command directs the output to the named file instead of the printer.

If there is a *file-name* and the file already exists, the output is appended to the end of the file. Otherwise, PRINTER ON creates a new file with the name specified in *file-name*.

Example Coding

The first PRINTER ON command starts sending output to the local printer. The second uses a file named SCRN1.

```
PRINTER ON:

PRINTER ON: scrn1
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter

PURGE TYPE

The PURGE TYPE command clears the contents of the typeahead buffer.

Format

PURGE TYPE:

Remarks

Keyboard input is stored temporarily in the typeahead buffer until the script processor is ready to use it. The PURGE TYPE command clears the contents of the typeahead buffer. Use this command when you want the script to ignore previous keystrokes from the user.

Example Coding

This is a segment of a script that logs the user in to a remote system. The empty ON ERROR segment causes the EXIT SCRIPT ON command to fall through if it does not exit as a result of detecting the $ prompt after logging in. The user may have anticipated a successful log-in and typed some commands; so the PURGE TYPE command clears the user's input. The script then tells the user that the log-in failed, and it transfers control to another part of the script to try the log-in again.

```
...
ON ERROR:
END ON ERROR:
EXIT SCRIPT ON:$
PURGE TYPE:
DISPLAY:Log-in timed out. Retrying log-in.
GOTO: $start login
```

Results

0 – Command Successfully Completed

READ

The READ command accepts input from the keyboard and stores it in a variable.

Format

READ: *variable-name*

Remarks

If the variable *variable-name* already exists, the READ command replaces its current value.

If the variable *variable-name* does not exist, the READ command creates it and assigns a value to it, unless the maximum number of variables would be exceeded by adding the new one. In that case, the command ends with an error.

The READ command accepts input from the keyboard until the user presses (RET). The characters typed before the (RET) are stored in the variable named by *variable-name*.

The user can type any number of characters before pressing (RET). However, the READ command stores no more than the first 74 characters, and the excess characters are ignored by the script processor.

NOTE

ECHO must be on when the READ command executes for the user to be able to see the input on the screen.

Example Coding

In this example, the script displays a menu on the screen and tells the user to type a letter to choose the next action. The READ command stores the user's response in the variable USER_ACTION. The CASE command then calls a script to perform the user's choice. If the user types an invalid response, the DEFAULT command transfers control back to the menu display.

```
$get user input again:
...
COMMENT:    Turn on ECHO, just in case it is off.
    ECHO:
COMMENT:    Now get the user's choice.
    DISPLAY:Type a letter from A to N and press RETURN:
    READ: user_action
    CASE: user_action
         "A" SCRIPT: readfl
         "a" SCRIPT: readfl
         "B" SCRIPT: copyfl
         "b" SCRIPT: copyfl
         ...
         "N" SCRIPT: nextnd
         "n" SCRIPT: nextnd
    DEFAULT: GOTO: $get user input again
    CASE END:
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
18 – Variable not found

RETRY

The RETRY command causes control to transfer to the next line in the script when a timeout error occurs.

Format

RETRY: *counter*

Remarks

Each script has a "retry counter," which keeps track of the number of times that a segment of code can be rerun when a timeout error occurs.

The script processor automatically sets the script's retry counter to zero when it starts the first script, just as if the first command in the script were RETRY: 0.

A script's retry counter is also set to zero when the script is called with a SCRIPT or CHAIN command.

The RETRY command stores the number *counter*, which must not be negative, in the script's retry counter.

See Section 5.4.4 for a full description of error processing.

Example Coding

The first example sets the script's retry counter to 3, which means that unless another RETRY command executes, each time (up to 3) that a timeout error occurs, the retry counter is decremented and control transfers to the line following the RETRY command. If a fourth timeout error occurs before another RETRY command executes, the ON ERROR segment executes, if there is one; and if there is not an ON ERROR segment, an automatic EXIT SCRIPT command executes.

The second example sets the script's retry counter to 0, which means that reruns do not occur when timeout errors are detected.

```
RETRY: 3
...
RETRY: 0
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter

RX BAUD

The RX BAUD command sets the rate at which characters are both received and transmitted.

Format

RX BAUD: *speed*

Remarks

The RX BAUD command is exactly the same as the BAUD RATE command. See BAUD RATE.

SCRIPT

The SCRIPT command calls another script file as a subroutine.

Format

SCRIPT: *script-file*

Remarks

The SCRIPT command causes the script processor to open the file named by *script-file* and transfer control to the first command in that file. That script is termed the "called script."

If *script-file* does not have an extension, the script processor looks for a file named *script-file*.SCR.

Execution of the current (or "calling") script stops. However, the script processor keeps the script file open and keeps track of the location of the SCRIPT command when it executes. The SCRIPT command remains "outstanding" until control returns to the line following it as the result of executing an EXIT SCRIPT command in a called script. The script processor also saves other information about the current script:

- Retry counter
- Location of current RETRY command
- Location of current ON ERROR segment

Control returns when an explicit or implicit EXIT SCRIPT command executes. The script processor executes an implicit EXIT SCRIPT command if:

- An error occurs in a script and there is neither an active retry counter (see the RETRY command) nor a current ON ERROR segment. (See Section 5.4.4 for full information about error processing.)
- Control reached the end of the current script file.

A called script can call another script by executing a SCRIPT command, causing another SCRIPT command to be outstanding. This is called "nesting." Scripts can be nested 10 deep. When a script executes an EXIT SCRIPT command, control returns to the line following the most recently executed SCRIPT command, which is then no longer outstanding.

There is no restriction on which scripts can be called. A script can call itself with a SCRIPT command, or it can be called by a script it calls with a SCRIPT command.

When control returns from the called script, the variables error_number and error_message contain the result of executing the called script. So, if an error occurred in the called script and it was not handled there, the calling script can handle the error after control returns.

See the CHAIN command, which transfers control to another script but does not set up a return location. Only SCRIPT commands set up return locations and become outstanding. CHAIN command executions do not increase the nesting depth.

Example Coding

See the CHAIN command for example coding. More examples of the SCRIPT command appear in Section 5.4.4, Error Processing.

Results

0 – Command Successfully Completed
8 – Cannot find file

When control returns to the line following the SCRIPT command, it may be the result of an error in the called script. So, if the current ON ERROR segment executes immediately after a SCRIPT command, it may be the result of the SCRIPT command failing or of an error in the execution of a command in the called script.

SEND

The SEND command sends a string of characters through the communication line.

Format

SEND: *string*

Remarks

The *string* is examined for special character translation and is then sent through the communication line.

Example Coding

This script segment logs into a LAT service. It waits for the "Username:" prompt, sends the user name (ending the line with a carriage return character), then waits for the user to type the password.

```
...
ECHO:
PORT: lat
NTS: mysystem
WAIT FOR:Username:
SEND:fried<CR>
WAIT FOR:Password:
TYPE UNTIL:<CR>
...
```

Results

0 – Command Successfully Completed
2 – Timeout

SEND FROM

The SEND FROM command sends the contents of a file through the communication line.

Format

SEND FROM: *file-name*

Remarks

The SEND FROM command opens the file named by *file-name* and sends the contents through the communication line.

There is no default for any part of *file-name*.

The script processor does not interpret the contents of the file. That is, the contents of the file are treated as a stream of bytes.

Example Coding

This script segment creates a file on the remote host. It uses SEND FROM commands to transfer the contents of two local files, and it includes titles with SEND commands.

```
...
SEND:create sched.txt<CR>
SEND:Beginning of weekly report:<CR><CR>
SEND FROM: week.txt
SEND:Beginning of monthly report:<CR><CR>
SEND FROM: month.txt
SEND:<CTRL/Z>
...
```

Results

0 – Command Successfully Completed
8 – Cannot find file

SET

The SET command assigns a string to a variable or deletes a variable.

Format

SET: *variable-name* [*string*]

Remarks

With no *string*:

- If *variable-name* exists as a variable, the SET command deletes the variable.
- If *variable-name* does not exist as a variable, the SET command ends with an error.

With *string*:

- If *variable-name* exists as a variable, the SET command replaces its current value with *string*.
- If *variable-name* does not exist as a variable, but the maximum number of variables has been reached, the SET command ends with an error. (The maximum number of variables is 80, including the two standard variables, Error_Number and Error_Message.)
- If *variable-name* does not exist as a variable, the SET command adds it with *string* as its value.
- The script processor does not interpret special character symbols in the SET command *string*. For example, if the command specifies "<CR>" for *string*, it stores the four characters, not a single carriage return character.
- The standard variables Error_Number and Error_Message can be changed or deleted with the SET command. However, there is no effect, because the SET command itself places values into these variables when it ends.

Example Coding

This script segment looks at a variable that was set elsewhere and calls other scripts depending on the value. Then, it deletes the variable. The second CASE command looks at the contents of a variable returned by the called script. If the value is not either "ERROR" or "WARNING," the script sets the variable to "OK" and returns to the calling script.

```
...
CASE: action
    "A" SCRIPT: proca
    "B" SCRIPT: procb
    "C" SCRIPT: procc
CASE END:
SET: action
CASE: my-result
    "ERROR" EXIT EMULATOR:
    "WARNING" EXIT SCRIPT:
CASE END:
SET: my-result OK
EXIT SCRIPT:
```

Results

0 – Command Successfully Completed
18 – Variable not found

SKIP

The SKIP command passes over lines in the script without executing them.

Format

SKIP: *lines*

Remarks

The SKIP command transfers control forward in the script, ignoring the number of lines specified by *lines*.

The value of *lines* must not be negative.

If a SKIP command transfers control to the line following the last line in the script, the script processor executes an implicit EXIT SCRIPT command.

If a SKIP command attempts to transfer control to any line past the line following the last line in the script, the command ends with an error.

Example Coding

These two script segments do the same basic things. They wait for the string "ok" and run a program on the remote system when it appears. If the "ok" is not detected and a timeout occurs, both send a logout command to the remote system, then hang up the phone and leave SETHOST.

One difference between the script that uses the SKIP command and the other, which uses ON ERROR segments, is the number of lines of code. The SKIP command saves four lines.

But a more significant difference is that the first script segment does not change the active ON ERROR segment. That is, when it finishes, an ON ERROR segment that was active at the beginning is still active. The second script segment, on the other hand, sets up an ON ERROR segment to handle the timeout, then sets up an empty error handler to deactivate the first one. The result is that the original ON ERROR segment, if there was one, would not get control if an error were to occur.

```
...
NO SKIP ON:ok
SKIP: 3
SEND:logout<CR>
HANG UP:
EXIT EMULATOR:
SEND:run myjob<CR>
...

...
ON ERROR:
    SEND:logout<CR>
    HANG UP:
    EXIT EMULATOR:
END ON ERROR:
WAIT FOR:ok
ON ERROR:
END ON ERROR:
SEND:run myjob<CR>
...
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter

SKIP ON

The SKIP ON command passes over the next line in the script if a specific string of characters is received.

Format

SKIP ON: *string*

Remarks

The SKIP ON command waits until *string* is received over the communication line or the command times out.

If the script processor detects the *string*, it passes over the next line in the script and transfers control to the line that follows it.

If the SKIP ON command times out, the timeout error condition occurs.

If the timeout error condition occurs and control is not transferred elsewhere as a result of an ON ERROR segment or RETRY command, then control passes to the next line, and there is no skip.

See the RETRY and ON ERROR commands and Section 5.4.4, Error Processing, for more information.

Example Coding

See the PAUSE command for an example of SKIP ON.

Results

0 – Command Successfully Completed
2 – Timeout

STOP BITS

The STOP BITS command sets the number of stop bits to 1 or 2.

Format

STOP BITS: 1

or

STOP BITS: 2

Remarks

The STOP BITS command is invalid when you use NETWORK, LAT, or CTERM in a PORT command.

See the PORT command.

Example Coding

```
PORT: Data-1
PARITY: None
DATA BITS: 8
STOP BITS: 1
BAUD RATE: 2400
DIAL:B
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter
5 – Incompatible Settings

SYSTEM

The SYSTEM command executes an MS–DOS system command.

Format

SYSTEM: [*command*]

Remarks

If there is no *command*, the user is left at the MS–DOS prompt. The user can return to the script by typing the MS–DOS EXIT command.

If there is a *command*, the script processor passes it to MS–DOS for execution.

Any output from the MS–DOS command will appear on the screen.

Example Coding

See the DIAL command for examples of SYSTEM.

Results

0 – Command Successfully Completed
12 – MS–DOS command failed

TIMEOUT

The TIMEOUT command forces an immediate timeout error condition.

Format

TIMEOUT:

Remarks

The timeout error condition occurs.

If control is not transferred elsewhere as a result of an ON ERROR segment or RETRY command, then the script processor executes an implicit EXIT SCRIPT command, and the script ends.

See the RETRY and ON ERROR commands and Section 5.4.4, Error Processing, for more information.

Example Coding

This is an example of a counted loop. The commands between the RETRY and TIMEOUT commands execute 10 times, after which control transfers to the ON ERROR block, if one is active. If there is no active ON ERROR block, an implicit EXIT SCRIPT command executes.

```
...
RETRY: 9
...
TIMEOUT:
...
```

Results

2 – Timeout

NOTE

The result of the TIMEOUT command is always an error condition. Therefore, the standard variable Error_Number cannot have a zero value.

TIMER

The TIMER command specifies the timeout period.

Format

TIMER: *seconds*

Remarks

The TIMER command specifies the number of *seconds* in a timeout period.

Until a TIMER command executes in a script session, the default timeout period is 15 seconds.

See the TIMER OFF command.

Example Coding

See the DTR SET command for an example of TIMER.

Results

0 – Command Successfully Completed
4 – Invalid Parameter

TIMER OFF

The TIMER OFF command disables timeouts.

Format

TIMER OFF:

Remarks

The TIMER OFF command turns off the timeout period, which was set by the TIMER command or by default when the script session started.

While the timeout period is turned off, no command can time out. As a result, some commands (such as WAIT FOR) could wait indefinitely. However, the TIMEOUT command can force a timeout error.

Use the TIMER command to re-enable timeouts.

Example Coding

See the DTR SET command for an example of TIMER OFF.

Results

0 – Command Successfully Completed

TX BAUD

The TX BAUD command sets the rate at which characters are both received and transmitted.

Format

TX BAUD: *speed*

Remarks

The TX BAUD command is exactly the same as the BAUD RATE command. See BAUD RATE.

TYPE UNTIL

The TYPE UNTIL command sends keyboard input through the communication line until the user types a specific string.

Format

TYPE UNTIL: *string*

Remarks

The TYPE UNTIL command accepts input from the keyboard and sends it through the communication line.

When the script processor detects the characters in *string* in the input, it stops sending keyboard input and executes the next command in the script.

Control keys, such as CTRL/C and CTRL/F10 have no effect on SETHOST or the script processor while a TYPE UNTIL command executes. The generated characters are sent through the communication line.

If keyboard input is disabled by a KEYBOARD OFF command, the TYPE UNTIL command enables it while the command executes. When the command ends, the script processor disables the keyboard again.

The TYPE UNTIL command does not time out. It waits indefinitely for *string* in the input.

Example Coding

See the OPEN command for an example of TYPE UNTIL.

Results

0 – Command Successfully Completed

WAIT FOR

The WAIT FOR command suspends processing until a specific string of characters is received from the communication line.

Format

WAIT FOR: *string*

Remarks

The WAIT FOR command waits until *string* is received over the communication line or the command times out.

If the script processor detects the *string*, the WAIT FOR command ends and execution continues with the next line.

If the WAIT FOR command times out, the timeout error condition occurs.

Example Coding

See the SEND command for an example of WAIT FOR.

Results

0 – Command Successfully Completed
2 – Timeout

XON/XOFF

The XON/XOFF command causes the script processor to use the XON/XOFF protocol.

Format

XON/XOFF: *buffer-limit*

Remarks

The XON/XOFF command turns on use of the XON/OFF protocol and sets the number of characters that triggers XOFF.

The *buffer-limit* specifies the number of characters in the buffer at or above which SETHOST sends an XOFF character to stop transmission.

The value of *buffer-limit* must be one of the following:

64
256
512
1024

Example Coding

```
XON/XOFF: 256
```

Results

0 – Command Successfully Completed
4 – Invalid Parameter

5.5 Sample Scripts

The following sections describe sample scripts that you can use with SETHOST. Each sample provides steps for creating a script file and includes comments about how the commands operate within the script.

5.5.1 A Sample COM Log-In Script

The following sample creates a script file (COMLOGIN.SCR) that will log you into a VMS host using the COM1 port. This script assumes that COM1 is hardwired to a particular computer. (To use COM2, change the PORT: command to read DATA-2 instead of DATA-1).

1. Select the communications method.

   PORT:Data-1

2. Use the ECHO command so that you can see what is happening as the script executes each command.

   ECHO:

3. Now, start the log-in process. Use the WAIT FOR command. However, if the node you want to connect to is very busy, the WAIT FOR command may time out. To avoid this, first use the RETRY command to make several attempts at a connection (for this example, repeat the attempt 4 times).

   RETRY:4

   NOTE

   You can also use the TIMER command, supplying a time interval such as 60 seconds. For example: TIMER:60

4. Next, you need to send a carriage return character to get the username prompt, and include the WAIT FOR command here.

   SEND:<CR>

   WAIT FOR:Username:

5. Once the username prompt appears, you can cancel any remaining RETRY attempts.

   RETRY:0

6. Now you can send the user name.

   SEND:ROBERTS<CR>

7. Wait for the password prompt. If the node you want to connect to is very busy, the WAIT FOR command may time out. To avoid this, first use the RETRY command to make several attempts at completing the log-in (for this example, repeat the attempt 4 times).

   RETRY:4

   WAIT FOR:Password:

8. The password prompt appears, so you can cancel the RETRY attempts.

   RETRY:0

9. You can now enter your password at the prompt. Since the TYPE UNTIL command does not time out, you do not need to specify a RETRY period.

   TYPE UNTIL:<CR>

10. You should now be logged into the host node. An exception may be if you entered your password incorrectly. Use the EXIT SCRIPT command to leave the script processor and use the terminal emulator.

    EXIT SCRIPT:

In summary, the script commands in your COMLOGIN.SCR file should look like this:

```
PORT:Data-1
ECHO:

RETRY:4
SEND:<CR>
WAIT FOR:Username:

RETRY:0
SEND:ROBERTS<CR>

RETRY:4
WAIT FOR:Password:

RETRY:0
TYPE UNTIL:<CR>
EXIT SCRIPT:
```

5.5.2 A Sample LAT Log-In Script

The following sample creates a script file (LATLOGIN.SCR) that will log you into a VMS host using LAT.

1. Select the communications method and the service you want to connect to.

   PORT:LAT
   NTS: *service-name*

2. Use the ECHO command so that you can see what is happening as the script executes each command.

   ECHO:

3. Now, start the log-in process. Use the WAIT FOR command. However, if the local area network (LAN) is very busy, the WAIT FOR command may time out. To avoid this, first use the RETRY command to make several attempts at a connection (for this example, repeat the attempt 4 times).

   RETRY:4

4. Next, you need to send a carriage return character to get the username prompt, and include the WAIT FOR command here.

   SEND:<CR>

   WAIT FOR:Username:

5. Once the username prompt appears, you can cancel any remaining RETRY attempts.

   RETRY:0

6. Now you can send the user name.

   SEND:ROBERTS<CR>

7. Wait for the password prompt. If the node is very busy, the WAIT FOR command may time out. To avoid this, first use the RETRY command to make several attempts at completing the log-in (for this example, repeat the attempt 4 times).

   RETRY:4

   WAIT FOR:Password:

8. The password prompt appears, so you can cancel the RETRY attempts.

   RETRY:0

9. You can now enter your password at the prompt. Because the TYPE UNTIL command does not time out, you do not need to specify a RETRY period.

   TYPE UNTIL:<CR>

10. You should now be logged into the host. An exception may be if you entered your password incorrectly. Use the EXIT SCRIPT command to leave the script processor and stay in terminal emulation.

    EXIT SCRIPT:

In summary, the script commands in your LATLOGIN.SCR file should look like this:

PORT:LAT
NTS: *service-name*
ECHO:

RETRY:4
SEND:<CR>
WAIT FOR:Username:

RETRY:0
SEND:ROBERTS<CR>

RETRY:4
WAIT FOR:Password:

RETRY:0
TYPE UNTIL:<CR>
EXIT SCRIPT:

5.5.3 A Sample Mail Reader Script

The following sample is a script that will log into a VAX system using a LAT network connection, read any new mail messages, extract that mail to a file, print the mail file, then log out.

```
COMMENT:    MAIL.SCR
COMMENT:    This script logs into a VAX system using a network
COMMENT:    LAT connection. It then reads any new mail
COMMENT:    messages, stores them in a file, prints the file,
COMMENT:    then logs out.
COMMENT:    This script assumes that the user's VMS prompt has
COMMENT:    not been changed with the SET PROMPT command.  If
COMMENT:    it has, the "WAIT FOR:$ " commands must be changed.
COMMENT:    First, we log in using a separate script file.
    SCRIPT: LATLOGIN.SCR
COMMENT:    Start up MAIL.  This assumes LATLOGIN has left us
COMMENT:    at the "$ " prompt.
    SEND : MAIL <CR>
COMMENT:    The ON ERROR block handles the error condition
COMMENT:    that is raised when there are no new mail messages
COMMENT:    (when the WAIT FOR:new message command times out).
COMMENT:    Since there is no new mail, we just exit from mail
COMMENT:    and log out.
    ON ERROR:
    $NO NEW MAIL:
        COMMENT:Tell the user (if he's watching)
        COMMENT:    that he has no new mail.
        DISPLAY:<CR><LF><7>You have NO new mail messages<CR><LF>
        COMMENT:    exit from mail
        SEND:EXIT<CR>
        COMMENT:    Log out and return to DOS.
        WAIT FOR:$
        SEND:LOGOUT<CR>
        EXIT EMULATOR:
    END ON ERROR:
    WAIT FOR:new message
    WAIT FOR:MAIL>
COMMENT:    If you have a LOT of new mail, you might wish to
COMMENT:    increase the TIMER value here, so that the SELECT
COMMENT:    and EXTRACT commands do not cause a timeout.
    SEND:select newmail<CR>
    WAIT FOR:MAIL>
COMMENT:    An alternative here (the following 2 lines) would
COMMENT:    be to turn PRINTER ON: and then SEND:extract/all
COMMENT:    TT:<CR>. This would print the new mail on the
COMMENT:    local printer, if there is one.
    SEND:extr/all newmail.txt <CR>
    WAIT FOR:MAIL>
COMMENT:    Leave mail.
    SEND: exit <CR>
    WAIT FOR:$
```

```
COMMENT:    Print the new mail on a printer
COMMENT:    attached to the VAX.
    SEND: print newmail.txt <CR>
    WAIT FOR:$
COMMENT:    Leave VMS and return to DOS.
    SEND:logout<CR>
    EXIT EMULATOR:
```

6

Using NDU to Control Remote Printers and Disks

The Network Device utility (NDU) is a DECnet utility that controls your use of remote printers and disks as if they were directly connected to your personal computer. The disk or printer, resident on the remote node, appears to be a local device except for differences in access time. These differences depend on the type of communication services for the remote node you are using.

A remote disk file can be assigned a volume name (such as D:) and can be used by MS–DOS utilities or applications software as if it were a local hard disk volume. A remote printer is assigned the device name NPRN and can be used as if it were a local printer. Because the devices only appear to be resident at the local node, they are called "virtual devices."

NDU provides virtual disk support through a File Access Listener (FAL) at any remote DECnet node. Virtual disks are single remote files which appear to be entire MS–DOS volumes. A single virtual disk can be used privately for read and write access, or it can be shared for read only access.

The virtual printer device is called NPRN. Any output to this device is forwarded to a remote system and retained until an NDU command is issued to close the file and queue it for printing.

Using NDU, you can:

- Assign a hard disk volume name to a new or existing remote file to be used as a virtual disk volume.
- Stop the use of a remote file as a virtual disk volume.

- Delete a remote disk file which has been used as a virtual disk volume.
- Assign the printer device name NPRN to a disk file at a remote node.
- Stop the use of the virtual printer at the remote node and ask that the saved text file be queued for printing.
- Obtain status information about all assigned hard disk drives and printer devices.

The NDU controls the use of both virtual disks and virtual printers:

- Virtual Disk Volumes

  NDU allows you to access up to four virtual disk volumes at a time. You can access four volumes on the same remote node, one volume on each of four different remote nodes, or any other combination totaling four volumes. Each remote volume is a file that is treated as if it were a hard disk. The file is a binary file on the remote node which contains MS–DOS directories and files.

- Virtual Printers

  NDU allows you to access one virtual printer at a time. The remote node which provides the virtual printer saves any text you output to the printer device NPRN in a temporary file. When you stop your use of the virtual printer, the temporary file is queued to be printed at the default printer on the remote node.

This chapter is divided into two parts:

The first part describes:

- Installing the virtual device drivers (see Section 6.1).
- Controlling virtual disk volumes (see Section 6.2).
- Typing NDU commands to control virtual disk volumes (see Section 6.3).
- Getting help (see section 6.4).
- An NDU command summary (see Section 6.5), followed by a description of each NDU command and its syntax for virtual disks in alphabetical order.
- Special considerations while using NDU for virtual disks (see Section 6.6).

The second part describes:

- Controlling remote printers (see Section 6.7).
- Typing NDU commands to control remote printers (see Section 6.8).
- Getting help (see Section 6.9).
- An NDU command summary (see Section 6.10), followed by a description of each NDU command and its syntax for controlling remote printers in alphabetical order.
- Special considerations while using NDU for virtual printers (see Section 6.11).

6.1 Installing the Virtual Device Drivers

Although NDU controls your use of virtual devices, two other programs actually perform the input and output for you. One program performs operations for virtual disks, while the other performs operations for virtual printers. You must install these programs (device drivers) on the DOS operating system before you can run NDU. If you do not, NDU displays an error message indicating that either the disk driver or the printer driver is not installed. For example:

```
Network printer driver not installed
```

You install the programs when you first install the DECnet–DOS software. The DECnet Installation Procedure (DIP) automatically installs the device driver for you, if you selected this component as part of your configuration. Refer to the appropriate installation guide for more details.

6.2 Using NDU to Control Virtual Disks

Using NDU you can create a disk file on a remote node to be used as a virtual disk volume.

You can create an unlimited number of virtual disks, but only four can be used at any one time.

You enter the NDU utility by using one of the following methods:

- Method A: You enter a command string that includes NDU followed by the name of the specific NDU command, then press (RET).

```
C:\> NDU command RET
```

After each NDU command is executed, the MS–DOS prompt is returned.

```
C:\>
```

This method can also be used for entering commands in batch mode. For instance, you may want to open virtual drives at start-up time. To do this, include the following command in your AUTOEXEC.BAT file:

NDU OPEN NODE *node-name* NDISK *file-name* DRIVE *drive*

NOTE

When you run NDU in batch mode, an ERRORLEVEL of 0 is returned for success. A 1 is returned for failure.

- Method B: You supply the name of the utility, NDU, and press RET. You cannot use this method for submitting NDU commands in batch mode.

```
C:\> NDU RET
```

NDU responds with a start–up message, then displays its own prompt. If you have already opened any virtual disk drives, NDU displays the status of the drives. For example:

```
Network Device Utility (NDU) 2.0
Network Disk Driver Version 2.0
Network Printer Driver is not installed

Disk            Status/ Access Node/ Socket Reads Writes

Drive           Ndisk  User
  G             CLOSED
  H             CLOSED
  I             CLOSED
  J             CLOSED

NDU>
```

Enter the NDU command after the NDU prompt, and press RET. Continue this procedure until you have entered all NDU commands.

```
NDU> command RET
NDU> command RET
NDU> command RET
NDU>
```

You can also start NDU from a window, if you are using MS-Windows. NDU will run under windows as a Class B application.

To exit from NDU, enter the EXIT command and press RET. The system returns with the MS–DOS prompt.

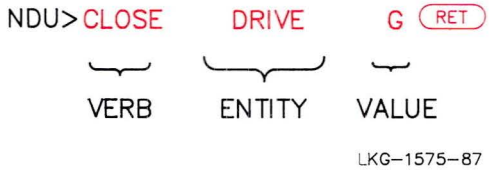
```
NDU> EXIT RET
C:\>
```

You can also use CTRL/Z RET to exit from NDU. While holding down the CONTROL key, press Z. Then press RET.

6.3 Typing NDU Commands

Figure 6–1 shows an example of the parts of an NDU command:

Figure 6–1: An NDU Command



NDU commands act on entities and their values. When using an NDU command, you must provide the command verb, the entity, and the entity value.

6.3.1 Command Verbs

You can abbreviate command verbs to a character string that is unique to that verb. For example, you can type **CRE** for CREATE. However, for clarity and consistency, all examples in this chapter show the full command format.

6.3.2 Entities

Table 6–1 lists the entities that NDU commands act upon when controlling virtual disks. When you specify more than one entity in a command line, use either a space or a tab to separate them.

Table 6–1: NDU Command Entities for Virtual Disks

Entity	Function
ACCESS *access-mode*	is used with the OPEN and CREATE commands to select the operating mode used to access the virtual hard disk. RW access indicates that the disk can be read from or written to, but it cannot be shared. RO access indicates that the disk can be shared, but only for the purpose of reading.
ALLOCATION *n*	specifies the initial disk file size of the virtual disk file (in blocks) on the remote node. The value of *n* is a decimal number. This entity is only valid with the CREATE command.
DRIVE *drive*	specifies a drive name to be treated as a hard disk. The name is one alphabetic character. **The drive name must be one of the names listed by the SHOW STATUS command.** When you start NDU, it displays the drives that are available by indicating they are CLOSED. You can then select G, for example, as the drive name to be used in the DOS commands and functions that address a drive.
MAX *n*	is the maximum size of the virtual disk in megabytes. The value of *n* can be 1, 10, 20, or 32. Note that 32-megabyte disks made under MS–DOS Version 2 are not compatible with 32-megabyte disks made under Version 3.
NDISK *file-name*	identifies the file name associated with a drive name. For example, NDISK MYDISK1.DSK associates the file name MYDISK1.DSK with the drive name that is addressed by a DOS command. The file name can be from 1 to 8 alphanumeric characters. It may include device and directory fields, provided it is properly formatted for the remote node's system type. If you include information for the device and directory fields, the total number of characters you can use in the command line is 127.
NODE *node-name* or *node-address*	identifies and locates the virtual hard disk's resident node. The node name can be from 1 to 6 alphanumeric characters in length and must contain at least one alphabetic character. You can also specify a node address for the remote node. The node's address includes a unique area number and a node number, separated by a period: *area.node* where: *area* is a number in the range of 1 to 63. *node* can be in the range of 1 to 1023.

Table 6–1 (Cont.): NDU Command Entities for Virtual Disks

Entity	Function
USER *access-info*	specifies access control information for a specific remote node. This is the identification information that you enter during log-on at the hard disk's resident DECnet node. Each item in the identification string must be between 1 to 39 alphanumeric characters. The access control string has the following format: USER *user-name* [/*password*[/*account*]] where: *user-name* is the name of the user on the specified remote node. If USER is not specified, the default access control information set by NCP will be used. You can set the default information by using the NCP DEFINE NODE command. For more detailed information about using NCP commands, refer to the *DECnet–DOS Network Management Guide*. *password* is the password you need to access files or programs on the specified remote node. *account* is normally not required by operating systems. Note that account information cannot be supplied unless you supply a specific password as well. If you supply a user name but you do not enter a password, you will be prompted for the password. If you want the characters representing the access information to be stored in uppercase letters, simply type the characters. If you do not want the characters to be stored as uppercase, place the string in double quotation marks. Character strings that are not within quotation marks are forced to uppercase.

6.4 Using the HELP Command

If you need assistance in selecting NDU commands, use the HELP command. Enter the HELP command, then press RET. For example:

```
NDU>HELP RET
```

To obtain information about one of the subjects listed, enter HELP again plus a subject. Then press RET. For example:

```
NDU>HELP SHOW RET
```

6.5 NDU Command Summary for Virtual Disks

NDU provides you with command verbs that allow you to control the use of remote files as virtual disk volumes. Table 6–2 lists each NDU command and its function. The remainder of this section discusses each command in alphabetical order.

Table 6–2: NDU Commands for Virtual Disks

Command	Function
CLOSE	Requests that an existing connection to a virtual hard disk be terminated.
CREATE	Instructs NDU to create and open a new remote file and format it to be treated as a virtual hard disk.
DELETE	Deletes a remote file which had been used as a virtual hard disk.
HELP	Displays a message explaining the use of the NDU command and the meaning of the command parameters.
OPEN	Requests a connection to an existing hard disk.
SHOW	Displays the activity and current state of all virtual hard disks and the virtual printer. A status report is also displayed at the completion of other function requests.

CLOSE

The CLOSE command ends the connection between the specified drive and the virtual disk file on the remote node.

Format

CLOSE DRIVE *drive*

or

CLOSE NODE *node-name* NDISK *file-name*

where

drive

is one alphabetic character that specifies the virtual drive to be acted upon.

node-name

identifies and locates the virtual hard disk's resident node. The node name must be from 1 to 6 alphanumeric characters, including at least 1 alphabetic character.

You can also specify a *node-address* for the remote node. Refer to Table 6–1 to see how the node address is formatted.

file-name

specifies the name of the file that is the virtual disk on the remote node. The file name can consist of 1 to 8 alphanumeric characters. It may include device and directory fields, provided it is properly formatted for the remote node's system type. If you include information for the device and directory fields, the total number of characters you can use in the command line is 127.

Example

```
NDU>CLOSE DRIVE G (RET)
```

CLOSE

This command ends the connection between the local node and the remote hard disk drive G. Any subsequent operations to drive G result in the following error message:

```
Not ready error reading drive G
Abort, Retry, Ignore?
```

CREATE

The CREATE command creates and formats a new remote data file, which is treated as a hard disk, and establishes a connection between a volume name at your local node and the file.

Format

CREATE NODE *node-name* NDISK *file-name* [DRIVE *drive* | USER *access-info* | ACCESS {RW | RO} | ALLOCATION *n* | MAX *n*]

where

node-name

identifies and locates the virtual hard disk's resident node.

file-name

identifies the file name associated with a drive name.

drive

specifies the name for a drive to be treated as a hard disk. The name consists of one alphabetic character. You should use the NDU SHOW command to list available names for the disk. Only the names for closed drives can be used. The default is the next available drive.

access-info

indicates access control information for a specific remote node. If the access control information is omitted, the access data specified with NCP is used instead. (See the entry under USER in Table 6–1 for a description of access control information.)

RW or RO

identifies the operating mode for accessing the virtual disk. RO specifies that the disk can be shared, but only for the purpose of reading. RW specifies that the disk can be read from or written to, but it cannot be shared. The default is RW.

ALLOCATION *n*

specifies the initial disk file size in blocks of the virtual disk file on the remote node. The value of *n* is a decimal number greater than the minimum virtual disk size. The default is the minimum size.

MAX *n*

specifies the maximum size to which the virtual disk can grow in megabytes. The value of *n* in this case may be 1, 10, 20, or 32. The default is 32.

Remarks

The following message is displayed while NDU is creating a new virtual hard disk file. It is an informational message only. The number of blocks displayed on the screen changes as the file is being created.

```
CREATE DISK Writing Block n
```

Following a CREATE request, NDU displays status information about the hard disk. The information is followed by the NDU> prompt.

As you write files to a virtual disk, free space in the current file is used first. The file is then extended as necessary until the maximum size is reached. Deleting files from the virtual disk will not reduce the size of the virtual disk file. To reduce the size of a virtual disk file from which MS–DOS files have been deleted, you must create a new virtual disk and copy all files from the old disk to the new disk.

Example

```
NDU>CREATE DRIVE G NODE DUBLIN NDISK ACCTDEPT.TXT USER ROCKY (RET)
```

This command creates a new remote file named ACCTDEPT.TXT to be treated as a virtual hard disk, drive G. Future access to this hard disk may be restricted to USER JONES, depending on the specified access control information.

If DRIVE G already existed and was open, the following error message would be displayed:

```
Drive "G" is already OPEN: CREATE function not done.
```

DELETE

The DELETE command deletes an existing virtual disk file on a remote node.

Format

DELETE NODE *node-name* NDISK *file-name* [USER *access-info*]

or

DELETE DRIVE *drive*

where

node-name

identifies and locates the virtual hard disk's resident node.

file-name

identifies the hard disk's file name.

access-info

indicates access control information for a specific remote node. If the access control information is omitted, the access data specified with NCP is used instead. (See the entry under USER in Table 6–1 for a description of access control information.)

drive

is one alphabetic character that specifies the virtual drive to be acted upon.

Remarks

After a DELETE request, NDU displays status information about all the drives. It also displays a message requesting verification that you want to delete the specified drive. For example:

```
"Are you sure (y/n)?"
```

The information is followed by the NDU> prompt.

Example

```
NDU> DELETE NODE MUNICH NDISK TEMPDISK.TXT (RET)
```

This command deletes a file named TEMPDISK.TXT at node MUNICH. If a drive was opened with the specified virtual disk, this command closes the drive. The drive is now available for use with another virtual disk.

HELP

The HELP command displays information about NDU commands and entities.

Format

HELP [*command-verb* | *entity*]

where

command-verb

is the NDU command for which you want information.

entity

is the NDU entity for which you want information.

Examples

```
NDU> HELP (RET)
```

The system displays a list of all NDU commands and entities for which help information is available.

```
OPEN   CLOSE   DELETE   CREATE   SHOW     EXIT   HELP
NODE   USER    DRIVE    NDISK    NPRINT   MAX    ACCESS   ALLOCATION
```

```
NDU> HELP CREATE (RET)
```

The system displays help information for the CREATE command.

OPEN

The OPEN command establishes a connection between your local node and an existing virtual hard disk at a remote DECnet node.

Format

OPEN NODE *node-name* NDISK *file-name* [DRIVE *drive* | USER *access-info* | ACCESS {RW | RO}]

where

node-name

identifies and locates the virtual hard disk's resident node.

file-name

identifies the file name associated with a drive name.

drive

refers to a drive name to be treated as a hard disk. The default is the next free drive.

access-info

indicates access control information for a specific remote node. If the access control information is omitted, the access data specified with NCP is used instead. (See the entry under USER in Table 6–1 for a description of access control information.)

RW or RO

identifies the operating mode for accessing the virtual disk. RO specifies that the disk can be shared, but only for the purpose of reading. RW specifies that the disk can be read from or written to, but it cannot be shared. The default is RW.

Remarks

Following an OPEN request, NDU displays status information about the hard disk followed by the NDU> prompt.

Example

```
NDU>OPEN DRIVE G NODE DUBLIN NDISK ACCTDEPT.TXT (RET)
```

This command opens a connection between the local node and the remote DECnet node DUBLIN. At that node, an existing file named ACCTDEPT.TXT is opened for READ WRITE access. All subsequent operations directed to the hard disk drive G are sent to ACCTDEPT.TXT at node DUBLIN. If the file does not exist, the OPEN operation fails and the following error message is displayed:

```
OPEN function failed: the remote server could not find that file.
```

If the drive was already in use, the following error message is displayed:

```
Drive name is already OPEN, cannot OPEN it again.
```

If the file on the drive was already open for a create function, the following error message is displayed:

```
OPEN function failed: requested ACCESS conflicts with another's
use of the file
```

SHOW

The SHOW command causes NDU to report on the status of all virtual disks and the virtual printer.

Format

SHOW STATUS

Remarks

You can display system status information through the use of DOS commands such as DIR and CHKDSK.

Example

```
NDU>SHOW STATUS (RET)
```

Sample output from this command appears as follows:

```
Disk   Status/   Access   Node/    Socket   Reads     Writes
Drive  Ndisk              User

E      CLOSED
F      OPEN      RW       DUBLIN   6        241       68
       ND01.NVD           JONES/PASSWORD
G      CLOSED
H      CLOSED


Printer   Status/   Node   Socket/    Writes
Device    Nprint           User

NPRN      CLOSED
```

This display includes the following information:

- The name of the disk drive.
- The drive's status – OPEN or CLOSED.
- The file name.
- The ACCESS mode – read or write.

- The NODE name, the USER name, and any account information.
- The number of the SOCKET you are connected to. (DECnet assigns you to a socket.)
- The number of completed READ operations.
- The number of completed WRITE operations.
- The name of the printer.
- The printer's status – OPEN or CLOSED.

The USER and account information are displayed if you have specified them in the CREATE or the OPEN command. If you do not specify this information and it is obtained from the NCP database, it is not displayed.

6.6 Special Considerations While Using Virtual Disks

While using NDU to control virtual disks, you should be aware of the following information:

- When you issue an NDU CLOSE command for a remote virtual disk file residing on a personal computer that is running FAL, FAL will report an error message. This is only a warning; no error has occurred.

- The DELETE command will fail if you create a virtual disk file with one NDISK file specification and then attempt to delete the virtual disk file with the following command:

  DELETE NODE *node* NDISK *file*

  Always delete the virtual disk (if it is connected) using the same file specification that you used to create the disk.

- After you issue an NDU DELETE command, NDU now prompts you for confirmation in the MS–DOS style:

  ```
  Are you sure (Y/N)?
  ```

In previous versions of DECnet–DOS, the virtual disk facility was experiencing the following problems:

1. 32-megabyte disks created under MS–DOS or PC DOS Version 2 systems are not usable from MS–DOS or PC DOS Version 3 systems. (The opposite of this is also true: 32-megabyte disks created on MS–DOS or PC DOS Version 3 systems are not usable from MS–DOS or PC DOS Version 2 systems.)

DECnet–DOS Version 2.0 solves both of these problems with the following:

- All 1.2-megabyte, 10-megabyte, and 20-megabyte virtual disks created by DECnet–DOS Version 1.1 remain usable in all configurations.

- All 32-megabyte virtual disks created by DECnet–DOS Version 1.1 under MS–DOS or PC DOS Version 3 systems will remain usable on any Version 3 system. These disks are not usable from MS–DOS or PC DOS Version 2 systems.

6.6.1 Using FIXNVD

If you created 32-megabyte virtual disks with DECnet–DOS Version 1.1 (using MS–DOS or PC DOS Version 2 systems), those disks will not be usable with DECnet–DOS Version 2.0 until you repair them using the FIXNVD utility. The FIXNVD utility is automatically installed by the DECnet–DOS Installation Procedure, DIP. The file name for this utility is FIXNVD.EXE.

If you attempt to open a Version 1.1 virtual disk with Version 2.0, NDU generates the following error message:

```
Cannot OPEN this disk created with an older release of DECnet.
Run FIXNVD first.
```

To use the FIXNVD utility, first make a copy of your virtual disk file. For example:

```
$ COPY V11DISK1.FIL V11DISKBU.DSK (RET)
```

Now you can run FIXNVD on the new file. This is the syntax for using FIXNVD:

FIXNVD *node*[*/user/password/account*] *backup-disk-name*

Example 1:

```
$ COPY VDISK.DSK DISK.007 (RET)
```

(on VMS node VMSNOD)

```
C> FIXNVD VMSNOD DISK.007 (RET)
```

(on your PC)

Example 2:

```
$ COPY VDISK.DSK DISK$07:[SMITH.DISKS]PAYROLL.DAT (RET)
```

(on VMS node REMOTE)

```
C> FIXNVD REMOTE/SMITH/HARP DISK$07:[SMITH.DISKS]PAYROLL.DAT (RET)
```

(on your PC)

FIXNVD will not write to a file unless it is a proper candidate for repair.

NOTE

FIXNVD will make the files and directories allocated in excess of 33,439,744 bytes inaccessible. In fixing the bug and making Version 2 and Version 3 disks compatible, FIXNVD must shrink the maximum size of 32-megabyte disks. Any files or directories written when the disk volume was filled in excess of 33,439,744 bytes will become inaccessible. Run CHKDSK to determine if this has happened:

CHKDSK D:

If the disk volume is filled, reinstall DECnet–DOS Version 1.1 (or just NDU.EXE and NDDRV.SYS from DECnet–DOS Version 1.1) and restore the backed-up virtual disk. Copy the files from the backed-up disk to two new virtual disks, then reinstall DECnet–DOS Version 2.0.

6.7 Using NDU to Control Remote Printers

NDU allows you to direct text to a remote node to be queued for printing. You enter NDU by using one of the following methods:

- Method A: Enter a command string that includes NDU followed by the name of the specific NDU command. Press RET.

  ```
  C:\> NDU command RET
  ```

  After each NDU command is executed, the MS–DOS prompt is returned.

  ```
  C:\>
  ```

  This method can also be used for entering commands in batch mode.

NOTE

When you run NDU in batch mode, an ERRORLEVEL of 0 is returned for success. A 1 is returned for failure.

- Method B: You supply the name of the utility, NDU, and press (RET). You cannot use this method for submitting NDU commands in batch mode.

  ```
  C:\> NDU (RET)
  ```

  NDU then responds with its own prompt.

  ```
  NDU>
  ```

  Enter the NDU command after the NDU prompt, and press (RET). Continue this procedure until you have entered all NDU commands.

  ```
  NDU> command (RET)
  NDU> command (RET)
  NDU> command (RET)
  NDU>
  ```

  You can also start NDU from a window, if you are using MS-Windows. NDU will run under windows as a Class B application.

  To exit from NDU, enter the EXIT command and press (RET). The system returns with the MS–DOS prompt.

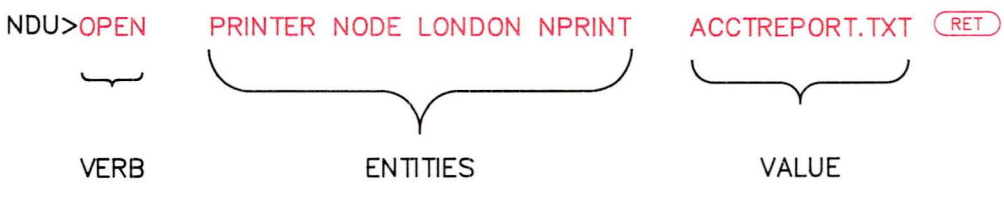
  You can also use (CTRL/Z)(RET) to exit from NDU. While holding down the CONTROL key, press the letter Z key. Then press (RET).

  ```
  NDU>EXIT (RET)
  C:\>
  ```

6.8 Typing NDU Commands

Figure 6–2 shows an example of the parts of an NDU command:

Figure 6–2: Parts of an NDU Command



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NDU commands act on entities and their values. When using an NDU command, you must provide the command verb, the entity, and the entity value.

6.8.1 Command Verbs

You can abbreviate command verbs to a character string that is unique to that verb. For example, you can type **CRE** for CREATE. However, for clarity and consistency, all examples in this chapter show the full command format.

6.8.2 Entities

Table 6–3 lists the entities that NDU commands act upon when controlling remote printers. When you specify more than one entity in a command line, use either a space or a tab to separate them.

Table 6–3: NDU Command Entities for Remote Printers

Entity	Function
NODE *node-name*	identifies and locates the printer's resident node. The node name can be from 1 to 6 alphanumeric characters in length and must contain at least one alphabetic character.
NPRINT *file-name*	specifies the name of the file which will contain the text sent to the virtual printer before it is queued for printing on the remote node. The file name can consist of 1 to 8 alphanumeric characters. It may include device and directory fields, provided it is properly formatted for the remote node's system type. If you include information for the device and directory fields, the total number of characters you can use in the command line is 127.

Table 6–3 (Cont.): NDU Command Entities for Remote Printers

Entity	Function
USER *access-info*	specifies access control information for a specific remote node. This is the identification information required to access the print file on the remote node. Each item entered must be between 1 and 39 alphanumeric characters. The access control string has the following format: USER *user-name* [/*password*[/*account*]] where *user-name* is the name of the user on the specified remote node. If USER is not specified, default access control information set by NCP will be used. You can set the default information by using the NCP DEFINE NODE command. For more detailed information about NCP commands, refer to the *DECnet–DOS Network Management Guide*. *password* is the password you need to access files or programs on the specified node. *account* is a 1 to 39 alphanumeric character string that consists of account information. Note that account information cannot be supplied unless you supply a specific password as well. If you supply a user name but you do not enter a password, you will be prompted for the password. If you want the characters representing the access information to be stored in uppercase letters, simply type the characters. If you do not want the characters to be stored as uppercase, place the string in double quotation marks. Character strings that are not within quotation marks are forced to uppercase.

6.9 Using the HELP Command

If you need assistance in selecting NDU commands, use theHELP command. To view the list of HELP topics, type HELP and press RET. For example:

```
NDU> HELP RET
```

To obtain information about a specific subject, type the HELP command and a topic. Then press RET. For example:

```
NDU> HELP OPEN RET
```

6.10 NDU Command Summary for Remote Printers

NDU provides you with commands that allow you to direct text to a remote node to be queued for printing. Table 6–4 lists each NDU command and its function. The remainder of the chapter discusses each command in alphabetical order.

Table 6–4: NDU Commands for Remote Printers

Command	Function
CLOSE	Requests that NDU end an existing connection to a remote print file and queues it for printing and deletion.
CREATE and OPEN	Instructs NDU to create a remote printer file and make it ready for use.
HELP	Displays a message explaining the use of the NDU command and the meaning of the command parameters.
SHOW	Displays the activity and current state of the virtual disks and the virtual printer.

CLOSE

The CLOSE command ends the connection between the device NPRN and the file on the remote node. The file is then queued to be printed on the remote printer. After the file is printed, it is deleted.

Format

CLOSE PRINTER

Example

```
NDU> CLOSE PRINTER (RET)
```

This command ends the connection between the device NPRN and the printer on the remote node. Any subsequent operations sent to the printer device result in the following error message:

```
Not ready error writing device NPRN
Abort, Retry or Ignore?
```

CREATE and OPEN

The CREATE and OPEN commands function in the same way.

The CREATE and OPEN commands create a new virtual printer file and make it ready for use. The printer file is created and then linked to the device NPRN.

Format

CREATE PRINTER NODE *node-name* [NPRINT *file-name*] [USER *access-info*]

OPEN PRINTER NODE *node-name* [NPRINT *file-name*] [USER *access-info*]

where

node-name

identifies and locates the printer's resident node.

file-name

specifies the name of the remote printer file. If you omit *file-name*, a name for the remote printer file is created.

access-info

specifies access control information for the remote node. If the access control information is omitted, the access data specified with NCP is used instead. (See the entry under USER in Table 6–3 for a description of access control information.)

Remarks

Following a CREATE or OPEN request, NDU displays status information about the printer queue followed by the NDU> prompt.

Examples

```
NDU>CREATE PRINTER NODE DUBLIN NPRINT DEMO.TXT USER JONES (RET)
```

This command creates a file named DEMO.TXT to be printed at the remote DECnet node DUBLIN.

```
NDU>OPEN PRINTER NODE PARIS NPRINT LETTER.TXT USER SAM (RET)
```

This command creates a file named LETTER.TXT to be printed at the remote DECnet node PARIS.

HELP

The HELP command displays information about NDU commands on your screen.

Format

HELP [*command-verb* | *entity*]

where

command-verb

is an NDU command for which you want help information.

entity

is an NDU entity for which you want help information.

Examples

```
NDU> HELP (RET)
```

The system displays a list of all NDU commands and entities for which help information is available:

```
OPEN   CLOSE   DELETE   CREATE   SHOW     EXIT   HELP
NODE   USER    DRIVE    NDISK    NPRINT   ALLOCATION   ACCESS
```

```
NDU> HELP CREATE (RET)
```

The system displays help information for the CREATE command.

SHOW

The SHOW command causes NDU to report on the status of all virtual disks and the virtual printer.

Format

SHOW STATUS

Example

```
NDU>SHOW STATUS (RET)
```

Sample output from this command appears as follows:

```
Disk    Status/    Access    Node/    Socket    Reads      Writes
Drive   Ndisk                User

H       CLOSED
I       CLOSED
J       CLOSED
K       CLOSED

Printer    Status/    Node    Socket/     Writes
Device     Nprint             User

NPRN       OPEN               1            0
           155551.TXT

NDU>
```

This display includes the following information:

- The name of the disk drive.
- The drive's status – OPEN or CLOSED.
- The file name.
- The ACCESS mode – read or write.
- The NODE name, USER name and account information string (no information displayed here).

- The number of the SOCKET you are connected to. (DOS assigns you to a socket.)
- The number of completed READ operations.
- The number of completed WRITE operations.
- The name of the printer.
- The printer's status – OPEN or CLOSED.

The USER and account information are displayed if you have specified them in the OPEN or the CREATE command. If you do not specify this information and it is obtained from the NCP database, it is not displayed.

7

Using DECnet–DOS Mail

The DECnet-DOS Mail utility lets you send messages and text files to users on other nodes or systems in the DECnet network. Note that Mail can only send messages and text to remote nodes. You cannot receive mail at your local node.

7.1 Running the Mail Utility

The first time you start the Mail utility, you are prompted for information. The Mail program uses this information each time it runs. The information is stored in the initialization file MAIL.DAT in the DECnet directory. If the file does not exist when you start Mail, the program asks you a series of questions and creates it with your answers. You can edit the information in MAIL.DAT at any time using a text editor. You can view the information in MAIL.DAT with the SHOW DEFAULTS command when you run Mail.

The initialization file can contain some or all of these mail parameters:

- REPLY_ADDRESS = *node-name::user-name*
- DEFAULT_NODE = *node-name*
- CARBON_COPY = *node-name::user-name*
- EDITOR = *path-name*
- PERSONAL_MESSAGE = a line of text

The following sections describe these parameters in more detail.

7.1.1 REPLY_ADDRESS

A DECnet-DOS node cannot receive mail from other nodes. In order for users to respond to mail that is sent from your node, they must have a way to return or send messages to you. The DECnet-DOS Mail utility provides a way for other users to send mail to you on a different node by using the REPLY_ADDRESS parameter.

You must define the REPLY_ADDRESS parameter when you first run the Mail utility. If not, other users will not know where to send their replies. The address consists of a node name and a user name. The node name can be any node that you want to use for receiving mail. The user name should be a name that identifies you as a valid user on the specified node.

When other users receive mail from you, the REPLY_ADDRESS appears as part of the "SUBJ:" field in your message. The node name and user name are included in the "Reply to" field. Mail also includes the node address on the same line, in the "From" field just before the "Reply to" field.

For example:

```
FROM:  MSDOS::TURK::BROOKS
TO:    BURGER::PORTER
SUBJ:  GROUP MEETING "From 55.261, Reply to TURK::BROOKS"
```

In this example, the REPLY_ADDRESS is TURK::BROOKS. (The node number in this case is 55.261.) The same node name and user name appear in the first "FROM:" field. (MSDOS is the name of your local node.) The return address in the "FROM:" field may vary depending on whether or not your message had to be routed through another node. However, the "Reply to" field does not change. For this reason, the person responding to your message should always use the information in the "Reply to" field.

If you do not define a REPLY_ADDRESS, the "FROM:" field will reflect only the default name DECNETDOS. For example:

```
FROM:  MSDOS::DECNETDOS
TO:    BURGER::PORTER
SUBJ:  GROUP MEETING
```

As indicated in this example, the user PORTER will not be able to answer your mail message because the necessary information has been omitted. Be sure to include both a node name and your user name when you define the REPLY_ADDRESS.

7.1.2 DEFAULT_NODE

If you often send mail to the same node, you can shorten the address for that node by defining it as the DEFAULT_NODE. Once you have defined the DEFAULT_NODE in MAIL.DAT, you can send mail to any user on that node simply by specifying the user name. For example, you can define the DEFAULT_NODE as SPAGS by entering it in MAIL.DAT as follows:

DEFAULT_NODE = SPAGS

Whenever you send mail from your personal computer node to a user on SPAGS, just include the user's name in the "TO:" field. For example:

```
MAIL>SEND (RET)
TO:     SAM,JOHN,DAVID (RET)
SUBJ:   Lab work
```

In this example, Mail first searches MAIL.DAT for the name of your DEFAULT_NODE. When it finds the name SPAGS, it automatically sends your message to the users SAM, JOHN, and DAVID on node SPAGS.

You can also use the DEFAULT_NODE for routing mail messages. If you want to send mail to a node that is not defined in your NCP database, the mail program will use the DEFAULT_NODE to route your message to the desired node. For example:

```
MAIL>SEND (RET)
TO:     BJARN::ANDERSON (RET)
SUBJ:   Weekly report
```

In this example, the node BJARN is a node that is not defined in the NCP database. In order to send your message to this address, the mail sender program requests that the DEFAULT_NODE (SPAGS) forward the message to the user ANDERSON on node BJARN.

If you do not define a DEFAULT_NODE, the mail sender program cannot route your mail messages. In addition, you will not be able to use the shortened form for mail addresses. You will have to include both the node name and the user name for any messages that you send.

7.1.3 CARBON_COPY

CARBON_COPY is the address to which a copy of your mail message is sent. Each time you send a mail message, a copy of that message will be sent automatically to the CARBON_COPY address. This address requires both a node name and a user name. For example, you can define the CARBON_COPY address as DELON::BRIAN by entering it in MAIL.DAT as follows:

```
CARBON_COPY = DELON::BRIAN
```

Now, whenever you send mail to another user, a copy of that mail will automatically be sent to the user BRIAN on node DELON. This node does not appear anywhere in your message. For example:

```
MAIL>SEND (RET)
TO:     FORLRN::PETER (RET)
SUBJ:   Corrected problems
```

In this example, your message is sent to the user PETER on node FORLRN as well as to the user BRIAN on node DELON.

7.1.4 EDITOR

EDITOR specifies the complete path name for the editor that the mail program will use when you want to edit mail messages. You must include the /EDIT switch with a mail command if you want to edit a message or a text file before you send it.

7.1.5 PERSONAL_MESSAGE

The PERSONAL_MESSAGE is a message that other users see whenever you send them mail. The message can contain your name and phone number, or it can be any other descriptive text you wish to create. For example, you can create a message containing your name and phone extension by entering it in MAIL.DAT as follows:

```
PERSONAL_MESSAGE = "Fred at ext 7227"
```

When you send a mail message, your personal message appears as part of the "FROM:" field. For example:

```
FROM:   MSDOS::TURK::BROOKS    "Fred at ext 7227"
TO:     BURGER::PORTER
SUBJ:   Group Meeting "From 55.261, Reply to TURK::BROOKS"
```

7.2 Starting the Mail Utility

To start the Mail utility, enter a mail command. You can enter commands using either of two methods:

1. Enter a command directly from the command line. This method allows you to include one or more of the following qualifiers with your command:

   - The subject of your message (or a description of a file if you are sending one).
   - The name of a file (if you are sending one).
   - The address of the person who will receive your message or file.

2. Enter a command after the Mail prompt (MAIL>). This method allows you to include a subject, a file name, and an address, or to be prompted for this information. In addition, you have the option of editing the mail message or file before you send it.

You can also start the Mail utility from a window, if you are using MS-Windows. Mail will run under windows as a Class B application. (There is a MAIL.PIF file included on your kit that allows you to run Mail as a Class B application.)

7.2.1 Entering Mail Commands from the Command Line

When you enter mail commands from the command line, you can include the name of a file that you want to send as well as the address of the person who will receive the file. For example:

```
C:\>MAIL ACCTRPT.TXT BARKER::JONES RET
```

This command sends the file, ACCTRPT.TXT, to the user JONES on the node BARKER.

You can also include a subject for the file you want to send. For example:

```
C:\>MAIL/SUBJECT="Here is the accounting report you requested" LF
ACCTRPT.TXT BARKER::JONES RET
```

(Note that you must include LF if the command continues on to more than one line.)

If you do not include an address for sending a message, the program requests the information by issuing the "TO:" prompt. For example:

```
C:\>MAIL/SUBJECT="Here is your accounting report" ACCTRPT.TXT (RET)
TO:
```

If you do not enter a subject, a file name, or an address, the Mail program responds with its prompt, MAIL>. For example:

```
C:\>MAIL (RET)
MAIL>
```

7.2.2 Entering Mail Commands from the Mail Prompt

If the Mail prompt (MAIL>) is already on the screen in front of you, you can enter mail commands. You can type either MAIL or SEND to send a mail message. The program prompts you for an address and then a subject. For example:

```
MAIL>MAIL (RET)
TO:    JIMINY::BOOKER (RET)
SUBJ:  Procedures (RET)
```

You can also type MAIL or SEND followed by the name of a file that you want to send. The program prompts you for an address and a subject. For example:

```
MAIL>SEND RECEIPTS.DAT (RET)
TO:    CURTIN::JONES (RET)
SUBJ:  You need these figures for your report (RET)
```

7.3 Using Distribution Lists

Distribution lists transmit mail messages to a previously defined group of people. This saves having to retype a list of names each time you send mail to the people on the list.

If you frequently send mail to the same people, you can place their names in a distribution list file. When you then specify the list file as the destination for your mail message, the mail sender forwards the message to all of the names and addresses in the file. You can use this file as an addition to the names you have already indicated in the "TO:" field.

The distribution list file contains each user's mailing address. The address consists of the user's node name and user name. The node name and the user name are always separated by a double colon (::), and each address is on a separate line in the file.

The following is a sample distribution list:

```
BURGER::DEERE
SMAAG::JOHNS
ANTICS::M_OLDFIELD
ABRUPT::VOLKER
NARDON::G_HART
```

To create a distribution list file, use an editor that is installed in your system. (Refer to the appropriate user's guide for the type of editor you are using.) Enter the node names and user names of the people to whom you will be sending mail. Be sure to separate the node name and the user name with two colons (::), and enter each address on a separate line.

You can also supply a user name without the node name and double colon. If you do so, Mail will use the DEFAULT_NODE to send your message.

If you do not want mail to go to some of the people in your distribution list, you can edit the list to eliminate their names temporarily. To do this, simply place an exclamation mark (!) in front of their names. The next time you specify the distribution list, the mail program will skip over their names and will not send your message to those users. Later, if you want to change the list to include the people you previously excluded, simply edit the file and remove the exclamation marks.

The following is a sample distribution list file with two names temporarily omitted from the list.

```
!BURGER::DEERE
SMAAG::JOHNS
ANTICS::M_OLDFIELD
!ABRUPT::VOLKER
G_HART
```

In this sample, the users DEERE and VOLKER on nodes BURGER and ABRUPT will not receive your mail message.

To send mail using a distribution list file, enter the at sign (@) and the name of your distribution list file in the "TO:" field.

For example:

```
MAIL>SEND [RET]
TO:     FRANCE::MORGAN,WINTER::G_SMITH,@DEPART.LIS [RET]
SUBJ:   Previous Month's Earnings
```

In this example, the name of the distribution list file is DEPART.LIS. While you can use several names and addresses in the "TO:" field, you can only include one distribution list file for each message you send. DECnet-DOS does not support multiple or nested distribution lists.

When using distribution list files, make sure the particular file you want to access is in the current directory. If it is not, then you must also indicate the name of the directory which contains the distribution list file you want to use.

7.4 Using Qualifiers

You can use the qualifiers /EDIT and /SUBJECT with the MAIL and SEND commands. These qualifiers can be used alone or combined together. /EDIT lets you edit the mail message before you send it. This qualifier invokes the editor you have on your system. /SUBJECT lets you include the subject of your message at the same time you enter the mail command, which bypasses the need for the SUBJECT: prompt. The following examples illustrate different possibilities for using /EDIT and /SUBJECT.

Example 1:

```
MAIL>MAIL/EDIT (RET)
TO:    RENEWS::TAILOR (RET)
SUBJ:   New information for you (RET)
```

After you press (RET) (once you have completed the subject line), the program invokes the editor and clears the screen for you to enter the text of your message.

Example 2:

```
MAIL>SEND/SUBJECT="New information for you" (RET)
TO:    RENEWS::TAILOR (RET)
```

After you press (RET) (once you have completed the address line), you can enter the text of your message on the line immediately following the address.

Example 3:

```
MAIL>SEND/EDIT/SUBJECT="New information for you" (RET)
TO:    RENEWS::TAILOR (RET)
```

After you press (RET) (once you have completed the address line), the program invokes the editor and clears the screen for you to enter the text of your message.

7.5 Getting Help for Mail

Help is available for the Mail utility by typing HELP at the mail prompt. For example:

```
MAIL>HELP (RET)
```

You can get help on the following topics:

```
EXIT                    SEND
INIT FILE               SEND EXAMPLES
MAIL                    SHOW DEFAULTS
MAIL EXAMPLES
```

Information is also available for the following mail qualifiers:

```
/EDIT
/SUBJECT
```

To see HELP text for a specific topic, type HELP followed by the topic. For example:

```
MAIL>HELP INIT FILE (RET)
```

This command displays information about the initialization file.

7.6 Mail Command Summary

The Mail utility provides the following commands for sending mail messages:

```
EXIT
HELP
MAIL
SEND
SHOW  DEFAULTS
```

The following sections describe each of the mail commands in alphabetical order.

EXIT

The EXIT command causes you to leave the Mail utility.

Format

EXIT

Examples

In the following examples, the Mail program ends and you return to the prompt or drive you were using previously.

```
MAIL>EXIT (RET)
C:\>
```

or

```
MAIL>(CTRL/Z) (RET)
C:\>
```

HELP

HELP provides information about the Mail utility. HELP topics and qualifiers include:

/EDIT	SEND
INIT FILE	SEND EXAMPLES
EXIT	SHOW DEFAULTS
MAIL	/SUBJECT
MAIL EXAMPLES	

Format

HELP [*topic*]

Examples

To view the HELP file, type HELP at the mail prompt. For example:

```
MAIL> HELP (RET)
```

To view information for a specific topic, type HELP followed by the topic. For example:

```
MAIL> HELP SEND (RET)
```

This command displays information about how to send mail.

MAIL and SEND

Both the MAIL command and the SEND command allow you to send mail messages and text files to other users in the network. These commands may be used interchangeably.

Note that you can send text files only using mail. You cannot send binary, 8-bit ASCII, or image files as mail messages. If you attempt to send these types of files, Mail will not display an error message. It will forward the files to the node you specify; however, the information in the files may be corrupted. Also, if you attempt to send a non-ASCII text file as a mail message, MAIL will not produce a useful error message. Instead, it will behave erratically.

Format

MAIL[/*switch*] [*file-name*]

where

/*switch*	is a valid MAIL (or SEND) switch. The valid switches are: /EDIT /SUBJECT
file-name	is the name of a text file to be sent as a mail message.

Remarks

To use the SEND or the MAIL command, type either command at the mail prompt. The Mail utility will first prompt you (with the "TO:" prompt) for the name of the user (or users) who will receive your message. You can include one or several user names, as well as the name of a distribution list file. The following example requests a mail message to be sent to the user MORGAN on node FRANCE, the user G_SMITH on node WINTER, and the addresses in the distribution list file DEPART.LIS.

```
MAIL>S
TO:SEND (RET)
SUBJ:FRANCE::MORGAN,WINTER::G_SMITH,@DEPART.LIS (RET)
```

The utility prompts you for the subject of your message (with the "SUBJ:" prompt).

You can avoid the "SUBJ:" prompt by specifying the /SUBJECT qualifier when you first enter the command. For example:

```
MAIL> SEND/SUBJECT="Previous Month's Earnings" (RET)
TO:     FRANCE::MORGAN,WINTER::G_SMITH,@DEPART.LIS (RET)
```

The /SUBJECT qualifier can be followed either by a colon (:) or by an equal sign (=). The text of the subject must be enclosed in quotation marks (" ").

You can include a file specification with SEND or MAIL. This allows you to send a copy of a file to users on other nodes. For example:

```
MAIL> MAIL/SUBJECT="Monthly Report"  MARCH.DAT (RET)
TO:     GUEST::GAMBOL (RET)
```

This command sends the file MARCH.DAT to the user GAMBOL on node GUEST. The subject of the file is "Monthly Report".

If you want to edit your message or file before you send it, use the /EDIT qualifier. /EDIT calls in the editor you specified when you first set up your Mail options. When you include this qualifier, the Mail utility clears the screen for you to enter the text of your message. If you are editing a file before sending it, the text of the file appears on the screen. When you have completed your edits, leave the editor. The mail message (or file) is then sent to all of the users you specified in the "TO:" field.

SHOW DEFAULTS

The SHOW DEFAULTS command displays the options that you have defined in your mail initialization file (MAIL.DAT). This command is useful for checking which of the mail parameters you have already defined, and whether they need to be changed or deleted.

Format

SHOW DEFAULTS

Example

```
MAIL>SHOW DEFAULTS (RET)
```

Mail displays the information from MAIL.DAT. For example:

```
REPLY_ADDRESS = DELON::P_JONES
DEFAULT_NODE = DELON
CARBON_COPY = DELON::P_JONES
EDITOR = EDT
PERSONAL_MESSAGE = PAJ on node MERGER
MAIL>
```

8

Using FAL to Provide Remote File Access to Your Node

This chapter describes the File Access Listener (FAL). The FAL utility provides a way for you to let other nodes access files on your node. The purpose of this utility is to listen for and receive remote access requests from the network. These requests are the results of file access routines from other nodes in the network (such as NFT on another personal computer node or a COPY command from a DECnet-VAX system).

When FAL detects a request to copy a file to or from your node, it first determines if access checking has been enabled on your local system. (Access checking is enabled if the file DECACC.DAT exists in the DECnet database path. The file is created the first time you use the NCP SET ACCESS command. For more information about using NCP and NCP commands, refer to the *DECnet-DOS Network Management Guide*.) If access checking is not enabled, your system's files are available to any and all incoming access requests while FAL is running.

NOTE

If you issue the NCP command CLEAR ACCESS, the DECACC.DAT file is deleted. If you clear all entries with the NCP command CLEAR ACCESS USER *user*, the DECACC.DAT file will still exist, but it will not contain any entries. If this happens, FAL will do access checking but it will now allow access to any users.

If access checking is enabled, then FAL checks the type of access privilege contained in the incoming request. If the request has the proper privilege for access to your node, FAL sends or receives the file data to or from the requesting node.

NOTE

MS-DOS systems do not retain file attributes with files. As a result, when FAL is asked by a remote node for the attributes of a file on the personal computer, it cannot determine what those attributes are.

8.1 Starting FAL

FAL must be running on your system or must be run by the Job Spawner (see Chapter 9) before any exchanges of file data can take place. In addition, since MS-DOS is a single-tasking operating system, you must run FAL to the exclusion of all other application programs.

You can use FAL in two different ways: from the command line or in a windows environment (if you are using MS-Windows). FAL will run under windows as a Class A application. Use the file FAL.EXE if you want to run FAL as a windows application. This image file contains both windows and non-windows versions of FAL. If you are not running windows, use the file FALNOWIN.EXE to save user disk storage space.

The windows version of FAL provides the same functions as command line FAL, but the appearance is very different. This chapter describes how to use FAL from the command line. For information on how to use FAL as a windows application, see Appendix F.

To start FAL from the command line, type the command at the system prompt. For example:

```
C:\>FAL (RET)
```

FAL will run until you cancel it by pressing (CTRL/C) or any other key. If you use (CTRL/C) , FAL will not finish the current task. Instead, it will exit immediately and close down all links with the remote node. If you use any other key, FAL will first finish its current task and then exit.

8.2 Using FAL Switches

While FAL is running, file data is passed back and forth between your node and the requesting node. You can control the way FAL operates by using switches. The valid switches for FAL include:

/ASCII (/A)
/BINARY (/B)
/ERROR (/E)
/LOG (/L)

To use these switches, type them after the FAL command on the same line. There should be a space between the command and the switch. If you use more than one switch, be sure to separate each of them with a space.

The following sections describe the FAL switches in more detail.

8.2.1 /ASCII

When you use the /ASCII switch, all files that are copied from the personal computer are transferred as ASCII files. An ASCII file is a file whose records end with end-of-text or line-terminating characters, such as a carriage return/line feed (CR/LF) pair.

If you use the /ASCII switch, FAL will copy all files in ASCII format, including image files. Note that image files can lose data if they are copied in the ASCII format.

Format

/ASCII

Example

```
C:\>FAL /ASCII RET
```

NOTE

If you specify neither the /ASCII nor the /BINARY switch, the default is CHECK. When FAL is started without either switch, it automatically checks each file it is requested to send. FAL looks for any CR/LF characters in the first 512 bytes of the file. If there are any, it sends the file as ASCII. If the requested file is a binary file, FAL sends the file as binary.

8.2.2 /BINARY

When you use the /BINARY switch, all files that are copied from the personal computer are transferred as binary files. A BINARY (or image) file is a file whose data is copied exactly as it appears, with no interpretation of CR/LF characters.

Using this switch ensures that any file copied to a remote node and then back to your personal computer will not lose any data. However, ASCII files copied from the personal computer when the /BINARY switch is used may not be in the proper format for use on the remote node.

Format

/BINARY

Example

```
C:\>FAL /BINARY (RET)
```

NOTE

If you specify neither the /ASCII nor the /BINARY switch, the default is CHECK. When FAL is started without either switch, it automatically checks each file it is requested to send. FAL looks for any CR/LF characters in the first 512 bytes of the file. If there are any, it sends the file as ASCII. If the requested file is a binary file, FAL sends the file as binary.

8.2.3 /ERROR

When you use the /ERROR switch, FAL will report an error to the remote node if the requesting node is attempting to overwrite an existing file. If you do not set this switch, an existing file will be deleted and a new one will be created with the same name. The default is NO ERROR.

Format

/ERROR

Example

```
C:\>FAL /ERROR (RET)
```

8.2.4 /LOG

When you use the /LOG switch, FAL logs the type of access for every request it receives. The type of access includes the following information:

- The command or request (such as an NFT DIRECTORY or DELETE command)
- The requested directory name and file name
- The node name
- The access control information for that node (user name and account)

This information is displayed on the screen in front of you. If you do not want to see the information on the screen, you can redirect it to an output file when you first issue the FAL command.

Format

/LOG:*file-name*

where

file-name	is the name of a file to use for storing the access information.

Example

```
C:\>FAL /LOG:ACCSINFO.TXT (RET)
```

This command appends the logging information to the file ACCSINFO.TXT.

8.3 Performance and Tuning Hints

The following sections describe hints and suggestions that you can use to improve performance or tune your system. Also listed are some restrictions you may encounter while using FAL on an MS-DOS system.

8.3.1 Hints

Some hosts may use as many as 4 logical links to perform a single file access function. If you plan to run FAL, it is suggested that you increase the number of logical links supported. Enter the following command:

```
NCP>DEFINE EXECUTOR MAXIMUM LINKS 8 (RET)
```

Trapping of hard device errors works for all IBM Personal Computers. When FAL stops due to a device error, all its sockets are still active. Use the NCP SHOW KNOWN LINKS command to determine which links should be closed. Use the NCP SET command to selectively close links that have a "local #" of 17 (in other words, the FAL object). For example:

```
NCP>SET LINK n STATE OFF
```

where *n* is a FAL ("local #") link.

(Note that issuing a (CTRL/C) does not always abort all links.)

FAL does not do file locking. If you will be using FAL for simultaneous access to the same file, ensure that all users of that specific file open the file for reading **only**. If two users attempt to open the same file for simultaneous write, unpredictable results may occur.

If you run FAL under the Job Spawner and another user on a VMS system performs a file access using file lists, the operation may fail after the first file. Wildcard file access is supported.

8.3.2 Restrictions

Because MS-DOS path specifications contain the backslash character and directory names and file names have the same syntax, VMS cannot use path specifications that are not surrounded by double quotation marks. In addition, a number of restrictions apply when using file specifications enclosed in quotation marks with VMS. To solve all these problems, FAL accepts VMS syntax for file specifications. For example:

```
$DIR MSDOS::\TEST\*.C (RET)          will fail
$DIR MSDOS::"\TEST\*.C" (RET)        will work
$DIR MSDOS::[TEST]*.C (RET)          will work
```

VMS does not understand that *whatever* is sometimes a file and sometimes a directory. To avoid the problems that this causes, always specify file names or use VMS syntax:

```
$ DIR MSDOS::"\" (RET)                          will fail
$ DIR MSDOS::"\*.*" (RET)                       will work

$ COPY *.whatever MSDOS::"\DIR" (RET)           will fail
$ COPY *.whatever MSDOS::"\DIR\*.*" (RET)       will work
$ COPY *.whatever MSDOS::[DIR]*.* (RET)         will work
```

VMS dos not separate the parts of a file specification when it does wildcarding. As a result, wildcard copies of files from a personal computer to VMS using VMS DCL cannot be done using MS–DOS file syntax. Such copies must be done using VMS file syntax:

```
$ COPY MSDOS::"\WORK\*.*" *.* (RET)             will fail
$ COPY MSDOS::[WORK]*.* *.* (RET)               will work
```

9

Using the DECnet–DOS Job Spawner

The Job Spawner is a DECnet–DOS utility that runs as a foreground task while waiting for incoming connection requests from other nodes in the network. When a connection request arrives, the Spawner looks up the requested object name or number in its database (DECOBJ.DAT), then runs the program that services that type of request. When the program finishes, the Spawner resumes control and again waits for incoming connection requests.

9.1 Overview of the Job Spawner

In DECnet–DOS Version 2.0, the Spawner supports the File Access Listener (FAL), the DECnet Test Receiver, and user-written servers. By using the Job Spawner, your personal computer can process different requests at different times without any need for user intervention.

As an example, if the Job Spawner is running and it detects a request for file transfer, the Spawner initiates the FAL utility and causes FAL to run. FAL will continue to run until the requested activity is complete. The Spawner then continues to listen for other requests. (The Job Spawner cannot run two service programs simultaneously.)

The Job Spawner accesses a database file to determine the programs (or objects) that will run for each kind of connection that the Spawner detects. In previous versions of DECnet–DOS, you had to create an ASCII file called DECSPAWN.DAT which contained information about the objects accessed by the Spawner. With DECnet–DOS Version 2.0, you can no longer use DECSPAWN.DAT. A new file, DECOBJ.DAT, contains the appropriate object database for use by the Spawner. This is a binary file rather than an ASCII file. In order to create the DECOBJ.DAT file, you must use the Network Control Program (NCP) command, DEFINE OBJECT.

NOTE

If you used the DECnet–DOS Installation Procedure to install your kit and you selected certain components to be installed as Spawner objects (such as FAL or DTR), the DECOBJ.DAT database has already been created for you. You can use the NCP DEFINE OBJECT, LIST OBJECT, and PURGE OBJECT commands to change, review, or delete the objects in your database file. Refer to the *DECnet–DOS Network Management Guide* for more information about using NCP commands.

9.2 Creating a Spawner Database File

To create a DECOBJ.DAT file, first start the NCP utility. For example:

```
C:\>NCP (RET)
NCP>
```

To define the objects, use the DEFINE command. DEFINE takes the following format:

OBJECT *object-name* [NUMBER *n*] FILE *file-name* [ARGUMENTS *xxx*]

where

object-name is the name of the DECnet object. The object name can have a maximum length of 16 characters.

n is the number of the DECnet object. The range for this number is 0 to 255. The default is 0.

file-name is the name of a batch file or program to be started by the Spawner. Batch file names must end with the .BAT extension. The file name may include a path specification.

xxx are the command line arguments for the program specified with FILE. You can use one to three arguments for each file.

If you want the argument information to be stored in uppercase letters, simply type the characters. If you do not want the characters to be stored as uppercase, place the string in double quotation marks. For example:

abc will be stored in the database as **ABC**

"**Aab**" will be stored in the database as **Aab**

For example, to define FAL as object #17 with an argument that includes the batch file T.BAT, use the following command:

```
NCP>I DEFINE OBJECT FAL NUMBER 17 FILE FAL ARGUMENT "/LOG:T.bat /ASCII"(RET)
```

Now you can use the LIST command to display the objects you have defined. For example:

```
NCP>I LIST KNOWN OBJECTS (RET)

DECnet Objects

  #     Taskname          File  "Arguments"

  17     FAL               FAL    "LOG:/T.bat /ASCII"
```

You can also use the PURGE command to delete one object or all of the objects in the database. For more information about PURGE and other NCP commands, refer to the *DECnet–DOS Network Management Guide*.

If you wish to write your own server programs, note the following:

1. The server program is run by the Spawner as if this command were typed:

   PROGRAM –USE *n*

   where

   n is the number of a socket on which an incoming connect request has been accepted by the Spawner in deferred mode. It is the server program's responsibility to accept or reject the incoming connect request. It is also the server program's responsibility to close all sockets used for data communications before returning control to the Spawner. This includes the socket number that was passed to the server program by the Spawner.

2. If a server program exits with a non-zero status, the Spawner will attempt to close the socket that it passed to the server program.

9.3 Using the Job Spawner

To start the Job Spawner, simply type SPAWNER at the system prompt and press (RET). To exit from the Spawner, type an exclamation mark (!).

You can also start the Job Spawner from a window, if you are using MS-Windows. The Spawner will run under windows as a Class B application. (There is a SPAWNER.PIF file included in your kit that allows you to run the Spawner as a Class B application.)

Format

SPAWNER

Remarks

If you run the Spawner under MS-Windows, be sure you have enough memory to start FAL or DTR. You should also note that the Spawner can run only one server program (FAL or DTR) at a time.

Example

The following example illustrates the Spawner running and receiving an incoming connect request for FAL:

```
C:\>SPAWNER (RET)

press '!' to abort
SPAWNER (V2.0) listening... on Wed Jul 15 1987 at 11:22:46
Connect request from node DELON for object #17 name fal on Wed Jul 15 1987
at 11:26:57

Executing: FAL -use 2... on Wed Jul 15 1987 at 11:26:57
                FAL - File Access Listener - Version 2.0

Network Driver Version 2.0
Current working directory:C:\DECNET
Files will be sent as either ASCII or binary.
Existing files will be overwritten.
No access checking will be done (world has read/write privileges).

FAL running....
DIRECTORY access from DELON for LOCAL"":C:\DECNET\*.EXE;*

SPAWNER (Version 2.0) listening... on Wed Jul 15 1987 at 11:27:01

SPAWNER exiting... on Wed Jul 15 1987 at 11:34:22
```

Note that the command line argument for FAL in this example is "-use 2." This means that the incoming connect request is pending (in accept deferred mode), on socket number 2.

If you start the Spawner and it cannot locate the necessary database to use for answering a request, it displays the following help information:

```
Error: Could not open file C:\DECNET\DECOBJ.DAT

. Abort job spawner by pressing '!'
. Job spawner does not support multiple links.
. Database file for spawner in DECnet database path.
. Job spawner can spawn batch files.
. Job spawner can pass command line arguments to servers.
. Name of database file is DECOBJ.DAT.
. Use the DEFINE and LIST commands in NCP to configure DECOBJ.DAT.

    Example contents of a DECOBJ.DAT:

      DECnet Objects
        #   Taskname          File              "Arguments"

        0    SHOWME            C:\SHOWME.BAT    "a1 a2 a3"
        17   FAL                                 "/l:fal.log    /a"
        63   DTR
        129                    C:\BATCH.BAT     "a1 a2"
```

In this example, note that several batch files are included that are associated with object names or object numbers. The Spawner executes each batch file as specified, passing the arguments that are contained in the DECOBJ.DAT database. The Spawner always attempts to close the socket that was created for the batch file's incoming connect request.

A

NFT Error Messages

When an NFT error occurs, you should receive one or more of the error messages listed in this appendix.

If you are accessing a remote system and the remote node reports an error for which no text has been defined, the following message is displayed:

DAP error reported by remote node: ***error-code/error-code***

The error message consists of a pair of DAP error codes in octal. The first error code indicates a specific error type. The second error code identifies the specific reason for that error.

To determine the meanings of the displayed error codes, refer to the appendix in the *DECnet-DOS Programmer's Reference Manual.*

If a local error occurs for which there is no defined text, the following message is displayed:

Unexpected network error, ERRNO value: *n*

where *n* is in decimal.

If you receive either of these messages, see your network coordinator.

A.1 Types of NFT Error Messages

NFT error messages fall into three general categories:

- **Command line error messages**

  These messages are displayed when you mistype part of a command line (such as the verb or a switch).

  For example:

```
NFT>COPI PAGE1.TXT LONDON::PAGE1.TXT;1 (RET)

Error: Unrecognized command: COPI
```

  Where the COPY command is mistyped.

- **File input/output (I/O) errors**

  These messages are displayed when you are accessing a local or remote file or submitting a remote file. Remote file I/O error messages are displayed on two lines:

- The first line states the problem.

- The second line explains why the problem occurred, and the line begins with the word "Because." These messages are referred to as secondary messages and are listed at the end of this appendix.

  For example:

  Error Opening File: MUFFLE:MYSTAT.DAT
  Because cannot assign address – possibly node name is undefined.

  This message indicates that you typed a remote node name that was not previously defined.

- **Network errors**

  These messages are displayed when you try to run NFT on a system where network support, or some part of it, is missing or not working properly.

Within each category, the messages are listed in this appendix alphabetically.

When a command line specifies multiple operations and an error is encountered during one operation, NFT tries to execute subsequent operations, even after the error has been detected.

A.2 Command Line Error Messages

The error messages listed in this section are all related to the syntax of a command line.

Error: Cannot APPEND to list of files.

You tried to append one or more files to the end of more than one file. You can have only one output file.

Error: Cannot APPEND to wildcard file name.

You included a wildcard in the output file name when you tried to append an input file to an output file.

Error: Cannot COPY from wildcard specification to explicit files.

You tried to copy multiple files using a wildcard while you wanted the output files to have specific names or file types.

Error: Cannot SUBMIT list of files.

You tried to submit more than one remote command file (in a list) to be run on the remote node.

Error: Command string too long.

The command line you typed was longer than 256 characters.

Error: File lists not supported for DELETE command.

You tried to delete a list of files. You can delete multiple files only using wildcards.

Error: File lists not supported for DIRECTORY command.

You tried to display a directory of a list of files. You can only display multiple file names using wildcards.

Error: Illegal ALLOCATION quantity: *text*

You used the /ALLOCATION switch with the COPY command and specified a non-numeric value.

Error: Illegal Maximum Record Size: *value*

You used the /MRS switch with the COPY command and specified either a non-numeric value or a value outside of the range of 0 to 1024.

Error: Illegal VFC amount: *value*

You used the /VFC switch and specified either a non-numeric value or a value that is less than 0 or greater than 255.

Error in allocation amount.

You used the /ALLOCATION switch without a value. Please supply one.

Error in allocation quantity.

You used the /ALLOCATION switch with the COPY command and the remote node did not accept this value.

Error in maximum record size.

You used the /MRS switch with the COPY command and the remote node did not accept the value you specified.

Error in VFC size.

You used the /VFC switch with the COPY command and specified a fixed length header which was not accepted by the remote node.

Error: Quoted local files are illegal.

You enclosed a local file specification in quotation marks (" "). Quotation marks are used only for remote file specifications.

Error: Too many file names in list. Limit is 10.

You included more than ten file names in a list (for example, with the APPEND command).

Error: Two paths in a row.

You specified more than one path name without specifying the corresponding file names in between.

Error: Unrecognized: *command*

You mistyped an NFT command or tried to use a command that NFT could not recognize.

Error: Unrecognized /CC option: *option*

You used the /CC switch and specified an incorrect record attribute. The attributes must be one of the following:

None – No attributes
FTN – FORTRAN carriage control
CR – Implied carriage return/line feed
PRN – Fixed header with carriage control

Error: Unrecognized switch: *switch*

You mistyped the name of a switch or used a switch that NFT could not recognize.

Error: Wild cards are not supported in file name lists.

You tried to list files using wildcards (for example, with the APPEND command).

Warnings

The following messages are warnings. When they are displayed, the current operations will continue.

Print switch not supported with this command.

You used the /PRINT switch with a command that does not support the switch (for example, DELETE).

Warning: Cannot DELETE both remote and local files. *xxx* file name(s) will be ignored

You specified a local and a remote file to be deleted. NFT deletes the file you listed first. Therefore, if you listed the remote file name first, *xxx* is replaced by the word "Local". If you listed the local file name first, *xxx* is replaced by the word "Remote".

Warning: Cannot perform DIRECTORY for both local and remote files. *xxx* file name(s) will be ignored

You requested a directory listing of both remote and local file names. NFT displays the directory you listed first. Therefore, if you listed the remote directory first, *xxx* is replaced by the word "Local". If you listed the local directory first, *xxx* is replaced by the word "Remote".

Warning: Cannot print file(s) on local printer.

You included the /PRINT switch in a COPY operation from a remote node to the local node. You cannot print remote files on the local printer. (However, you can print local files on a remote printer.)

Warning: Cannot TYPE from one file to another.

You included two file specifications with the TYPE command.

Warning: Renaming files with wildcard specifications not supported. *xxx* file name(s) will be ignored

You tried to rename a file with the COPY command and used a wildcard in both the input file name and the output file name.

Warning: File(s) will NOT be deleted after copy.

The /DELETE switch was used as an invalid switch with the COPY command. /DELETE is only valid with /PRINT.

Name is too long for local file. Limit is 12 characters. Enter local file name:

You entered a file name that is too long for DOS to accept. The local file name must be 12 characters or less.

Unable to make local file name from remote name: *node-name*::*file-name.typ* Enter local file name:

You omitted the local file name with the COPY command, and NFT was not able to create a local file name from the specified remote file name.

A.3 File I/O Error Messages

The messages listed in this section are all related to accessing local and remote files or submitting a remote command file. If you receive a remote node error message, refer to the documentation for that operating system or see your network coordinator for instructions on how to correct the problem.

Examples of file I/O errors are improper file specifications or a file read error. Remember that remote file I/O messages are displayed on two lines. The second line is a secondary message that describes why the error occurred. Many of the secondary messages can be displayed with more than one file I/O message.

Cannot delete file: ***file-name.typ***

NFT cannot delete the local file you specified because it is a directory file or has a Read Only protection.

Error Closing File: ***node-name::file-name.typ***

NFT cannot close the remote file you specified. The secondary message explains the specific reason.

Error Deleting File: ***node-name::file-name.typ***

NFT cannot delete the remote file you specified. The secondary message explains the specific reason.

Error In Directory of ***node-name::***

There is a problem with the remote directory you specified. The secondary message explains the specific reason.

Error Opening File: ***node-name::file-name.typ***

NFT cannot open the remote file you specified. The secondary message explains the specific reason.

Error Reading from: ***node-name::file-name.typ***

NFT cannot copy from the remote file you specified. The secondary message explains the specific reason.

Error Submitting File: ***node-name::file-name.typ***

NFT has a problem running the remote command file you specified. The secondary message explains the specific reason.

Error Printing File: ***node-name::file-name.typ***

NFT has a problem queuing the remote file to a printer. The secondary message explains the specific reason.

Error Writing to: ***node-name::file-name.typ***

NFT cannot copy to the remote file you specified. The secondary message explains the specific reason.

Error: Cannot SUBMIT local file.

You tried to run a local command file.

Error: Unable to type non-ASCII file: *file-name.typ*

You tried to type a file that has a non-ASCII format. NFT displays the name of the file you tried to type.

File not found: *file-name.typ*

You tried to access a file that NFT could not find. The file may not exist, or you may have mistyped the file name.

Record too big – Try /BLOCK or /IMAGE

The usual cause is attempting to transfer a binary file as ASCII. Use the /BLOCK switch to transfer stream files that were put on the remote system with PCSA, and use the /IMAGE switch to create fixed record length files on the remote system.

Unable to open file: *file-name.typ*

NFT cannot open the local file you specified.

A.4 Network Error Messages

The error messages listed in this section are all related to network software, including temporary files created by NFT.

Network errors pertain to network operation failures or rejections. For example, connection requests can be rejected by the network due to insufficient network resources or to an invalid node name.

Allocation quantity too large.

The disk on the remote system is too full to process your request.

Connection lost.

The remote system broke the connection.

Host is down.

You are trying to access a remote host and it is not in operation.

Insufficient network resources.

The remote system could not accept any more connections.

Network is down.

You are trying to perform network activity and the network is not currently available.

Network not installed.

You must start DECnet to use NFT.

No route to host.

This message is an indication of one of the following conditions:

- The network driver is not loaded or you are not using the correct version.
- The line state is OFF.
- The remote host is currently unreachable.

Problem with temporary file for remote file names.

You are copying a file from a remote node, and you included a wildcard in the command. For example, COPY NODE::*.*. NFT first requests a directory list of the remote files. NFT then stores these file names in a temporary local file on the default disk. If a problem occurs with the temporary file due to a lack of disk space, for example, this message is displayed.

Remote system DAP buffer size < 256.

Two programs on different systems have such different buffer sizes that they cannot communicate with one another.

A.5 Secondary Error Messages

Secondary error messages are displayed with remote file I/O messages. Many of the secondary messages can occur with more than one file I/O message. Also, a file I/O message can be displayed with one of several secondary messages depending on the cause of the problem.

Because bad record size.

The specified record size is either invalid or illegal for the specified operation.

Because cannot assign address, possibly node name is undefined.

The network rejected an attempted connection because the remote node name did not correspond to any node name defined at the local node.

Because cannot open file.

An error occurred on a file open operation.

Because cannot position to end of file.

NFT cannot append the specified input file to the end of the specified output file.

Because device is write locked.

The specified output file cannot be created because the output device is write locked.

Because directory full.

You tried to copy a file to a remote node and the remote directory is already full.

Because directory not found.

The specified directory does not exist on the node/device that was specified or defaulted in the file specification.

Because disk quota exceeded.

You tried to perform a remote file operation and there is no room on the remote disk.

Because error in directory name.

The specified directory does not conform to the syntax of the target system.

Because error in file name.

The specified file name does not conform to the syntax of the target system.

Because error in record attribute.

You specified remote file record attributes (such as FORTRAN, implied line feed/carriage return, embedded or VMS print file) that are not valid.

Because error in record format.

You specified a remote file record format (such as fixed, variable, VFC, or stream) that is not valid.

Because file locked by other user.

Another user currently has the specified file locked or open for writing. You can also receive this message in a full directory listing.

Because file not found.

The specified file or files do not exist.

Because file read error.

An irrecoverable error has occurred while reading on the device.

Because file write error.

An irrecoverable error has occurred while writing on the device.

Because illegal record attributes.

The file's record attributes (that is, FORTRAN, implied CR/LF, embedded, or VMS print file) are invalid or unsupported by NFT.

Because incorrect user access information.

The network rejected an attempted connection because the specified access control information (user ID, password, and account) does not match a valid account on the remote node.

Because invalid record format.

The file's record format (that is, fixed, variable, VFC, or stream) is invalid or unsupported by NFT or the remote FAL.

Because invalid wildcard operation.

The remote system rejects the specified wildcard as inappropriate for the specified operation.

Because privilege violation.

An operation was specified for which you do not have privileges.

A.6 Other Error Messages

- Address already in use.
- Address family not supported by protocol family.
- Argument list too long.
- Argument too long.
- Attribute read error.
- Attribute write error.
- Bad address.
- Bad block on device.
- Bad file number.
- Bad terminator or bad value for switch:
- Bad version number.
- Cannot close file.
- Cannot get JFN for file.
- Cannot open local file with DOS reserved names:
- Cannot PRINT list of files.
- Cannot PRINT local file.
- Connection refused.
- Connection reset by peer.
- Connection timed out.
- Destination address required.
- Device not available.
- Device not found.
- Device not ready.
- Device or file full.
- Disk full or other error in closing file.
- Disk full or other error in writing file.
- Disk usage exceeds quota.

- Error in data type.
- Error in file type extension.
- Failure to get transmit buffer.
- F11-ACP could not access file.
- F11-ACP could not create file.
- F11-ACP could not mark file for deletion.
- File activity precludes operation.
- File already open.
- File exists.
- File extend failure.
- File is currently in an undefined state.
- File name syntax error.
- File name too long.
- File not found.
- FSZ field invalid.
- Illegal record encountered.
- Invalid DAP message type received.
- Invalid DAP message format received.
- Invalid file options.
- Invalid object name format.
- Invalid wildcard context value.
- Logical name error.
- LPT page limit exceeded.
- Message too long.
- Network capacity exceeded.
- Network dropped connection.
- Network operation failed at remote node.
- Network operation not supported.
- Network operation timed out.
- NFAR error, FFIRST with dir in progress.
- NFAR error, file not open.
- NFAR error, FNEXT with no dir in progress.
- NFAR error, illegal access.
- NFAR error, invalid function.
- NFAR error, invalid RATs.
- NFAR error, missing ::.
- NFAR error, missing quote.
- NFAR error, no \\\\ or *\\.
- NFAR error, no more room.
- NFAR error, record buffer too small.
- NFAR error, socket not found.

- No buffer space available.
- Node name cannot be longer than 6 characters.
- Node is unreachable.
- No more sockets available.
- No such device.
- Not supported by remote.
- Operation illegal or invalid for file organization.
- Operation in progress.
- Operation not supported on socket.
- Operation would block.
- Parity error on device.
- Path and file names not valid for SET, SHOW, or EXIT commands.
- Protocol not available.
- Protocol not supported.
- Remote object is too busy.
- Result too large.
- Socket is already connected.
- Socket is not connected.
- Socket operation on nonsocket.
- Socket type not supported.
- Spool or submit command file error.
- Switches not valid for SET, SHOW, or EXIT commands.
- Task not available.
- Too many open files.
- Unexpected DAP message received.
- Unmatched quotes:
- Unrecognized local file specification, remote-to-remote operations not supported.
- Unrecognized object.
- Unrecognized remote file specification:
- Unrecognized remote file specification, local-to-local operations not supported.
- Unsupported DAP flag field received.
- VFC value must be less than 256.

A.7 Warnings

- Extra local file names will be ignored.
- Extra remote file names will be ignored.
- Warning: Destination file name list longer than source list.

B

SETHOST Error Messages and Codes

This appendix lists the error messages and codes you can encounter when using SETHOST.

B.1 For Connections Using the LAT Protocol

B.1.1 During Initial Connect

Message: Service not known
Explanation: PC LAT service table does not contain that name.
Resolution: Expand the service name table with the /D:*n* switch to the LAT driver or force the name into LAT's table with the NCP SET NODE command.

NOTE

You cannot use the NCP SET NODE command for the service name for a cluster.

Message: Start session error
Explanation: This is caused by the PC LAT driver running out of resources.

Causes:

- No more virtual circuit blocks,
- No more sessions available,
- No more sessions available on this circuit.

B.1.2 During a Session

Displays the LAT Session Status Word. The 08 means the connection has broken.

Message: LAT Reason: 0108
Explanation: Connection was broken because a Stop Slot message was received from the remote system.

Message: LAT Reason: 0208
Explanation: Connection was broken because a Stop message was received from the remote system.

Message: LAT Reason: 0308
Explanation: Connection was broken because the retransmit limit was reached. If the default is used, that means SETHOST tried 8 times to send a message and got no response from the remote system.
Resolution: Try increasing the retransmit count for LAT with the /R:*n* switch to the LAT driver.

Message: LAT Reason: 0408
Explanation: Connection was broken because a message containing an illegal slot was received.

Message: LAT Reason: 0508
Explanation: Connection was broken because an illegal message was received.

B.2 For Connections Using the CTERM Protocol Over DECnet

B.2.1 During Initial Connect

Message: Unrecognized node name
Explanation: DECnet error 49. The most common error.
Resolution: Use NCP to set up the node name.

Message: DECnet reason: (See Section B.3.)

B.2.2 During a Session

The 80__ __ means the connection has broken. The C0__ __ means the connection has broken due to a DECnet error.

Message: CTERM reason: 8001
Explanation: Connection was broken because an unknown protocol message was received by the CTERM driver from the remote system.

Message: CTERM reason: 8002
Explanation: Connection was broken because of a CTERM protocol violation by the remote system.

Message: CTERM reason: C003
DECnet Reason: (See Section B.3.)
Explanation: Connection was broken because the CTERM driver could not process the CTERM initiate message.

Message: CTERM reason: C004
DECnet Reason: (See Section B.3.)
Explanation: Connection was broken while the CTERM driver was trying to receive a message from the remote system.

Message: CTERM reason: C005
DECnet Reason: (See Section B.3.)
Explanation: Connection was broken while the CTERM driver was sending a message to the remote system.

Message: CTERM reason: C006
DECnet Reason: (See Section B.3.)
Explanation: Connection was broken when the CTERM driver checked for a message from the remote system.

Message: CTERM reason: 8007
Explanation: Connection was broken because the remote system does not support the CTERM protocol.

Message: CTERM reason: 8008
Explanation: Connection was broken because the remote system does not support the correct CTERM protocol version.

Message:	CTERM reason: C009
DECnet Reason:	(See Section B.3.)
Explanation:	Connection was broken because the CTERM driver did not receive a BIND request message from the remote system.

Message:	CTERM reason: C00A
DECnet Reason:	(See Section B.3.)
Explanation:	Connection was broken because the CTERM driver could not send a BIND request message to the remote system.

Message:	CTERM reason: 800B
Explanation:	Connection was broken because there are no more CTERM sessions available. The maximum number of sessions the CTERM driver is built for is 32.

Message:	CTERM reason: 800C
Explanation:	Connection was broken because the session handle passed to the CTERM driver did not match an existing session.

Message:	CTERM reason: 800D
Explanation:	Connection was broken because the CTERM driver did not have enough memory to complete the operation.

Message:	CTERM reason: C00E
DECnet Reason:	(See Section B.3.)
Explanation:	Connection has broken. See DECnet section to determine why.

B.3 DECnet Reason Codes

Code	Meaning
0	Connection rejected by object
1	Insufficient network resources
2	Unrecognized node name
3	Network object is unknown at remote node
4	Unrecognized object
5	Invalid object name format
6	Object too busy
7	Arg list too long
8	Exec format error
9	Bad file number
10	Invalid node name format

11	Local node shutting down
12	Not enough core
13	Permission denied
14	Bad address
15	Block device required
16	Mount device busy
17	File exists
18	Cross-device disk
19	No such device
20	Not a directory
21	Is a directory
22	Invalid argument
23	File table overflow
24	Too many open files
25	Not a typewriter
26	Text file busy
27	File too large
28	No space left on device
29	Illegal seek
30	Read-only file system
31	Too many links
32	No node resources for new logical link
33	No user resources for new logical link
34	Access control rejected
35	Operation would block
36	Bad account information
37	Operation already in progress
38	No response from object
39	Node unreachable
40	Message too long
41	Protocol wrong type for socket
42	Protocol not available
43	Connect image data field too long
44	Socket type not supported
45	Operation not supported on socket
46	Protocol family not supported
47	Address family not supported by protocol family
48	Address already in use
49	Can't assign requested address

50	Network is down
51	Network is unreachable
52	Network dropped connection on reset
53	Software caused connection abort
54	Connection reset by peer
55	No buffer space available
56	Socket is already connected
57	Socket is not connected
58	Can't send after socket shutdown
59	Too many references: can't splice
60	Connection timed out
61	Connection refused
62	Too many levels of symbolic links
63	File name is too long
64	Host is down
65	Host is unreachable
66	Directory not empty
67	Too many processes
68	Too many users
69	Disk quota exceeded

C

NDU Error Messages

This appendix lists the error messages you may encounter when using the NDU utility. The first section deals with Virtual Disk error messages, the second section lists Virtual Printer error messages. The NDU error messages fall into three categories. They are listed alphabetically.

Command line error messages

These messages are displayed when you mistype part of a command line. The error message includes a circumflex (^) which appears directly under the error, followed by explanatory text. For example:

```
NDU>CLOSE DRIVE ONE (RET)
                ^DISK DRIVE must be a single character.
```

Network error messages

These messages are displayed when you try to run NDU on a system where network support, or some part of it, is missing or not working properly.

Execution error messages

You may encounter these messages when you attempt to perform an NDU function, such as CREATE or OPEN.

C.1 Virtual Disk Error Messages

The following error messages may occur when you perform operations on virtual disks.

C.1.1 Network Errors

A network error consists of a pair of messages that are separated by a colon. The message format is:

ndu-specific-message : *dap-specific-message*

The first message can be one of the following NDU messages:

CLOSE during DELETE function failed.

CLOSE function failed.

CREATE function failed.

DELETE function failed.

OPEN function failed.

The second half of the message string can be one of the following DAP messages:

A received DAP message was poorly formed.

During the dialog with the File Access Server on the remote node (which was necessary to execute your request), a message was received of the proper type but it did not contain the proper contents.

Action: For an explanation of the DAP message, refer to the appendix in the *DECnet-DOS Programmer's Reference Manual*. If you need additional assistance, contact the person responsible for your network.

An unexpected DAP message was received.

During the dialog with the File Access Server on the remote node (which was necessary to execute your request), a message was received of the wrong type.

Action: For an explanation of the DAP message, refer to the appendix in the *DECnet-DOS Programmer's Reference Manual*. If you need further assistance, contact the person responsible for your network.

Internal error.

An internal error message was detected.

Action: Contact the person responsible for your network for assistance.

The remote server's buffer is too small.

During the dialog with the File Access Server on the remote node, which was necessary to execute your request, a message was received which included the maximum possible buffer size for the remaining messages. This size is too small to support the communication.

Action: Contact the person responsible for your network for assistance.

The remote server could not find that file.

The NDISK file that you specified was not found at that remote node.

Action: You must specify a file which exists.

The remote server reports DAP error *x:x*.

The remote File Access Listener is relaying a DAP error message to you. The error message consists of a pair of DAP error codes. The first error code indicates a specific error type. The second error code identifies the specific reason for that error.

Action: To determine the meanings of the displayed error codes, refer to the appendix in the *DECnet-DOS Programmer's Reference Manual*. If you need further assistance, contact the person responsible for your network.

The specified file is not a virtual disk file.

The NDISK file that you specified does not have the proper attributes. This can happen if you make an error in the file name.

Action: Specify a file which has been created with the CREATE command.

C.1.2 Command Line Error Messages

The error messages listed in this section are all related to the syntax of a command line.

ACCESS must be either RO or RW.

You can specify only RO or RW as valid ACCESS options.

DRIVE *name* is too long. It must be a single character.

A disk drive's name cannot exceed one alphabetic character.

Initial ALLOCATION must be a decimal number between 0 and 65535.

You can specify a decimal value in the range 0 to 65535. However, because of internal requirements, NDU always sets this value greater than 30 when the file is actually created.

Unexpected syntax error.

You mistyped a command.

Unrecognized command.

You mistyped an NDU command or tried to use a command that NDU could not recognize.

Unrecognized HELP option; try typing just HELP.

You typed an invalid HELP option. Just type HELP for assistance.

Unrecognized NDISK file name.

A valid file name consists of 1 to 126 alphanumeric characters. The file name may include device and directory fields, but it must be in the proper format for the remote node's system type.

Unrecognized node name.

A valid node name consists of 1 to 6 alphanumeric characters. It must contain at least one alphabetic character. The node name can also be a unique numeric address in the format of *area.number*.

Unrecognized NPRINT file name.

A valid file name consists of 1 to 126 alphanumeric characters. The file name may include device and directory fields, but it must be in the proper format for the remote node's system type.

Unrecognized Parameter.

You supplied an invalid parameter with an NDU command. Type HELP for assistance.

Unrecognized SHOW option.

NDU could not recognize the option. The only valid option for the SHOW command is STATUS.

Unrecognized USER name.

NDU could not recognize the USER name. A valid USER name consists of access control information: *user-id*, *password* and *account*. Each field can include 1 to 39 alphanumeric characters. Enter a valid USER name.

C.1.3 Execution Error Messages

The following error messages may occur when you attempt to execute an NDU command or fail to install the virtual disk driver beforehand.

ALLOCATION used for CREATE only, value IGNORED.

The ALLOCATION parameter was not accepted with the command you specified.

Action: The ALLOCATION parameter can only be supplied with the CREATE command. You cannot use it with other NDU commands.

All the drives are in use, cannot OPEN another drive.

All four disk drives are in use.

Action: Close one of the open drives before opening another.

All the drives are in use, CREATE function not done.

You cannot create a new virtual disk because all drives are in use.

Action: Close one of the drives.

Cannot CLOSE a drive, the disk driver is not installed.

You cannot close a virtual disk without having the virtual disk driver installed.

Action: Refer to the appropriate installation guide for your system for instructions on installing the virtual disk driver. Install the virtual disk driver and run the NDU utility to close the drive.

Cannot CREATE a drive, the disk driver is not installed.

You cannot create a virtual disk without having the virtual disk driver installed.

Action: Refer to the appropriate installation guide for your system for instructions on installing the virtual disk driver. Install the virtual disk driver and run the NDU utility to create the disk drive.

Cannot CREATE a disk file without including NDISK parameter.

You cannot issue a CREATE command without the NDISK parameter.

Action: Reissue the CREATE command, and specify the name of the file that will contain the virtual disk on the remote node.

Cannot CREATE a disk file without including NODE parameter.

You cannot issue a CREATE command without the NODE parameter.

Action: Reissue the CREATE command, and specify the name of the remote node with NODE.

Cannot DELETE a disk file without including NDISK parameter.

You cannot issue a DELETE command without the NDISK parameter.

Action: Reissue the DELETE command, and specify the name of the file that will contain the virtual disk on the remote node.

Cannot DELETE a disk file without including NODE parameter.

You cannot issue a DELETE command without the NODE parameter.

Action: Reissue the DELETE command, and specify the name of the remote node with NODE.

Cannot DELETE, the disk driver is not installed.

You cannot delete a virtual disk without having the virtual disk driver installed.

Action: Refer to the appropriate installation guide for your system for instructions on installing the virtual disk driver. Install the virtual disk driver and run the NDU utility to delete the disk drive.

Cannot OPEN a drive, the disk driver is not installed.

You have not installed NDU properly.

Action: Refer to the appropriate installation guide for your system for instructions on installing the virtual disk driver. Repeat the procedure and run the NDU utility.

Cannot OPEN a drive without including NDISK parameter.

You cannot issue an OPEN command without the NDISK parameter.

Action: Reissue the OPEN command, and specify the name of the file that will contain the virtual disk on the remote node.

Cannot OPEN a drive without including NODE parameter.

You cannot issue an OPEN command without the NODE parameter.

Action: Reissue the OPEN command, and specify the name of the remote node with NODE.

Drive *name* is already OPEN; CREATE function not done.

The drive is already open. You cannot format the new data file.

Action: Use the SHOW STATUS command to list the open drives.

Drive *name* is already OPEN, cannot OPEN it again.

The drive is already open.

Action: You cannot open a drive that is already open.

Drive *name* is not a network disk.

The drive name that you specified is invalid.

Action: The drive name consists of one alphabetic character. Use the SHOW STATUS command to list the valid drive names.

Drive *name* is not a network disk, cannot CLOSE it.

You cannot close a drive which is not a virtual disk drive.

Action: Use the SHOW STATUS command to list the open drives.

Drive *name* is not a network disk, cannot OPEN it.

You can only use the drive names listed by the SHOW STATUS command.

Action: Use a proper drive name.

Drive *name* is not a network disk, CREATE function not done.

You can only use the drive names listed by the SHOW STATUS command.

Action: Use a proper drive name.

Drive *name* is not OPEN, cannot CLOSE it.

You cannot close an unopened drive.

Action: Use the SHOW STATUS command to list the status of the drives.

Drive *name* is not OPEN, cannot DELETE its disk.

You cannot delete a disk without having the drive opened.

Action: Use the SHOW STATUS command to list the status of the drives.

Drive *name* is too long. It can only be a single character.

You supplied an invalid name for the disk drive.

Action: A valid drive name consists of one alphabetic character. Use the SHOW STATUS command to list the valid drive names.

DRIVE, NDISK, or PRINTER must be specified, the CLOSE function was not done.

You cannot issue the CLOSE function without specifying DRIVE, NDISK, or PRINTER as a parameter.

Action: To perform the CLOSE function, you must specify either the name of the virtual disk drive or the file that will be the virtual disk on the remote node.

Length of NDISK parameter is too long.
File name must be less than 127 characters.

An invalid length was supplied for the file name.

Action: The NDISK parameter specifies the name of the file which will be the virtual disk on the remote node. The valid range for the file name is 1 to 126 alphanumeric characters. Enter a valid file name.

Length of NODE parameter is too long.
Node name must be less than 6 characters.

An invalid node name was supplied.

Action: A valid node name consists of 1 to 6 alphanumeric characters. It must contain at least one alphabetic character. Enter a valid node name.

Length of USER parameter is too long.
The string must be less than 120 characters.

You supplied an invalid USER name.

Action: NDU could not recognize the USER name. A valid USER name consists of access control information: *user-id*, *password* and *account*. Each field can include 1 to 39 alphanumeric characters. Enter a valid USER name.

NDISK not found, the CLOSE function was not done.

Either DRIVE or NDISK must be specified; the CLOSE function was not done.

Action: To determine which drive is to be closed, you must specify a drive name, an NDISK file specification, or both.

The Disk Driver is not installed.

You cannot create or use a virtual disk without first installing the Virtual Disk Driver.

Action: Refer to the appropriate installation guide for your system for instructions on installing the virtual disk driver. Repeat the installation procedure and then try to run NDU.

C.2 Virtual Printer Error Messages

The following error messages may occur when you use the virtual printer feature.

C.2.1 Network Errors

A network error consists of a pair of messages separated by a colon. The message format is:

ndu-specific-message : *dap-specific-message*

The first message can only be:

OPEN/CREATE function failed.

The second half of the message string can be one of the following DAP messages:

A received DAP message was poorly formed.

During the dialog with the File Access Server on the remote node (which was necessary to execute your request), a message was received of the proper type but it did not contain the proper contents.

Action: For an explanation of the DAP message, refer to the appendix in the *DECnet-DOS Programmer's Reference Manual.* If you need additional assistance, contact the person responsible for your network.

An unexpected DAP message was received.

During the dialog with the File Access Server on the remote node (which was necessary to execute your request), a message was received of the wrong type.

Action: For an explanation of the DAP message, refer to the appendix in the *DECnet-DOS Programmer's Reference Manual.* If you need further assistance, contact the person responsible for your network.

Internal error.

An internal error message was detected.

Action: Contact the person responsible for your network for assistance.

The remote server's buffer is too small.

During the dialog with the File Access Server on the remote node (which was necessary to execute your request), a message was received which included the maximum possible buffer size for the remaining messages. This size is too small to support the communication.

Action: Contact the person responsible for your network for assistance.

The remote server could not find that file.

The NDISK file that you specified was not found at that remote node.

Action: You must specify a file which exists.

The remote server reports DAP error *x:x*.

The remote File Access Listener is relaying a DAP error message to you. The error message consists of a pair of DAP error codes. The first error code indicates a specific error type. The second error code identifies the specific reason for that error.

Action: To determine the meanings of the displayed error codes, refer to the appendix in the *DECnet-DOS Programmer's Reference Manual*. If you need further assistance, contact the person responsible for your network.

C.2.2 Command Line Error Messages

The error messages listed in this section are all related to the syntax of a command line.

DELETE function failed: Connect failed, Unrecognized node name.

A valid node name consists of 1 to 6 alphanumeric characters. It must contain at least one alphabetic character. The node name can also be a unique numeric address in the format of *area.number*.

OPEN/CREATE function failed: Connect failed, Unrecognized node name.

A valid node name consists of 1 to 6 alphanumeric characters. It must contain at least one alphabetic character. The node name can also be a unique numeric address in the format of *area.number*.

Unexpected syntax error.

You mistyped a command.

Unrecognized command.

You mistyped an NDU command or tried to use a command that NDU could not recognize.

Unrecognized HELP option; try typing just HELP.

You typed an invalid HELP option. Just type HELP for assistance.

Unrecognized NPRINT file name.

A valid file name consists of 1 to 126 alphanumeric characters. The file name may include device and directory fields, but it must be in the proper format for the remote node's system type.

Unrecognized Parameter.

You supplied an invalid parameter with an NDU command. Type HELP for assistance.

Unrecognized SHOW option.

NDU could not recognize the option. The only valid option for the SHOW command is STATUS.

Unrecognized USER name.

NDU could not recognize the USER name. A valid USER name consists of access control information: *user-id*, *password* and *account*. Each field can include 1 to 39 alphanumeric characters. Enter a valid USER name.

C.2.3 Execution Error Messages

The following error messages may occur when you attempt to execute an NDU command or fail to install the virtual printer driver beforehand.

Cannot CLOSE the printer, the Printer Driver is not installed.

You cannot close the printer without having the virtual printer driver installed.

Action: Refer to the installation guide for instructions on installing the virtual printer driver. Install the virtual printer driver and run the NDU utility to close the printer.

Cannot OPEN/CREATE the printer, the Printer Driver is not installed.

You cannot open/create the virtual printer without having the virtual printer driver installed.

Action: Refer to the *DECnet-DOS Installation Guide* for instructions on installing the virtual printer driver. Install the virtual printer driver and run the NDU utility to open/create the printer.

Cannot OPEN/CREATE the printer without including NODE parameter.

You cannot issue the OPEN or CREATE command without the NODE parameter.

Action: Reissue the OPEN or CREATE command, and specify the name of the remote node with NODE.

Length of NODE parameter is too long.
Node name must be less than 6 characters.

You supplied an invalid node name.

Action: A valid node name consists of 1 to 6 alphanumeric characters. It must contain at least one alphabetic character. Enter a valid node name.

Length of NPRINT parameter is too long.
File name must be less than 127 characters.

You supplied an invalid file name for the NPRINT parameter.

Action: A valid file name consists of 1 to 126 alphanumeric characters. The file name may include device and directory fields, but it must be in the proper format for the remote node's system type. Enter a valid file name.

Length of USER parameter is too long.
The string must be less than 120 characters.

You supplied an invalid USER name.

Action: NDU could not recognize the USER name. A valid USER name consists of access control information: *user-id*, *password* and *account*. Each field can include 1 to 39 alphanumeric characters. Enter a valid USER name.

Printer is not OPEN, cannot CLOSE it.

You cannot close an unopened printer.

Action: Use the SHOW STATUS command to list the status of the printer.

The Printer Driver is not installed.

You cannot create or use a virtual printer without first installing the Virtual Printer Driver.

Action: Refer to the appropriate installation guide for your system for instructions on installing the virtual printer driver. Repeat the installation procedure and then try to run NDU.

D

SETHOST Keyboard Illustrations and Character Sets

D.1 Keyboard Illustrations

This appendix contains illustrations of the following keyboards:

- Digital LK250 keyboard
- IBM Personal Computer and Personal Computer XT keyboard
- IBM Personal Computer AT keyboard
- IBM Enhanced Personal Computer keyboard

There are also other keyboard illustrations available on line as files in the DECnet directory. These files are included in your installation kit. The files all start with the letters KBD and have a file type of .HLP. (For example, KBDAT.HLP is the keyboard mapping help file for the IBM Personal Computer AT keyboard.) Each .HLP file contains an illustration of the keyboard and a description of the keys and their functions.

NOTE

Keyboard templates for certain keyboards are provided for reference purposes only. Their presence in the on-line help files does not imply support for the use of these keyboards.

Figure D-1: The LK250 Keyboard

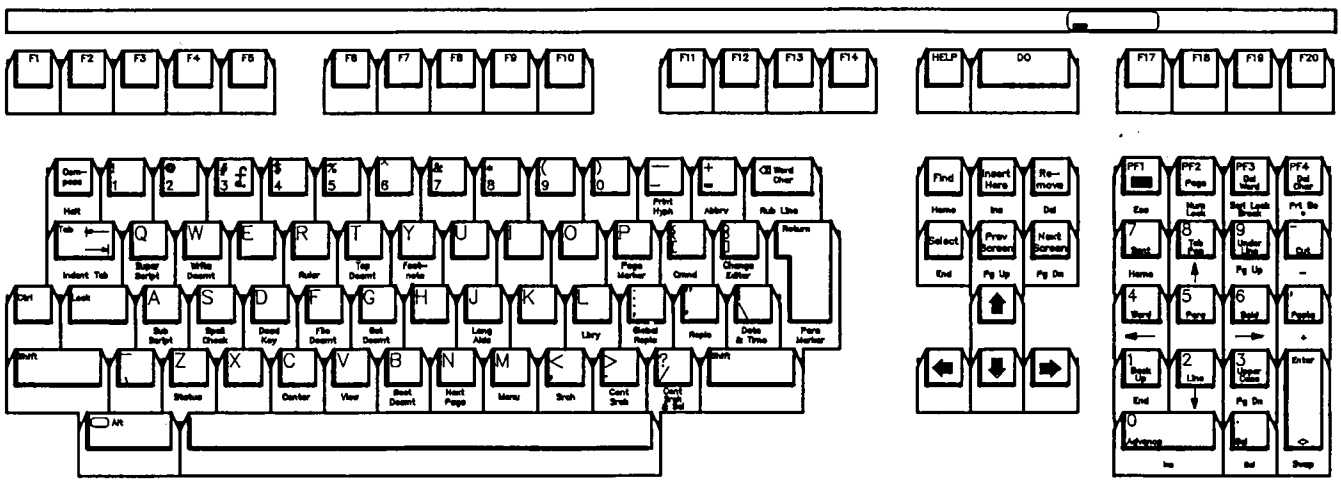

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Figure D-2: The IBM Personal Computer XT Keyboard

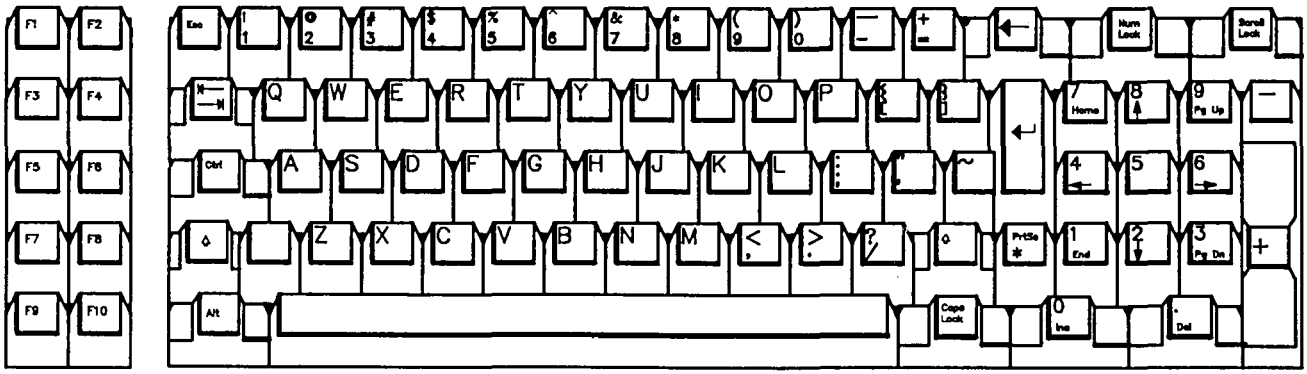

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Figure D-3: The IBM Personal Computer AT Keyboard

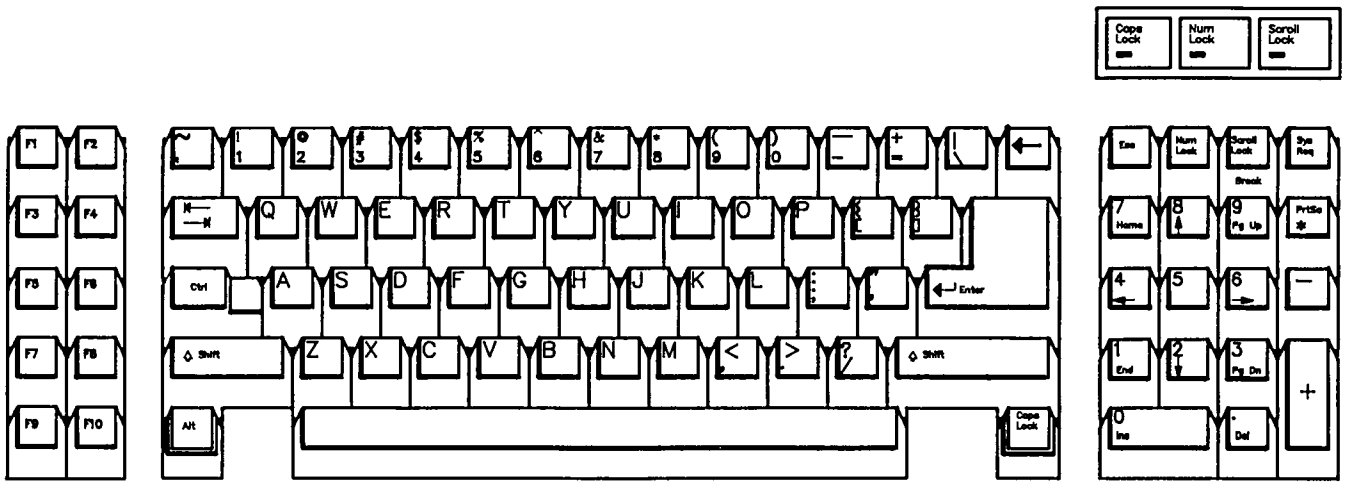

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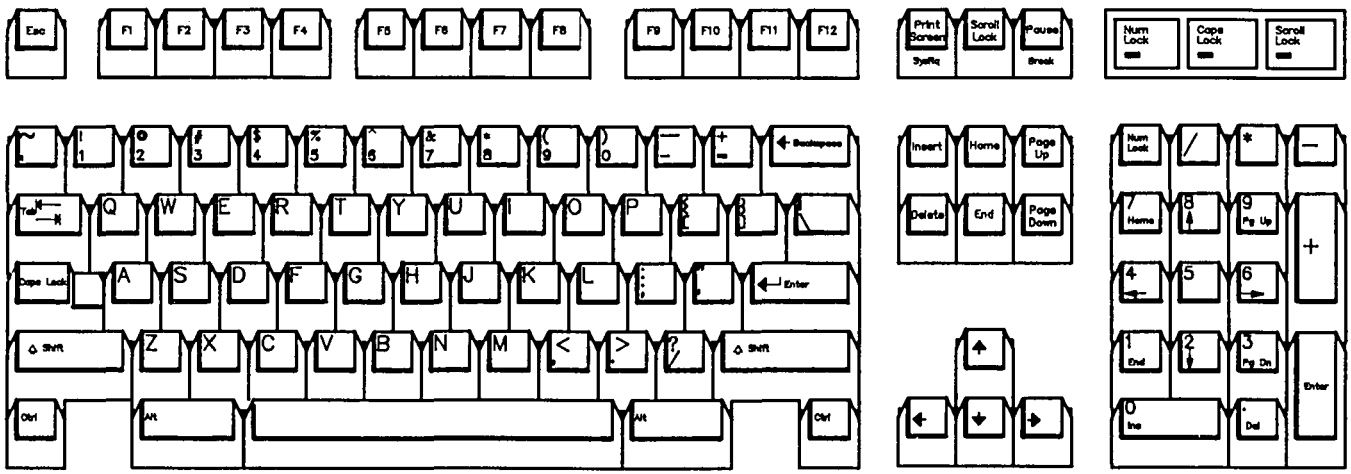
Figure D-4: The IBM Enhanced Personal Computer Keyboard



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D.2 Using International Character Sets

This appendix includes tables that illustrate the various international character sets you can use during terminal emulation. You can select or change character sets from the General Set-Up menu.

The character set files that SETHOST uses for translating are stored in the DECnet directory (for example, C:\DECNET*.CHR). These are ASCII text files, and they contain two 256-character tables. The first table is the DECIBM table. The DEC character is indexed into this table to find the corresponding IBM character (which is then displayed on the screen). The second table is the IBMDEC table. The IBM character is indexed into this table to find the corresponding DEC character to send to the remote system.

Because SETHOST uses the IBM ROM character set and not a graphic character set for displaying characters, you are limited in the use of certain characters. When you select a character from the character set file, SETHOST tries to determine the closest match to the character you want to display.

NOTE

If you need to conserve disk space, you only need to store the character set files that you will be using. If you are only using the ASCII and DEC Multinational characters, those are the defaults that SETHOST will use if it cannot find the character set file that you selected.

You should note the following information when using the character set translation files:

- DIP will copy all of the Character Translation Files (*.CHR) for both the DECnet-DOS kit and the DECnet-VAXmate kit.
- For the DECnet-VAXmate kit, these files are required only for NFT support of character translations.
- For the DECnet-DOS kit, these files are required for both the Personal Computer SETHOST and NFT support of character translations.
- All of these files (except for the country file desired) may be deleted from your disk in order to conserve disk space.

- To perform 8-bit character translation, the ISO.CHR and DECM.CHR character translation files are used.

- For Scandinavian countries, the DECM2.CHR file should be copied to DECM.CHR for 8-bit character translations, and the ISO2.CHR file should be copied to ISO.CHR for 8-bit character translations.

D.2.1 DECnet-DOS Character Sets

To configure DECnet-DOS SETHOST for use with international keyboards, follow these steps:

1. Follow the instructions for setting up international mapping that came with your system or keyboard. This usually consists of running a DOS KEYB program. (The KEYB program is a DOS program that replaces the resident keyboard program.) For example, with PC DOS V3.10 you would use KEYBFR.COM to map your keyboard to a French keyboard.

2. Determine which DEC character set you need to use to access the remote system.

3. Tell SETHOST which character set you wish to use. (Follow steps 4 through 8.)

4. Press F3 to get into the Set-Up menu.

5. Use Pg Up or Pg Dn to get to the General menu.

6. Use Up Arrow or Down Arrow to move to the line indicating "Multinational Mode" or "NRC Mode". This line lets you select between 8-bit or 7-bit character sets. The next line allows you to select between either a list of DEC 8-bit character sets or DEC 7-bit character sets.

   Use End to make the selections.

7. Select the character set you want to use.

8. Save this as the new default by using the Save Set-Up Parameters option on the Action menu.

The following tables indicate the character sets you can use with DECnet-DOS. Note that the special graphics character set is built in to SETHOST.

Table D-1: ISO Latin-1 Character Set (Left Half)

Row	B8 B7 B6 B5 B4 B3 B2 B1	0	1	2	3	4	5	6	7
0	0 0 0 0	NUL 0 0 0	 20 16 10	SP 40 32 20	0 60 48 30	@ 100 64 40	P 120 80 50	` 140 96 60	p 160 112 70
1	0 0 0 1	 1 1 1	DC1 (XON) 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71
2	0 0 1 0	 2 2 2	 22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72
3	0 0 1 1	 3 3 3	DC3 (XOFF) 23 19 13	# 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73
4	0 1 0 0	 4 4 4	 24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74
5	0 1 0 1	 5 5 5	 25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75
6	0 1 1 0	 6 6 6	 26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76
7	0 1 1 1	 7 7 7	 27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77
8	1 0 0 0	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 68	x 170 120 78
9	1 0 0 1	HT 11 9 9	 31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79
10	1 0 1 0	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A
11	1 0 1 1	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	[133 91 5B	k 153 107 6B	{ 173 123 7B
12	1 1 0 0	FF 14 12 C	 34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	\ 134 92 5C	l 154 108 6C	| 174 124 7C
13	1 1 0 1	CR 15 13 D	 35 29 1D	– 55 45 2D	= 75 61 3D	M 115 77 4D	] 135 93 5D	m 155 109 6D	} 175 125 7D
14	1 1 1 0	SO 16 14 E	 36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	n 156 110 6E	~ 176 126 7E
15	1 1 1 1	SI 17 15 F	 37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	_ 137 95 5F	o 157 111 6F	DEL 177 127 7F

KEY

CHARACTER: ESC / 33 OCTAL / 27 DECIMAL / 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

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Table D-2: ISO Latin-1 Character Set (Right Half)

8		9		10		11		12		13		14		15		COLUMN BITS B8 B7 B6 B5 B4 B3 B2 B1	ROW
1 0 0 0		1 0 0 1		1 0 1 0		1 0 1 1		1 1 0 0		1 1 0 1		1 1 1 0		1 1 1 1			
	200 128 80	DCS	220 144 90	NBSP	240 160 A0	°	260 176 B0	À	300 192 C0	Ð	320 208 D0	à	340 224 E0	ð	360 240 F0	0 0 0 0	0
	201 129 81		221 145 91	¡	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1	0 0 0 1	1
	202 130 82		222 146 92	¢	242 162 A2	2	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2	0 0 1 0	2
	203 131 83		223 147 93	£	243 163 A3	3	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3	0 0 1 1	3
IND	204 132 84		224 148 94	¤	244 164 A4	'	264 180 B4	Ä	304 196 C4	ô	324 212 D4	ä	344 228 E4	Ô	364 244 F4	0 1 0 0	4
NEL	205 133 85		225 149 95	¥	245 165 A5	µ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	å	345 229 E5	õ	365 245 F5	0 1 0 1	5
	206 134 86		226 150 96	¦	246 166 A6	¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6	0 1 1 0	6
	207 135 87		227 151 97	§	247 167 A7	·	267 183 B7	Ç	307 199 C7	×	327 215 D7	ç	347 231 E7	÷	367 247 F7	0 1 1 1	7
HTS	210 136 88		230 152 98	¨	250 168 A8	¸	270 184 B8	È	310 200 C8	Ø	330 216 D8	è	350 232 E8	ø	370 248 F8	1 0 0 0	8
	211 137 89		231 153 99	©	251 169 A9	¹	271 185 B9	É	311 201 C9	Ù	331 217 D9	é	351 233 E9	ù	371 249 F9	1 0 0 1	9
VTS	212 138 8A		232 154 9A	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA	1 0 1 0	10
PLD	213 139 8B	CSI	233 155 9B	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB	1 0 1 1	11
PLU	214 140 8C	ST	234 156 9C	¬	254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC	1 1 0 0	12
RI	215 141 8D		235 157 9D	SHY	255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD	1 1 0 1	13
SS2	216 142 8E		236 158 9E	®	256 174 AE	¾	276 190 BE	Î	316 206 CE	Þ	336 222 DE	î	356 238 EE	þ	376 254 FE	1 1 1 0	14
SS3	217 143 8F		237 159 9F	¯	257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF	ÿ	377 255 FF	1 1 1 1	15

HIGHLIGHTS DIFFERENCES FROM ASCII

KEY

CHARACTER | ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

LKG-1578-88

Table D-3: DEC Multinational Character Set (Left Half)

Row	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
BITS B8 B7 B6 B5 B4 B3 B2 B1	0 0 0 0		0 0 0 1		0 0 1 0		0 0 1 1		0 1 0 0		0 1 0 1		0 1 1 0		0 1 1 1	
0	0 0 0 0	NUL 0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SOH 1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX 2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX 3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT 4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ 5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK 6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL 7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS 10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT 11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF 12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT 13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
12	1 1 0 0	FF 14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C
13	1 1 0 1	CR 15 13 D	GS	35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
14	1 1 1 0	SO 16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI 17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

C0 CODES — GL CODES (ASCII GRAPHICS)

KEY

CHARACTER: ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1579-88

Table D-4: DEC Multinational Character Set (Right Half)

8		9		10		11		12		13		14		15		COLUMN BITS B8 B7 B6 B5	ROW
1 0 0 0		1 0 0 1		1 0 1 0		1 0 1 1		1 1 0 0		1 1 0 1		1 1 1 0		1 1 1 1		B4 B3 B2 B1	
	200 128 80	DCS	220 144 90		240 160 A0	°	260 176 B0	À	300 192 C0		320 208 D0	à	340 224 E0		360 240 F0	0 0 0 0	0
	201 129 81	PU1	221 145 91	¡	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1	0 0 0 1	1
	202 130 82	PU2	222 146 92	¢	242 162 A2	²	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2	0 0 1 0	2
	203 131 83	STS	223 147 93	£	243 163 A3	³	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3	0 0 1 1	3
IND	204 132 84	CCH	224 148 94		244 164 A4		264 180 B4	Ä	304 196 C4	Ô	324 212 D4	ä	344 228 E4	ô	364 244 F4	0 1 0 0	4
NEL	205 133 85	MW	225 149 95	¥	245 165 A5	µ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	a	345 229 E5	õ	365 245 F5	0 1 0 1	5
SSA	206 134 86	SPA	226 150 96		246 166 A6	¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6	0 1 1 0	6
ESA	207 135 87	EPA	227 151 97	§	247 167 A7	·	267 183 B7	Ç	307 199 C7	Œ	327 215 D7	ç	347 231 E7	œ	367 247 F7	0 1 1 1	7
HTS	210 136 88		230 152 98	¤	250 168 A8		270 184 B8	È	310 200 C8	Ø	330 216 D8	è	350 232 E8	ø	370 248 F8	1 0 0 0	8
HTJ	211 137 89		231 153 99	©	251 169 A9	¹	271 185 B9	É	311 201 C9	Ù	330 217 D9	é	351 233 E9	ù	371 249 F9	1 0 0 1	9
VTS	212 138 8A		232 154 9A	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA	1 0 1 0	10
PLD	213 139 8B	CSI	233 155 9B	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB	1 0 1 1	11
PLU	214 140 8C	ST	234 156 9C		254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC	1 1 0 0	12
R1	215 141 8D	OSC	235 157 9D		255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD	1 1 0 1	13
SS2	216 142 8E	PM	236 158 9E		256 174 AE		276 190 BE	Î	316 206 CE		336 222 DE	î	356 238 EE		376 254 FE	1 1 1 0	14
SS3	217 143 8F	APC	237 159 9F		257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF		377 255 FF	1 1 1 1	15

C1 CODES

GR CODES
(DEC SUPPLEMENTAL GRAPHICS)

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

LKG-1580-88

Table D-5: DEC Special Graphics Character Set

Row	B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
	COLUMN	0		1		2		3		4		5		6		7	
	BITS	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	◆	140 96 60	— SCAN 3	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	▒	141 97 61	— SCAN 5	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	␤	142 98 62	— SCAN 7	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	␋	143 99 63	— SCAN 9	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	␍	144 100 64	├	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	␊	145 101 65	┤	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	0	146 102 66	┴	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	±	147 103 67	┬	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	␤	150 104 68	│	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	␉	151 105 69	≤	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	␊	152 106 6A	≥	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	␋	153 107 6B	π	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	␌	154 108 6C	≠	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	␍	155 109 6D	£	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	┼	156 110 6E	·	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	(BLANK)	137 95 5F	— SCAN 1	157 111 6F	DEL	177 127 7F

C0 CODES

GL CODES (DEC SPECIAL GRAPHICS)

KEY

CHARACTER		
ESC	33	OCTAL
	27	DECIMAL
	1B	HEX

LKG-1581-88

Table D-6: British NRC Set

Row	B8 B7 B6 B5 / B4 B3 B2 B1	0		1		2		3		4		5		6		7	
	COLUMN																
	BITS	0 0 0 0		0 0 0 1		0 0 1 0		0 0 1 1		0 1 0 0		0 1 0 1		0 1 1 0		0 1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	£	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

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Table D-7: Dutch NRC Set

Row	B7 B6 B5 B4 B3 B2 B1	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0	0 0 0 0	NUL 0 0 0	DLE 20 16 10	SP 40 32 20	0 60 48 30	¾ 100 64 40	P 120 80 50	` 140 96 60	p 160 112 70
1	0 0 0 1	SOH 1 1 1	DC1 (XON) 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71
2	0 0 1 0	STX 2 2 2	DC2 22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72
3	0 0 1 1	ETX 3 3 3	DC3 (XOFF) 23 19 13	£ 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73
4	0 1 0 0	EOT 4 4 4	DC4 24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74
5	0 1 0 1	ENQ 5 5 5	NAK 25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75
6	0 1 1 0	ACK 6 6 6	SYN 26 22 16	& 46 38 25	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76
7	0 1 1 1	BEL 7 7 7	ETB 27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77
8	1 0 0 0	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 68	x 170 120 78
9	1 0 0 1	HT 11 9 9	EM 31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79
10	1 0 1 0	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A
11	1 0 1 1	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	ij 133 91 5B	k 153 107 6B	¨ 173 123 7B
12	1 1 0 0	FF 14 12 C	FS 34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	½ 134 97 5C	l 154 108 6C	f 174 124 7C
13	1 1 0 1	CR 15 13 D	GS 35 29 1D	– 55 45 2D	= 75 61 3D	M 115 77 4D	| 135 93 5D	m 155 109 6D	¼ 175 125 7D
14	1 1 1 0	SO 16 14 E	RS 36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	n 156 110 6E	' 176 126 7E
15	1 1 1 1	SI 17 15 F	US 37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	_ 137 95 5F	o 157 111 6F	DEL 177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1584-88

Table D-8: Finnish NRC Set

Row	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
BITS B8 B7 B6 B5 B4 B3 B2 B1	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	é	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	Ä	133 91 5B	k	153 107 6A	ä	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	Ö	134 92 5C	l	154 108 6C	ö	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	Å	135 93 5D	m	155 109 6D	å	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	Ü	136 94 5E	n	156 110 6E	ü	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	–	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

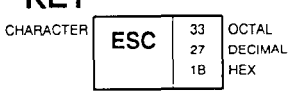
CHARACTER: ESC (.) | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1582-88

Table D-9: French NRC Set

Row	COLUMN	0		1		2		3		4		5		6		7	
	BITS B7 B6 B5 B4 B3 B2 B1	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	à	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	£	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 56	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	°	133 91 5B	k	153 107 6B	é	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ù	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	§	135 93 5D	m	155 109 6D	è	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	¨	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY



LKG-1585-88

Table D-10: French Canadian NRC Set

Row	COLUMN / BITS B7 B6 B5 / B4 B3 B2 B1	0 (0 0 0)		1 (0 0 1)		2 (0 1 0)		3 (0 1 1)		4 (1 0 0)		5 (1 0 1)		6 (1 1 0)		7 (1 1 1)	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	à	100 64 40	P	120 80 50	ô	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	â	133 91 5B	k	153 107 6B	é	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ù	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	ê	135 93 5D	m	155 109 6D	è	175 125 7D
14	1 1 1 0	SO	15 13 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	î	136 94 5E	n	156 110 6E	û	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	—	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL / 27 DECIMAL / 1B HEX

LKG-1586-88

Table D-11: German NRC Set

Row	COLUMN / BITS B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
		0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	§	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	Ä	133 91 5B	k	153 107 6B	ä	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	Ö	134 92 5C	l	154 108 6C	ö	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	Ü	135 93 5D	m	155 109 6D	ü	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	β	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

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Table D-12: Italian NRC Set

Row	COLUMN	0		1		2		3		4		5		6		7	
	BITS B7 B6 B5 / B4 B3 B2 B1	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	§	100 64 40	P	120 80 50	ù	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	£	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	°	133 91 5B	k	153 107 6B	à	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ò	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	é	135 93 5D	m	155 109 6D	è	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	ì	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

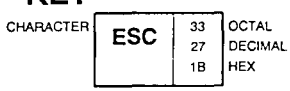

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Table D-13: Norwegian/Danish NRC Set

ROW	BITS B7 B6 B5 B4 B3 B2 B1	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
		0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	Ä	100 64 40	P	120 80 50	ä	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	Æ	133 91 5B	k	153 107 6B	æ	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	Ø	134 92 5C	l	154 108 6C	ø	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	Å	135 93 5D	m	155 109 6D	å	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	Ü	136 94 5E	n	156 110 6E	ü	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	–	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1589-88

Table D-14: Spanish NRC Set

ROW	BITS B7 B6 B5 B4 B3 B2 B1	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	§	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	£	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	¡	133 91 5B	k	153 107 6B	°	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	Ñ	134 92 5C	l	154 108 6C	ñ	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	¿	135 93 5D	m	155 109 6D	ç	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	–	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

LKG-1590-88

Table D-15: Swedish NRC Set

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
BITS B7 B6 B5 B4 B3 B2 B1	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL 0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	É	100 64 40	P	120 80 50	é	140 96 60	p	160 112 70
1	0 0 0 1	SOH 1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX 2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX 3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT 4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ 5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK 6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL 7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS 10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT 11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF 12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT 13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	Ä	133 91 5B	k	153 107 6B	ä	173 123 7B
12	1 1 0 0	FF 14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	Ö	134 92 5C	l	154 108 6C	ö	174 124 7C
13	1 1 0 1	CR 15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	Å	135 93 5D	m	155 109 6D	å	175 125 7D
14	1 1 1 0	SO 16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	Ü	136 94 5E	n	156 110 6E	ü	176 126 7E
15	1 1 1 1	SI 17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	–	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1591-88

Table D-16: Swiss NRC Set

ROW	COLUMN / BITS B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
		0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	à	100 64 40	P	120 80 50	ô	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	ù	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	é	133 91 5B	k	153 107 6B	ä	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ö	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	ê	135 93 5D	m	155 109 6D	ü	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	î	136 94 5E	n	156 110 6E	û	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	è	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER | ESC | 33 OCTAL / 27 DECIMAL / 1B HEX

LKG-1592-88

D.2.2 DECnet-VAXmate Character Sets

To configure DECnet-VAXmate SETHOST for use with international keyboards, follow these steps:

1. Follow the instructions that came with your VAXmate for selecting an international keyboard and character set. For example, to use the DEC Multinational character set, you need to use the DECKEYB file MCSUS.KEY.

   To use a 7-bit National Replacement Character Set, use KEYB to select the appropriate .KEY file. SETHOST will automatically use that character set. For 8-bit character sets, you have a choice between DEC Multinational and ISO Latin-1 character sets.

2. Tell SETHOST which character set you wish to use. (Follow steps 3 through 7.)

3. Press F3 to get into the Set-Up menu.

4. Use Next or Previous to get to the General menu.

5. Use Up Arrow or Down Arrow to move to the character set selection option.

6. Select the character set you want to use.

7. Save this as the new default by using the Save Set-Up Parameters option on the Action menu.

The following tables indicate the character sets you can use with DECnet-VAXmate.

Because some of the following character sets have both a left and a right half, the sets have been positioned in this appendix to begin on a left-hand (verso) page.

Table D-17: ISO Latin-1 Character Set (Left Half)

Row	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
	BITS B8 B7 B6 B5 / B4 B3 B2 B1		0 0 0 0		0 0 0 1		0 0 1 0		0 0 1 1		0 1 0 0		0 1 0 1		0 1 1 0		0 1 1 1	
0	0 0 0 0	NUL	0 0 0		20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1		1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0		2 2 2		22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1		3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0		4 4 4		24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1		5 5 5		25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0		6 6 6		26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1		7 7 7		27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9		31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
12	1 1 0 0	FF	14 12 C		34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C
13	1 1 0 1	CR	15 13 D		35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
14	1 1 1 0	SO	16 14 E		36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI	17 15 F		37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1593-88

Table D-18: ISO Latin-1 Character Set (Right Half)

8		9		10		11		12		13		14		15		COLUMN BITS B8 B7 B6 B5	ROW
1 0 0 0		1 0 0 1		1 0 1 0		1 0 1 1		1 1 0 0		1 1 0 1		1 1 1 0		1 1 1 1		B4 B3 B2 B1	
	200 128 80	DCS	220 144 90	NBSP	240 160 A0	°	260 176 B0	À	300 192 C0	Ð	320 208 D0	à	340 224 E0	ð	360 240 F0	0 0 0 0	0
	201 129 81		221 145 91	¡	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1	0 0 0 1	1
	202 130 82		222 146 92	¢	242 162 A2	2	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2	0 0 1 0	2
	203 131 83		223 147 93	£	243 163 A3	3	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3	0 0 1 1	3
IND	204 132 84		224 148 94	¤	244 164 A4	'	264 180 B4	Ä	304 196 C4	Ô	324 212 D4	ä	344 228 E4	ô	364 244 F4	0 1 0 0	4
NEL	205 133 85		225 149 95	¥	245 165 A5	µ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	å	345 229 E5	õ	365 245 F5	0 1 0 1	5
	206 134 86		226 150 96	¦	246 166 A6	¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6	0 1 1 0	6
	207 135 87		227 151 97	§	247 167 A7	·	267 183 B7	Ç	307 199 C7	×	327 215 D7	ç	347 231 E7	÷	367 247 F7	0 1 1 1	7
HTS	210 136 88		230 152 98	¨	250 168 A8	¸	270 184 B8	È	310 200 C8	Ø	330 216 D8	è	350 232 E8	ø	370 248 F8	1 0 0 0	8
	211 137 89		231 153 99	©	251 169 A9	1	271 185 B9	É	311 201 C9	Ù	331 217 D9	é	351 233 E9	ù	371 249 F9	1 0 0 1	9
VTS	212 138 8A		232 154 9A	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA	1 0 1 0	10
PLD	213 139 8B	CSI	233 155 9B	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB	1 0 1 1	11
PLU	214 140 8C	ST	234 156 9C	¬	254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC	1 1 0 0	12
RI	215 141 8D		235 157 9D	SHY	255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD	1 1 0 1	13
SS2	216 142 8E		236 158 9E	®	256 174 AE	¾	276 190 BE	Î	316 206 CE	Þ	336 222 DE	î	356 238 EE	þ	376 254 FE	1 1 1 0	14
SS3	217 143 8F		237 159 9F	–	257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF	ÿ	377 255 FF	1 1 1 1	15

HIGHLIGHTS DIFFERENCES FROM ASCII

KEY

CHARACTER | ESC | 33 OCTAL / 27 DECIMAL / 1B HEX

LKG-1594-88

Table D-19: Digital Multinational Character Set (Left Half)

Row	B8 B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
	COLUMN		0		1		2		3		4		5		6		7
	BITS	0 0 0 0		0 0 0 1		0 0 1 0		0 0 1 1		0 1 0 0		0 1 0 1		0 1 1 0		0 1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

C0 CODES

GL CODES (ASCII GRAPHICS)

KEY

CHARACTER: ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1595-88

Table D-20: Digital Multinational Character Set (Right Half)

8		9		10		11		12		13		14		15		COLUMN BITS B8 B7 B6 B5 B4 B3 B2 B1	ROW
1 0 0 0		1 0 0 1		1 0 1 0		1 0 1 1		1 1 0 0		1 1 0 1		1 1 1 0		1 1 1 1			
	200 128 80	DCS	220 144 90		240 160 A0	°	260 176 B0	À	300 192 C0		320 208 D0	à	340 224 E0		360 240 F0	0 0 0 0	0
	201 129 81	PU1	221 145 91	¡	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1	0 0 0 1	1
	202 130 82	PU2	222 146 92	¢	242 162 A2	²	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2	0 0 1 0	2
	203 131 83	STS	223 147 93	£	243 163 A3	³	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3	0 0 1 1	3
IND	204 132 84	CCH	224 148 94		244 164 A4		264 180 B4	Ä	304 196 C4	Ô	324 212 D4	ä	344 228 E4	ô	364 244 F4	0 1 0 0	4
NEL	205 133 85	MW	225 149 95	¥	245 165 A5	µ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	a	345 229 E5	õ	365 245 F5	0 1 0 1	5
SSA	206 134 86	SPA	226 150 96		246 166 A6	¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6	0 1 1 0	6
ESA	207 135 87	EPA	227 151 97	§	247 167 A7	·	267 183 B7	Ç	307 199 C7	Œ	327 215 D7	ç	347 231 E7	œ	367 247 F7	0 1 1 1	7
HTS	210 136 88		230 152 98	¤	250 168 A8		270 184 B8	È	310 200 C8	Ø	330 216 D8	è	350 232 E8	ø	370 248 F8	1 0 0 0	8
HTJ	211 137 89		231 153 99	©	251 169 A9	¹	271 185 B9	É	311 201 C9	Ù	330 217 D9	é	351 233 E9	ù	371 249 F9	1 0 0 1	9
VTS	212 138 8A		232 154 9A	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA	1 0 1 0	10
PLD	213 139 8B	CSI	233 155 9B	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB	1 0 1 1	11
PLU	214 140 8C	ST	234 156 9C		254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC	1 1 0 0	12
R1	215 141 8D	OSC	235 157 9D		255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD	1 1 0 1	13
SS2	216 142 8E	PM	236 158 9E		256 174 AE		276 190 BE	Î	316 206 CE		336 222 DE	î	356 238 EE		376 254 FE	1 1 1 0	14
SS3	217 143 8F	APC	237 159 9F		257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF		377 255 FF	1 1 1 1	15

C1 CODES — GR CODES (DEC SUPPLEMENTAL GRAPHICS)

KEY

CHARACTER ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1596-88

Table D-21: STD Character Set (Left Half)

Row	COLUMN	0		1		2		3		4		5		6		7	
	BITS B8 B7 B6 B5	0 0 0 0		0 0 0 1		0 0 1 0		0 0 1 1		0 1 0 0		0 1 0 1		0 1 1 0		0 1 1 1	
	B4 B3 B2 B1																
0	0 0 0 0	BLANK (NULL)	0 0 0	▶	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	‘	140 96 60	p	160 112 70
1	0 0 0 1	☺	1 1 1	◀	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	☻	2 2 2	↕	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	♥	3 3 3	!!	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	♦	4 4 4	¶	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	♣	5 5 5	§	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	♠	6 6 6	▬	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	•	7 7 7	↨	27 23 17	’	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	◘	10 8 8	↑	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	○	11 9 9	↓	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	◙	12 10 A	→	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	♂	13 11 B	←	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
12	1 1 0 0	♀	14 12 C	∟	34 28 1C	’	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	¦	174 124 7C
13	1 1 0 1	♪	15 13 D	↔	35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
14	1 1 1 0	♫	16 14 E	▲	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	☼	17 15 F	▼	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	△	177 127 7F

KEY

CHARACTER | ESC | 33 OCTAL / 27 DECIMAL / 1B HEX

LKG-1597-88

Table D-22: STD Character Set (Right Half)

8		9		10		11		12		13		14		15		COLUMN BITS B8 B7 B6 B5	ROW
1 0 0 0		1 0 0 1		1 0 1 0		1 0 1 1		1 1 0 0		1 1 0 1		1 1 1 0		1 1 1 1		B4 B3 B2 B1	
Ç	200 128 80	É	220 144 90	á	240 160 A0		260 176 B0		300 192 C0		320 208 D0	α	340 224 E0	≡	360 240 F0	0 0 0 0	0
ü	201 129 81	æ	221 145 91	í	241 161 A1		261 177 B1		301 193 C1		321 209 D1	β	341 225 E1	±	361 241 F1	0 0 0 1	1
é	202 130 82	Æ	222 146 92	ó	242 162 A2		262 178 B2		302 194 C2		322 210 D2	Γ	342 226 E2	≥	362 242 F2	0 0 1 0	2
â	203 131 83	ô	223 147 93	ú	243 163 A3		263 179 B3		303 195 C3		323 211 D3	Π	343 227 E3	≤	363 243 F3	0 0 1 1	3
ä	204 132 84	ö	224 148 94	ñ	244 164 A4		264 180 B4		304 196 C4		324 212 D4	Σ	344 228 E4	⌠	364 244 F4	0 1 0 0	4
à	205 133 85	ò	225 149 95	Ñ	245 165 A5		265 181 B5		305 197 C5		325 213 D5	σ	345 229 E5	⌡	365 245 F5	0 1 0 1	5
å	206 134 86	û	226 150 96	ª	246 166 A6		266 182 B6		306 198 C6		326 214 D6	μ	346 230 E6	÷	366 246 F6	0 1 1 0	6
ç	207 135 87	ù	227 151 97	º	247 167 A7		267 183 B7		307 199 C7		327 215 D7	τ	347 231 E7	≈	367 247 F7	0 1 1 1	7
ê	210 136 88	ÿ	230 152 98	¿	250 168 A8		270 184 B8		310 200 C8		330 216 D8	Φ	350 232 E8	°	370 248 F8	1 0 0 0	8
ë	211 137 89	Ö	231 153 99	⌐	251 169 A9		271 185 B9		311 201 C9		331 217 D9	Θ	351 233 E9	•	371 249 F9	1 0 0 1	9
è	212 138 8A	Ü	232 154 9A	¬	252 170 AA		272 186 BA		312 202 CA		332 218 DA	Ω	352 234 EA	·	372 250 FA	1 0 1 0	10
ï	213 139 8B	¢	232 155 9B	½	253 171 AB		273 187 BB		313 203 CB		333 219 DB	δ	353 235 EB	√	373 251 FB	1 0 1 1	11
î	214 140 8C	£	234 156 9C	¼	254 172 AC		274 188 BC		314 204 CC		334 220 DC	∞	354 236 EC	n	374 252 FC	1 1 0 0	12
ì	215 141 8D	¥	235 157 9D	¡	255 173 AD		275 189 BD		315 205 CD		335 221 DD	∅	355 237 ED	2	375 253 FD	1 1 0 1	13
Ä	216 142 8E	₧	236 158 9E	«	256 174 AE		276 190 BE		316 206 CE		336 222 DE	∈	356 238 EE	▮	376 254 FE	1 1 1 0	14
Å	217 143 8F	ƒ	237 159 9F	»	257 175 AF		277 191 BF		317 207 CF		337 223 DF	∩	357 239 EF	SP	377 255 FF	1 1 1 1	15

KEY

CHARACTER | ESC | 33 OCTAL / 27 DECIMAL / 1B HEX

LKG-1598-88

Table D-23: ST2 Character Set (Left Half)

Row	B8 B7 B6 B5 B4 B3 B2 B1	0	1	2	3	4	5	6	7
0	0 0 0 0	BLANK (NULL) 0 0 0	▶ 20 16 10	SP 40 32 20	0 60 48 30	@ 100 64 40	P 120 80 50	‘ 140 96 60	p 160 112 70
1	0 0 0 1	☺ 1 1 1	◀ 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71
2	0 0 1 0	☻ 2 2 2	↕ 22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72
3	0 0 1 1	♥ 3 3 3	!! 23 19 13	# 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73
4	0 1 0 0	♦ 4 4 4	¶ 24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74
5	0 1 0 1	♣ 5 5 5	§ 25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75
6	0 1 1 0	♠ 6 6 6	▬ 26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76
7	0 1 1 1	• 7 7 7	↨ 27 23 17	’ 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77
8	1 0 0 0	◘ 10 8 8	↑ 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 58	x 170 120 78
9	1 0 0 1	○ 11 9 9	↓ 31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79
10	1 0 1 0	◙ 12 10 A	→ 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A
11	1 0 1 1	♂ 13 11 B	← 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	[133 91 5B	k 153 107 6B	{ 173 123 7B
12	1 1 0 0	♀ 14 12 C	∟ 34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	\ 134 92 5C	l 154 108 6C	¦ 174 124 7C
13	1 1 0 1	♪ 15 13 D	↔ 35 29 1D	– 55 45 2D	= 75 61 3D	M 115 77 4D	] 135 93 5D	m 155 109 6D	} 175 125 7D
14	1 1 1 0	♫ 16 14 E	▲ 36 30 1E	• 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	n 156 110 6E	~ 176 126 7E
15	1 1 1 1	☼ 17 15 F	▼ 37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	_ 137 95 5F	o 157 111 6F	△ 177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL | 27 DECIMAL | 1B HEX

LKG-1599-88

Table D-24: ST2 Character Set (Right Half)

8		9		10		11		12		13		14		15		COLUMN BITS B8 B7 B6 B5 B4 B3 B2 B1	ROW
1 0 0 0		1 0 0 1		1 0 1 0		1 0 1 1		1 1 0 0		1 1 0 1		1 1 1 0		1 1 1 1			
Ç	200 128 80	É	220 144 90	á	240 160 A0		260 176 B0		300 192 C0		320 208 D0	α	340 224 E0	≡	360 240 F0	0 0 0 0	0
ü	201 129 81	æ	221 145 91	í	241 161 A1		261 177 B1		301 193 C1		321 209 D1	β	341 225 E1	±	361 241 F1	0 0 0 1	1
é	202 130 82	Æ	222 146 92	ó	242 162 A2		262 178 B2		302 194 C2		322 210 D2	Γ	342 226 E2	≥	362 242 F2	0 0 1 0	2
â	203 131 83	ô	223 147 93	ú	243 163 A3		263 179 B3		303 195 C3		323 211 D3	Π	343 227 E3	≤	363 243 F3	0 0 1 1	3
ä	204 132 84	ö	224 148 94	ñ	244 164 A4		264 180 B4		304 196 C4		324 212 D4	Σ	344 228 E4	⌠	364 244 F4	0 1 0 0	4
à	205 133 85	ò	225 149 95	Ñ	245 165 A5		265 181 B5		305 197 C5		325 213 D5	σ	345 229 E5	⌡	365 245 F5	0 1 0 1	5
å	206 134 86	û	226 150 96	ō	246 166 A6		266 182 B6		306 198 C6		326 214 D6	μ	346 230 E6	÷	366 246 F6	0 1 1 0	6
ç	207 135 87	ù	227 151 97	Ō	247 167 A7		267 183 B7		307 199 C7		327 215 D7	τ	347 231 E7	≈	367 247 F7	0 1 1 1	7
ê	210 136 88	ÿ	230 152 98	¿	250 168 A8		270 184 B8		310 200 C8		330 216 D8	Φ	350 232 E8	°	370 248 F8	1 0 0 0	8
ë	211 137 89	õ	231 153 99	ā	251 169 A9		271 185 B9		311 201 C9		331 217 D9	Θ	351 233 E9	•	371 249 F9	1 0 0 1	9
è	212 138 8A	ü	232 154 9A	Ā	252 170 AA		272 186 BA		312 202 CA		332 218 DA	Ω	352 234 EA	·	372 250 FA	1 0 1 0	10
ï	213 139 8B	ø	233 155 9B	ℓ	253 171 AB		273 187 BB		313 203 CB		333 219 DB	δ	353 235 EB	√	373 251 FB	1 0 1 1	11
î	214 140 8C	£	234 156 9C	'n	254 172 AC		274 188 BC		314 204 CC		334 220 DC	∞	354 236 EC	n	374 252 FC	1 1 0 0	12
ì	215 141 8D	Ø	235 157 9D	ĭ	255 173 AD		275 189 BD		315 205 CD		335 221 DD	∅	355 237 ED	2	375 253 FD	1 1 0 1	13
Ä	216 142 8E	Ł	236 158 9E	3	256 174 AE		276 190 BE		316 206 CE		336 222 DE	∈	356 238 EE	■	376 254 FE	1 1 1 0	14
Å	217 143 8F	ł	237 159 9F	⌒	257 175 AF		277 191 BF		317 207 CF		337 223 DF	∩	357 239 EF	SP	377 255 FF	1 1 1 1	15

KEY

CHARACTER | ESC | 33 OCTAL / 27 DECIMAL / 1B HEX

LKG-1600-88

Table D-25: Finnish 7-Bit NRC Set

Row	BITS B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
	COLUMN	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0		20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	é	140 96 60	p	160 112 70
1	0 0 0 1		1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0		2 2 2		22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1		3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0		4 4 4		24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1		5 5 5		25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0		6 6 6		26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1		7 7 7		27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9		31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	Ä	133 91 5B	k	153 107 6B	ä	173 123 7B
12	1 1 0 0	FF	14 12 C		34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	Ö	134 92 5C	l	154 108 6C	ö	174 124 7C
13	1 1 0 1	CR	15 13 D		35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	Å	135 93 5D	m	155 109 6D	å	175 125 7D
14	1 1 1 0	SO	16 14 E		36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	Ü	136 94 5E	n	156 110 6E	ü	176 126 7E
15	1 1 1 1	SI	17 15 F		37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	–	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 (OCTAL) / 27 (DECIMAL) / 1B (HEX)

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1601-88

Table D-26: French Canadian 7-Bit NRC Set

Row	COLUMN / BITS B7 B6 B5 B4 B3 B2 B1	0 (0 0 0)		1 (0 0 1)		2 (0 1 0)		3 (0 1 1)		4 (1 0 0)		5 (1 0 1)		6 (1 1 0)		7 (1 1 1)	
0	0 0 0 0	NUL	0 0 0		20 16 10	SP	40 32 20	0	60 48 30	à	100 64 40	P	120 80 50	ô	140 96 60	p	160 112 70
1	0 0 0 1		1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0		2 2 2		22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1		3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0		4 4 4		24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1		5 5 5		25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0		6 6 6		26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1		7 7 7		27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9		31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	â	133 91 5B	k	153 107 6B	é	173 123 7B
12	1 1 0 0	FF	14 12 C		34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ù	174 124 7C
13	1 1 0 1	CR	15 13 D		35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	ê	135 93 5D	m	155 109 6D	è	175 125 7D
14	1 1 1 0	SO	16 14 E		36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	î	136 94 5E	n	156 110 6E	û	176 126 7E
15	1 1 1 1	SI	17 15 F		37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	—	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1602-88

Table D-27: French 7-Bit NRC Set

Row	COLUMN / BITS B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
		0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0		20 16 10	SP	40 32 20	0	60 48 30	à	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1		1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0		2 2 2		22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1		3 3 3	DC3 (XOFF)	23 19 13	£	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0		4 4 4		24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1		5 5 5		25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0		6 6 6		26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1		7 7 7		27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9		31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	°	133 91 5B	k	153 107 6B	é	173 123 7B
12	1 1 0 0	FF	14 12 C		34 28 1C	'	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ù	174 124 7C
13	1 1 0 1	CR	15 13 D		35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	§	135 93 5D	m	155 109 6D	è	175 125 7D
14	1 1 1 0	SO	16 14 E		36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	¨	176 126 7E
15	1 1 1 1	SI	17 15 F		37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	–	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER | ESC | 33 (OCTAL) / 27 (DECIMAL) / 1B (HEX)

HIGHLIGHTS DIFFERENCES FROM ASCII

NOTE

QUOTATION MARKS (") ARE USED AS AN APPROXIMATION FOR THE DIERESIS MARK (¨), COLUMN 7, ROW 14.

LKG-1603-88

Table D-28: German 7-Bit NRC Set

Row	BITS B7 B6 B5 B4 B3 B2 B1	0	1	2	3	4	5	6	7
	COLUMN	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0	0 0 0 0	NUL 0 0 0	20 16 10	SP 40 32 20	0 60 48 30	§ 100 64 40	P 120 80 50	` 140 96 60	p 160 112 70
1	0 0 0 1	1 1 1	DC1 (XON) 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71
2	0 0 1 0	2 2 2	22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72
3	0 0 1 1	3 3 3	DC3 (XOFF) 23 19 13	# 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73
4	0 1 0 0	4 4 4	24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74
5	0 1 0 1	5 5 5	25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75
6	0 1 1 0	6 6 6	26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76
7	0 1 1 1	7 7 7	27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77
8	1 0 0 0	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 68	x 170 120 78
9	1 0 0 1	HT 11 9 9	31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79
10	1 0 1 0	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A
11	1 0 1 1	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	Ä 133 91 5B	k 153 107 6B	ä 173 123 7B
12	1 1 0 0	FF 14 12 C	34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	Ö 134 92 5C	l 154 108 6C	ö 174 124 7C
13	1 1 0 1	CR 15 13 D	35 29 1D	– 55 45 2D	= 75 61 3D	M 115 77 4D	Ü 135 93 5D	m 155 109 6D	ü 175 125 7D
14	1 1 1 0	SO 16 14 E	36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	n 156 110 6E	ß 176 126 7E
15	1 1 1 1	SI 17 15 F	37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	_ 137 95 5F	o 157 111 6F	DEL 177 127 7F

KEY

CHARACTER | ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1604-88

Table D-29: Italian 7-Bit NRC Set

Row	COLUMN / BITS B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
		0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0		20 16 10	SP	40 32 20	0	60 48 30	§	100 64 40	P	120 80 50	ù	140 96 60	p	160 112 70
1	0 0 0 1		1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0		2 2 2		22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1		3 3 3	DC3 (XOFF)	23 19 13	£	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0		4 4 4		24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5		25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0		6 6 6		26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7		27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9		31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	°	133 91 5B	k	153 107 6B	à	173 123 7B
12	1 1 0 0	FF	14 12 C		34 28 1C	'	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ò	174 124 7C
13	1 1 0 1	CR	15 13 D		35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	é	135 93 5D	m	155 109 6D	è	175 125 7D
14	1 1 1 0	SO	16 14 E		36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	ì	176 126 7E
15	1 1 1 1	SI	17 15 F		37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	—	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1605-88

Table D-30: Norwegian/Danish 7-Bit NRC Set

Row	BITS B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
	COLUMN	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0		20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1		1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0		2 2 2		22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1		3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0		4 4 4		24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1		5 5 5		25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0		6 6 6		26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1		7 7 7		27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9		31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	Æ	133 91 5B	k	153 107 6B	æ	173 123 7B
12	1 1 0 0	FF	14 12 C		34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	Ø	134 92 5C	l	154 108 6C	ø	174 124 7C
13	1 1 0 1	CR	15 13 D		35 29 1D	–	55 45 2D	=	75 61 3D	M	115 77 4D	Å	135 93 5D	m	155 109 6D	å	175 125 7D
14	1 1 1 0	SO	16 14 E		36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI	17 15 F		37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1606-88

Table D-31: Spanish 7-Bit NRC Set

Row	COLUMN / BITS B7 B6 B5 B4 B3 B2 B1	0	1	2	3	4	5	6	7
		0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0	0 0 0 0	NUL 0 0 0	 20 16 10	SP 40 32 20	0 60 48 30	§ 100 64 40	P 120 80 50	` 140 96 60	p 160 112 70
1	0 0 0 1	 1 1 1	DC1 (XON) 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71
2	0 0 1 0	 2 2 2	 22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72
3	0 0 1 1	 3 3 3	DC3 (XOFF) 23 19 13	£ 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73
4	0 1 0 0	 4 4 4	 24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74
5	0 1 0 1	 5 5 5	 25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75
6	0 1 1 0	 6 6 6	 26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76
7	0 1 1 1	 7 7 7	 27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77
8	1 0 0 0	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 68	x 170 120 78
9	1 0 0 1	HT 11 9 9	 31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79
10	1 0 1 0	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A
11	1 0 1 1	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	¡ 133 91 5B	k 153 107 6B	° 173 123 7B
12	1 1 0 0	FF 14 12 C	 34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	Ñ 134 92 5C	l 154 108 6C	ñ 174 124 7C
13	1 1 0 1	CR 15 13 D	 35 29 1D	– 55 45 2D	= 75 61 3D	M 115 77 4D	¿ 135 93 5D	m 155 109 6D	ç 175 125 7D
14	1 1 1 0	SO 16 14 E	 36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	n 156 110 6E	~ 176 126 7E
15	1 1 1 1	SI 17 15 F	 37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	– 137 95 5F	o 157 111 6F	DEL 177 127 7F

KEY

CHARACTER: ESC | 33 (OCTAL) / 27 (DECIMAL) / 1B (HEX)

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1607-88

Table D-32: Swedish 7-Bit NRC Set

Row	COLUMN / BITS B7 B6 B5 B4 B3 B2 B1	0 (0 0 0)	1 (0 0 1)	2 (0 1 0)	3 (0 1 1)	4 (1 0 0)	5 (1 0 1)	6 (1 1 0)	7 (1 1 1)
0	0 0 0 0	NUL 0 0 0	 20 16 10	SP 40 32 20	0 60 48 30	É 100 64 40	P 120 80 50	é 140 96 60	p 160 112 70
1	0 0 0 1	 1 1 1	DC1 (XON) 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71
2	0 0 1 0	 2 2 2	 22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72
3	0 0 1 1	 3 3 3	DC3 (XOFF) 23 19 13	# 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73
4	0 1 0 0	 4 4 4	 24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74
5	0 1 0 1	 5 5 5	 25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75
6	0 1 1 0	 6 6 6	 26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76
7	0 1 1 1	 7 7 7	 27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77
8	1 0 0 0	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 68	x 170 120 78
9	1 0 0 1	HT 11 9 9	 31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79
10	1 0 1 0	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A
11	1 0 1 1	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	Ä 133 91 5B	k 153 107 6B	ä 173 123 7B
12	1 1 0 0	FF 14 12 C	 34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	Ö 134 92 5C	l 154 108 6C	ö 174 124 7C
13	1 1 0 1	CR 15 13 D	 35 29 1D	– 55 45 2D	= 75 61 3D	M 115 77 4D	Å 135 93 5D	m 155 109 6D	å 175 125 7D
14	1 1 1 0	SO 16 14 E	 36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	Ü 136 94 5E	n 156 110 6E	ü 176 126 7E
15	1 1 1 1	SI 17 15 F	 37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	– 137 95 5F	o 157 111 6F	DEL 177 127 7F

KEY

CHARACTER: ESC | 33 (OCTAL) / 27 (DECIMAL) / 1B (HEX)

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1608-88

Table D-33: Swiss 7-Bit NRC Set

Row	BITS B7 B6 B5 B4 B3 B2 B1	0		1		2		3		4		5		6		7	
	COLUMN	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0		20 16 10	SP	40 32 20	0	60 48 30	à	100 64 40	P	120 80 50	ô	140 96 60	p	160 112 70
1	0 0 0 1		1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0		2 2 2		22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1		3 3 3	DC3 (XOFF)	23 19 13	ù	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0		4 4 4		24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1		5 5 5		25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0		6 6 6		26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1		7 7 7		27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9		31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	é	133 91 5B	k	153 107 6B	ä	173 123 7B
12	1 1 0 0	FF	14 12 C		34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	ç	134 92 5C	l	154 108 6C	ö	174 124 7C
13	1 1 0 1	CR	15 13 D		35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	ê	135 93 5D	m	155 109 6D	ü	175 125 7D
14	1 1 1 0	SO	16 14 E		36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	î	136 94 5E	n	156 110 6E	û	176 126 7E
15	1 1 1 1	SI	17 15 F		37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	è	137 95 5F	o	157 111 6F	DEL	177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1609-88

Table D-34: U.K. 7-Bit NRC Set

Row	B4 B3 B2 B1	0	1	2	3	4	5	6	7
	COLUMN	0	1	2	3	4	5	6	7
	BITS B7 B6 B5	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0	0 0 0 0	NUL 0 0 0	20 16 10	SP 40 32 20	0 60 48 30	@ 100 64 40	P 120 80 50	` 140 96 60	p 160 112 70
1	0 0 0 1	1 1 1	DC1 (XON) 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71
2	0 0 1 0	2 2 2	22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72
3	0 0 1 1	3 3 3	DC3 (XOFF) 23 19 13	£ 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73
4	0 1 0 0	4 4 4	24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74
5	0 1 0 1	5 5 5	25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75
6	0 1 1 0	6 6 6	26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76
7	0 1 1 1	7 7 7	27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77
8	1 0 0 0	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 68	x 170 120 78
9	1 0 0 1	HT 11 9 9	31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79
10	1 0 1 0	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A
11	1 0 1 1	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	[133 91 5B	k 153 107 6B	{ 173 123 7B
12	1 1 0 0	FF 14 12 C	34 28 1C	' 54 44 2C	< 74 60 3C	L 114 76 4C	\ 134 92 5C	l 154 108 6C	| 174 124 7C
13	1 1 0 1	CR 15 13 D	35 29 1D	– 55 45 2D	= 75 61 3D	M 115 77 4D	] 135 93 5D	m 155 109 6D	} 175 125 7D
14	1 1 1 0	SO 16 14 E	36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	n 156 110 6E	~ 176 126 7E
15	1 1 1 1	SI 17 15 F	37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	_ 137 95 5F	o 157 111 6F	DEL 177 127 7F

KEY

CHARACTER: ESC | 33 OCTAL, 27 DECIMAL, 1B HEX

HIGHLIGHTS DIFFERENCES FROM ASCII

LKG-1610-88

D.2.3 Multinational Characters and VT100 Emulation

If you select VT100 emulation and you are using ALL-IN-1 or WPS-PLUS software, DEC multinational characters are not displayed. In order to get WPS-PLUS software to use the multinational character set (MCS) and to properly display the MCS characters in the on-line help screens, you need to define the following symbols on your VMS system:

DEFINE KOA$TERMINAL_*xxxx* "OUTPUT_SETHOST"
DEFINE KOA$TERMINAL_MCS_SETHOST "Y"

where *xxxx* is the terminal name (such as RTA1, VTA32, and so on).

E

Using NFT in a Windows Environment

The Network File Transfer utility (NFT) is available as a Class A (fully functional) windows application. You can start NFT by selecting it from your DECnet directory. To do this, use the mouse to click twice on the file name, NFT.EXE.

NFT appears as a window on your screen. If you were using the MS–DOS Executive, the current directory of files also appears on your screen.

If you want to use character set translation while running NFT in a windows environment, you will need to use the *.CHR files. These files contain all of character set information you need. The files should already exist in your DECnet directory (if you used the DECnet–DOS Installation Procedure (DIP), the files were automatically copied to this directory). If the files are not in your directory, you should copy them from the installation diskette.

E.1 NFT Menu Options

NFT provides a way for you to copy files to or from another node in a DECnet network. It allows you to list directories, delete files, display files, print text files, and submit batch jobs. To perform these functions, NFT provides several options for you to choose from. The options appear on the menu bar at the top of the window when you first start the utility. The options include the following:

- Copy
- View
- Change Directory
- Special

- Data Type
- Character Set
- Help

E.1.1 Copy

The Copy option lets you perform three tasks:

1. Copy a file to a destination file.
2. Append a file to a destination file.
3. Copy information to the MS-Windows clipboard.

When you select Copy or Append, a pop-up window appears that requires you to enter a source file specification and a destination file specification. You also have a choice of different attributes or character sets to use with your file.

Once you enter a source file name and a destination file name, you can click OK and have NFT start the file transfer. NFT then displays a window that indicates the operation is "In Progress." It also displays text indicating that the file is being copied. When the transfer is complete, the "In Progress" window should indicate the completion status. You must close this window in order to clear the screen and return to the previous NFT window you were using.

If you select Copy to Clipboard, NFT displays a window that requires you to enter a file specification. You can then click OK to have NFT place that file in the clipboard.

E.1.2 View

The View option provides different ways of looking at a file. They include the following:

- Brief – displays file names only.
- Verbose – displays file names and the dates the files were created.
- Get full info – displays additional information for selected files.
- Text – displays the contents of a text file. When you select this option, a pop-up window appears that requires you to enter a file specification for the file whose contents you want to view.

E.1.3 Change Directory

The Change Directory option lets you select a different directory to use for choosing source or destination files. You can select a new local directory, or you can select a remote directory.

When you select this option, NFT displays a pop-up window that requires you to enter a file specification for the new directory. You can click OK to change the directory, or you can click Cancel to return to the NFT window.

E.1.4 Special

The Special option provides three different ways of treating your source file. They are:

- Delete – deletes the source file.
- Print – prints the source file (this option applies to remote files only).
- Submit – submits the source file as a batch job (this option applies to remote nodes only).

E.1.5 Data Type

The Data Type option lets you specify the type of data that will be used in the source file. The data types include the following:

- ASCII
- Image
- Block mode
- Macy11
- Line numbers
- Convert character set

Note that if you do not select a data type, NFT will try to determine the type by default. Some binary files may appear to NFT as ASCII files, and they will not be transferred properly. In order to avoid this, you should select the "Image" data type for use with binary files.

E.1.6 Character Set

The Character Set option lets you select the type of character set to use for the source file. This option is applicable only for ASCII files. It is necessary to change character sets only if the source and destination file character sets differ from each other.

The character sets you can select from include the following:

- No translation (this is the default)
- DEC Multinational
- USA
- Dutch
- Finnish
- French-Canadian
- French
- German
- ISO Latin-1
- Italian
- Norwegian/Danish
- Spanish
- Swedish
- Swiss
- U.K.

F

Using FAL in a Windows Environment

The File Access Listener (FAL) is available as a Class A (fully functional) windows application. You can start FAL by selecting FAL.EXE from your \DECNET directory. To do this, use the mouse to click twice on the file name, FAL.EXE.

FAL appears as a window on your screen. FAL will continue to listen for and receive remote access requests from other nodes in the network until you close the utility.

You can also use FAL as an icon. Once you start the utility, you can change it to an icon, and FAL will continue to listen for and receive connect requests and file I/O. This allows you to perform other tasks while FAL listens in the background. When you recall FAL from the icon, the utility lists all of the connect requests and file I/O it has received until that point.

FAL allows you to choose Help or the following options:

- ASCII – This option transfers all files as ASCII files.
- Binary – This option transfers all files as binary files.
- Do not supersede – This option allows other users to read the files on your system, but users cannot supersede your files.
- Log – This option causes status messages to be logged to a file.
- Trace – This option starts a protocol trace. (This is generally used by system programmers.)

The options provide the same functionality in windows as they do when used from the command line. The options listed here are also described (as switches) in Chapter 8.

If you select Help, FAL displays a list of the available options and a brief description of each option.

When you select the Log option, FAL displays a pop-up window that prompts you for the name of the file to use for logging information. You can use the default log file name of FAL.LOG, or you can enter a different name. Once you set up a log file, FAL logs the type of access for every request it receives in that file. The type of access includes the following information:

- The command or request (such as an NFT DIRECTORY or DELETE command).
- The requested directory name and file name.
- The node name.
- The access control information for that node (user name and account).

G

Modem Control

The information in this appendix is provided for people who need to know how modem control is implemented. The information is intended for people who understand modem operations.

G.1 Using Modem Control

To use modem control for DECnet on your personal computer, you should make sure that cables and connections conform to the EIA RS-232-C and CCITT V.28 and V.24 standards.

The following assumptions have been made for this release of DECnet-DOS:

- Connections that were established before turning the line state ON will be maintained.

- Connections that still exist when turning the line state OFF will be maintained (unless the data set is specifically commanded to hang up).

You should also be aware of the following information:

- In the United Kingdom (UK), the R1 relay in modem number 2B is held up for approximately 2 seconds in order to bridge the gaps in the ringing signal. For proper operation in calls that are automatically answered, the 2-second hold up requires that the amount of time from DSR = ON through DTR = OFF and back to DSR = ON be at least 5 seconds. This will avoid a false second call seizure. (Refer to state 7 in Figure G-1.)

- It is assumed that the terminal has two modes of operation:

  — data leads only (modem control signals ignored)

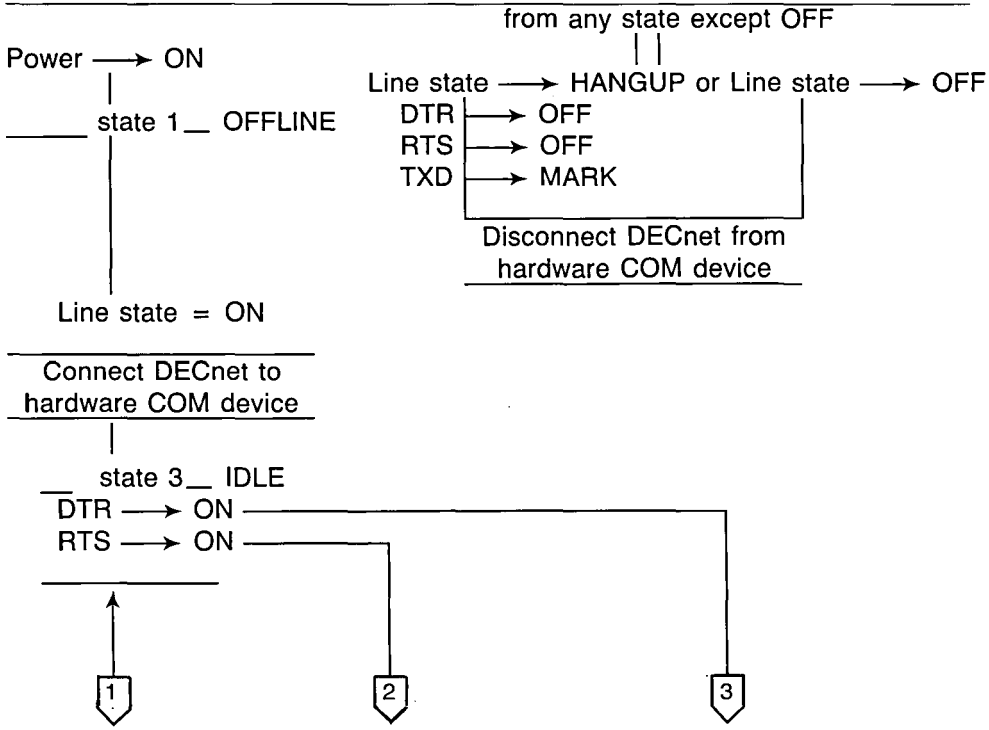
  — full modem control (modem control signals acknowledged)

  The data leads only mode is used for local connections, such as null modem applications. The proper mode signals are simulated internally to allow the use of a single control flow. You can choose between the two modes by using a set-up parameter.

G.2 Modem States

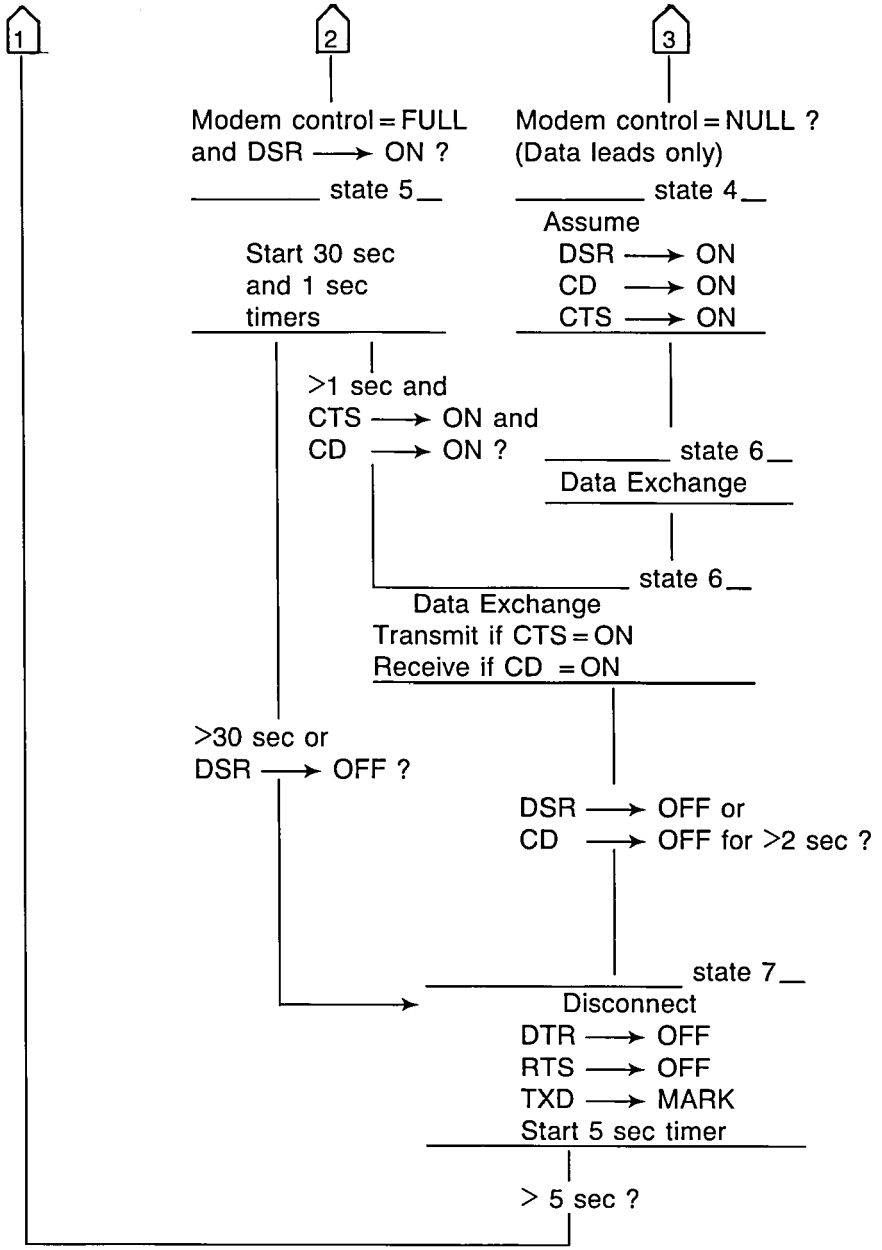
Figure G-1 shows the different states for the modem. (State 1 and state 2 refer to power ON and internal self-test functions, and are omitted from this diagram for purposes of clarity.)

Figure G-1: Modem States



(continued on next page)

Figure G-1 (Cont.): Modem States



The following sections explain the modem states that are detailed in Figure G-1.

G.2.1 General

The general states include:

- 1, OFF, or MARK – these relate to the negative voltage at the interface pin.
- 0, ON, or SPACE – these relate to the positive voltage at the interface pin.

G.2.2 State 1

This state is entered at power on.

G.2.3 State 2

This state is entered if the terminal is on-line.

G.2.4 State 3

This state exits unconditionally to state 4 if the data leads only mode is selected. If the full modem control mode is selected, state 5 is entered (as soon as Data State Ready, DSR, has come on). The wait for DSR is untimed. State 3 is the state that an on line terminal is normally in before connection has been established.

In state 3, the Data Terminal Ready (DTR) and Request to Send (RTS) signals are turned on. In this state, the modem can switch itself on-line only if DTR is ON. The RTS signal is needed by some modems to prepare the transmit channel.

NOTE

In some cases (such as private wire), it is possible for DSR to be ON before DTR is ON. This is possible if there is a manual connection from the modem to the line.

G.2.5 State 4

In this state, the actual signals from the modem are ignored and forced internally ON (if the data leads only mode is selected). State 6 is then entered.

G.2.6 State 5

This state is entered only after Data Set Ready (DSR) has come ON. This indicates that the modem is on-line. The modem can come on-line either automatically or manually. It will come on-line automatically if there is a call coming in through the automatic answer unit of the modem. It will come on-line manually when you switch from voice to data after you have established an incoming or an outgoing manual call.

Once the modem is on-line, two timers are started. The timers are called T1 and T2. The timers operate as follows:

- T1 protects against a non-data call. This is a PTT requirement in Germany. If no data link has been established within 30 seconds after the modem has gone on-line (state 6), an automatic disconnect is initiated.

- T2 protects against data transfer within the first second after the modem has gone on-line. This avoids garbage due to transient effects in some older modems.

If Clear to Send (CTS) and Carrier Detect (CD) have both come ON, the link is considered established.

G.2.7 State 6

This state is the normal data exchange state of the terminal when the call is established.

G.2.8 State 7

This is the disconnect state. The disconnect is initiated by loss of carrier (CD) for greater than 2 seconds, or by the loss of Data Set Ready (DSR). The terminal waits 5 seconds, then a new connection is anticipated by entering state 3. This sequence provides a proper disconnection for all known modems. Figure G-2 illustrates the minimum implementation of the V.24 circuits for full duplex modem control.

Figure G-2: Minimum Implementation of V.24 Circuits for Full Duplex Modem Control

Internal DTE Signal Name (Typical) See state 7 in Figure G-1		ISO 2110 Male Connector Pin Number		V.24 Circuit Number
PROT GND	⏚ →	1	Protective Ground	101
TxD	▷ →	2	Transmitted Data	103
RxD	◁ →	3	Received Data	104
RTS	▷ →	4	Request To Send	105
CTS	◁ →	5	Ready for Sending	106
DSR	◁ →	6	Data Set Ready	107
SIG GND	→	7	Signal Ground	102
CD	◁ →	8	Received Line Carrier Detect	109
DTR	▷ →	20	Data Terminal Ready	108/2

G.3 Interface Requirements

The following tables specify the interface leads which are required to use DECnet-DOS in asynchronous mode, either with a direct connection or with a modem. (The DECnet software will not monitor the modem leads when direct connection is specified. This allows for the connection to a remote node using a null modem, a modem eliminator, or null modem cable. These are cables and devices which may not provide all the signal leads required for a modem connection.)

Following each table is a list of the part numbers for the Digital EIA RS-232 communication cables that will provide these leads.

Table G-1: Asynchronous Mode, Direct Connection

Pin No.	Function	CCITT V.24 Circuit No.	EIA RS-232-C Circuit No.
1	Protective Ground	101	AA
2	Transmit Data	103	BA
3	Receive Data	104	BB
7	Signal Ground	102	AB

Communication Cables:

BC22D	6	wire null modem cable (transmit and receive leads crossed within cable, eliminating the need for a separate null modem device)
BC22E	16	wire modem cable
BC22F	25	wire modem cable
BCC14	16	wire modem cable (with thumb screw connectors)
BCC04	25	wire modem cable (with thumb screw connectors)

Table G-2: Asynchronous Mode, Modem Connection

Pin No.	Function	CCITT V.24 Circuit No.	EIA RS-232-C Circuit No.
1	Protective Ground	101	AA
2	Transmit Data	103	BA
3	Receive Data	104	BB
4	Request to Send	105	CA
5	Clear to Send	106	CB
6	Data Set Ready	107	CC
7	Signal Ground	102	AB
8	Carrier Detect	109	CF
20	Data Terminal Ready	108/2	CD

Communication Cables:

BC22E	16	wire modem cable
BC22F	25	wire modem cable
BCC14	16	wire modem cable (with thumb screw connectors)
BCC04	25	wire modem cable (with thumb screw connectors)

G.4 Modem Option Selections

To use a modem with the asynchronous port, the modem must be configured to match the line characteristics used by DECnet-DOS. For many modems these will be the standard factory settings. Table G-3 lists some of the user-selectable options you may find on your modem.

Table G-3: User-Selectable Modem Options

Option	Description	Setting for Use with DECnet-DOS
Character Length	No. of bits used to encode a character.	10 bits – 8 data bits, 1 start bit, and 1 stop bit
Speed Indicate/Select	Indicates mode: modem indicates modem speed on pin 12 (CCITT V.24 112).	Indicate mode. (Pin 23, CCITT V.24 111, is never asserted, and pin 12, CCITT V.24 112, is not monitored by DECnet-DOS).
Receive Responds to RDL	Allows modem to respond to a remote digital loop-back test request.	Enabled (if you want to allow a remote modem test).

Other selectable modem options should be set according to the modem user's guide for the particular modem application you are using. (Other options include a public switched line, a leased line, asynchronous or synchronous mode, and so on.)

Glossary

access control information

Optional security information that you may need to access a remote node.

account

A character string consisting of 1 to 39 alphanumeric characters.

adjacent node

A node that you are physically connected to by a single line.

alphanumeric

A string of characters that contains letters (alphabetic characters), numbers (numeric characters), or a combination of both.

application

A program (other than the operating system) that performs specific functions in order to meet user requirements.

buffer

A temporary storage area in a node's memory. Buffers temporarily hold data being transferred to and from the node. The size and the number of buffers determine the amount of data that can be stored.

circuit

The communications path that operates over a physical line connecting two nodes.

command switch

A word or character string that modifies the way in which a command operates.

communication path

The route through hardware components and a cable that a message takes when sent from one node to another.

counter

A counter displays statistics about the flow of network messages for your node. The counters also record error conditions and accumulate their totals for you.

device

A specific name for a disk or diskette that is currently storing data files.

directory

A specific name assigned to a collection of files stored on a disk or a diskette. A directory can also provide a list of the file names that it contains.

emulate

To imitate the performance of a terminal on another system. When your personal computer emulates a terminal on a host system, it performs many of the same functions as the host terminal.

end node

A node that can send and receive information for its own use only. Your personal computer is an end node.

executor node

A node that runs NCP commands. For a personal computer, this is the local node.

file specification

A complete file identification including an optional drive name and path name. The file specification must include at least a file name followed by an optional file type and version number.

foreign file

A file that has a format other than a format recognizable to DECnet-DOS or DECnet-VAXmate. A foreign file specification must be enclosed in quotation marks (" ") in a command line.

host node

A node on the network that your node can access for the purpose of sharing resources and information.

line

The physical line connecting the local node with the adjacent node.

local node

The node that you are currently using to communicate with other nodes.

logging

The process of recording information from an occurrence in the network. Logging is the process that generates a record of the event.

loopback connector

A hardware device that temporarily connects the output portion of a circuit back to the input portion of a circuit for the purpose of testing communication lines. The loopback connector verifies the operation of devices on the same communications link.

loopback test

A test that sends an electronic signal over a hardware or software connection to verify the operation of devices along the communication link. Certain loopback tests require a loopback connector (see **loopback connector**).

modem

A hardware device capable of changing communications signals from digital to analog and back to digital. The term *modem* is a contraction of the words *mod*ulation and *dem*odulation.

modulation

The process of varying an original computer communication (digital) signal into a telephone communication (analog) signal.

network

A group of computers or systems that are connected together and can communicate with each other to share resources and information.

network coordinator

A person who assigns and updates node names and node addresses. The network coordinator also provides administrative assistance to network users.

network link

A temporary connection that establishes communication between programs running on different nodes. The SETHOST utility with network virtual terminal services is a program that establishes a network link with another node, enabling you to log into a remote host system.

node

A computer with the necessary hardware and software to participate in a network with other computers.

node address

A unique numeric character string that identifies a node to other systems in the network.

node definition

A character string that identifies a particular node. The definition includes both the node address and the node name.

node name

A 1- to 6-character alphanumeric string (containing at least one letter) that identifies a node to other users in the network.

password

A character string that uniquely confirms your identity to the system.

process name

A character string that identifies one particular user in a group of users sharing the same system.

protocols

Rules or formats that operating systems must follow to conduct effective communications with other computers in a network.

queue

A waiting line for completing a service, such as transferring files.

reachable node

A node to which the local node has a usable communications path.

remote node

Any node on the network other than the node you are currently using.

remote node list

A list containing node definitions of other nodes that are on the same network.

router

A DECnet node that can receive messages and information from one node and forward them to another node.

routing node

A DECnet node that can receive and forward information from one node to another. A routing node can perform other functions that are not limited strictly to routing information.

segment

A set of data that can be stored anywhere in memory and can be retrieved at any time.

TO *file-id*

A qualifier that specifies the name of the output file which stores information resulting from the execution of an NCP command.

topology

The physical arrangement of nodes and connecting hardware that makes up the network.

user name

A character string consisting of 1 to 39 alphabetic characters identifying a user at a remote node.

window

A rectangular section of your screen which is used for running programs or applications.

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