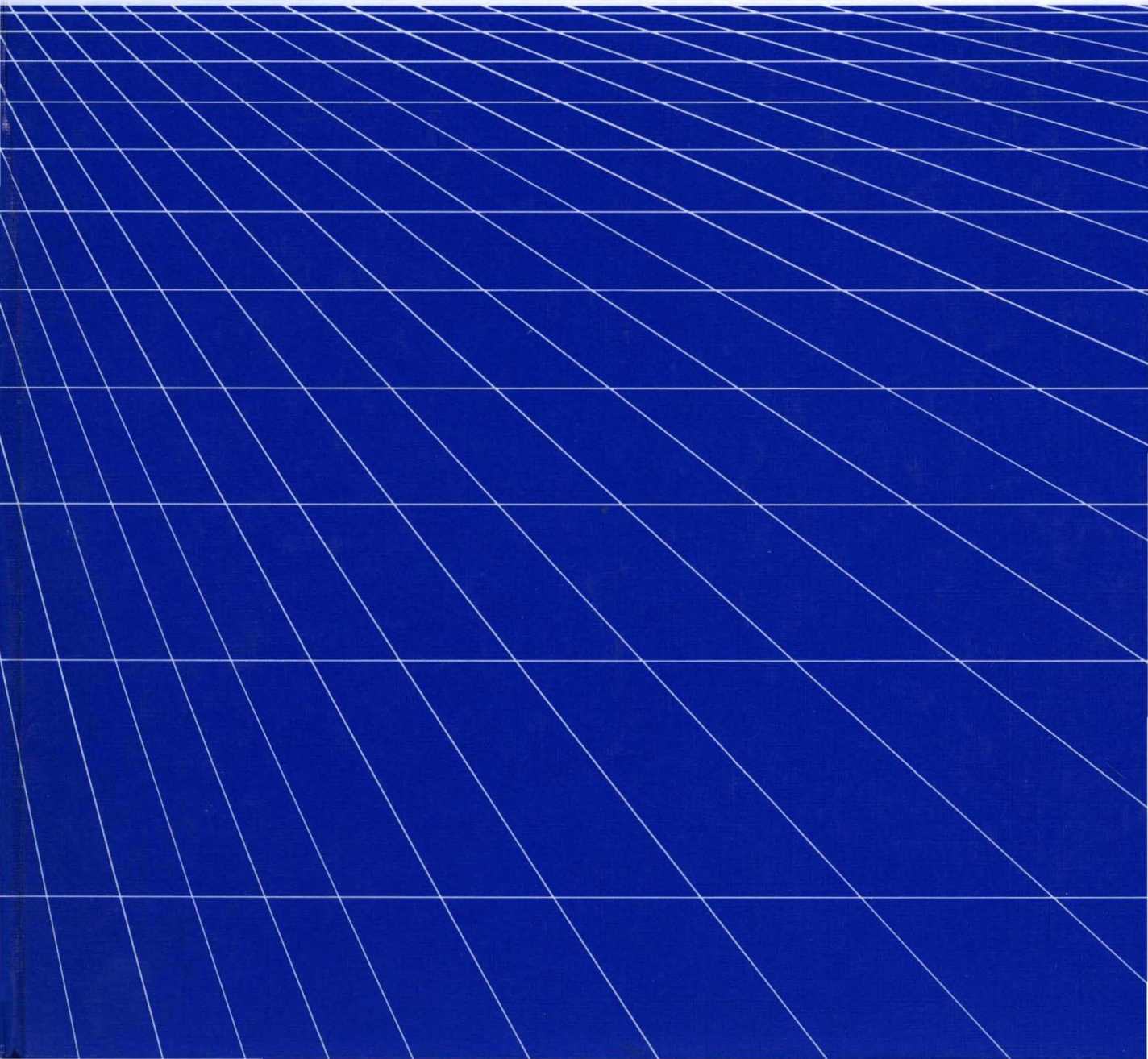
Digital Microsystems™

# DMS-816
# USERS MANUAL



Digital Microsystems DMS™

# DMS-816

Version 1.2

Digital Microsystems
1755 Embarcadero, Oakland, CA 94606
(415) 532-3686 TWX 910-366-7310

## FCC NOTICE

**§ 15.818 Class A computing device: information to user.**

*Warning*—This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

# TABLE OF CONTENTS

## 2.0 HINET UTILITIES

## 4.0 MS-DOS AND HINET

## APPENDICES

# PREFACE

## THE MANUAL

Digital Microsystems' Manuals are written with you, the user, in mind. All the information that you need to know about your DMS computer and the HiNet Network is carefully explained. This manual is divided into eleven sections. They are organized in the following manner:

- Section 1 (Introducing the Workstation) will introduce you to the particular DMS computer that you have and explain the basic procedures for setting it up to begin work.

- Section 2 (Using HiNet) is intended for new computer users or those new to the HiNet system. It contains basic information about files, partitions, network commands, and other material regarding the workstations and the HiNet network.

- Section 3 (CP/M and HiNet) covers the CP/M operating system.

- Section 4 (MS-DOS and HiNet) explains the MS-DOS operating system.

- Section 5 (Customizing) will explain how to load, save and restore the function keys on the keyboard.

- Section 6 (Using Printers) discusses how to use printers with DMS equipment and the HiNet Network.

- Section 7 (Data Storage) is present when it applies to DMS computers that have local storage capabilities (e.g., Floppy Disks or Hard Disks).

- Section 8 (Electronic Mail) explains how to use DMS electronic mail program. This system lets you send and receive messages through your HiNet computer network.

- Section 9 (Configuring Software) gives some further explanations of various software packages that can be used with DMS equipment and HiNet.

- Section 10 (Tele-Communications) explains the use of Modems and DMS-Gateways to mainframe computers.

- The Appendix contains a list of the most common error messages and their meanings.

**MANUAL CONVENTIONS**

In the text of this manual, prompts and other messages that are displayed on the CRT screen by the computer will be shown in a different typeface, while characters and commands that you, the user, enter through the keyboard

will be both **boldfaced and underlined** in the screen typeface.

**Boldfaced** and/or underlined comments in the normal text typeface are used to accent important points in this manual.

Because computer programs and hardware are constantly being improved and updated, a 'version number' almost always follows the name of the product. This number (sometimes called 'revision number') is used to identify the version and capabilities of the product. Since these numbers are changed every time a product is upgraded this manual will indicate them by the letter x in screen depictions. Thus, in **Version x.x** the 'x.x' would simply represent some number that may vary from unit to unit.

Often a version number will include a release date. In this manual these release dates are indicated by mm/dd/yy (for month/day/year).

**NOTES**

To bring to your attention important points that might otherwise be easily passed over, this manual will use three different 'levels' of NOTE headings.

---NOTE---

These are details that you should know in order to use the equipment. They are points that will help you to avoid problems as you use the computer.

**---NOTE---**

Here is a point which you must pay close attention to in order for the system to work. It should catch your eye if you are having a problem and are going back to the manual for information.

**---WARNING!---**

WATCH IT! This indicates that something could go very wrong if you don't pay close attention. Always heed these warnings.

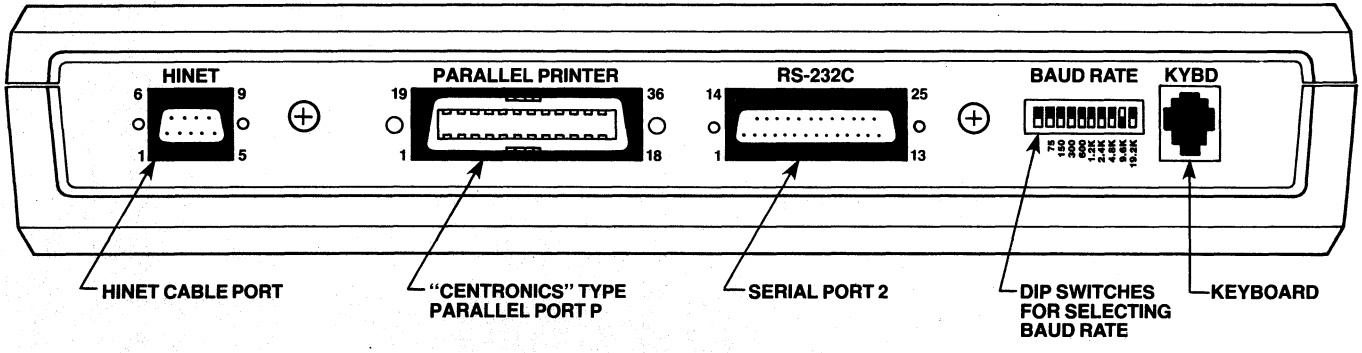
**PART NUMBERS**

If you need a specific part that is referred to in this manual, you should contact your DMS Dealer or Digital Microsystems directly. Describe what you need or use the part name given in the manual.

**FEEDBACK FROM YOU.**

Digital Microsystems would like this manual to be as clear and informative as possible. If you encounter any problems in using this manual, or have any comments or suggestions, please let us know.

The Documentation Department
Digital Microsystems
1755 Oakland, CA 94606


HINET
6
9
1
5
PARALLEL PRINTER
19
36
1
18
RS-232C
14
25
1
13
BAUD RATE
KYBD
HINET CABLE PORT
"CENTRONICS" TYPE
PARALLEL PORT P
SERIAL PORT 2
DIP SWITCHES
FOR SELECTING
BAUD RATE
KEYBOARD

# DIAGRAM 1-1

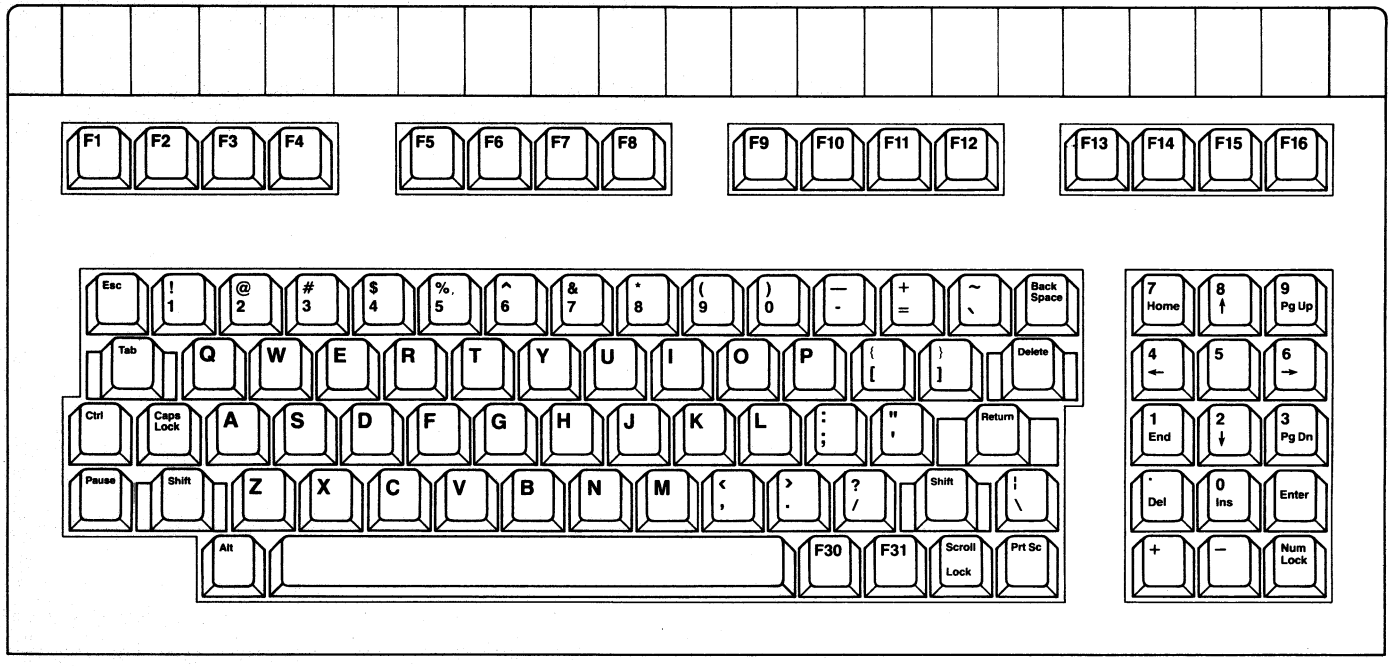

F1 F2 F3 F4
F5 F6 F7 F8
F9 F10 F11 F12
F13 F14 F15 F16
Esc
! 1
@ 2
# 3
$ 4
% 5
^ 6
& 7
* 8
( 9
) 0
— -
+ =
~ `
Back Space
Tab
Q W E R T Y U I O P
{ [
} ]
Delete
Ctrl
Caps Lock
A S D F G H J K L
: ;
" '
Return
Pause
Shift
Z X C V B N M
< ,
> .
? /
Shift
| \
Alt
F30
F31
Scroll Lock
Prt Sc
7 Home
8 ↑
9 Pg Up
4 ←
5
6 →
1 End
2 ↓
3 Pg Dn
. Del
0 Ins
Enter
+
—
Num Lock

**DIAGRAM 1-2**

# 1.0 INTRODUCTION TO THE WORKSTATION

The DMS-816 workstation contains both a 16-bit (8088) microprocessor with 256 Kbytes of internal memory (upgradable to 512 K) and an 8-bit (Z-80B) microprocessor sharing 64K of memory. With the DMS-816, you may choose among three operating systems--HIDOS, CP/M-86 or MS-DOS. This unique combination of operating systems and HiNet Local Area Networking allows you to use a wide variety of software (developed for microcomputers based on either IBM's PC-DOS, Microsoft's MS-DOS or Digital Research's CP/M) and share Hard Disk storage, printers and data among many users.

This introductory section will outline the main features of the DMS-816 workstation and explain how to set it up on the HiNet Network. (Setting up the HiNet Network is described in the Network Master's User Manual.)

## 1.1 SETTING UP THE WORKSTATION

After unpacking the DMS-816 from its shipping carton, examine the unit for damage. Make sure that the CRT screen is not cracked or broken. (Do not touch any broken glass; the coating on the inside of the screen is toxic.) If there is any visible damage to the DMS-816, do not plug it into an electrical outlet. Contact your dealer or Digital Microsystems at

once. You should also contact the shipping company if the damage seems to have occurred during transit.

You will find in the shipping carton, along with this manual, the main computer cabinet and a detachable low profile keyboard.

Diagrams 1-1 and 1-2 illustrate the various external parts of the DMS-816. The parts mentioned in the following pages are labeled in the diagrams for clarity.

**THE CRT SCREEN**

The DMS-816's 12-inch CRT screen can display 25 or 24 lines with 80 characters per line. By default, the DMS-816 displays 25 lines. See Section 1.6 for information on changing the screen display.

The brightness of the screen display can be adjusted by rotating the knob under the left-hand side of the CRT cabinet. After several minutes have passed without keyboard input, the screen will dim very low with the cursor barely showing. Any further input from the keyboard (including the Shift Key) or output from a program will bring the screen intensity back to normal along with whatever was on the screen. This feature preserves the life of the screen.

----------NOTE----------
Do not turn the DMS-816 rapidly on and off. This could cause a very bright dot to form in the center of the screen which might damage the CRT.

Make sure that the power switch is OFF before plugging the power cord into an electrical outlet.

---

The CRT has a row of adjustment controls on the back of the cabinet. These adjustments are for service technicians; there should not be any need for you to use them.

**KEYBOARD CORD**

The DMS-816 comes with a detachable, low-profile keyboard that is connected to the main cabinet with a coiled 'telephone-like' cord. Plug the end of the cord with a plastic clip into the socket labeled KYBD on the back of the DMS-816's cabinet. The cord will fit only one way into the socket; the tab on the clip should face up. If you wish to detach the keyboard later, be sure to press the tab on the clip to release it from the cabinet.

**LINE VOLTAGE SWITCH**

The DMS-816 can operate on either 115V or 220V. You must set the voltage supply switch for the voltage in your area. The voltage supply switch is located on the rear of the CRT cabinet.

To select the proper voltage for the DMS-816, insert a pointed object such as a ball-point pen tip into the switch and slide the switch horizontally in the direction indicated on the cabinet.

WARNING!---If you are not sure of the voltage in your area, do not plug the workstation in until you have checked with a technician. Damage may result from an incorrect voltage setting.

**POWER CORD**

The power cord is permanently attached to the underside of the CRT cabinet, near the power switch. The other end should be plugged into a three-holed grounded electrical outlet. Make sure that the power switch is off (pushed in on the side without a dot) before plugging in the unit.

**HINET CABLE**

This is the cable that connects your DMS-816 workstation to the HiNet Master's Hard Disks with all the files in your Network. The HiNet cable plugs into the HiNet socket on the rear of the cabinet. The D-shaped connector will fit only one way into the socket.

## 1.2 TURNING ON THE DMS-816

The Power Switch is located under the CRT screen's cabinet on the right hand side. Turn on the DMS-816 by pushing up on the switch on the side marked with a raised dot. When the power is first turned on, the DMS-816 will automatically proceed with a memory self-test. There should be three "beeps" with a pause between the first and

second tones. Three beeps indicate that all tests have been successfully completed. The first line of the message:

```
Joining HiNet...

Login Please:

Network User Name =>
```

should appear in the upper left corner of the screen. If the Network is running, the "Login Please" and "Network User Name =>" messages will be displayed on the screen with the cursor positioned just after the => prompt. (See Section 2 for information on how to log in to the Network.)

## 1.3 POSSIBLE PROBLEMS

There are be several reasons why a login message may not appear.

- The Network may be down for backup or repair; see your system administrator.
- Your HiNet cable may be disconnected or loose. Check the connection on the back of your workstation.
- There may be a problem with the cable somewhere in the network. Ask if anyone

else is having trouble and then see your system administrator.

- If nothing appears on the screen after the three test beeps, try moving the screen intensity dial under the left side of the CRT; the intensity may be set too low for any characters to be displayed.

You should also try to RESET the workstation. See the section below.

**RESETTING**

Holding down the CTRL, ALT and DEL Keys all at the same time will RESET your workstation. You will then have to login again. See Section 2.4.

equivalent to CTRL-BREAK?

By holding down the CTRL-ALT-INS keys, an Interrupt signal is generated when the DMS-816 is running under HIDOS or CP/M-86. This is useful if the workstation is "stuck" due to a program error. Usually an Interrupt will return you to the HIDOS prompt (e.g., A>). You will still be logged into the Network. However, like resetting the station, an Interrupt will erase any work that you have not saved to the Network Hard Disk. For more information about saving files, see Section 2.

Holding the CTRL ALT and DEL Keys down for a few seconds will result in the DMS-816 entering its PROM Monitor. This mode of operation allows a programmer or technician access to the contents of the internal RAM

(Random Access Memory). Enter a question mark after the --> prompt to list the available 8088 Hardware Commands. The top of the screen also displays the PROM Serial Number. This unique number must be listed in the Master's Machine Table. To log in to the Network from the PROM Monitor, type B and then RETURN.

## 1.4 THE KEYBOARD

As you look at the keyboard you can see that there are six groups of keys: Main Section, Numeric Pad, and four groups of four Function Keys along the top of the keyboard. Refer to diagram 1-2.

### 1.4.1 KEYPAD

On the right side of the keyboard unit is a 12-key command and numeric keypad. The unshifted values of the keys send special codes that many software programs (designed for IBM PC-DOS) use for displaying text and moving the cursor. (Moving the cursor is described in section 2.3.) The shifted value of the keys are the digits 0-9 and a decimal point. The plus and minus sign keys do not have a preprogrammed shifted value. The ENTER key has the same effect as the RETURN key.

The NUM LOCK Key locks the keypad into its shifted position--the numeric values. NUM LOCK acts as a toggle switch; press it once and the

keys are shifted, press it again and the keys return to their unshifted values.

Pressing the NUM LOCK Key along with the CTRL Key will have the same result as the PAUSE Key; use it to stop a scrolling file. Press any character key to continue scrolling. Neither NUM LOCK or ENTER can be reprogrammed with Customiz. (See section 5 for information on reprogramming the function keys with Customiz.)

**SPECIAL EDITING KEYS**

When the DMS-816 is running an applications program written for IBM's PC-DOS, the numeric keypad keys have special control codes programmed into them. These codes are used by these applications programs to control the cursor and for editing. They will not have any effect when you are operating under MS-DOS or CP/M.

The specially coded keys are labeled: **Home, PgUp** (Page UP), **PgDn** (Page Down), **End, Del** (Delete) and **Ins** (Insert). There are also four arrow keys to control the movement of the cursor. Your applications program's manual will explain their particular functions and uses.

### 1.4.2 PROGRAMMABLE FUNCTION KEYS

Across the top of the keyboard are four groups of four keys each, labeled F1 through F16. These are Function Keys. They can be programmed using Digital Microsystems' Customiz program or directly from the keyboard. Each key

can be programmed with three different values or strings of characters (unshifted, shifted and CTRL values). The two keys labeled F30 and F31 in the main section are also programmable. See section 5.0, Customizing.

All of the keys in the keypad except for ENTER and NUM LOCK can be reprogrammed with three values each. To restore the commands that are labeled on the keys either reset the workstation or press **ESC** =.

### 1.4.3 MAIN SECTION

The main section of the keyboard is generally similar to that of a standard electric typewriter. However, some of the keys have special computer-related functions and these will be discussed here.

**CTRL**

The CONTROL Key is located on the far left of the second row of keys from the bottom. When you hold down the CONTROL key, you alter the meaning of all the other keys, changing them from letters and numbers into codes that tell the computer what to do. In other words, just as holding down the SHIFT key changes lower case to upper case, holding down the CONTROL key changes the keyboard from a typewriter keyboard to a computer command board. And just like using the SHIFT key, you hold down the CONTROL key while striking the other keys.

Control commands may or may not be displayed on the screen depending on the program involved; they will not appear in any text or numeric data you are entering into the computer. In this manual we will use the abbreviation **CTRL** to indicate when something is a Control Command. For example, **CTRL C** would mean strike the C key while holding down the CONTROL key. Manuals for applications programs may use other symbols to indicate use of the CONTROL key, but no matter what symbol is used, it always operates in the same way.

**RETURN**

The **RETURN** key (short for Carriage Return) is on the right side of the main keyboard section. It is used both as a computer command key and an end-of-line carriage return (like an electric typewriter). Most commands that you give to the computer through the keyboard (or text you enter to answer its questions) will end with a carriage return. This is the signal to the computer that you have finished typing in the command (or answer) and you want the computer to proceed. This manual will use the word **RETURN** or the symbol **<CR>** to indicate a Carriage Return in command sequences.

For example, when you turn on the workstation and get the login message, the computer waits for you to type in your User Name. After you have done so, you let the computer know you have finished by hitting RETURN. (**NAME: PAT <CR>**).

---NOTE---
In most cases when using the workstation as a word processor, you do not need to hit RETURN at the end of each line of text as you do with a typewriter. The computer takes care of fitting your words into lines of proper length; you only need to hit RETURN to indicate the end of a paragraph. See your word processor program manual for further information about how word processors use the RETURN key.
---

**ESC**

The **ESC** (for Escape) key is located at the far left of the top (number) key row. It is a special key with functions that vary from program to program. In some programs it can be used as a second Control Key (though you do not hold it down while pressing another key); in other situations it may be used when an error has caused the computer to "hang" and become unable to respond to normal commands (hence the name 'Escape'). Your applications program manuals will describe its uses.

---NOTE---
It is important to use the correct case of a letter when you use the ESC key. If the command requires an upper-case letter or a lower-case letter, you must use the specified one or the results could be totally different and at times disastrous.
---

**DELETE**

Located at the far right of the second row from the top, the DELETE key is used (as you might suspect) for deleting characters. In MS-DOS and some word processing programs, hitting the DELETE key causes the Cursor to move one space to the **left** and erase that character (or space).

In other programs or operating systems, such as CP/M (see section 3), the DELETE key operates by echoing the character it has just deleted. For example, suppose while in CP/M you typed the word **COMPUTRE**, and then used the DELETE Key to eliminate the last two letters. The screen would show **COMPUTREER**; but only **COMPUT** would remain in memory. (Many people find this feature confusing, so they use the BACK SPACE key to delete letters when they are in CP/M. The BACK SPACE key moves the Cursor to the left, erasing the characters that it backs over.

Entering **CTRL X** before you press RETURN will erase an entire command line in CP/M. CTRL X in MS-DOS will void the current command and place a backslash (\) marker at the end of the line.

Notice that there is one key marked DELETE and one key marked DEL on the keyboard, the former in the main section and the latter in the keypad area. The DEL key is applications dependent; the program you are running may or may not use it as a DELETE key. The shifted (NUM LOCK) value of the DEL key is the decimal point (period). The DEL key is also used to reset the workstation.

**BACK SPACE**

The BACK SPACE Key (located at the far right of the bottom row) does just what you would expect; it moves the Cursor one space to the left. In most word processing programs it does so without erasing any of the characters. However, if you are in the operating system (CP/M or MS-DOS), it will act as an 'Erase' key, eliminating the characters it backspaces over.

**PAUSE**

The PAUSE Key is located at the far left of the bottom row. In CP/M and MS-DOS, the computer sometimes sends lines of data or text to the screen faster than you can read them (e.g., when using the TYPE command). As new lines are added to the bottom of the screen all lines scroll upward and the top lines disappear. The PAUSE Key is programmed to send a CTRL S, to stop and re-start this screen scrolling. When you hit the PAUSE Key (or CTRL S) the lines of text stop scrolling. When you hit the PAUSE Key again (or any other character key), the computer resumes adding lines to the bottom of the screen and everything continues scrolling upward.

**CAPS LOCK**

Like a typewriter, the CAPS LOCK Key makes all of the letters type out as upper case. However, unlike a typewriter, the CAPS LOCK Key only affects the letter keys. It has no effect whatsoever on the symbol and number keys.

The CAPS LOCK Key does not stay down when you press it. The key acts as a toggle switch; press it once and the character keys are locked as capitals, press it again and the keys are returned to lower case. When the CAPS LOCK Key is on, use of the SHIFT Key causes letters to be typed in lower case.

**REPEATING KEYS**

All of the keys on the DMS-816 (including the command keys) are repeating keys. If you hold them down they will automatically repeatttttttttt until you release them.

**NUM LOCK**

The NUM LOCK key acts like the CAPS LOCK key except it affects only the Special Editing /Number keypad keys. The shifted values of the keypad are the numbers 0 through 9 and a decimal point. The unshifted values are applications-dependent cursor control and editing keys. You may also program whatever values you wish into them with CUSTOMIZ.

**SCROLL LOCK KEY**

The Scroll Lock key is applications dependent. Check your applications program's manual for its uses.

The CTRL value of the Scroll Lock key generates a CTRL C which will interrupt the

command or program that is running under MS-DOS (not CP/M). Unlike the CTRL C in CP/M, the system does not 'warm boot' when CTRL Scroll Lock is pressed. (In CP/M a warm boot reloads the directory of your partition into your workstation's memory.)

**PrtSc KEY**

The PrtSc key (the shifted value) will dump the contents of the screen to a printer that is either connected directly to the workstation or to the SPOOL printer (a screen dump).

The CTRL/SHIFT value of PrtSc will send to the printer everything that is entered afterwards until you press CTRL/SHIFT PrtSc again. Entering a CTRL P will have the same effect. See Section 6 for more information on printers.

**ALT KEY**

The ALT Key (ALTERNATE) is also an applications-dependent key. Like the Shift and CTRL keys, this key is held down along with a character key when it is used. Some programs that are written for other types of PCs and MS-DOS based computers will use this key to program functions into the character keys. Refer to your software manuals to see if they use this key.

The ALT Key can also be used to display all of the available characters and graphics symbols. Each character has a decimal

equivalent. When the ALT Key is held down and a decimal number (32 - 255) is entered on the Numeric Keypad, the related character will be displayed on the screen when the ALT Key is released. The numbers 0 - 31 will not diplay the correct characters, instead the CTRL equivalents will be shown.

## 1.5 DMS-816 PORTS

In computer terminology, a port is a connection between the internal electronics of the computer and a cable which leads to another device (modem, printer or mouse). The port consists of an array of contacts or "pins". Each pin carries a specific signal from the computer to the external device. There are several different standards that lend their names to the type of port; RS-232 and Centronics are the two most often encountered in micro-computers. RS-232 refers to serial ports and "Centronics" refers to parallel ports.

The DMS-816 has three ports for connecting the workstation to various devices. In addition to the HiNet network (RS-422) Serial Port, there is an RS-232 Serial Port and a Centronics-type Parallel Port on the back of the computer's cabinet. Refer to Diagram 1-1.

The ten DIP switches located on the back of the DMS-816 next to the serial port are used to set the rate at which information is transmitted to a printer or a modem that is attached to that serial port.

----------NOTE----------

In order for the serial port to function properly, all of the DIP switches must be in a down position except for one. The one switch that is pointed up selects the BAUD Rate for the serial port.

---

The following table gives the switch positions and the resulting BAUD Rate on the Serial Port:

| Switch up | BAUD Rate |
|---|---|
| 1 | 19200 |
| 2 | 9600 |
| 3 | 4800 |
| 4 | 2400 |
| 5 | 1200 |
| 6 | 600 |
| 7 | 300 |
| 8 | 150 |
| 9 | 75 |

----------NOTE----------

You should NOT change the BAUD Rate switches while you are in the middle of an applications program. It is recommended that the workstation be turned off, the DIP switches changed and the power turned back on.

---

See section 6 for information about connecting printers and modems to these ports. A jumper block, located on the CPU board in the lower cabinet, is provided for the serial port. This enables a variety of serial printers to be

connected without the necessity of rewiring a special RS-232 cable. Section 6 will explain how to do this.

## 1.6 CRT SCREEN EMULATIONS

Every microcomputer has specific ways of displaying characters and shapes on the CRT screen. Some of these ways have become popular among manufacturers and they create emulations of other terminals. This helps the programmers of applications software write programs that will work on a variety of microcomputers.

The DMS-816 has two different screen addressing modes. The mode that is selected depends upon which operating system is being used.

Whenever the DMS-816 is running a program that is written for PC-DOS (IBM), the screen emulates a monochrome (one-colour) IBM-PC. Programs that are written for the IBM-PC series of microcomputers will usually run on the DMS-816 as long as there are no graphics or special sound effects involved. Text Only!

Whenever the DMS-816 is running programs that utilize CP/M-80, CP/M-86 or generic MS-DOS, the screen will emulate an ADDS REGENT 25 terminal. Software that is written for these operating systems, and not specifically for the IBM-PC, will probably have an install program that will require specific codes for addressing the screen. The program may ask for the type of terminal the DMS-816 emulates. If the program

has the ADDS REGENT 25 terminal as a choice, then select that option. If it does not, then the following screen addressing codes may be entered in the install program to enable the DMS-816 to display the program correctly:

ADDS REGENT 25 EMULATION CODES FOR THE DMS-816

| CODE | HEX VALUE | SCREEN FUNCTION |
|---|---|---|
| ESC K | (1BH,4BH) | Clear to end of line. |
| ESC k | (1BH,6BH) | Clear to end of screen. |
| ESC R | (1BH,52H) | Character inverse video: Displays all following characters in inverse video mode. |
| ESC N | (1BH,4EH) | Character normal video: Displays all following characters in normal video mode. |
| ESC Y | (1BH,59H) | Position cursor to row and column: ESC Y row+20H col+20H |
| CTRL L | (0CH) | Clear screen, home cursor. |
| CTRL A | (01H) | Position cursor in upper left corner of screen (Home position). |
| CTRL H | (08H) | Move the cursor one space backward. |

< MORE >

| | | |
|---|---|---|
| CTRL F | (06H) | Move the cursor one space forward. |
| CTRL Z | (1AH) | Move the cursor one line up on the screen. |
| ESC : | (1BH, 3AH) | Change display from 25 lines to 24 lines. |
| ESC < | (1BH, 3CH) | Change display from 24 lines to 25 lines. |

----------NOTE----------
Most programs configured for an ADDS Regent Terminal are set to 24 line display. By default the DMS-816 is set for 25 line display. You must enter the appropriate ESCAPE sequence to change the line display before using a program that is configured for 24 lines. This can be done from the keyboard under HIDOS or CP/M-86 by entering after the > prompt: **x ESC : <CR>**. This will set the screen to a 24 line display. Alternatively, you could reconfigure the program to work with a 25 line display and take advantage of the extra line.
---

## 1.7 TERMINAL EMULATION

The DMS-816 can be used as a "dumb" terminal. This allows it to be attached to a DMS-3/4 HiNet Master's RS-232 Serial Port 0. In this emulation, signals from the Master are displayed on the screen and input from the keyboard is sent to the Master for processing.

The screen handling characteristics are limited however. Generally, applications programs should not be run on the Master, especially with the DMS-816 terminal.

To use a DMS-816 as a terminal follow these steps:

1) Use an RS-232 cable with wires 2 and 3 switched or insert a Modem jumper block in the DMS-816's serial port. (See Section 6 and Appendix B.)

2) Connect the RS-232 cable to the DMS-816's serial port and to the Master's PORT 0 (or the appropriate port for the piece of equipment you are using).

3) Set the DMS-816's BAUD Rate with the Serial Port DIP switches to 9600 (switch 2 up). For equipment other than a DMS-3/4 Master, use the appropriate BAUD setting.

4) Turn on the DMS-816 and press the CTRL-ALT-DEL keys down at the same time; hold them down for about 3 seconds and release them. The PROM Monitor message should appear. The PROM version number MUST be 3.6Is or greater. Type E and then <CR>.

The DMS-816 should now be in a terminal emulation mode. Power up the Master and enter the appropriate commands.

----------NOTE----------

The terminal emulation for the DMS-816 only recognizes Carriage Return, Line Feed, CTRL L

for clear screen and CTRL G for Bell. There is no cursor addressing. You can run all of the DMS HiNet utilities such as ALLOC, USERS, MACHINE etc., but no application programs.

---

## 1.8 MAINTENANCE

Unlike other DMS workstations, the DMS-816 has no cooling fan and therefore does not require periodic cleaning of the fan filter. In fact there is no real maintenance for the User of a DMS-816. If you wish to clean the cabinet of the DMS-816 remember two important points:

1) Never clean the cabinet or the CRT screen with anything but a mild soapy detergent such as IVORY Dish Washing Liquid. Place a little detergent on a damp cloth and rub gently. Do not use cleaning sprays or any solvent based chemical; they will ruin the cabinet over a period of time. Be careful not to drip any liquids into the cabinet through the ventilation slots.

2) When cleaning the CRT screen, use a damp cloth. If necessary, a little glass cleaner can be applied to a cloth and used on the screen. Do not spray the glass cleaner directly on the screen as it may splatter onto the cabinet.

Now that you are familiar with the layout of the DMS-816 and have connected it to the network, Section 2 will explain how to log in to the network and how to use files and partitions.

# 2.0 HINET UTILITIES

## 2.1 INTRODUCTION

This chapter provides basic information that is necessary for operating DMS workstations on the HiNet Local Area Network (LAN). It will not attempt to cover all aspects of the system. Additional information about specific utilities is available throughout this manual.

The HiNet Network supports four different operating systems: HIDOS, CP/M-80, CP/M-86 and MS-DOS. The operating system that you wish to run depends upon your pre-assigned User Name and the capabilities of your workstation. Your assigned partitions must be formatted for either CP/M or MS-DOS. You cannot have files from both operating systems in one partition or be assigned to both types of partitions at the same time.

## 2.2 BEFORE STARTING

If you are new to the HiNet Network ask the person in charge of your Network for the following:

- Your user name (and password, if any).

- The name (and password, if any) of the partition you will use for saving your work.

- The file name(s) and partition name(s) where the application program(s) you will be using are stored.

- The user's manual(s) for the application program(s) that you will be using.

This manual will assume that the programs you will be using are located on the SYSTEM partition which is assigned to your drive A.

## 2.3 THE CURSOR

When you turn on a DMS workstation and get the Login message, you will see a solid block of light after **NAME:**. This is the cursor. The cursor marks the place on the screen (and, of course, in your text or numerical table) where your next operation or keystroke will be entered. In this case it marks the place where the first letter of your User Name will be entered.

As you type characters on the keyboard, the cursor moves to the right and shows where the next character will be entered. In a sense, the cursor is like the tip of a pen placed against paper; your next mark will be made wherever it is located. Just as you can lift a pen up off the paper and put it down anywhere else you want, it is possible to shift the cursor around

the screen, or through the pages of your text, with commands from the keyboard.

These commands (usually called Cursor Commands) vary according to the kind of program you are using. They will be explained in the appropriate parts of this manual, or in the user's manuals supplied with your applications programs.

## 2.4 LOGGING ON

While using the HiNet Network, the programs you use and the work you produce are stored on the HiNet Master Hard Disk. These programs and data files are available to you at any Network station where you log on. You may log on at any station by turning on the power or, if the power is already on, by 'Resetting' the station. On the workstation's screen you will see the words:

```
Joining HiNet...
Login please:
Network User Name=>
```

You then type in the User Name you have been given, followed by a Carriage Return. If you make a mistake while typing in your User Name hit **RETURN** twice and you will be returned to **NAME:** so you can start over.

After you enter your name and press RETURN, the station will respond with **PASSWORD:**.

```
Joining HiNet...
Login please:
Network User Name=> PAT
Password=>
```

If you have a password, you must now type it in followed by RETURN. The letters of your password will not appear on the screen as you type them.

If you make a mistake while typing your password, simply hit RETURN to restart the login process. If no password is required with your User Name you may hit RETURN to complete the login process.

If you have correctly logged onto a DMS workstation, the screen will show an **A>** (or possibly some other letter) after the login message.

A User Name is linked to a particular operating system (HIDOS, CP/M-86, or MS-DOS). If you try to log in to a workstation with a User Name that is linked to an operating system that the workstation cannot handle, your login request will be denied. See section 2.11.4 for a list of workstations and their compatible operating systems.

### 2.4.1 MS-DOS DATE AND TIME

Whenever you log in to a 16-bit workstation under MS-DOS, the current Network date and time (entered from the Master) are displayed on the screen. After the date, you are requested to enter a new date and then a new time. Hitting RETURN twice will keep the date and time the same. You can change the Network's date and time settings only from the Master, not from a workstation. Two RETURNS in the Login Command in your User Table entry will bypass this MS-DOS feature. If there is an AUTOEXEC.BAT file in the partition assigned to the A drive, the date and time requests will not appear at all.

## 2.5 THE PROMPT

The **A>** that you see is called a 'Command Prompt'; it means that the computer is finished with what you last told it to do and is waiting for your next command. This particular form of prompt indicates that you are in CP/M or MS-DOS (see section 3.0 or section 4.0). The use of the letter **A** shows that you are currently accessing Drive A and thus it is sometimes called the "A Prompt". If you were accessing one of the other three drives you would see a "B Prompt" (**B>**) for Drive B, or some other letter for some other drive. (See section 2.9, Drives.) Application programs usually have their own forms of prompts such as **:** or **OK.**

## 2.6 USING COMPUTER COMMANDS

### CAPITALS VS. LOWER CASE

After the prompt, type in your commands, whatever they might be. In most instances it will make no difference whether you type the command in CAPITAL LETTERS or lower case, and we will use both in this manual. Occasionally, however, some program may recognize only capitals, or lower case letters, so if a command fails to work, it is a good idea to try typing it in the other case.

### SPACES

Watch out for spaces when entering commands. In most cases you must pay close attention to the placing of spaces between the parts of a command. For example, **B> dir D:** will give you a directory of the files on drive D, but **B> dirD:** will give you the response **DIRD:?.**

### CARRIAGE RETURNS

When you have typed in a command you must end it with a carriage return (**RETURN**) to tell the computer to execute your command.

----------NOTE----------
Some computer manuals assume that you know this and do not specify when the RETURN command is to be used in their command descriptions.
---

**CANCELING AND CORRECTING COMMANDS**

A command line may be corrected and/or canceled before you press the RETURN key. The BACKSPACE key will erase the last character in the line each time the key is pressed.

If you make a mistake or decide not to carry out a command when you have almost finished entering it, you can cancel the entire command by entering a CTRL X. In CP/M this will erase the line all the way back to the A> prompt. In MS-DOS the end of the command will be marked with a \ and the cursor will move to the next line down so that you may reenter the command.

If you have made a mistake in a particularly complex command line in CP/M, you have the option of preserving the command line with the mistake on the screen and starting over from scratch again. Entering a CTRL U will place a # sign marker at the end of the command line and move the cursor to the first column in the next row down. This way you have the old command to refer to while reentering the command correctly.

## 2.7 THE TYPE AHEAD BUFFER

You will notice that it often takes a moment for the screen to respond to the commands you have entered into the computer. Because DMS workstations are equipped with a 'Type Ahead Buffer' it is not necessary for you to wait for the screen to catch up before going on to your next command. Since the computer will remember

what you have typed, and will carry out your commands in sequence, you can type in commands or text faster than the screen responds to them. However, some commands, such as CP/M's DIR and TYPE, will abort if you enter additional characters or RETURNS while the command is being processed.

## 2.8 LOGGING OFF THE NETWORK

Normally it is not necessary for you to log off the Network formally. Simply turning your workstation off or resetting it will result in the Network Master automatically logging you out. Sometimes, however, if the Network is very busy, it can take several minutes to log out officially. If your present partition assignments are owned for writing only by you, no one else will be able to write to your assigned partitions until the Master logs you off the Network.

To immediately log yourself off the Network, use the LOGOUT command. Entering LOGOUT <CR> (or A:LOGOUT <CR>) will Release write ownership for any partitions you are assigned to and log you off the Network.

It is particularly important to use LOGOUT if you plan to turn off one workstation and go work on another one. If the Master has not logged you off the first workstation by the time you log in to the second station, you will not be able to write to your assigned partitions (if they are set to be OWNED by you). If this happens you will have to get the System

Administrator to clear your write protection with the NETALLOC program. (See Section 2.11.5 for more information on owning partitions.)

## 2.9 FILES AND PARTITIONS, OVERVIEW

This section will provide a general overview of files, partitions, and drives. It is intended for those new to the HiNet system who may be unfamiliar with these terms. Additional information on files will be found in section 2.10 and detailed information on how partitions are used with HiNet will be found in section 2.11.

### FILES

All computer work is stored in files. Almost everything you do with your workstation will in some way concern files--taking information out of a file, putting information in, using one file to process another, and so forth. Like a paper file, a computer file can range in size from very long to very short and contain almost any kind of information. There are two general types of computer files--data files and program files.

Program files (often called 'Applications Programs') tell the computer how to carry out your instructions. Programs are the tools you and the computer work with. Word processing programs are used to write documents and letters, accounting programs keep books, data

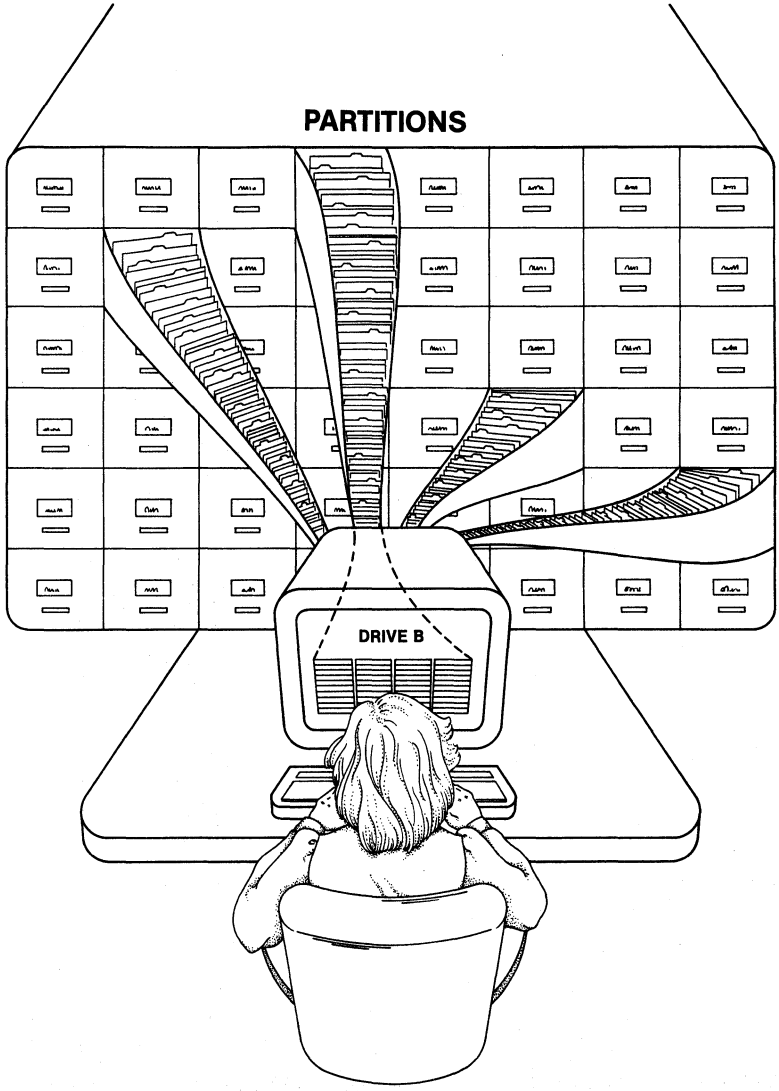
base management programs analyze data, and so on. Applications programs such as these are usually purchased or custom-written by professional programmers.

Data files are created by your use of applications programs. They are the files that contain your work. The individual memos and manuscripts written with a word processing program are stored as data files, as are the ledgers created and maintained by an accounting program, or the mailing lists maintained by a data base management program.

**PARTITIONS**

Your workstation is connected to a Master Computer that uses Hard Disk Storage to store information for everyone on the Network. This Hard Disk Storage is divided into Partitions that contain files. You can think of Hard Disk Storage as a very large filing cabinet with many drawers. Each partition is like a separate file drawer that can contain many files.

Partitions may be assigned to specific people, to departments, or to general functions. For example, a partition named 'ACCOUNTS' might be used by many people and contain accounting programs, ledgers, customer files, and tax records (all in separate files). A second partition labeled 'MELVIN' might be used by one person to keep his personal work, while a third named 'SYSTEM' could be used to store various programs that everyone on the Network shares.


PARTITIONS
DRIVE B

When you tell the computer to save some work that you have done on your workstation, it is placed in a file. You have to name the file and the partition where the file is kept. If you change the contents of a file and order the computer to save it, the old version will be erased and replaced by the new version. Some applications programs will rename the original file and save it as a backup file.

**DRIVES**

Inside a DMS 8-bit workstation are four connections--eight in 16-bit workstations--each of which you can link to one of the partitions on the Hard Disk. In computer terminology these links are called 'Drives' or 'Logical Devices', and they are labeled 'A', 'B', 'C' and 'D' for 8-bit stations, 'A' through 'H' for 16-bit stations. These drive letters are what appear on your screen as the prompt (A>, B> etc.).

When a workstation is running under CP/M-80, there are four drives available that can be assigned to partitions. 16-bit workstations, running either CP/M-86 or MS-DOS, have eight drives available.

Using the ASSIGN command (see section 2.11.5) you can electronically connect each of your drives to one specific partition on the Hard Disk. In other words, your workstation can be linked to any four or eight partitions on the Master Hard Disk depending on your workstation type.

Assigning a partition (file drawer) to one of your drives gives you the power to open that partition and work with its contents. You can read material from the files stored in the partition, alter those files, erase them, create more files, rename old ones or copy them to other partitions.

----------NOTE----------
The label 'Drive' can be associated with any memory storage device (Hard Disk partition, Floppy Disk, etc.) depending on how you assign it. For example, your Network may contain some workstations equipped with Floppy Disk Drives (the DMS-3/F, DMS-3/501 or DMS-3). At those stations you can assign any of your logical drives to a Floppy Disk Drive or a Local Hard Disk partition instead of a partition on the Master's Hard Disk.
---

## 2.10 FILES

Programs and data are stored in files. Like a file drawer, each partition may contain many files. Once you are logged onto the system and accessing the proper partition, most of your work will concern the manipulation of files.

### 2.10.1 FILE NAMES

Every file, whether program or data, has a distinct name by which you and the computer know it. When you create a file through the use of a

program, you give it a name. Files can be renamed at any time.

File names follow a simple pattern--first an identifying name of 1 to 8 characters, then a period, and then a 'type' name of 1 to 3 characters which is used to identify what sort of file it is, for example, **SHOPPING.LST, CHAP-3.TXT, WHO.COM, LETTER.BAK** etc.

### 2.10.2 FILE TYPE IDENTIFIERS

The period and three-character file type identifier at the end of a file name are not mandatory; **XX, 2,** and **ADVERT** could all be used as file names if you wish. However, most people find it useful to identify files by their kind, both for their own information and because some operations (erasures, for example) can be performed on groups of files rather than one by one.

By common convention some type identifiers have standard meanings. For example: **.COM, .CMD, .BAS** and **.OVR** usually indicate a program. **.BAK** indicates a backup file (such as those created automatically by some word processing programs). **.TXT** usually stands for Text, **.DOC** for Document, **.LST** for List, and **.LTR** for letter.

### 2.10.3 FORBIDDEN CHARACTERS

You can name (or rename) a file anything you want as long as there are no more than 8 characters before the period, no more than three

after, and you do not use any of these forbidden characters, in CP/M: > < , ; : + ? * ] [ . TAB plus these in MS-DOS: " / \ | . (These characters are reserved for special CP/M and MS-DOS instructions. For example, the period is used as a file separator.)

To learn how to rename a file, see sections 3.4. and 3.6. To learn how to erase a file see section 3.5. To learn how to copy files from one partition to another see section 3.6.

----------NOTE----------
Make sure you do not give two different files the same name. Even if they reside in two different partitions, the chance of confusing them can lead to one or both files being destroyed. CP/M will not allow you to have the same filename twice in a partition. If you copy a file into another partition that has a file with an identical filename the file in the destination partition will be overwritten--effectively erasing it. (MS-DOS will allow two files with the same name to exist in the same partition but they must be in separate sub-directories.)
---

### 2.10.4 FILENAME WILDCARD SYMBOLS

When listing files for certain commands (ERASE, for example) you can identify a group of files by using the characters that their names have in common, plus the wildcard symbols * and ?, to stand for those characters that are

different. A question mark will stand for any single character, and an asterisk will stand for everything on one side of the period.

**?** stands for **ANY SINGLE CHARACTER.**

***** stands for **EVERYTHING ON ONE SIDE OF THE PERIOD.**

For example, **FI??.DOC** would represent any file with **FI** as the first two letters of its name, any additional two letters, and **DOC** after the period (**FISH.DOC, FILM.DOC, FIRM.DOC,** etc.). ***.LST** would stand for any file of the type **.LST** (**SHOP.LST, MAILING.LST, POOBAH.LST, R2D2.LST,** etc.). Since * stands for everything to one side of the period, ***.*** would stand for every single file in a partition. FI*.DOC would stand for every file beginning with FI and ending in .DOC. However, the expression ***SEC.TXT,** represents every file that ends with TXT, not just those that have SEC in the filename. As soon as CP/M sees the * wildcard symbol, it ignores everything after it until the period. In a case like this you must use the ? symbols instead of *.

**DIRECTORY**

To see a directory of the files contained within the partition you are currently accessing (that is, the partition assigned to the drive you are logged onto), type **DIR** after the command prompt (**A>DIR**). For more on Directories see sections 3.2 and 3.3.

## 2.11 PARTITIONS

### 2.11.1 PARTITION NAMES

Each partition on the Network Hard Disks has a name. Some may have the names of the people who use them for their own work. Such names may be the same as or similar to a person's Network User Name. A Network User Name, remember, allows a person to log in to the HiNet Network; it is like a key allowing you access to the HiNet system. A named partition is someone's assigned workspace.

Other partition names might identify the partition's contents (Ledgers, Forms, Inventory) or the department that uses the partition (Sales, Personnel, Research). Usually the partition named SYSTEM is used to hold all of the programs used by everyone on the Network.

----------WARNING----------
You should never erase, change, or add anything to the SYSTEM partition (or the SYSTEM partition's files) without first discussing it with the person in charge of the Network.
---

### 2.11.2 DIRNET (DIRECTORY NETWORK)

Type the command **DIRNET** (**A>DIRNET <CR>**). This stands for 'Directory of the Network.' Your screen will now show a listing of all the partitions on the Hard Disk. The screen will display a table similar to this:

```
A>DIRNET <CR>

DIRNET Version x.x

Partitions on Volume 0 vol0Mastr

ACCOUNT1   2M   :  MELVIN     2M
ACCOUNT2   1M   :  MRS G    512K
CHOU       1M   :  PERSONNEL  1M
LEROY    512K   :  RESEARCH   2M
MARY2    512K   :  SYSTEM     2M
```

The command **DIRNET MAP <CR>** displays all of the partitions on the Network's Hard Disks along with the type of operating system a partition is formatted for, the storage size in bytes, the write protection mode, and whether or not it is set for flagged backup. (These terms will be described in later sections.) DIRNET MAP gives the Network Administrator quick access to necessary information about the Network's partitions.

### 2.11.3 PARTITION SIZES

When you look at the DIRNET directory you can see that each partition name is followed by a number. This gives the partition size in bytes. A byte is one character or space in written text. An average single-spaced typed page is about 3,000 bytes, usually abbreviated 3K. The K stands for 'Kilo', the metric word for

thousand. (However, in computer terminology K = 1024 bytes). One million bytes--actually 1024 X 1024 or 1,048,576--would be abbreviated 1M (M stands for 'Mega', one million in metric notation).

The size of each partition is determined by the person in charge of the Network. The partition's size determines the number and size of the files within a given partition. Thus, if you had a 512K partition--which has a 4K directory--you could put into it one file of 520,192 bytes, or any combination of files that added up to no more than 508K or more than 128 individual files. (Note that a 512K partition needs about 4K for a directory which leaves 508K for files.)

### 2.11.4 PARTITION DEFAULT ASSIGNMENTS

The person in charge of your Network assigns specific partitions to some or all of your drives as 'default partition assignments'. Whenever (and wherever) you log onto the Network, your default partition assignments will automatically be in effect. Thus, if your HIDOS default partition assignments were:

A: SYSTEM B: MAIL C: PAT D: PAYABLE

they would automatically be assigned to drives A through D whenever you logged on to any workstation on your Network.

By typing **ASSIGN** (A>**ASSIGN** <CR>) you can see a table showing your current partition

assignments. The ASSIGN command (as explained in section 2.11.5) also allows you to assign different partitions temporarily to any of your drives. Of course, temporary assignments only last until you log off (or change them again). Whenever you log in again you will get your default assignments.

----------NOTE----------
In computer jargon 'default' refers to whatever choice the computer is programmed to select automatically when it is turned on or reset. Use of the word 'default' implies that you can then switch to a different choice if you desire.
---

In an office, where people usually have their own desks or workspaces, there is a natural tendency to think of a particular workstation as 'yours'. However, as far as the Master Computer is concerned you can use any station. Any workstation you log onto with your User Name will be treated by the Master Computer as your station, with your default partition assignments, until it is turned off, or reset. Thus, you could use any workstation on the Network as your own, or several people could take turns with the same workstation simply by logging on with their own User Names.

Since every User Name is linked to a specific operating system, you should know which workstations are compatible with the name you are using. If you use more than one operating system, you will need more than one User Name. Here is a list of Digital Microsystems'

workstations and the operating systems that they are capable of using:

| | 8-BIT SYSTEMS | | 16-BIT SYSTEMS | |
|---|---|---|---|---|
| Workstation | CP/M-80 | HIDOS | CP/M-86 | MS-DOS |
| DMS-5080 | YES | YES | NO | NO |
| DMS-3/F | YES | YES | NO | NO |
| DMS-3/501 | YES | YES | NO | NO |
| DMS-3/B | YES | YES | NO | NO |
| DMS-3/10x | YES | YES | NO | NO |
| DMS-4 | YES | YES | NO | NO |
| DMS-1280 | YES | YES | NO | NO |
| DMS-5086 | NO | NO | YES | YES |
| DMS-86 | NO | NO | YES | YES |
| DMS-816 | YES | YES | YES | YES |

### 2.11.5 TYPES OF PARTITION PROTECTION

Since it is possible to have four operating systems on the Network, different types of partitions are necessary. The most important differences are the ways in which partitions are protected from multiple users writing to them at the same time. On a Network, information is meant to be shared among Users. However, in order for files to be added, deleted or altered by several Users in the same partition, the partition has to be specially structured and Users must observe certain protocols. The four different operating systems and their specific requirements are as follows:

**CP/M 2.2** -- When you are writing and reading files to and from partitions, the Basic Disk Operating System (BDOS) keeps track of your work by maintaining a directory of all the files in your partition. If someone else tries to write to a partition that you are writing to at the same time, the BDOS will become confused and can overwrite files already on the Hard Disk. To help prevent the destruction of files, CP/M 2.2 will not allow two users to write to the same partition without one or both of the people getting a BDOS R/O error message. This results in the loss of whatever work has been done since the last save command. CP/M does protect the partition's directory from damage but files currently being edited may be lost anyway.

**MS-DOS** cannot tell if two people are writing to the same partition. If this happens, more than one file in the partition will probably be destroyed. Even more disastrous is the possibility of the directory being corrupted, thus causing the loss of all the files in the partition. It is therefore very important to use partition protection to guard against this kind of error on the Network. All MS-DOS partitions must be either OWNABLE or Read-Only. The ASSIGN command determines whether you own a partition for writing, or someone else owns write privileges, or the partition is Read/Only.

**HIDOS** is a DMS-enhanced version of CP/M 2.2 that allows two or more people to write to shared partitions at the same time. However, a file cannot be altered at the same time. A User-initiated protocol called NETLOCK must be used

to control file access. HIDOS shared partitions are covered in more detail in section 2.13.

**CP/M-86** is the 16-bit version of CP/M 2.2. Workstations operating under CP/M-86 can **read** files from any HIDOS partition as well as partitions set aside specifically for CP/M-86 commands and applications programs. These partitions should also be OWNABLE. However, any partitions on a HIDOS Network that are marked as shared in the Master's ALLOC Table (where the partitions are organized) cannot be **written to** by CP/M-86 workstations.

----------NOTE----------
MS-DOS partitions cannot be accessed by either HIDOS or CP/M-86 workstations, and vice versa. A HIDOS workstation can write to CP/M-86 partitions and most data files can be used interchangeably.
---

As mentioned above, the HiNet Network has four different modes of partition protection. Here is a more detailed look at them.

**R/W Read/Write**--anyone can read from and write to a partition. This is the standard CP/M 2.2 status for partitions. Under HIDOS and MS-DOS this method affords no partition protection. This mode is not recommended for **any** partitions, whether HIDOS, CP/M-86 or MS-DOS.

**R-O Read-Only**--anyone can read from a partition but no one can write to it unless the status is changed in the ALLOC Table. (The ALLOC Table keeps track of the partitions on the

Hard Disk.) This is normally what the SYSTEM partition is set to so that program files cannot be accidentally erased or altered. This partition protection attribute is available for both CP/M and MS-DOS.

**OWNABLE**--The user who owns a partition is the only person who can write to it until he or she resets and logs out, or uses the RELEASE or LOGOUT command (section 2.13.3). This is the preferred partition protection method for all unshared partitions. It prevents Read-Only errors in CP/M partitions and loss of files due to accidental writes by two people to MS-DOS partitions.

When you assign an OWNABLE partition to one of your drives, the ASSIGN Table will say that the partition is either OWNABLE, OWNED BY username or OWNED BY YOU.

**OWNABLE** means that the partition can still be written to by anyone. However, the partition is Read-Only until someone claims write-ownership of it with ASSIGN.

**OWNED BY USERNAME** means that someone else has write permission. If the ASSIGN screen shows your User Name owns a partition, it means that either someone else has logged in under your name or you have logged in on another station and have claimed ownership of that partition.

**OWNED BY YOU** indicates that you have write privileges to a partition from the workstation you are currently at. You will not be able to write to that partition from another workstation

until you release ownership of the partition with the RELEASE command (see Section 2.12.3) or reasign the drive.

----------NOTE----------
If the write ownership of a partition needs to be changed because the person using it no longer needs it but has neglected to log off the Network, the Network Administrator can clear the write protection with the NETALLOC program.
---

## 2.12 SHARING PARTITIONS

If you had a metal file drawer with paper files at your desk no one else could simultaneously use it at his or her desk. With the HiNet Network it is possible for more than one person to be electronically linked at the same time to a single partition on the Master Hard Disk. In other words, many workstations could be reading or copying material from files on the same partition at the same time without difficulty.

The previous versions of the HiNet-CP/M Network only allows one person at a time to add, delete, or alter material in a partition. If two people work on a partition at the same time and try to change, add, or delete files stored on the same partition, then one or both will get a **BDOS R/O ERROR** message. When this happens, you will have to enter a CTRL C after the CP/M prompt (A>^C) to reload your directories. As a result, you will remain logged onto the Network but you will lose all the work you have done

since the last time you ordered the computer to 'save' your work.

**WARNING!**---In the case of word processing and other programs that do not create backup files, you may lose your original file completely if you get a BDOS R/O error. It is therefore VERY IMPORTANT that users inform each other before they access the same non-shared partition to perform any kind of WRITE function.

----------NOTE----------
Many people can copy a file from the same partition as described above or in section 2.6. This will not cause any problem as long as the original file is not altered or deleted. This allows everyone to share use of the same programs from a common partition because the files are only being read (by the computer) and not altered.
---

### 2.12.1 HIDOS

A Network that is configured with HiNet-HIDOS instead of HiNet-CP/M will allow more than one person to work on different files stored in the same partition and, in some circumstances, to work on different records of the same file.

HIDOS is a modified version of CP/M-80 2.2 that allows multiple users to work with different files in the same partition without error. These partitions are specially prepared SHARED partitions. Not all partitions on a HIDOS

Network need be shared. Only partitions marked as shared in the Network Master's ALLOC Table and prepared with the SHRALLOC program can be written to by more than one User at a time. See your Network Master's Installation Manual for information on preparing Shared partitions.

As a modification of CP/M, HIDOS is completely compatible with CP/M-80 software; any program, Floppy Disk, or file that works with a normally configured HiNet-CP/M will also work on a HiNet-HIDOS Network. Since HIDOS is a multi-user feature, it is only designed to operate with the HiNet BIOS and thus cannot be applied to a stand-alone system.

Since it is possible for HIDOS, CP/M 2.2, CP/M-86 and MS-DOS to be operating on the same Network, workstations running anything but HIDOS cannot write to shared partitions. The DMS-5086 and DMS-86 can be assigned to shared partitions and read files from them when running CP/M-86 but they cannot write to the partition. The assignment will be for Read-Only. When these workstations are running MS-DOS they cannot be assigned to CP/M based partitions at all.

Except as noted below, people working in a shared partition must work with different files. Two people trying to work on the same file at the same time will cause each other serious errors and one, or both, may lose some or all of their work. These errors will occur without any warning or error message appearing on the screen. To avoid such problems, the NETLOCK utility must be used to warn people that a file is in use. (See section 2.14.2.)

----------NOTE----------
It is possible for programmers to adapt software applications programs to provide for automatic file- and record-locking. This allows two people to access the same file on HiNet and make changes to it. Such adaptation allows simultaneous updating of different records in the same database file. Details can be obtained by writing to the Documentation Department at Digital Microsystems.
---

### 2.12.2 NETLOCK IN SHARED PARTITIONS

If more than one person uses files in the same shared partition, NETLOCK must be used to avoid errors which can cause the loss of data. NETLOCK is a warning signal that, **if you use it**, warns people when a file in a shared partition is already being accessed.

----------NOTE----------
Since all un-shared partitions must be assigned write ownership for one user at a time, there is no need to use NETLOCK on ownable partitions.
---

Before accessing a file in a shared partition, use the NETLOCK command to place a lockstring in the lockstring table. A lockstring is an eight character or less 'word' with an optional 3 letter file type separated by a period--just like a filename. The lockstring must exactly match the filename that you want to work on. For example: **NETLOCK TELE.DIR <CR>** would store the lockstring TELE.DIR in the

lockstring table. The program would tell you that "Your lockstring is stored in the lock table".

Now, if someone else wants to alter the TELE.DIR file, he or she would first enter the same command. The NETLOCK program would reply: "***This file or partition is locked***". The User would then know that someone else is altering the file TELE.DIR. A file cannot be altered by more than one User at a time.

----------WARNING----------
NETLOCK will not prevent someone from logging in to a partition already in use; it is only a warning signal. To be effective, each person accessing a shared partition must use NETLOCK. Thus, everyone who is likely to be altering the same partition(s) should regularly use NETLOCK before logging on to such a partition.
---

As far as NETLOCK is concerned, a lockstring can be any combination of 13 characters or less, however, you must use the actual filename so that everyone enters and looks for the same string. For example, two people who want to access the TELE.DIR file could enter TELE.DIR and TELEDIR. Both lockstrings would be accepted and stored in the lock table. Neither User would realize that someone else is altering the file: disaster could result.

When you finish altering a file the NETLOCK lockstring should be erased so that others will not be erroneously told the file is in use. To erase a lock, type NETUNLOK followed by the

lockstring name exactly as it was entered. For example **NETUNLOK TELE.DIR <CR>**.

----------NOTE----------
Resetting your workstation or doing a 'warm boot' (CTRL C) will erase any NETLOCK lockstring you have entered. Some programs, such as Wordstar and ASSIGN, automatically execute a warm boot whenever you leave or complete the program. This will also erase a Lockstring. However, simply exiting the partition in which you have entered a lockstring will not, by itself, erase the warning; you must use NETUNLOK, RELEASE LOCKS, enter a CTRL C (under HIDOS), or Reset the workstation.
---

### 2.12.3 RELEASE COMMAND

The RELEASE command allows you to release all lockstrings that you have entered with one command. It also ends a spool file and clears the ownership of a partition.

To clear all lockstrings from partitions and/or files, use the command:

**RELEASE LOCKS <CR>**

To clear write ownership of any partition that you may have, enter:

**RELEASE W A: B: <CR>**

where A: and B: are the drives that are assigned to the partitions you wish to clear. You can

enter one or all eight drive designators if necessary. The colons after the drive letters ar optional.

To clear write ownership of all the partitions assigned to your drives, enter:

**RELEASE W <CR>**

To terminate a spool job under MS-DOS, use the command:

**RELEASE SPOOL <CR>**

This will end the job that was spooling and allow you to print it on the spool printer. See Section 4, Volume 1, for more information on using the spool printer.

To RELEASE all owned partitions and end a spool file enter:

**RELEASE BOTH <CR>**

To accomplish all of the functions of RELEASE, use the command sequence:

**RELEASE ALL <CR>**

This command will clear write ownership on your partitions, as well as release any lockstrings that you have for your files, and will spool any print jobs you have pending.

Entering **RELEASE <CR>** will bring up a menu of all the functions of the RELEASE command.

## 2.13 ASSIGN COMMAND

The Assign command is used to see what partitions are currently assigned to your drives, and to temporarily change those assignments if desired. It also is used to assign various types of printers to your workstation (see Section 4, Volume 1).

To see a list of your current assignments type ASSIGN at the command prompt (**A>ASSIGN <CR>**). Your screen will display a table similar to this on an 8-bit workstation:

```
A>assign

ASSIGN Utility -- Version x.xx for Separated Boot

                 Current Drive Assignments
                 -------------------------

A: CSYSTEM    1M  HiNet Partition  Owned by Master   user #0
B: MAIL     512K  HiNet Partition  Read/Write
C: ACCOUNTS 512K  HiNet Partition  Ownable (R-O)
D: MARTHA     1M  HiNet Partition  Shared

Printer assigned to SPOOL (HiNet Print Spooler)
```

In this example, CSYSTEM, MAIL, ACCOUNTS and MARTHA are HiNet partitions assigned to the A, B, C and D drives. The CSYSTEM partition usually contains the various CP/M programs used by everyone on the Network and is commonly assigned to drive A. Drives can be assigned to any HiNet partition. These partitions can

be owned by you or by another person, shared by more than one user, write protected entirely or accessed by anyone. These various attributes will be covered in the following sections.

### 2.13.1 CHANGING DRIVE ASSIGNMENTS

Whenever you assign an ownable partition, you must specify whether or not you need write ownership or just read permission. Shared partitions, of course need not be owned for writing, since several Users can add or modify files at the same time.

Use the ASSIGN command's W option to claim write ownership of an Ownable partition. For example, the command sequence:

**ASSIGN W B: <partition name> <CR>**

makes the partition assigned to your B drive Owned by you and Read-Only for everyone else on the Network. Note that you must enter a colon after the drive letter or an error will result. You can enter one or all of your drives after the W to request write permission. However, if a partition is already owned by someone else the message:

**WARNING: PARTITION ASSIGNED TO DRIVE __ IS ALREADY OWNED BY username**
**DO YOU WANT READ-ONLY ASSIGNMENT? (Y/N)=>**

is displayed. You must decide if you want the assignment to be Read-Only. If you enter N, for No, the previous assignment will remain active.

To assign a partition to one of your drives only for the purpose of reading files, use the ASSIGN R option. For example,

**ASSIGN R C TELEX <CR>**

links your C drive to the TELEX partition and gives you Read-Only permission; you cannot write to TELEX unless you reassign with ASSIGN W.

If you forget to specify Read or Write permission, ASSIGN will ask you which you require before making the actual link to the partition.

The same type of message may be displayed when you log in to the Network if your default assignments are for OWNABLE partitions or you have an ASSIGN W command in the login command. Your four default partition assignments in the USERS Table can be automatically assigned as Owned By You when you log in to the Network.

When you have finished writing to a partition that someone else may want to use, you should either unassign it from your drive, reassign that drive or, if you still wish to read from it, use the RELEASE command to change its protection status back to OWNABLE. (See RELEASE, section 2.12.3.)

If you wish to log in to more than one workstation, and your assigned partitions are write-protected, you will have to use RELEASE each time you switch workstations and write to a partition.

----------NOTE----------
The error message:

*****Error: partition on drive __ is not ownable.**

will be displayed if a partition you are trying to make owned by you is not marked as OWNABLE in the ALLOC Table.
---

### 2.13.2 ASSIGNING A PRINTER

When you type **ASSIGN <CR>**, the ASSIGN will list the current printer assignment. This tells you how text you send to the printer will be routed. If the printer is assigned to SPOOL then whenever you issue a 'print' command the text will be sent to the Spool Printer (Spool Printer is the default setting). If your printer is assigned to one of the Serial Ports, text you send to a printer will be routed through that port. Obviously, if the cable from your printer is plugged into Port 2, and you have the printer assigned to Port P, nothing is going to reach the printer until you change the assignment or the cable.

To change a printer assignment, type after the command prompt: **ASSIGN P** and the **Port Identifier.** For example:

**A>ASSIGN P PORT2<CR>** assigns the printer to Serial Port 2.

---NOTE---
Each workstation on the Network has a default printer assignment in the MACHINE Table. If you are using several different workstations, check the printer assignment with the ASSIGN command.
---

### 2.13.3 ASSIGNING DRIVES TO FLOPPY DISKS

You can assign any of the four CP/M drives to a local Floppy Disk. The DMS-3/F has two Mini-Floppy Disk Drives (5.25 inch), the DMS-3/501 has one Mini-Floppy Disk Drive, and the DMS-3 series computers have either one or two 8-inch Floppy Disk Drives.

To assign a Floppy Disk Drive to one of the four CP/M drives, use the format:

**ASSIGN <drive letter> <drive identifier> <CR>**

where <drive identifier> is the two character code for the size and type of disk drive. The DMS-3/F and DMS-3/501 both use Double-Density Mini-Floppies. These are designated as M0 (for the 3/F's left drive and the single disk drive on the DMS-3/501) and M1 (for the right drive on the 3/F). 8-inch Floppy Disk Drives are designated as D0 and D1 for left and right, top and bottom double density, S0 and S1 for single density, as the following chart shows:

Floppy Disk Drive Identifiers

| | | |
|---|---|---|
| DMS-3/F | Left Drive = M0 | Right Drive = M1 |
| DMS-3/501 | Left Drive = M0 | |
| DMS-3 | Left Drive = D1,S1 | Right Drive = D0,S0 |
| DMS-4 | Top = D0,S0 | Bottom = D1,S1 |

## 2.13.4 ASSIGNING DRIVES TO LOCAL HARD DISKS

A HIDOS (CP/M) drive can also be assigned to a local Hard Disk's partition. The local partition's name must be preceded with an **H:**. This tells CP/M that the partition you are assigning to a drive is not on the Master Hard Disk but is part of the local storage. To assign a local Hard Disk partition to a CP/M drive use the format:

**ASSIGN Drive H:partition name<CR>**

For example, entering:

A>**ASSIGN D H:CREDITS<CR>**

will assign to your D drive the partition CREDITS that is on your local Hard Disk.

----------NOTE----------

When assigning local Floppy Disk Drives or Hard Disk Partitions to Network Drives, your User Name must be linked to a FULL SERVICE type of operating system in the USERS Table. If the

User Name has a High Memory OS instead, the local drives will not work on the Network.

---

### 2.13.5 ASSIGN HELP SCREEN

To review the parameters and syntax for the ASSIGN command, enter **ASSIGN ? <CR>**. This will display a screenful of information about the ASSIGN command and how to use it.

If you incorrectly enter an ASSIGN command, the screen will display an error message and a short explanation of why the assignment is wrong.

### 2.13.6 SAVING ASSIGNMENTS IN A FILE

When you log into a workstation, four of your drives are automatically assigned. On 16-bit workstations you can assign up to eight drives to eight different partitions.

It would be tedious if you had to reenter the remaining partition assignments every time you logged onto the Network. Therefore, ASSIGN gives you a way to save all of the assignments in a file. These assignments can later be read to restore all of your drive assignments. This file can be used in the login command to restore all of your drive assignments automatically whenever you log in to the Network.

To save your assignments in a file follow this procedure:

1) Assign some or all of your drives to partitions.

2) Save the assignments in a file by entering the command:

**ASSIGN S filename <CR>**

To restore your drive assignments use the command sequence:

**ASSIGN R filename <CR>**

where filename is the file in which you previously saved the assignments. ASSIGN R will ask for partition passwords if necessary. It will also ask if you wish to change the printer assignment if the current one is different from the one specified in the file.

You can create as many different assign files as you need. For example, you may wish to have one assignment file for CP/M and one for MS-DOS if you work regularly in both operating systems. Store the assignment files in partitions of the appropriate operating systems.

### 2.13.7 ASSIGN COMMAND SUMMARY

**ASSIGN <CR>** -- lists current assignments.

**ASSIGN** (drive **letter**) (partition **name**) -- changes the assignment.

**ASSIGN** (drive **letter**) **U:** -- leaves logical drive unassigned.

**ASSIGN S filename** -- saves four to eight drive assignments in a file.

**ASSIGN R filename** -- restores the drive assignments that were previously stored in a file.

**ASSIGN W (drive letter:)** -- grants write ownership to ownable partitions assigned to drive letter if that drive is not already owned. You may enter 1 or more drive letters.

**ASSIGN W <CR>** -- grants write ownership to all partitions assigned to your drives if they are not already owned.

**ASSIGN (drive letter) H:(partition name)** -- links a partition on a local Hard Disk to a Network Drive. Files can be transferred between Hard Disks.

**ASSIGN (drive letter) <disk identifier>** -- links a Network Drive to a local Floppy Disk Drive. The disk identifier must be specified for the drive position and density (M0, M1, D0, D1, S0, S1).

**ASSIGN P PORT2** -- assigns the printer to local serial printer port.

**ASSIGN P SPOOL** -- assigns printer to spool.

**ASSIGN P PORTP** -- assigns printer to Centronics parallel port.

**ASSIGN ?** -- displays summary of ASSIGN commands.

## 2.14 PARTITION PASSWORDS

Partitions may be secured against unauthorized access by use of a password. If this is the case, the words **'ENTER PASSWORD:'** will appear on the screen after you use the ASSIGN command to call up that particular partition. You will then have to type in the password followed by carriage return. Passwords can be in either upper or lower case letters. If you type an incorrect password the station will respond **'ASSIGNMENT DENIED'.**

## 2.15 USING PARTITIONS AND FILES

One of the best methods of organizing the Network's partitions is to store application programs on one partition and all work or data files on other partitions. If everyone kept copies of the various application programs in his or her workspace partitions, the Hard Disk Storage would become full of duplicated programs. By having a single partition devoted to storage of commonly used utilities and software, everyone can share their use without massive duplication. Also, since application programs are often upgraded, having everyone share a single copy on the SYSTEM partition ensures that everyone has access to the latest version.

Section 2.15.1 below describes how to move from one partition to another, and section 2.15.2 explains how to use programs stored in one partition and data files stored in another.

## 2.15.1 CHANGING DRIVES AND PARTITIONS

Whenever you are using your workstation you are 'logged' to one of your four (or eight) drives, and the partition assigned to your logged drive is the one you are accessing. In a sense the logged drive/partition is like an open file drawer; unless you specify otherwise, whatever you do will relate to that drive and partition. If you ask for a file and do not specify a particular drive, the computer will automatically search the open partition. If you enter a command the computer will assume you mean it to affect the partition on the logged drive unless you tell it otherwise.

If you are accessing the A drive (and whatever partition is assigned to that drive) you will see the 'A Prompt' (**A>**). To change to another drive (and, of course, the partition assigned to that drive) simply type the letter of the drive you wish to go to, a colon, and a carriage return. Thus, **A>C:<CR>** would log you to the C drive and you would see the 'C Prompt' (**C>**).

----------NOTE----------
You cannot access a partition unless it is assigned to one of your drives. If you wish to access a partition not assigned to one of your four (or eight drives), you must first use the ASSIGN command to put it on one of the drives.
---

## 2.15.2 FILES, COMMANDS, & PARTITIONS

Just because you are logged to one drive and partition does not mean that you are barred from the other partitions assigned to your various drives. You can easily specify that a command or file operation is to affect some other drive and the partition assigned to it merely by using the other drive's letter and a colon.

### FILES

Often you may wish to use an applications program even though you do not have a copy of the program stored in the partition assigned to your logged drive. You can easily run a program from another drive/partition. Under HIDOS Release 6 (ZCPR) there is no need to specify the location of a .COM file **if the file is stored on either your logged drive or the partition that is assigned to the A drive.** The operating system will first search partition you are logged to and then the partition assigned to the A Drive. If the .COM file is located on any other drive you must specify where the file is. This is done from the command prompt by typing the letter of the drive/partition where the file is stored, a colon, the command file's name, and carriage return.

----------NOTE----------

The automatic search for COM files applies only to workstations running HIDOS ZCPR (CP/M-80). Workstations running CP/M-86 must specify where the CMD file is if it is not on the logged

Drive. MS-DOS workstations can use the PATH command to automatically locate COM and EXE files.

---

As an example, the command **B>XYZ<CR>** will run the XYZ.COM program that could be stored on the partitions assigned to either drive A or B and allow you to use it with with your files stored on the partition assigned to drive B. Any data files that the XYZ program created or altered would continue to be stored on B (the logged drive/partition).

----------NOTE----------

When invoking a program for use it is not necessary to include the file type identifier (e.g., .COM in CP/M and MS-DOS, .CMD in CP/M-86 or .EXE in MS-DOS). Only the part of the file name before the period need be used. For example, **D>A:CUSTOMIZ<CR>** would call up the CUSTOMIZ.COM (or CUSTOMIZ.CMD) program.

---

Of course, as soon as you exit the program, reset your workstation, or turn it off, the stored copy of the program would disappear from your station's memory. (If you wanted a permanent copy of the file in your partition, you would have to use the PIP command as explained in section 3.6.)

**COMMANDS**

Many programs can also operate across partition barriers. This is done by adding the

letter of the drive you want the program to affect, and a colon, to the end of the command invoking that program. For example, if you were in drive A and typed **DIR** you would get a directory of the files on drive A; but if you typed **DIR B:** you would get a directory of the files in the partition assigned to drive B.

**THE COLON**

When used in a command, the colon (:) signals the computer to open a partition assigned to a particular drive. There are three ways to use the colon to direct your work on drives and partitions.

1) Letter, colon, RETURN orders the computer to change the logged drive to that of the specified letter.

2) Letter, colon, filename, RETURN tells the computer to look for that file on the drive of that letter and bring it into the station's workspace.

3) Command, letter, colon, RETURN tells the computer to carry out the command on the drive specified by the letter.

For example:

**B>C:<CR>** means change logged drive to C.

**C>A:ACROSS.PAR<CR>** means search the partition assigned to drive A, load a copy of file

ACROSS.PAR into the workstation's memory and remain logged on to drive C.

**C>DIR D:<CR>** means apply the DIR command to drive D while remaining logged to drive C.

Here are some of the different ways you can use the CP/M and MS-DOS drives to work with partitions and files:

| | |
|---|---|
| **A>B:<CR>** | Change logged partition. |
| **B>A:ASSIGN<CR>** | Use a program that is stored in another partition. |
| **B>SD D:<CR>** | Apply a program to one or more files in another partition. |
| **B>A:SD D:<CR>** | Use a program stored in one partition and apply it to another partition. |

### 2.15.3 USER NUMBERS--DIVIDING PARTITION SPACE

Your four drives are linked to four partitions on the Network's Hard Disks. The files you create and store on those partitions normally exist all on one "User Area" in each partition. However, it is possible to divide a partition into 16 separate User Areas, each with a different User Number, 0 through 15. Files stored in one User Area are invisible when working in another User Area. This system of dividing partitions allows you to keep sets of

files separate from other sets; it is another method of organizing your partitions.

HIDOS with ZCPR enhances the standard CP/M User Number feature. Originally, once you were in a User Area, all other areas, including other drives were "empty" to your commands. When a program was called and it was not in your current User Area, you could not access that program. Now under ZCPR, the Command Processor will first search in the logged User area, then in the default User Area (usually User 0) and then in Drive A. This means that you do not have to have multiple copies of a program in different User Areas in a partition.

When you log to a drive you are automatically in User Area 0. To change to another User Area use the command:

**USER <user number> <CR>**

where <user number> is a number between 0 and 15 inclusive. For example:

**USER 2 <CR>**

will log you into User Area 2. The prompt in column 1 would change to the drive letter followed by the number 2 (e.g., D2>). At first this User Area would be empty of files. If you need to copy a file from another drive or User Area use PIP with the [G <user number> option. For example, if you are in User Area 2 on the D drive and want to copy a file from User area 0 on the A drive enter:

D2>**PIP D:=A:filename[G0 <CR>**

You do not have to specify where PIP.COM is stored as long as it is in User Area 0 of your logged drive (D0 in this case) or in A0 (User Area 0 of Drive A). Since the Command Processor is searching for the PIP program it may take a few seconds longer than if you were working in User Area Zero.

It is possible to change the User Area where the Command Processor first looks for COM files. The **DFU** command tells the Command Processor where to look for COM files instead of on the A Drive. By entering **DFU <user number> <CR>**, where <user number> is one of the User Areas on your currently logged drive. For example, while logged to User Area 2 of Drive D, entering the command:

D2>**DFU 2 <CR>**

will tell the Command Processor to look for COM files on User Area 2 on the D Drive not User Area D0 or the A Drive.

### 2.15.4 PARTITION SIZES & DIRECTORY SPACE

If you work with many small files, such as letters and memos, you must be aware of the limits of the directory space in your partition. The space that is available to store the directory of the files limits the number of files you can have on the partition but does not affect the size of the files. For example, on a 512 Kbytes CP/M partition, there can be stored

a total of 128 files, even if each file has only 2 Kbytes stored in it. (A 256K partition, the smallest you can have, can hold a maximum of 64 files.) Therefore, even though only half of the partition's storage space is used, you would not be able to add any more files.

In a situation like this you will get a **No Space** error message on your screen when you try to save the 129th file. This would result in the loss of the file you were working on.

To prevent this kind of problem, routinely clean out old files from your partition, especially if you have a lot of small letters and memos. Some word processing programs create a backup file for every original file you edit. This can quickly fill up the directory space of a small partition. Be sure to erase the backup files for those jobs that are completed and printed. You could also store important old letters and memos on clearly labeled Floppy Diskettes.

## 2.16 USING TWO STATIONS AT ONCE

While it is possible for one user to log in simultaneously to multiple workstations (that is, log in with the same User Name to more than one station at a time), the current versions of HiNet-HIDOS and MS-DOS place some restrictions on what can be done under these circumstances.

There is no problem if you log in and work at two different stations if the work you do at each station is stored on different partitions (or if you only make changes to files at one workstation). The same is true if you only want to look at files, copy them to some other partition, or print them. However, some word processing programs create a temporary file in the partition when you open a file just to read it. This changes the directory structure and may cause problems for someone else who is writing to the partition.

If you are logged onto two stations--both of which are accessing the same non-HIDOS or non-shared partition--and you modify work on one of them, you will not be able to read your work correctly (that is, as you've changed it) on the other. If you save work on one station you will not be able to save work to the same partition at the other station until you release ownership of the partition from the first station with the RELEASE program. At that point the partition will again be ownable. Before writing to the partition from the second workstation you will have to reassign the drive to the partition and ask for write ownership. This procedure ensures that the workstation's directory is fully up to date; there is no chance of corrupting files or the directory.

Under HiNet-HIDOS, you can add or change different files in the same shared partition from several different workstations. However, you cannot work on or change the **same file** in a partition from several workstations. You must warm boot (enter a CTRL C) before you make new

changes on the same file at a different workstation.

----------NOTE----------
Some programs, such as a few word processors and compilers, create temporary files with the same name (e.g., ED.$$$). If two people are using a program of this type in the same shared partition, the two files with the same name will overwrite each other causing many errors that may not be immediately detectable. Be aware of these types of programs and use them in shared partitions with utmost care! To detect the presence of these temporary files, begin an edit of a fairly long work file (greater than 20K) and jump to the end of the file. Next, jump back to the beginning or middle of the file. From another workstation look at the directory of the partition that the file is in and search for a file with an extension such as $$$, that is, a file with illegal characters that is not normally in the directory. If one is found, the program cannot be used in a shared partition by more than one person at a time.
----------

## 2.17 COPYING BETWEEN OPERATING SYSTEMS

The FILECOPY program is used to copy data files to and from partitions that have different operating systems. It can also read and write files to Floppy Disks. The CP/M copy program PIP and the MS-DOS program COPY should be used to copy files between partitions with the same operating system.

----------NOTE----------
Don't bother to copy a program file from an MS-DOS partition to a CP/M partition; the program will not work at all.
---

Currently, FILECOPY can only be run from a workstation (or the Master) under HIDOS (CP/M-80). However, files can be transferred in both directions--from HIDOS to MS-DOS and from MS-DOS to HIDOS.

When you specify a file to be copied, first tell FILECOPY where it is. A file in a HIDOS partition (or Floppy DIsk Drive) is located by the **drive letter** that is assigned to the partition the file is in. A file in an MS-DOS partition is located by the **name** of the partition the file is in.

**HIDOS PARTITION — USE DRIVE LETTER: (A: - D:)**

**MS-DOS PARTITION — USE PARTITION NAME: (SYSTEM:)**

The FILECOPY command sequence requires that you first enter the location of the file you are copying, the filename, and then the destination partition and new filename (if necessary).

**FILECOPY SOURCE DESTINATION**

For example, while working under HIDOS, you want to copy the file MARCH that is stored in a partition assigned to your B: drive to an MS-DOS partition called DEBITS, the command would look like this:

**FILECOPY B:MARCH DEBITS: <CR>**

If the file is to have the same name in the destination partition, no name is needed after the partition name. If you are going to make changes to the file you should give it a new name or a variation on the original name so that the updated file will not be confused with the old file. In that case, specify another name after the destination partition or drive letter. You may also use the wildcard symbols * and ? to copy groups of files.

----------NOTE----------
If a partition is protected by a password, FILECOPY will request that you enter it before it will copy a file to or from that protected partition. If the destination partition is owned by someone else, FILECOPY will not allow you to write to it until that partition is relased. Note that you cannot assign ownership to an MS-DOS partition from a HIDOS workstation or release ownership of it. FILECOPY does the assign and unassign for you.
---

## USING FILECOPY WITH DISKETTES

The Master or any workstation with Floppy Disk Drives can use FILECOPY to transfer MS-DOS files between partitions and diskettes. The MS-DOS files on the diskette are in a CP/M readable format. You cannot use FILECOPY to read or write IBM-PC or Microsoft compatible diskettes at this time. The TRANSFER program is used for this purpose.

To copy files from an MS-DOS partition to a Floppy Disk, follow these steps:

FORMAT the diskette according to its size and density. (FORMAT5 for 5.25-inch diskettes, FORMAT for 8-inch disks.)

ASSIGN a CP/M drive to the Floppy Disk Drive (either M0 or M1 for 5.25-inch; S0, S1 for single density 8-inch; D0, D1 for double density 8-inch disks).

Use the command format (all in one line):

**FILECOPY**

**(MS-DOS partition name):filename**

**(disk drive letter): <CR>**

For example: **FILECOPY MICRO:SOFTTEXT D: <CR>**

To copy from a diskette to an MS-DOS partition, reverse the order of the disk drive and partition name:

**FILECOPY D:filename MICRO: <CR>**

You can use the wildcard symbols ? and * to copy groups of files. By specifying a different destination filename the files can be renamed.

## FILECOPY--PARTITION DIRECTORIES

FILECOPY also allows you to display a listing of the directories of MS-DOS partitions.

Use wildcard symbols to search for groups of files. For example, the command:

**FILECOPY DEBITS: DIR**

will display the directory of the MS-DOS partition DEBITS when working on a HIDOS workstation.

## COPYING PC-DOS DISKETTES

The TRANSFER utility is used to copy files from PC-DOS diskettes with a DMS-3/501 or DMS-3/F 5.25-inch Disk Drive to Network Hard Disk partitions. Using the TRANSFER program is covered in the DMS-3/501 and DMS-3/F manuals. However, an important point should be mentioned here.

If an MS-DOS workstation is already assigned to the partition where the PC-DOS diskette is transferred to, the station will not be able to "see" any new files in the partition until the partition is reassigned. Reassigning a partition forces the operating system to read the latest directory of the partition into the workstation's memory. At that point DIR will be able to display the files that were transferred.

## 2.18 THE WHO COMMAND

You may find out who is currently using the Your CRT will display a table listing the current users by their User Names. It will show

the time each user last logged on, the last time he or she requested information from the system and whether it was a read or a write. You will notice your own name in the table followed by 'Who' since you are using the WHO command. A second table gives the status of the Network spool printer showing who is currently printing, who is sending material to the spooler, and who is ready to print.

----------NOTE----------
It is possible for a User Name to appear more than once in the WHO Command HiNet Status Table (not counting the Spooler Table), since one person might have logged onto more than one station at a time.
---

**WHO HIST COMMAND**

By typing **A>WHO HIST <CR>** you can see a table showing who has used the system since the last time that the Master was reset or turned on; usually on a day to day basis. The table also shows the various times Users have logged on and logged off.

Another version of the WHO command is WHO AM I (which can be abbreviated as WHO A<CR>). Entering this command will result in a display of a single line of the WHO Table with your user name, user number and status.

**WHO MAP**

The WHO MAP command displays a slightly different format of the WHO Table. The list of Users is sorted according to the time they logged into the Network, starting with the earliest User. The Spooler Table lists the job number and the Spool Blocks that the print job required. This feature may be useful to System Programmers rather than to the average User.

```
A>WHO <CR>

Who Version 4.0a For Separated Boot

                    HiNet Status as of 12:51:24

User No User Name    Login Time   Last Req Time   Request   Status
------- ---------    ----------   -------------   -------   ------
  1F      ANN         12:50:03      12:51:24       who       active
  06      CHRIS       09:33:40      12:51:22       read      active
  09      DAVE        12:29:49      12:30:07       read      active
  1D      JACK80      11:23:35      12:51:08       read      active
  19      JOEL        12:38:02      12:38:43       read      active
  14      LESFOX      09:46:45      11:27:20       read      logging out
  12      LESFOX      09:46:36      12:51:04       read      active
  00      MASTER      09:30:03      11:18:56       read      active
  0B      MOISH       11:45:38      12:46:08       read      active
  1B      ROBERT86    11:18:57      12:11:41       clrlock   active
  03      ROBHI       10:25:42      12:22:37       read      active
  10      Unknown                                  starting  active

12 Network Users

                HiNet Spool Jobs

User Name     Spool Time     File Length     Status
---------     ----------     -----------     -------
RSTEVE         12:44:29      324 records     ready
DAVE           09:07:34      117 records     waiting
CHRIS          12:51:21       45 records     ready

3 Spool Jobs
```

# 2.19 RAM DISKS ON 16-BIT WORKSTATIONS

## 2.19.1 INTRODUCTION

What is a RAM Disk? You probably know that a Floppy Disk is a flexible plastic disk on which data is stored by magnetizing tiny spots on the disk's surface. Hard Disks store data in the same way except that they use rigid metal plates that spin at a much higher speed than Floppy Disks and can store much more data. RAM disks function in a totally different way from either Floppy Disks or Hard Disks. However, to you, the user, a RAM Disk behaves as if it were a very fast Floppy Disk. The main difference is that data is accessed much faster than either Hard Disks or Floppy Disks and the data is not permanently stored but must be copied back to the Network's Hard Disk.

Inside a 16-bit workstation (DMS-816, DMS-86, DMS-5086) is the Random Access Memory or RAM. The RAM chips store data electronically--as opposed to magnetically. While the computer is on, information is stored and exchanged in the RAM, depending on the applications program that you are running. When the computer is turned off or reset, the data is lost.

A RAM Disk is created by dividing part of the workstation's internal RAM into two or more parts: the Transient Program Area (TPA) and the RAM Disk(s). The TPA memory is set aside for running applications programs. The RAM Disk acts as local storage for files.

## 2.19.2 SETTING UP A RAM DISK

The procedures for setting up or "activating" a RAM Disk differ depending on whether you are running CP/M-86 or MS-DOS. Remember that only the 16-bit workstations--the DMS-816, -86, -5086--can use RAM Disk Storage. HiNet Masters are 8-bit computers and therefore cannot use RAM Disks.

### CP/M-86 RAM DISKS

The procedure for activating the RAM Disk Memory is very easy when your workstation is operating under CP/M-86. Simply ASSIGN one of the eight logical drives (A through H) to **ULTRA0**. For example,

A>**ASSIGN H ULTRA0**

The RAM in the workstation will be split in half. If you have 512 Kbytes of memory the RAM Disk will be 256 K in size; 1 Mbyte total RAM will yield a 512 Kbyte RAM Disk. These sizes are fixed. There can be only one RAM Disk per workstation when running CP/M-86.

### MS-DOS RAM DISKS

MS-DOS requires a procedure different from CP/M-86 to set up and activate a RAM Disk. A file named **CONFIG.SYS** must be present in the partition that is assigned to your A: Drive. (The contents of this file will be discussed in a moment.) As long as this file is present, with

the proper contents, the RAM Disk will be activated every time you log in under MS-DOS.

The RAM Disk will be assigned to logical **Drive I.** The RAM Disk does not show up when you use the ASSIGN command. You can see if it is active by entering either **DIR I:** or **CHKDSK I:.**

If the CONFIG.SYS file is not already present in your A partition you can create one with either a word processing program or the MS-DOS line editor EDLIN. CONFIG.SYS may have other commands in it if it already exists. Do not disturb these commands unless directed to do so by your Network Administrator.

Enter the following line as the only line of the file or add it to the existing file:

**DEVICE = ULTRA100.SYS**

Again, the CONFIG.SYS file must be in a partition that is assigned to your A drive in the USERS Table. However, the partition assigned to A should not be the MSYSTEM partition. (If it is then everyone else who has MSYSTEM assigned to A will also have a RAM Disk. Some applications programs require the memory space that the RAM Disk takes up; other users may need this extra memory. Therefore a personal partition with CONFIG.SYS in it should be assigned to A in the USERS Table.

----------NOTE----------

The ULTRAxxx.SYS file can be in the A drive partition. It can also be in a partition that is assigned to another drive if that drive is

specified in the CONFIG.SYS file. For example, if ULTRA100.SYS is in a partition assigned to the D: Drive, the CONFIG.SYS file device statement should read:

**DEVICE = D:ULTRA100.SYS**

In this case MS-DOS will look to the partition assigned to the D: Drive to find the ULTRA100.SYS file.

---

ULTRA100.SYS sets aside 100 Kbytes out of the standard 256K of RAM to be used as a RAM Disk. This leaves 156 K RAM available for applications programs and for MS-DOS (48K).

Both the DMS-816 and DMS-5086 are available with 512K RAM. With this much RAM, ULTRA360.SYS creates a 360 K RAM Disk. A 360K RAM Disk has the same storage capacity as a double-sided 9-sector/track Floppy Disk (IBM-PC format).

The DMS-5086 is also available with 1 Mbyte of RAM memory. ULTRA740 creates a 740 Kbytes RAM Disk out of the total 1Mbyte RAM

----------NOTE----------

The DMS-816 can be upgraded from the basic 256K RAM to 512K. This upgrade involves adding a daughter board with the additional RAM chips to the main CPU board. This upgrade can be done at the time of purchase or by a qualified technician. Please contact your authorized DMS dealer.

---

It is possible to create more than one RAM

Disk under MS-DOS. If the available memory is large enough you can have, for example, two 360 Kbyte RAM Disks (out of 1 Mbyte memory). Smaller memories could have two or three 100K RAM Disks. To set up additional RAM Disks in your workstation just add another line to the CONFIG.SYS file that defines another DEVICE. For example, a CONFIG.SYS file that has:

```
DEVICE = ULTRA100.SYS
DEVICE = ULTRA360.SYS
```

in it will create two RAM Disks, one with 100 Kbytes in Drive I and the other with 360 Kbytes in Drive J. This would require a total memory of 1 Mbyte for it to work. If there is not enough memory to support the RAM Disks the station will probably get a parity error and you will not be able to log in. In this case you will have to access the CONFIG.SYS file from another workstation that does not have it in its A Drive, and change the file or erase it.

----------IMPORTANT!----------

Under MS-DOS, COMMAND.COM must be copied to the RAM Disk every time the workstation is reset. Otherwise, whenever a large applications program is exited, the workstation will 'hang' when it cannot find COMMAND.COM. There are two ways around this problem. COMMAND.COM can be copied to the RAM Disk with COPY or with the aid of the AUTOEXEC.BAT file (see section 4).

A more permanent solution is to place a command line in the CONFIG.SYS file that specifies where to look for COMMAND.COM if it is not in the logged drive. The drive letter where

COMMAND.COM will always be must be specified in the following line:

```
SHELL = A:\COMMAND.COM A:\ /P
```

This command line is placed in the CONFIG.SYS file along with the DEVICE statement. Make sure that this line is copied exactly unless the partition assigned to the A: Drive might not have COMMAND.COM in it at all times. (For example, the Transfer programs may destroy the copy of COMMAND.COM in a partition.) Normally, when a partition is marked as MS-DOS in the ALLOC Table, it is automatically formatted and a copy of COMMAND.COM is placed in the partition. If COMMAND.COM disappears from the partition assigned to the A drive, the workstation will not be able to load MS-DOS. on net-boot

## 2.19.3 USING A RAM DISK

Using a RAM Disk is much like using a Floppy Disk. However, it is much faster than either a Floppy Disk or a Hard Disk. When an applications program and the files you are working on are all in the RAM Disk, the access time for moving around in files and doing calculations is very short.

The RAM Disk is blank when it is activated. (There is no need to format the RAM Disk as you do a Floppy Disk.) Files from the Network's Hard Disks are PIPped (CP/M) or COPYied (MS-DOS) to the drive that is assigned to the RAM Disk. The drive assignments may vary between operating

systems. Of course, files may also be created in the RAM Disk by application programs.

**IMPORTANT**---Any files that you need to save must be copied back to the Network's Hard Disks before turning off the workstation, resetting it, logging off the Network or, in CP/M-86 reassigning the drive. A sudden power loss to the workstation will result in the erasure of any work you have not saved to the Network's Hard Disks. If you are doing a series of complex calculations in the RAM Disk, you should periodically copy the results to the Network's Hard Disks to protect your work.

# 3.0 THE CP/M ENVIRONMENT

## 3.1 INTRODUCTION

Though it is often thought of as Control Program for Microcomputers, CP/M actually stands for Control Program/Monitor. Produced and sold by Digital Research, CP/M is an operating system used by many different computers. An operating system controls the transfer of information within the computer and organizes files and partitions on Floppy Diskettes and Hard Disks.

The 8-bit CP/M system that comes with the HiNet Network and all DMS 8-bit workstations, CP/M-80, is an extensive and sophisticated program. Digital Microsystems' enhanced version of CP/M 2.2 is called HIDOS. All of the commands and functions described in this section are compatible for both CP/M 2.2 and HIDOS.

Networks receiving updates or new software for HiNet Release 6 will have an altered version of the CCP (Console Command Processor) called ZCPR--Z-80 Command Processor Replacement. This Command Processor has several refinements and additional capabilities not present in CP/M-80. These features will be marked in the text by the initials **ZCPR** to prevent any confusion for people with Networks that have not been updated but who may receive this manual.

In this manual will concentrate on those commands and functions most often used by workstation operators. Further information on CP/M can be obtained from Digital Research's manuals (which come with each HiNet installation), or the many books on CP/M available at computer stores.

## 3.2 DIR (Directory)

The DIR command is used to find out what files are stored in a partition assigned to one of your drives. You invoke DIR from the command prompt. If you do not specify which drive you want listed, you will get a directory of the partition assigned to the drive you are currently logged to. **B>DIR<CR>**, for example, would give you a directory of all the files in whatever partition is assigned to drive B.

If you wanted to find out what files were on some other drive you could either log on to that drive and then invoke the DIR command, or stay on one drive and call for the directory of a different drive by adding that drive's letter and a colon after the DIR command. For example, **B>DIR C:<CR>** would keep you on drive B but give you a directory of drive C.

A typical directory looks like this:

```
B> Dir
B: ACCOUNTS DAT : GEORGE   LTR : WS       COM :
B: MAILIST2 DOC : MAILIST3 DOC : SHOPPING LST :
B: PROP     TXT : SD       COM : TAXDEDUC FIL :
B: DRAFT1   TXT : DRAFT2   TXT : DRAFTFIN TXT :
B: MAILLST1 DOC : INVE     DOC : TAX      LTR :
B>
```

----------NOTE----------
You can only use the DIR command to search for files in partitions assigned to one of your four drives. If you wish to obtain a directory of some other partition, you must first assign it to one of your drives with the ASSIGN command (see section 2.13).
---

The DIR command can also be used to find a particular file, list specified types of files, or list files with certain identical characters in their names. For example,

**A>DIR D:Money.lst <CR>**

would cause the computer to search drive D for a file titled 'Money.lst'. If the file were found it would be listed; if not, the screen would show the message: **NO FILE.**

You can search for and list groups of files by their type or by common characters in their names, by using the 'wildcard' symbols * and ? (see section 2.10.4). For example, **DIR *.COM** would list all the COM type files. **DIR**

**FI??.*** would list out all files of any type that had four characters in their names, the first two of which were 'FI' (File.Doc, Fish.Txt, Find.Ins, Fire.Lst etc.).

| | |
|---|---|
| **B>DIR** | --Directory of logged drive. |
| **B>DIR x:** | --Directory of some other drive. |
| **B>DIR filename** | --Check for particular file. |
| **B>DIR *.xxx** | --List files by common type. |
| **B>DIR ???.???** | --List files by common characters. |

----------ZCPR----------

Under both ZCPR and CP/M, files can be hidden from a directory search. By using the STAT command, a group of files can be made SYSTEM files. Under regular CP/M, the SYSTEM files will not show on the screen when the DIR command lists the partition's directory. However, under ZCPR, all files will be listed with the DIR command unless you specify which files you want listed, SYSTEM (hidden) or DIRECTORY (unhidden).

To hide a group of files use the STAT command:

**STAT (file identifier) $SYS <CR>**

where (file identifier) is a single file name or a group of files with a common sequence of letters. For example, STAT *.COM $SYS will hide all files in the partition ending with .COM.

Entering DIR will still display all files in the partition. Entering **DIR *.* D <CR>** will only display unhidden files. Entering **DIR *.* S <CR>** will display only hidden SYSTEM files. The *.* can be replaced with any combination of wildcard

symbols. See Section 2.10.4 for more information on wildcard letters and directories.

---

## 3.3 SD (Super Directory)

SD (for Super or Sorted Directory) is not part of the CP/M system but an independent program. SD performs the same functions and is used in the same way as DIR. However, unlike DIR, it lists all of the filenames in alphabetic and numeric order, gives their size in thousands of characters, and reports the amount of space you have used up in the partition, plus the amount still available. Because it alphabetizes and gives more information, most people like to use SD instead of DIR.

Having the files listed in alphabetic order is a major benefit because partitions often contain so many files that directories fill the entire screen, and locating a particular file amidst such a profusion is time-consuming.

Seeing the size of a file is also very useful, as is knowing how much space you have left in the partition. File sizes are reported in blocks of 2K (K stands for Kilo, the Metric word for thousand). Thus a file that contained between 1 and 2048 characters would be listed as 2K, one between 2048 and 4096 as 4K, and so on.

You can also search for particular files, or groups of files, exactly as with the DIR command.

SD (V 2.01) can also sort the directory in another way. The command: **SD -T <CR>** will sort the directory by extension; files with no extension first, numbered extensions next and then extensions by alphabetical order all arranged in columns. Adding a -Q to the command (SD -QT) arranges the sort across the screen.

Since DIR is part of the operating system it is automatically present no matter what drive you are logged onto, or what partitions are assigned to your drives, and it is not listed as a file in any partition's directory. However, as a separate program, the SD command must be stored on a partition as a file, and invoked as you would an applications program.

For example, if SD were stored in the partition assigned to the drive you are logged onto, you would simply type **C>sd<CR>** to obtain a Super Directory of that partition.

If SD is not stored in the partition you are currently working with, you have to specify the drive of a partition that contains it. If it were stored in the partition assigned to drive A, and you were logged on C, you would call it up by typing **C>A:SD<CR>.**

Of course, just as with the DIR command, you could add on the letter/colon of some other drive after the SD and get a Super Directory of that drive. Thus, **B>A:SD D:<CR>** instructs the computer to take the SD program from drive/ partition A and give you a Super Directory of drive/partition D while you remain logged onto drive B.

## 3.4 REN (Renaming Files)

**NEWNAME=OLDNAME**

To rename a file you use the REN command which is part of the CP/M operating system and is automatically present at all times no matter what drive or partition you are using. After the command prompt you type REN, the new file name, an equals sign, and the old file name. The basic format to remember is **NEW=OLD.** For example, **C>REN wine=water<CR>** would change the file on drive C named 'water' into a file named 'wine'.

After executing a REN command the computer displays a new command prompt below your Rename command. To check and make sure that the right file has been given the correct new name, use DIR or SD to look at the directory.

When using the REN command you cannot use the wildcard symbols (*, ?) to change the names of more than one file at a time. If you use one of the forbidden symbols in a filename you will get an error message that says **FILENAME?**

If you mistype the name of the old file, or try to rename one that is not stored in the partition, you will get the message **NO FILE.** If you try to use the name of a file that already exists on the partition as a new name, you will be asked **"DELETE FILE?".** If you do not want the file that already exists with that name, enter Y; the old file will be deleted and the file will be renamed. Enter N if you still need the old file and the rename function will not be completed.

----------NOTE----------
Some applications programs have their own procedures for renaming files which should be used when you are operating within those programs. To use CP/M's REN command the screen must be showing the Command Prompt (**A>, B>** etc.).
---

## 3.5 ERA (Erasing Files)

The command for erasing a file is **ERA,** (another CP/M function that is always present) followed by the drive letter and full name of the file you wish to erase. For example, **D>ERA C:garbage.lst<CR>** will erase the file on drive C named 'garbage.lst'. If you do not specify a drive letter, ERA will assume you intend to erase a file from the drive you are currently logged on.

CP/M does not ask you to reconfirm your command, so be sure you have correctly named the drive and file to be eliminated before pressing RETURN. The file or files that you specified will be displayed on the screen as they are erased. When the erasure is completed the computer will display the command prompt.

You may use the wildcard symbols (*,?) to erase a group of files that have part of their names in common. For example, **B>era *.ltr<CR>** would erase all files on drive B that had LTR after the period. **D>ERA GONE????.*<CR>** would erase all files on drive D that began with GONE,

had four additional characters in their name, and were of any type.

If you were to type **B>ERA A:*.*<CR>** you would erase every single file stored in the partition assigned to drive A. In this case CP/M will ask you **ALL FILES Y/N?**. If you respond with a 'Y' then all the files will be gone for good.

**REMEMBER**---Except when you are erasing all files in a partition, CP/M will not ask you to what you have told it to erase, so be very sure you specify the correct drive and filename to be erased before pressing return. Before erasing a group of files with wildcard symbols, use the DIR or SD commands with the same filename letters and wildcard symbols to see exactly which files will be erased. (For example, before entering ERA ??FIL.*, enter the directory command DIR ??FIL.* .)

## 3.6 PIP (Copying and Transferring Files)

**DESTINATION=ORIGIN**

### 3.6.1 COPYING FILES

Often it becomes necessary to copy a file from one partition to another. For example, you may wish to duplicate some frequently used program (SD for instance) from the SYSTEM partition to your work partition. Or you may want to copy some of your work files from one partition to another. CP/M's PIP program is used

to duplicate permanent copies of files from one partition onto another.

Unlike REN and DIR, PIP is not automatically present on every drive. It is contained in a program file named PIP.COM. If the PIP program is not stored in the partition assigned to the drive you are currently using you must either log in to the drive/partition where it is stored, or bring a temporary copy of PIP into your station's workspace.

In other words, if you are logged onto drive B and the PIP file is on drive A, you can either use **B>a:<CR>** to switch to drive A, or

**B>a:pip<CR>** to bring a temporary copy of PIP to your computer's workspace.

To use PIP, first make sure that there is room in the new partition for the file you wish to copy (the SD program will show you the space available).

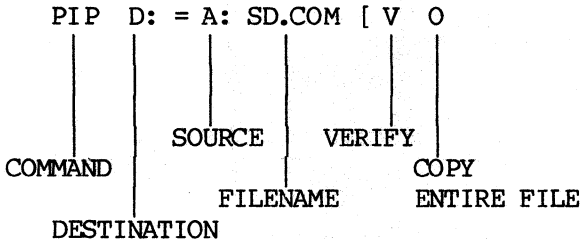
To copy a file from one partition to another, type **PIP, Destination Drive Letter, Colon, Complete Filename, Equals Sign, Origin Drive Letter, Colon, Complete Filename, RETURN.** For example, **A>PIP c:sd.com=a:sd.com<CR>** would copy the SD.COM file from drive A to drive C. The format is always **DESTINATION=ORIGIN** (or, NEW=OLD as in the REN command). When the PIP operation is completed the screen will show the command prompt.

If the destination filename is to be the same as the origin file name, you need not type the destination filename. Thus,

**A>PIP C:=A:SD.COM<CR>**

will copy the SD.COM file from A to C.

Below is that same PIP command diagrammed for clarity with a command for verification of a complete copy appended to the basic PIP sequence. (See section 3.6.3 and 3.6.4.) Normally there is a space only between the phrase PIP and the first Drive identifier. You do NOT enter spaces anywhere else in the command.




----------NOTE----------
PIP makes copies of files, it does not move a file from one partition to another. If you want a file stored in a partition and nowhere else, first copy it with PIP and then erase it from the original partition with the ERA command.
---

### 3.6.2 COPYING MULTIPLE FILES

If you have a number of files you wish to PIP, it is easier to type PIP first followed by RETURN (**A>PIP<CR>**). This puts you into the PIP program until you countermand the order; the screen will show this by an asterisk **(*)**. You need not type PIP again; after each PIP operation you will get another asterisk. Thus, you can do a series of PIP operations by only typing the drives, filenames and equals (=) signs. To cancel the PIP program type either **CTRL C** or **<CR>** after an asterisk.

To PIP a number of files with similar characters in their names use the wildcard symbols. To do this you type only the destination drive letter and colon, followed by an equals sign, and the origin drive letter, colon, and filename with wildcard symbols. You do not name the files on the destination side of the equals sign.

Here are two examples of PIP command lines.

**A>PIP a:=b:*.txt<CR>**

This PIP command would copy all of the files ending in TXT on drive B to the partition on drive A.

**B>A:PIP C:=B:ACCOUNT?.DAT<CR>**

This PIP command line would take the PIP program from drive A and copy to drive C all of the DAT type files on drive B that began with ACCOUNT (ACCOUNT1, ACCOUNT2, ACCOUNT3, etc.). PIP

will list on your screen the files as it copies them.

### 3.6.3 VERIFYING PIP COPIES

If you add **[v** (a 'v' preceded by a left square bracket) to the end of the origin filename before the RETURN, PIP will make an extra pass to verify that the copy is true and accurate. A sample PIP command is:

**B>a:PIP c:=d:complex.doc[v<CR>.**

It is extremely rare for PIP to make an error in copying a file, but adding the verify option gives an extra measure of safety.

### 3.6.4 COPYING TEXT AND DATA FILES

Sometimes you may need to make absolutely sure that all the data in a file is copied when you use PIP. For example, in some text files, part of the file may have a special CTRL character (CTRL Z) that CP/M normally interprets as 'end of file'. However, there may be additional information that must be copied after the CTRL Z. To ensure that all of the file is copied, you must add the letter o to the [v option at the end of the PIP command.

**B>a:PIP c:=d:complex.doc[vo<CR>.**

CP/M recognizes command files and does not need the [o option when copying files ending in .COM.

### 3.6.4 CHANGING FILE NAMES WITH PIP

You cannot have two files in the same partition with identical names. If you are copying a file to a partition that already contains a file with that exact same name, the existing file will be erased.

You need not make the filenames identical on either side of the equals sign when copying a file from one partition to another. Therefore, with the PIP program you can change the name of the file as you copy it. For example,

**A>PIP B:SOUTH.PAW=A:LEFT.HND[vo<CR>**

would copy the file LEFT.HND from Drive A to drive B and switch its name to SOUTH.PAW. If you change the file's name you can even PIP it within a single partition (in other words, create two copies of a file under different names). For example,

**A>PIP B:mailist3.dat=B:junkmail.lst[v<CR>**

----------NOTE----------
If you have a work file with the same name in two different partitions, and you work on one of them, you would end up with two files on different partitions with the same name but different content. This could get confusing as to which file had what content. Thus, it is the common practice when PIPping work files (NOT PROGRAM FILES) either to erase the original or rename one of them.
---

WARNING---Program files can be PIPped to your work partition as you wish, but you should NEVER ERASE the original program copy from the SYSTEM partition.

A series of PIP commands might look like this:

```
A>PIP<CR>
*D:accounts.dat=C:accounts.dat[vo<CR>
*B:applics.lst=C:names.dat[vo<CR>
*C:=B:*.doc[vo
Copying
TICK.DOC
HOLLY.DOC
MASH.DOC
MONEY.DOC
*B:=D:speech.txt[vo<CR>
*CTRL C
A>
```

## COMBINING FILES WITH PIP

PIP will also let you combine files. By listing several source files with only a comma between them, the destination file will have all of the source files combined together. The second file will start at the end of the first file, the third file at the end of the second file and so on.

For example, if you want to combine the three files, CHAPTER.1, CHAPTER2, and CHAPTER3, into

one file called FINAL.DOC that contains all three chapters in order, use the PIP command:

```
PIP FINAL.DOC=CHAPTER.1,CHAPTER.2,CHAPTER.3[V
```

In the example all three source files were on the same partition as was the destination file. You could specify different drives for each of the three source files as well as the destination file.

----------NOTE----------
You must create a new file that the source files are combined into. You cannot add one or more files to an already existing file. The first file will be erased instead of being added on to.
---

### 3.6.5 PIPPING FILES TO OTHER PARTITIONS

When you transfer files from your partition to another partition that is not Ownable or shared, you must be careful not to do so while another person is working in that partition. If you add a file to another partition it will change the directory of that partition. When the other person tries to ave any work, he or she will get a R/O error message and lose the most recent work.

The correct method of transferring files to another person's partition is to wait until the person is out of the partition or off the network or is prepared to receive the file. (The other person will have to enter a CTRL C

after the CP/M prompt before trying to save any files.)

Alternatively, a person can always PIP a file from another partition to his or her partition without any trouble. If you are trading files with other people, let them PIP the file in your partition to their partition. This is the best method.

## 3.7 TYPE (To See a File's Contents)

If you wish to look at the contents of a particular file you can use the CP/M command TYPE. This command displays the contents of a file on your CRT screen. (TYPE will only work with files containing letters and numbers. It will not work with files containing graphics or nothing but computer command codes.)

TYPE is part of the operating system and is automatically on every drive. You use it from the Command Prompt by entering **TYPE, Drive Letter, Colon, Filename, RETURN.** For example, **C>TYPE A:QBROWN.FOX<CR>** would display on your screen the contents of the file QBROWN.FOX on drive A.

Under CP/M 2.2 a file that contains more lines than can fit on your CRT screen will scroll up across the screen too fast to read, stopping only at the end with the final lines displayed. However, you can freeze this scrolling action at any time by entering a CTRL S or by pressing the PAUSE key. CTRL S instantly stops the file from moving up the screen.

Another CTRL S (or any other key) restarts the scrolling action. By alternately freezing and scrolling the file you can read it all. (Since the file scrolls fast you have to be quick with your freeze commands; it may take you a little practice to get the timing right.)

The HIDOS (ZCPR) Release 6 version of TYPE displays a file one screenful at a time. There is no need to use the PAUSE Key to start and stop the scrolling text. Hitting any key will display the next page of text. If you do not want the file to stop after each screenful of text, use the command **TYPE <filename> P.** The file will keep scrolling until you press PAUSE.

----------NOTE----------
The TYPE command does NOT print out the contents of a file onto a piece of paper even if there is a printer connected to your workstation. If you wish to have the contents of a file printed onto paper you must use the command **CTRL P** in conjunction with the **TYPE** command. See section 4 for information on printers and section 3.8 for information on CTRL P.
---

You can also use a word processing program to look at the contents of a file. With a word processing program you can read the contents and also add, change, or delete them. With the TYPE program you can only look at what is in the file, not edit it. However, it takes fewer keystrokes to see a file with TYPE than with a word processing program, so if all you want to do is check what is in the file you may wish to use TYPE.

## 3.8 CTRL P (Typing to Paper)

If you have a printer connected to either your workstation or the HiNet spooler (see Section 4, Volume 1) you can command the computer to print out on paper whatever you send to the screen. To do this, first ready the printer as described in Section 4 and in the printer's instruction manual, then enter a **CTRL P** command at the command prompt. From that point on, everything subsequently sent to your screen will also be sent to the printer until you enter another **CTRL P** or a **CTRL C** to turn off the send-to-the-printer command.

----------NOTE----------
Anything already on the screen before the CTRL P was entered will not be printed. Everything that appears on the screen after you enter the CTRL P (including your commands) will be printed until another CTRL P is issued.
---

If you wanted to print out a hard copy of a directory, for example, you would enter a CTRL P before the SD or DIR command. ('Hard Copy' is computer jargon for something printed on a piece of paper.) If you intended to change the names of several files, and wished to have a hard copy record of what was done, you could use CTRL P before starting with the REN commands, and each of your REN commands would be recorded by the printer.

You can also use CTRL P in conjunction with the TYPE Command to print out the contents of a file. **B>CTRL P TYPE B:Warnpees.nov<CR>**, for

example, would send to the printer the command line, the contents of the file Warnpees.nov and everything else you did until you sent another CTRL P or a CTRL C.

## THE LIST COMMAND

Instead of using CTRL P in conjunction with TYPE to send a file to a printer, you can use the LIST command that is available with HIDOS Release 6 (ZCPR). Enter the command:

**LIST filename <CR>**

where filename is the name of the file you wish to print instead of **CTRL P TYPE filename <CR>**. Unlike using TYPE, the file will not be displayed on the screen as it is being printed. The CP/M prompt will return to the screen when all of the text has been sent to the printer. When using the Network Spool Printer you must enter a CTRL C under HIDOS or RELEASE SPOOL under MS-DOS to SPOOL the file so that it can finish printing.

----------NOTE----------

If you wish to print a file created using either a word processing program or some other applications program with its own set of print commands, you should use that program's print commands and not CTRL P. This is because the print commands associated with an applications program allow you much greater control over exactly what is to be printed and in what manner. Also, files created with word processing

programs contain invisible, embedded computer commands that CTRL P or LIST can neither understand nor carry out.

---

## 3.9 USING SUBMIT FILES ON HINET

For general information on using Submit see your CP/M Manual; this section will only cover special considerations when using Submit in a Network environment. Here are the basic points to remember when using SUBMIT on the HiNet Network:

The HIDOS Release 6 (ZCPR) version of SUBMIT does not require that you run SUBMIT from the A drive. You can be logged to any Ownable partition on any drive. The Submit file will only effect that drive.

When using a Submit file you must be logged to the partition that the SUBMIT file will be running on and it must be owned by you.

You cannot change drives from within a SUBMIT program.

SUBMIT cannot be used on Shared partitions.

When SUBMIT is running a closed parenthesis symbol will be displayed in column one. When the SUBMIT file is finished the Drive letter prompt will return.

----------NOTE----------
If a REN command fails during a SUBMIT execution, the SUBMIT will abort.
---

----------WARNING----------
Should another User assign the partition that a SUBMIT file is running on and log to that drive, they will get an error message when they try to run a program (e.g., ASSIGN) or warm-boot, telling them that they do not own the partition for writing. The other User's workstation will begin to execute the Submit file which tries to write to the partition that is not owned by the User, resulting in an error. The other User must RESET their station in order to regain control.

To avoid problems, always run SUBMIT files on private partitions that are not likely to be assigned to ay other User's drives.
---

On Networks previous to Release 6 **NEVER have the SYSTEM partition assigned to your A drive while you are using Submit.** To be safe, follow this procedure when using SUBMIT on pre-Release 6 Networks:

A- If the SYSTEM Partition is assigned to your Drive A, re-assign it to another partition (**A>Assign C: SYSTEM<CR>**). See Section 2.13 for a description of the ASSIGN Command.

B- Assign a partition that no one else will be using to your Drive A (**C>Assign A: XXXXXX<CR>**).

C- Log on to your Drive A (**C>a:<CR>**).

D- Run your Submit file (**A>SUBMIT XXXXXX <CR>**). If the partition assigned to your Drive A does not contain a copy of the Submit program (SUBMIT.COM), you can take it from any partition on another drive, and you can also take the Submit file from another drive. Thus, **A>C:Submit D:XXXXX<CR>** would take SUBMIT.COM from drive C and apply it to the file XXXXX on Drive D.

## 3.10 ZCPR PROGRAMMERS TOOLS

With the integration of ZCPR in HIDOS Release 6, some additional tools for programmers are available. They are briefly mentioned here for those Users not familiar with ZCPR commands.

The JUMP command is used to jump directly directly to a program or subroutine already in memory. Enter the jump address in Hexadecimal after the command JUMP.

JUMP <jump address in Hex>

GO is the same as JUMP 100 but allows command line parameters to be passed. Use the format:

GO <command line parameters>.

GET loads a program into memory without executing it. Use the format:

GET <load address in Hex> <filename>

SAVE allows the user to save Pages and/or CP/M Sectors. In addition, the number may be post-fixed by the letter H to signify a Hex entry. If the named file exists SAVE will ask if it should be deleted. Enter Y to delete the old file or N to abort the save.

```
SAVE nn <filename>
SAVE nnh <filename>
SAVE nn <filename> S
```

The USER Number feature of CP/M has also been enhanced. User Numbers are covered more thoroughly in Section 2 of this volume.

----------NOTE----------
Under ZCPR the command line length decreases from 128 bytes to 80 bytes.
---

# 4.0 MS-DOS AND HINET

## 4.1 INTRODUCTION

The MicroSoft-Disk Operating System (MS-DOS),like CP/M-86, allows you to run programs that are designed for 16-bit computers. With a network made up of any DMS Master and DMS-816 workstations, you have the choice of running either 8-bit (CP/M-80) or 16-bit (CPM-86 and MS-DOS) software. The DMS-5086 and DMS-86 can also run the MS-DOS and CP/M-86 operating systems. This section of the manual will outline MS-DOS commands, how to use MS-DOS on the HiNet Network, the hierarchical file structure and the main differences between MS-DOS and CP/M. For a complete guide to MS-DOS, refer to the manual from MicroSoft that came with your MS-DOS Distribution Diskette.

As you learn more about MS-DOS and CP/M, you will find that there are some similarities between the two systems. There are several commands that have the same name in each operating system. However, the order in which you enter information for the commands may be different. If you will be working with both systems, you will have to remember the differences.

The features and capabilities of the MS-DOS operating system will be pointed out to you in

this section. For example, you can redirect the output of one command--such as TYPE--into the MORE filter. MORE causes the output to be displayed one screenful at a time. Using the COPY command, you can append one file to another in a process called concatenation. MS-DOS has other capabilities that can make your work easier. The following commands are covered in this section.

| | |
|---|---|
| DIR | Display the directory of a partition. |
| MD | Make a subdirectory in a partition. |
| CD | Change working directories. |
| PATH | Set a path for MS-DOS to search for commands. |
| TREE\F | Display all directories and files in a partition or along specific paths. |
| RMDIR | Remove an empty subdirectory. |
| COPY | Copy files between directories. |
| DEL | Delete files in a directory. |
| REN | Rename files. |
| TYPE | Display the contents of a file on the screen. |
| CTRL P | Send data to the printer. |
| PRINT | MS-DOS background printing utility. |

| | |
|---|---|
| AUTOEXEC | A Batch file that executes automatically upon login. |
| PIPE | Redirect Input and Output of commands. |
| PROMPT | Change the form of the displayed prompt. |
| CHKDSK | Diagnostic report and space saving utility for use on MS-DOS partitions. |

## 4.2 FILE STRUCTURE

One of the major differences between MS-DOS and CP/M is the manner in which you can organize your files. MS-DOS uses a tree-like arrangement of files to organize your partition or Floppy Diskette. Every partition that is formatted for MS-DOS has a primary directory stored on it that is called the **Root Directory.**

### 4.2.1 THE ROOT DIRECTORY

The Root Directory holds the names of all the files and subdirectories in the Root of your partition. You can keep all of your files in this root directory and access them in much the same way as you would files stored in a HiNet CP/M partition. However, you also have the alternative of creating subdirectories in the root directory. This means that you can store files in groups that have a common subject or belong to a specific program (such as a data

base). You can create many subdirectories within your partition and even subdirectories of your subdirectories. The reasons for doing this will be discussed further on in this section.

It is important to note that you do not have to use the subdirectory capabilities of MS-DOS in your work. The following sections can help users to develope powerful and complex filing systems within their partitions. However it is not necessary to do so.

If you think of your partition as a tree with a main root, a trunk, branches and leaves, you can visualize the kind of directories that you can build. The central root of the tree is the directory that you access when you enter your partition. By giving certain commands, you can branch out from the root directory and add subdirectories. The files that you create in these subdirectories are like leaves on the branches.

When we speak in terms of a tree directory, the tree is actually upside-down with the Root at the top and the subdirectories below. Therefore, you move "down" from the Root into other directories. MS-DOS commands enable you to move around in these directories, copy files between them and delete old files and directories.

What is the use of dividing a partition into subdirectories? Earlier we used the example of a large filing system to describe the Network's Hard Disks. Partitions are like file

drawers in the file cabinet with each drawer containing many files. To separate all those files into groups, you can place them in file folders. These folders are the subdirectories that can be created under MS-DOS. Each folder has a label that can define the files inside it--the subdirectory's name. Now when you look inside one of the network's partitions you are not confronted with many individual files but rather with distinct groups of files that can be more easily managed.

### 4.2.2 DIR--DISPLAY THE FILE DIRECTORY

You can display a list of all of the files and directories that are in your partition's Root Directory by entering the command **DIR \ <CR>**. The files in your Root will be listed along with the names of any of the subdirectories. The Root's subdirectories and their files will not be listed. Neither will the subdirectories of the Root's subdirectories. You must either be in a subdirectory or specify a path to a subdirectory to get a list of files from another directory. The TREE/F command lists all the files and all of the subdirectories in a partition. (See section 4.2.5.) Here is a sample screen depiction of a typical directory.

```
A>DIR <CR>
Volume in Drive A is: SERVICE
Directory of A:\

COMMAND .COM  17644  6-26-83   9:45
PW      .COM  35000  6-26-83   9:47
PFCONFIG.COM   7000  6-26-83   9:48
COMPLNTS      <DIR>  6-26-83  10:05
NOTES         <DIR>  6-28-83  08:00
REPLIES       <DIR>  6-29-83  11:00
       7 Files   452356  bytes free
```

If the directory of a partition has many files in it (more than 24) use the command:

**DIR/P <CR>**

to display the directory on 'page' or screenful at a time. You can also display the directory in a "wide" format, that is, without the size and date of the file and sorted into 5 columns across the screen. Use the command **DIR/W** to display the wide directory.

Notice that, in the above directory display, the Root directory is split up into subdirectories and files. Subdirectories are listed with the notation <DIR> next to them. The files in a subdirectory are not listed unless you are in that subdirectory when you enter the DIR command. The number of bytes that a file contains and the date and time it was created are listed after each file. At the end of the

directory appears a line that tells you how many files are in the directory and how much storage space is left on the partition or Floppy Disk.

If you are in a subdirectory and display the file directory, you will notice two files named . and .. (dot and dot dot). MS-DOS creates these files automatically in every subdirectory. The single dot file is a nickname for the current working directory. It helps MS-DOS keep track of where in the directory structure you are working and storing files. The dot dot file is shorthand for the parent directory of the one you are currently in. You can use the dot dot filename to move up the tree directory quickly with the Change Directory command (see section 4.2.4).

**COMMAND.COM**

Another file that is always present in the Root Directory is COMMAND.COM. This file is the MS-DOS command processor. It executes commands such as COPY, REN (rename), DEL (delete), MD (make directory), CD (change directory), RMDIR (remove directory) and PATH. These commands are present in every MS-DOS partition.

### 4.2.3 MD -- THE MAKE DIRECTORY COMMAND

When you are working with the MS-DOS operating system, you have the option of either having all of your files together in the Root directory or splitting up your files into sub-

directories that are arranged by subject or some other convenient system. In this way you can organize your files so that you do not have to search through all of your work every time you need information.

To make a subdirectory in your Root directory, use the MKDIR (Make Directory) command. This command--which can be abbreviated as MD--creates a new subdirectory that can have other files and directories in it. MS-DOS places the back-slash symbol before a filename to denote that the file is actually a directory. The Root Directory is indicated by a backslash symbol (\) without a filename. Therefore, **DIR ** means display the directory of the Root.

There are two ways to make a subdirectory:

1) From the Root Directory, enter not only the new subdirectory's name but the parent directory's name too.

2) A new subdirectory can be made that is one below your present working directory by entering the MD command followed by the new subdirectory's name.

The Root is the parent to all of the sub-directories in your partition. A subdirectory of the Root called REPORTS can be made by entering the command:

B>**MD \REPORTS** **<CR>**

A subdirectory of REPORTS named JULY is created by the command:

B>**MD \REPORTS\JULY <CR>**

A subdirectory of JULY named WEEK1 is made by the command:

B>**MD \REPORTS\JULY\WEEK1 <CR>**

The string of directory names that starts with the Root Directory and leads to a subdirectory is called a PATH. (The path of directories leads you through the forest of files.) The CHDIR command (Change Directory) enables you to move along a path to another directory where files are stored or where you wish to create new files.

Once you have moved your working directory from the Root to a subdirectory you can create the next subdirectory without specifying the entire path from the Root. If you were in the subdirectory REPORTS and you wished to make a directory called JUNE you can enter:

**MD JUNE <CR>**

and not have to specify the complete path \REPORTS\JUNE. As you go deeper into subdirectories this shorthand becomes very convenient.

### 4.2.4 CD -- CHANGE DIRECTORY COMMAND.

Once you have created a new directory with the MD command, use the CHDIR (or just CD) command to "move" into it. Typing the command:

**CD \REPORTS\JULY <CR>**

will change your current directory from the Root to JULY. Now any work you do will remain in files in the subdirectory JULY (unless you specify otherwise).

If you want to move down to the subdirectory WEEK1, enter the command:

**CD WEEK1 <CR>**

Notice that you do not have to start with a backslash (\) when you move to a subdirectory immediately below the one you are currently working in. When a change directory command starts with \ , it means that you are starting from the Root Directory.

To move back up the path towards the Root you can use a shorthand form of the command. The parent of the directory that you are currently in can be abbreviated as .. (two periods). Entering the command:

**CD .. <CR>**

will change your working directory to the parent of your current directory. The command:

**CD \ <CR>**

will put you back in the Root Directory.

To return to a lower directory, enter the complete pathname starting from the Root Directory. If you are in one subdirectory and

wish to move to another directory that is not in direct line with the parent directories, you can use the .. abbreviations to move up towards the Root directory. For example, the subdirectories WEEK1 and WEEK2 in the paths:

\REPORTS\JULY\WEEK1

\REPORTS\JULY\WEEK2

have the common parent directory JULY. To move from WEEK1 to WEEK2 you can use the CD command sequence:

**CD ..\WEEK2**

This will move you up to the JULY directory from WEEK1 and then down to the subdirectory WEEK2.

Entering the command **CD <CR>** will display the path from the Root to your working directory. With this command you can always check to see where you are in your partition and how to get to another group of files.

### 4.2.5 CHANGE THE DIRECTORY IN ANOTHER DRIVE

The CD command can also be used to change the working directory in another drive. That working directory then remains in effect until 1) you change it again with CD, 2) the workstation is reset, turned off or logged off the network or 3) the drive is reassigned. For example, while you are logged to the A: drive, the command:

A>**CD B:\LEAVES\GRASS <CR>**

will change the directory in the B: drive to the partition's subdirectory GRASS. Files in the GRASS directory will be accessed whenever the B: Drive is specified in a command (such as COPY or DIR).

### 4.2.6 THE TREE COMMAND

The DMS TREE program is an enhanced version of other MS-DOS directory utilities. It is more condensed and informative than the ones supplied with some other systems.

To see all of the directories in a partition that you are logged to enter:

**A>TREE <CR>.**

The TREE program will list all of the different subdirectories in the partition starting with the Root Directory.

Enter a drive letter and a colon to command the TREE utility to list the subdirectories in other partitions. For example, the command:

C>**A:TREE D: <CR>**

calls the TREE utility from the A drive and applies it to the partition assigned to the D drive.

Entering the command **TREE/F <CR>** will list the files that are in each subdirectory in a partition. This feature is extremely useful if you have a complicated partition directory and

are trying to find where a particular file is located. Use the PAUSE key to start and stop the TREE display from scrolling.

----------NOTE----------
TREE is not an internal program in MS-DOS. Therefore, you must specify where the TREE.COM program is (e.g., A:TREE) or specify a PATH to the directory or partition.
---

The diagram on the next page shows you what a directory structure of a partition might look like. A path down from the ROOT DIRECTORY to INVENTORY would look like this:

\JULY\WEEK2\INVENTORY

If you were in INVENT and wanted to get a file from PROFITS, enter the PATH:

\JUNE\PROFITS\filename

The command **TREE directory-name <CR>** will display all of the subdirectories that exist under the directory named in the command. Add the F switch (TREE/F directory-name) to list the subdirectories and the all files in a directory path. For example, for a partition with a structure like the one on the next page, the command:

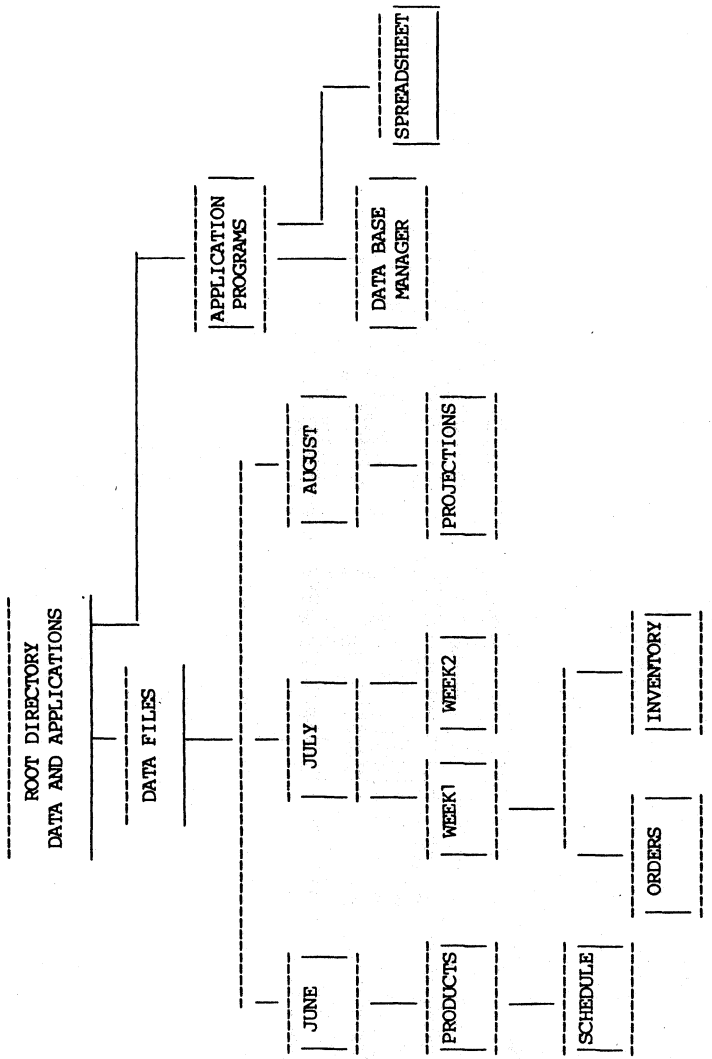
**TREE/F B:\JULY <CR>**

would display a listing like this:

```
Partition on Drive B: is SALES

      \JULY
        filename filename filename filename

      \JULY\WEEK1
        filename filename filename

      \JULY\WEEK1\ORDERS
        filename filename filename filename

      \JULY\WEEK1\INVENT
        filename filename

      \JULY\WEEK2
        filename filename filename filename
        filename filename filename
```

You can be even more selective about what files and subdirectories are displayed by entering a number from 1 to 9 after the command, e.g., TREE/2. This switch limits the depth at which TREE will search and list out subdirectories. The command TREE/2 \JULY, for example will only list out the subdirectories JULY\WEEK1 and JULY\WEEK2 in the partition (on the following page).

Entering **TREE ? <CR>** will result in a help screen with information about using the TREE utility.


ROOT DIRECTORY
DATA AND APPLICATIONS
DATA FILES
APPLICATION PROGRAMS
DATA BASE MANAGER
SPREADSHEET
JUNE
JULY
AUGUST
PRODUCTS
WEEK1
WEEK2
PROJECTIONS
SCHEDULE
ORDERS
INVENTORY

## 4.3 PATHNAMES -- THE PATH COMMAND

When you are working in a subdirectory it may be necessary to call on a program that is not resident in your working directory. MS-DOS always searches the current working directory first for a specified program. If it is not there then you will get the error message "File not found or bad command". You could enter a path every time you need a program that is out of your directory but this would soon become very tedious. The PATH command remembers one or more paths that you want it to search whenever it cannot find a command (either .COM or .EXE) in your working directory.

Normally any programs that you wish to access will be stored in your partition's Root Directory or the MSYSTEM's Root. The easiest way to find your path back to the Root is to enter CD <CR>. The Change Directory command will display the path between the Root and your current working directory. To set this as the default path when MS-DOS searches for a program, enter PATH and then the sequence of directories that was displayed by the CD command.

For example, if the CD command gave you the path:

A:\REPORTS\JULY\WEEK1

then you should enter the path command like this:

**PATH A:\REPORTS\JULY\WEEK1 <CR>**

if the files you want to access are in the REPORTS Directory. If the program you want to use is in the ROOT directory of your logged drive, all you have to enter for a path is:

**PATH **

If the programs you wish to access are in another partition that is assigned to one of your eight drives, you can enter a path that will tell MS-DOS which drives to search for a program. The semi-colon (;) separates different paths in the PATH command line. Therefore, you can specify multiple paths that MS-DOS will search for a command file when it cannot find it in the current working directory. Thus, entering the PATH command:

**PATH A:\;B:\ <CR>**

tells MS-DOS to search for a requested file first in the current working directory, then to look at the ROOT Directory of the partition assigned to the A drive and then in the ROOT Directory of the partition assigned to the B drive.

You may enter a PATH command in your cold-boot login command (in the USERS Table) so that MS-DOS will automatically search in the specified directories and assigned partitions for your files. A PATH can be quite complex, depending on how many partitions and how many subdirectories are involved. For example, if your partition is logged to the C: drive but most of your programs are in the MSYSTEM partition assigned to the A: drive, enter

**PATH A:** in your login command buffer. Thereafter, every time you need to run a specific program you won't have to type A: in order to access it; MS-DOS will automatically go to the partition assigned to the A drive to get it. If a file is not in the Root directory you will have to specify a PATH down into the sub-directory of the partition. The PATH

A:\REPORTS\JULY\WEEK1

would tell MS-DOS to search in the WEEK1 directory for a file in the partition assigned to the A drive.

By combining the two paths and separating them with a semicolon like this:

A:\;A:\REPORTS\JULY\WEEK1

MS-DOS would first search the Root directory and then the WEEK1 directory in the A drive partition. You can add other drives to the PATH command if necessary.

MS-DOS remembers your position in the directory tree even when you change from one drive to another and then back again. In other words, you can be in a subdirectory in drive C, for example, change to drive A, do some work and then change back to drive C. You will find that you are back in the same subdirectory as you were before you left drive C. MS-DOS will remember what subdirectories you were in for each drive until you reset (CTRL-ALT-DEL) the workstation or reassign your drives.

----------NOTE----------
PATH is only for program (command) files. MS-DOS will not search a path for data files. Data files must be in your current working directory to be accessed by an applications program or else you should specify the drive letter of the partition that the data files are in. Some applications programs that were written for MS-DOS version 1.1 are not able to use paths to find secondary overlay files that a program needs to function fully. (These files usually have the extension .OVR for overlay.) If your applications program tells you that it cannot find a certain file, e.g., MESSAGES.OVR, then you will have to COPY those files from the partition they are in to your working directory.
---

## 4.4 RMDIR--REMOVE A DIRECTORY

When you no longer need a directory, you can use the RMDIR command to delete it from the partition. However, the directory you wish to erase must be empty of all files except . and .. and cannot be a parent to any subdirectories. To remove an empty directory (for example, WEEK1) enter the command:

**RMDIR \REPORTS\JULY\WEEK1 <CR>**

## 4.5 COPYING FILES -- THE COPY COMMAND

Under MS-DOS, files can be:

- copied from directory to directory
- copied from MS-DOS partition to MS-DOS partition,
- renamed so that two copies of the same file can exist in the same directory.
- copied onto the end of another file (concatenated).

The MS-DOS COPY command's format is:

[FROM] => [TO]

**COPY OLDFILE NEWFILE** or

**COPY SOURCE DESTINATION**

Notice that there is only a space between the two filenames and that the sequence of the filenames is different from CP/M's PIP.

----------CP/M NOTE----------

Remember that CP/M's PIP utility uses the format:

[TO] <= [FROM]

PIP NEWFILE=OLDFILE or

PIP DESTINATION=SOURCE

---

With either operating system's copying utility, the drive designator can be placed before the filename to indicate where the file currently is and to what directory it is to be copied (for example, COPY B:OLDNAME B:NEWNAME).

MS-DOS allows you to copy a file from one directory to another. You can therefore have two files with the same name in the same partition, if necessary. This may cause problems if it is a file that you will be updating. However, command files will not pose this problem.

### 4.5.1 VERIFYING COPIES

The COPY utility has an option to verify that the copy is correct. This feature is invoked by entering a **/V** after the last filename in the COPY command. Notice that a forward slash (/) is used, not a backslash (\) as in a pathname. The / symbol is called a 'switch' because it turns on or off special functions in a command. For example, in MS-DOS:

**COPY A:ACCOUNT B:ACCOUNT.BAK/V**

would copy and verify an original file named ACCOUNT from the partition assigned to the A: drive and rename it ACCOUNT.BAK in a partition assigned to the B: drive.

----------NOTE----------

You cannot transfer files from an MS-DOS partition to a CP/M partition or vice-versa with COPY or PIP. The FILECOPY program is for that purpose. See section 2.17.

### 4.5.2 COPYING FILES BETWEEN DIRECTORIES.

To copy a file to your working directory from another directory, you must specify the pathname from the root to the other directory. For example, to copy a file named CUST1.LTR that is in a subdirectory with the pathname \CUSTOMER\COMPLAIN to your working directory, use the command sequence:

**COPY \CUSTOMER\COMPLAIN\CUST1.LTR /V**

The file at the end of the pathname will be copied into your current working directory. You can also copy files between two directories while you are in a third directory by stating the pathnames for each directory. Notice that you do not have to state the destination path or directory name when you are copying to your current working directory. Even when you copy and rename a file you may simply state the new name after the source path and directory name. For Example, to copy the file CUST1.LTR to your current directory and rename it CUSTRPLY.1 enter the command:

**COPY \CUSTOMER\COMPLAIN\CUST1.LTR CUSTRPLY.1/V**

If the file you wish to copy is in another MS-DOS partition that is assigned to one of your drives, enter the drive letter before the pathname, e.g., A:\CUSTOMER\COMPLAIN\CUST1.LTR.

### 4.5.3 COPYING FILES WITH WILDCARD SYMBOLS.

In MS-DOS you can use the two wildcard symbols ? and * to copy groups of files. (CP/M has the same feature.) A ? can represent any single letter. An * can represent any group of letters on one side or the other of the . in the filename. For example:

*.* -- represents all the files in a partition or directory.

LIST?.* -- represents any file in the partition or directory that had LIST as the first four letters in a five-letter filename and any extension.

See section 2.10.4 for more details on using the wildcard symbols.

### 4.5.4 APPENDING FILES (MERGING FILES).

The MS-DOS COPY utility also lets you join files together as you copy them. (The process is called concatenation.) To copy a group of files together into one separate file, use the command sequence:

**COPY LIST1+LIST2+LIST3 LIST.123 <CR>**

It is also possible to append a file to the end of another file without creating a third file. To to do this, use the + sign between two or more files but don't name a destination file (you can specify another partition or directory). The files following the first file will be

appended directly to the first file. For example, the command:

**COPY SECTION1+SECTION2+SECTION3 <CR>**

will append SECTION2 and SECTION3 to the end of SECTION1.

The command:

**COPY A:CHAPTER4+B:\PART2\CHAPTER1 <CR>**

will append the file CHAPTER1 in the subdirectory PART2 in the B: drive partition to CHAPTER4 in the A: drive partition.

## 4.6 DEL COMMAND -- ERASING FILES.

A file may be erased from a directory by using the ERASE or DEL commands. The command format for erasing a file is:

**DEL FILENAME <CR>**

MS-DOS will immediately erase the specified file when RETURN is pressed. The wildcard characters can be used to erase groups of files in a common directory. Be careful when using the * wildcard as it is easy to erase more than you intended. Before erasing files with wildcard symbols, double check the affected files by using DIR with the same wildcard symbols. If the displayed directory shows any files that you do not wish to erase, change the proposed DEL command appropriately.

The ERASE utility will ask you to reconfirm your request when you enter DEL *.* --the command to erase all files in a directory. You cannot use DEL to erase a directory; you must use RMDIR. This means that you must erase files directory by directory. If you have subdirectories in the partition, you cannot erase every file in your partition by entering a DEL *.* command from the Root Directory.

## 4.7 REN -- RENAME A FILE

The REN command renames a file. The format for renaming a file in MS-DOS is:

**REN OLDNAME NEWNAME <CR>**

The original filename is stated first followed by a space and then the new filename. Remember the command line structure by saying to yourself "I'll rename the old filename with a new filename."

You cannot rename a directory with the REN command. Wildcard symbols are also illegal when you are using REN. If you try to rename a file with a name that already exists you will get the error message:

**Duplicate file name or file not found**

----------CP/M NOTE----------
The CP/M REN command states the new filename first, followed by an = sign and then the old filename (e.g., REN NEWNAME=OLDNAME).
---

## 4.8 THE TYPE COMMAND -- DISPLAY A FILE

MS-DOS and CP/M both have a TYPE command with very similar abilities. If you wish to see a file displayed on the CRT screen, enter the TYPE command followed by the name of the file you wish to see. If the file is larger than one screenful, the file will be scrolled upward on the screen faster than you can read it. Therefore it is necessary to use either the PAUSE key, CTRL S or CTRL SCROLL-LOCK to stop the display whenever you wish to read it. Press any character key or the space bar to continue scrolling the file.

## 4.9 PIPES AND FILTERS

MS-DOS allows you to give more than one command to your workstation at a time by "piping" one command's results into another command. The | symbol is used to pipe two commands together. (Naturally enough, it is called a PIPE. On your keyboard it looks like a vertical line with a space in the middle.)

Filters read the input from a file or command, "filter" it and then send the output to a file, another command, a printer or the CRT screen. The MS-DOS Filter commands include MORE, FIND and SORT.

MORE -- displays file or command output one screenful at a time.

FIND -- searches for a constant string of text in a file.

SORT -- sorts text by alphabetical or numerical order.

The output from files and commands can also be re-directed. Usually the output would go to the CRT screen. By using the symbols >, <, and >> you can:

> direct the output of a command to a new file or to a printer.

>> append the data to an already existing file.

< use the data in a file as input to a command.

### 4.9.1 PIPING COMMANDS

One or more commands can be piped together so that you see not the intermediate output displayed on the screen, but only the end result. For example, you can PIPE the output of the DIR command to the MORE filter by entering the command sequence:

**DIR | MORE <CR>**

This would have the effect of displaying the contents of your directory 23 lines at a time, (providing, of course, that your directory had that many files in it). The command

**TYPE filename | MORE**

would display the contents of a file 23 lines at a time.

### 4.9.2 FILTERS

Another example of filtering uses the SORT command. By directing the contents of a file of people's names to the SORT filter and then redirecting the output to another file, you will have a file with all the names listed in alphabetical order. The command line would look something like this:

**SORT < NAMEFILE > ALPHAFILE <CR>**

The SORT command can also be connected by a pipe to another command or filter. For example:

**DIR | SORT | MORE <CR>**

would take the output of the DIR command (the directory of a partition), sort it alphabetically and then display it on the CRT 23 lines at a time.

SORT has two options (switches) that allow further manipulations of files. The /R switch will sort a list in reverse order. The /+n switch sorts a file starting at column +n (a number). The default number is column one if no switch is specified.

The FIND filter will search for a string of characters in a file and display the lines that contain the string. You must specify the string

(in double quotes) and the filename(s) The format for the FIND command is:

**FIND "string" filename <CR>**

There are three switches that allow more control over the FIND command.

/V display all lines NOT containing the specified string.

/C display the count of the number of lines that contain the specified string.

/N displays each line that contains the specified string and the relative line number of that line in the file.

The switches are placed immediately after the word FIND in the command line. For example, the command:

**DIR | FIND /C ".COM" <CR>**

would search for the string .COM and display the count of how many lines it occurred in. Since the Directory has one filename per line this FIND command would give us a count of how many .COM files were in the partition.

### 4.9.3 REDIRECTING INPUT AND OUTPUT

The TREE command often will display several screens of information if your directory is large. If you want to save the output of the TREE command and view it later or edit it for

printing you can use the > symbol to direct the output of TREE to a file. The command sequence:

**TREE/F > TREEFILE <CR>**

will place the output from the TREE directory into a file named TREEFILE.

----------NOTE----------
It is important to remember that while you can PIPE the output from one command to another command, you must redirect the output from or into a file with >, < or >>.
---

Use < to direct the contents of a file to a command as input (SORT < NAMEFILE).

Use > to direct the output of a command into a file (DIR > DISKFILE).

Use >> to append the output from a command to the end of an already existing file (TREE >> DISKFILE).

The output of an operation can also be directed to a printer. Use the > symbol to transfer output to a local printer or the Spool printer (DIR > PRN:<CR>).

## 4.10 CTRL P -- PRINTING

Like CP/M, MS-DOS has a CTRL function that allows you to send whatever is being displayed on the screen to a printer. (Naturally you must

have a printer connected to the workstation or be assigned to the spool printer. See section 6 for more information on printers.)

Entering a **CTRL P** followed by a TYPE file command will send the contents of the file to both the printer and the screen. The file will scroll more slowly when it is being printed because the computer has to wait for the printer to 'catch up'. Everything that you enter after the CTRL P will be sent to the printer until you type another CTRL P. The CTRL\SHIFT PrtSc key has the same effect as a CTRL P.

The SHIFT PrtSc key sends everything that is **already on the screen** either to the SPOOL printer or to a directly connected printer. This is called a screen dump. See section 6 for more information on using printers.

## 4.11 PRINT--BACKGROUND PRINTING UTILITY.

PRINT is a utility that allows you to continue working at your workstation while printing or spooling a file (or files). The file will be printed or spooled much more slowly than normal because the workstation only 'pays attention' to the printing in between the commands that you are giving it at the same time from the keyboard. Still, the job will get done. If it is more important that you continue working on another project while a file is being printed, this utility can be handy.

To start the background printing utility, enter **PRINT <CR>** after the prompt. If this is the first time you called up PRINT since you RESET or turned the workstation on, the utility will ask you:

**Name of LIST Device [PRN:]**

The abbreviation PRN: is the MS-DOS name for the printer device. If you are using a direct connect printer or the HiNet spooler, you will have already assigned the printer to either PORT2, PORTP or SPOOL. Therefore you can simply answer the above question with a RETURN.

You can then enter the filename of the file you wish to print by entering:

A>**PRINT filename <CR>**

The file will begin printing or spooling immediately. Whenever you demand time from the computer the printing will stop and then restart automatically when there is computer time for it. You can add additional files to the 'Print Queue' in the same manner as the first one. When the first file is finished printing, the second one will begin.

If you are using the HiNet Spooler, as soon as the last file has finished, PRINT will signal the Spooler that the job has finished and will close the spool file. The message:

**Print file has been spooled.**

will be displayed on the workstation's screen.

This message will appear on the screen even if you are in the middle of some other program. However, the words will not affect the actual content of the file you are working with.

There is room for ten files in the print queue.

----------NOTE----------
If an applications program is loaded while PRINT is spooling or printing, PRINT may stop altogether if the program takes up too much memory. Once you exit from the program, PRINT will resume its printing or spooling.
---

There are three switches that allow more control over the PRINT utility.

/T Terminates printing and removes all files from the Print Queue. (PRINT/T)

/C Cancels the currently printing file but does not remove the other files from the print queue. (PRINT filename /C)

/P Restarts printing the files in the print queue. Also adds new files to the queue. (PRINT filenames /P)

If you enter PRINT with no options, the filenames of the files that are currently waiting to be printed will be displayed. You can use the wildcard symbols (? and *) to place a group of files in the Print Queue. (For example, PRINT *.LTR will send all files with the extension .LTR to the print queue.)

## 4.12 THE AUTOEXEC BATCH FILE

When you log in to the network, one of the first things that MS-DOS does is look for a file called AUTOEXEC.BAT in the A drive. The AUTOEXEC.BAT file can contain one or more commands that will be immediately executed by MS-DOS such as ASSIGN, DIR, and TYPE. You could make a driev assignment, call up a program (such as a word processing program); almost any command that you can type from a keyboard can be made to run automatically from the moment you log in to the network.

----------NOTE----------
You cannot change the drive you are logged to within a batch file. This will confuse the batch processor and it will ask you to insert the disk with the batch file in the disk drive. You will have to enter CTRL C to abort the batch file.
---

You can create an AUTOEXEC Batch file with a word processing program (non-document mode), with the MSDOS line editor EDLIN or with the COPY command. Short files are easiest to prepare with the COPY command. To create a quick Batch file, follow these steps:

Enter the command line:

**COPY CON: AUTOEXEC.BAT <CR>**

Then enter the commands that you want processed whenever you log in to the network. Each command that requires a RETURN should end with one. For example, the command:

**ASSIGN P PORT2 <CR>**

would be on one line by itself. So would:

**PATH A:\ <CR>**

When you have entered all of the commands, press CTRL Z <CR>. This ends the input and creates a file named AUTOEXEC.BAT.

Here is an example of how to create an AUTOEXEC.BAT file:

```
A>COPY CON: AUTOEXEC.BAT <CR>
PATH B:\;C:\ <CR>
ASSIGN R ACNTDEPT <CR>
COPY A:DBASEII.COM I: <CR>
CTRL Z <CR>
                    1 File Copied
A>
```

When this file is processed it will set up paths for MS-DOS to follow when it looks for command files, restore all drive assignments that were stored in the file ACNTDEPT, COPY a program (DBASEII.COM) to the RAM Disk assigned to Drive I.

----------NOTE----------
The command, **COPY CON: filename <CR>** tells MS-DOS to store whatever is entered from the keyboard into a file until it receives a **CTRL Z <CR>**.
---

You can create many Batch files to carry out different repetitious processes. However,

there can only be one AUTOEXEC.BAT file that will be executed when you log in. It must be stored on a partition that is assigned to the A drive. That means that your MSYSTEM partition cannot be assigned to drive A because everyone would try to store a personal version of AUTOEXEC in the same partition. Fortunately, many applications programs that run under MS-DOS 2.0 do not require that the MSYSTEM partition always be assigned to the A drive. The PATH command will tell MS-DOS where to look for command files.

Other Batch files that you create must have different filenames with the extension .BAT, such as BEGIN.BAT, END.BAT, LUNCH.BAT. When you wish to run one of these Batch files, enter the filename only, without the extension (.BAT). That file will then be processed command by command.

To abort a Batch file, enter a CTRL C. You will be asked if you want to terminate the Batch job (Y/N).

NOTE---MS-DOS Batch files are similar in function to CP/M Submit files.

## 4.13 CHANGING THE PROMPT

MS-DOS allows you to change the form of the command prompt from the default drive letter and pointer (A>, B> etc.) to 13 different choices. The command that changes the prompt is:

**PROMPT $character**

where character is the code for each different form of the prompt. The character code must be preceded by a dollar sign ($). The following table lists the available choices and character code:

| Character | resulting prompt | example |
|---|---|---|
| $ | the $ character | $ |
| t | current HiNet time | 12:30:00 |
| d | current date | 12/25/83 |
| p | name of the current directory | C:\JULY |
| v | the MS-DOS version number | 2.0 |
| n | the default drive | A |
| g | the > character | > |
| l | the < character | < |
| b | the \| character | \| |
| _ | a <CR> and linefeed | |
| s | a space | |
| h | a backspace | |
| e | the ASCII escape code | |

These prompts can be combined to place multiple characters in the same prompt line. For example, the normal default prompt is a combination of the currently logged drive and the > character. The command that creates an A> prompt would be:

**PROMPT $n$g**

To display the time and the date on the next line down use the command:

**PROMPT $t$_$d**

## 4.14 USING CHKDSK

The CHKDSK command (CHECK DISK) can be run on Hard Disk partitions. CHKDSK looks at the directory of a partition, checking it for consistency and potential problem spots. The /F switch automatically corrects some disk problems.

Entering the command CHKDSK by itself applies the utility to the logged disk drive. For example, A>**CHKDSK <CR>** would run CHKDSK on the partition assigned to the A Drive. It would report its findings in the following format:

```
xxxxxx     bytes total disk space
xxxxxx     bytes in x hidden files
xxxxxx     bytes in x directories
xxxxxx     bytes in x user files
xxxxxx     bytes available on disk

xxxxxx     bytes total memory
xxxxxx     bytes free
```

where x is a digit of a number. If there are any errors in the directory they will be reported but not repaired. For example, CHKDSK might report "ERRORS FOUND, F PARAMETER NOT SPECIFIED".

The last two lines in the CHKDSK report display the total RAM memory built into the workstation and the amount of RAM available for applications programs. The basic DMS-816 has 256 Kbytes of RAM. The operating system requires about 51 K. This normally leaves about 212 Kbytes free for applications programs and/or RAM Disks. (The actual numbers displayed by CHKDSK give the memory figures as multiples of 1024--e.g., 256 K x 1024 bytes per K = 262144 bytes.)

The command:

A>**CHKDSK/F B:** **<CR>**

would check the directory of the partition assigned to the B Drive and, if there were any errors, automatically fix the problem spots. Often, CHKDSK will free up more storage space in the partition if some file space was misallocated in the directory. If the /F switch is entered, the message "x LOST CLUSTERS FOUND IN y CHAINS, CONVERT LOST CHAINS TO FILES? (Y/N)" might be displayed. If you answer yes, the lost chains will be converted to a file named FILEnnnnnn, where n is a number. You may be able to look at this file with the TYPE command (or with DEBUG if it is a HEX file). The file can either be renamed and added back to the file it was lost from, or erased.

## 4.15 SPECIAL EDITING FUNCTIONS

Every time you enter a command in MS-DOS, a copy of it is stored in the Command Template. By using special ESCAPE codes, the stored commands

can be repeated and/or edited. Ideally, to get the full benefit from these commands, you should program nine function keys with these ESCAPE codes using CUSTOMIZ (see section 5). Otherwise you can enter the ESCAPE codes directly to get the same result.

The following table lists the ESC codes and their function names. Each function name is briefly described in the section following the table.

| ESC CODE | EDITING FUNCTION |
|---|---|
| ESC S | COPY1 |
| ESC T | COPYUP |
| ESC U | COPYALL |
| ESC V | SKIP1 |
| ESC W | SKIPUP |
| ESC J | VOID |
| ESC Q | INSERT |
| RETURN | NEWLINE |
| CTRL Z | END OF TEXT |

COPY1 Copies one character at a time from the command template.

COPYUP When a character is specified after ESC T (e.g. ESC T :), every character in the template is copies up to the character specified.

COPYALL Copies all remaining characters in the template.

SKIP1 Skips over--does not copy--the next character in the template.

SKIPUP Specify a character after ESC W. Skips all characters up to the character specified.

VOID Voids the current command line and leaves the template unchanged.

INSERT Enters or exits insert mode. Inserts characters in command line instead of writing over them.

NEWLINE Makes the new command line the new template.

CTRL Z Signals the end of the file.

Additional information and examples are found in Microsoft's MS-DOS manual.

## 4.16 FEATURES DOCUMENTED IN MS-DOS MANUAL

MS-DOS has additional commands and features which are not covered in this manual but are documented in MicroSoft's MS-DOS User Manual. Here is a list with brief descriptions of commands that you may find useful.

CLS Clears the Screen and homes cursor.

EDLIN The MS-DOS Line Editor.

EXE2BIN Converts executable files to binary files (.EXE files to .COM files).

EXIT Exits command and returns to lower level.

| | |
|---|---|
| FC | FILE COMPARE --compares the contents of two files and reports differences. |
| MS-LINK | Combines and 'links' separately compiled object files. |
| REM | Displays a comment in a Batch file. |
| SET | Sets one string value to another. |

----------NOTE----------

Four MS-DOS utilites are not included with the distribution diskettes: RECOVER.COM, DISKCOPY.COM, SYS.COM and FORMAT.COM.

RECOVER does not function properly on Hard Disk partitions; it is intended only for MS-DOS format floppy disks which are not available on the HiNet Network.

DISKCOPY is also intended only for Floppy Diskettes, therefore it does not work on Hard Disk partitions.

SYS copies the MS-DOS system tracks onto a Floppy Diskette; again there are no MS-DOS format Floppy Diskettes on the Network.

FORMAT formats MS-DOS diskettes.

---

# 5.0 CUSTOMIZING THE DMS-816

## 5.1 FUNCTION KEYS

The top row of 16 keys are labeled F1 through F16. Each of these keys can be programmed with a string of characters and commands. Each string can be up to 128 characters in length. A total of 128 characters (256 bytes) can be programmed into all of the function keys. In addition to F1 through F16, each key on the number pad--except for ENTER and NUM LOCK--plus the two keys labeled F30 and F31 can also be programmed.

Each Function Key can have three different strings:

when the key is pressed normally (F1),

when SHIFT is pressed with a Function Key (SHIFT F1),

when the CTRL key is held down along with a Function Key (CTRL F1).

All of these options give you a total of 93 programmable keys.

## 5.2 PROGRAMMING FUNCTION KEYS

To load a Function Key with a string of characters or CTRL and ESC codes, follow this procedure:

1) Press the CTRL and SHIFT keys down and hit the key labeled F13. A line will be cleared at the top of the screen with the words:

Which function key do you want to program?

displayed near the left side.

2) Press the Function Key that you wish to program. The number of the key will be displayed. A $ symbol indicates that the SHIFTED value of the key is selected. A ^ symbol indicates the CTRL value of a key is selected.

3) Enter the string of characters that you wish to be processed whenever the Function Key is pressed. Use the CTRL/SHIFT F14 Key to backspace and erase characters in the string.

4) When finished, press CTRL/SHIFT F13 again. The string of characters you entered is stored in the Function Key buffer.

Notice that whatever occupied the top two lines on the screen when you pressed CTRL/SHIFT F13, is restored when you end loading the Function Keys.

At this time, if the DMS-816 is reset or shut off, the values programmed into the

Function Keys will be lost. The function key values can be saved in a file with KEYLOAD.

## 5.3 KEYLOAD AND KEYSAVE

There are two programs that can save and restore the values that you program into the Function Keys. KEYSAVE stores the Function Key strings in a file that can be recalled with the KEYLOAD program. Before resetting or turning off the DMS-816, follow this quick procedure to save your current Function Key settings.

1) Enter KEYSAVE and the name of a file that you wish to save the values of the Function Keys in. For example, the command:

**KEYSAVE FUNCKEYS <CR>**

will save the current values for the Function Keys in a file named FUNCKEYS.

To restore the contents of the Function Keys, use the KEYLOAD command. For example:

**KEYLOAD FUNCKEYS <CR>**

# 6.0 USING PRINTERS

## 6.1 INTRODUCTION.

### 6.1.1 LINKING TO A PRINTER.

There are two ways to link your DMS-816 to a printer:

1--Through the HiNet network to a central printer connected to the Master Hard Disk (the 'Spool Printer'). See section 6.2.

2--Directly to a single workstation through the RS-232C Serial Port 2 or the Centronics type Parallel port on the back of the DMS-816 (see diagram 1). Serial Printers are discussed in section 6.3.1.

The ASSIGN Command (see Section 2.11.5) will tell you where your printer is currently assigned and allow you to change the assignment if desired. When you are logged onto HiNet the default assignment depends on your User Name in the MACHINE Table; it can be either the Spool Printer, Serial Port 2 or Parallel Port P.

### 6.1.2 SENDING TEXT TO A PRINTER

There are two general methods of sending text to a printer--through an applications program and through the operating system's commands. These methods are described in the following sections.

#### PRINTING WITH AN APPLICATIONS PROGRAM

Many applications programs that you will use have their own sets of commands for sending text to a printer. While working with one of these programs you will have to use its print commands. Consult the program manual for the necessary procedures.

----------NOTE----------
Many word processing programs require that you adapt the program to your printer and/or to your workstation. This usually means that you must enter information about the printer or computer into a sub-program of the word processing software package. The sub-program could, for example, allow you to specify a certain type of communications protocol required by your printer, or to set up parameters for using non-standard paper. Read your word processing manual for specific information.
---

## PRINTING THROUGH CP/M AND MS-DOS

If you are operating in CP/M (see section 3) or MS-DOS (section 4), you may transmit text to the printer by entering the command **CTRL P.** Once you have issued a **CTRL P** command, everything that subsequently appears on your screen will be sent to the printer until you issue another **CTRL P** or a **CTRL C** to turn off the 'Transmit-to-Printer' command. This could include directories, commands you give to the computer, the contents of files displayed with the TYPE Command, and so forth.

NOTE---If you are working in an applications program with its own set of print commands, **CTRL P** will not work.

When you are working in CP/M you can print a file by PIPping it to the LST: device. (LST: is CP/M's name for a 'logical device' that Prints files; your Printer is such a device.) For example, to print the file CONTRACT.DOC that is stored in partition A, enter:

**PIP LST:=A:CONTRACT.DOC**

When you are PIPping a file to LST:, the file will not appear on the screen as it is being Printed, which is just the opposite of what happens with CTRL P. You can use PIP LST: with either a direct-connect printer or the Network's Spool Printer. Just be sure that you have assigned the printer to either Port 2 or Spool.

----------NOTE----------
If the document has been prepared by a word processing program and has special print commands imbedded in the text (e.g., for boldfacing and underlining), then PIPping the file to the LST: device will not result in the document being printed with those special features. You should use the word processing program's Print commands to achieve the desired results.
---

## 6.2 SPOOL PRINTER

The HiNet system allows all users to share a printer that is connected to the HiNet Master Computer. Text sent to the central printer is stored on the Master Hard Disk until the Printer is activated. Sending material to be stored in a central location for later use is called 'Spooling'. As you might expect, the storage place is referred to as the 'Spooler', and the Printer connected to the Spooler is called the 'Spool Printer'.

If your Spool Printer is operating in 'Automatic Mode' it will begin printing as soon as you have finished sending text from your workstation and broken the connection between workstation and Spooler. If the Spool Printer is operating in 'Manual Mode' you will have to go to the Master Terminal to activate it.

If your station is not assigned to the Spool Printer you can use the ASSIGN command to re-assign it to the Spooler (**A>ASSIGN P SPOOL**

<CR>). Your station will respond with your current drive assignments and the message **Printer assigned to SPOOL (HiNet Spool Printer).** See section 2.11.5 for more information on the ASSIGN command.

### 6.2.1 SENDING TEXT TO THE SPOOLER.

You may send text to the Spool Printer with either the PRINT commands associated with those applications programs that have print capabilities (see your program's manual), or from CP/M with a **CTRL P** (see 'Sending Material to a Printer', Section 6.1.2).

While a workstation is Spooling a file (sending the text of a file to the master disk) you will not be able to use your workstation. Once the text of that file is stored in the Master Hard Disk, your workstation can be used again.

The PRTSPOOL partition is divided up into sixteen "Spool Blocks"; each Block is one-sixteenth the size of the entire partition. For example, a 1 Mbyte PRTSPOOL partition can hold sixteen print jobs of up to 64 K each, 8 print jobs of 128K each or a combination of sizes. One print job file might be 120K; it would take up 2 Spool Blocks. Another job might be only 20K, but it would still require one whole 64K Spool Block (in a 1Mbyte PRTSPOOL partition).

As soon as one Spool Block fills up, your User Name will appear on the Master's screen. At that time--depending on how the

spooler is set up--the file will either start printing automatically or you may have to go to the Master and start it manually. This procedure is explained in Section 6.3.

It is important to understand that if a print job is larger than a Spool Block it will continue to spool into another Block until it is finished. At that point you can end the print job entirely or start spooling another file that will print out under the same User Name but with a different Spool ID code in front of the User Name. If a print job is greater than a Spool Block in size, you must end the print job before the last Spool Block will begin to print. The spool printer will wait until you end the print job before printing ANY other files.

**MULTIPLE FILES**

If you are sending files to the Spooler with the print commands contained in an applications program there will be a message to let you know when the file has been sent. These messages vary from program to program (a command line might change from 'printing' to 'Editing' for example, or 'End of File' might be displayed).

If you are using the CP/M command TYPE to display the contents of a file on the screen and send it to the Printer with a CTRL P, you will see when the file end is reached.

Once the end of the file is reached you can send another file to the Spooler using the same method as the first file. Multiple files may be

sent to the Spooler, one after another. The various files you send will be listed under a single job entry and printed out one after another. In other words, everything you send to the Spooler from the time you start until the time you get the **SPOOLED** message (see below) will be listed on the Spooler under your User Name as a single job.

**WHEN YOU FINISH SENDING TEXT**

WHEN YOU ARE FINISHED SENDING ALL OF YOUR TEXT TO THE SPOOLER YOU MUST SIGNAL THE MASTER THAT YOUR PRINT JOB IS DONE. The SPOOLER utility has to be told to end the print job before it will print out the last Spool Block of your job. If your job is small enough to fit within one Spool Block, the spool message will not come up on the Master until the Master has been told you are done sending the print job. Since you can send multiple files to the Spooler one after another, the Spooler has no way of knowing if further text is going to be sent unless you tell it that you are done. By cueing the Spooler that you are finished sending text, you also give it the command to finish printing the last Spool Block (in Automatic Mode).

If you are using an application program (a word processor, for example) to send a file or files to the Spool Printer, you signal the Spooler that you have completed sending your text by EXITING THE APPLICATION PROGRAM AND RETURNING TO THE OPERATING SYSTEM. Your application program's user manual will tell you how to do this. By returning to the operating

system, you order the Spooler to proceed with your print job.

**IN CP/M**

If you are sending text to the printer from the CP/M environment with a **CTRL P**, a **CTRL C** will signal the Spooler that everything has been sent. In other words, a **CTRL C** will command the Spooler to proceed with your print job. (In computer jargon a **CTRL C** is called a 'Warm Boot' and it is often used to exit programs or restart a series of operations.)

**IN MS-DOS**

In order to signal that you are done sending text to the spooler when in MS-DOS, you must use the RELEASE command. After you have entered the second **CTRL P** to stop printing, enter the command:

```
RELEASE SPOOL <CR>
```

If you are sending text to the spooler via a word processing program, exit the program and enter the RELEASE SPOOL command to signal that you are done.

When the correct signal has been sent to the Spooler, your screen should show:

```
Print Job Spooled
A>
```

This signifies that what you have sent to the Spooler is now ready for printing and your workstation is ready for its next task. If your Spool Printer is operating in Automatic Mode it will now finish printing your job (unless there is a job ahead of yours). In Manual Mode you will have to go to the Master Terminal to activate the Spool Printer (see next Section 6.2.2).

----------NOTE----------
In Automatic Mode, your job may start printing as soon as one Spool Block is filled. It will not print out the second Spool Block until it is filled or the job is ended. Therefore, once the Spool Printer has started on your job it will stop and wait until you signal the end of the job before continuing onto another Spool Block. No other jobs can be printed until you signal the end of yours. Be sure to end your Spool Job as soon as possible after completion.
---

In some cases, however, your screen may show:

```
***Spool Error
Depress <CTL-C> to abort, ESC to ignore or
<CR> to retry.
```

Do not abort the job immediately. As soon as a Spool Block becomes available--a file is printed--press <CR> to retry spooling the file; the message should go away and the file will continue printing where it left off (unless

another User took the available Spool Block first). Constant reoccurence of this problem indicates that the Network needs a larger PRTSPOOL partition.

### 6.2.2 SPOOLER MANUAL MODE

If your Spool Printer is operating in Automatic Mode it will print your job automatically. However, if your Spool Printer is operating in Manual Mode you will have to go to the Master Terminal and activate the Spool Printer yourself. This need not be done immediately, but because there is a limit to the number of jobs a Spooler can hold you should not let a job sit in the Spooler for too long as other people might need to use it.

The bottom portion of the WHO table will tell you how many jobs are awaiting action on the Spooler. The bottom section of the table looks like this:

| User Name | Spool Time | File Length | Status |
|---|---|---|---|
| GROUCHO | 8:45:01 | 09 records | Ready |
| HARPO | 9:02:45 | 137 records | Printing |
| CHICO | 11:33:55 | 1008 records | Spooling |

File lengths are measured in records (1 record = 128 bytes). As a rough rule of thumb 1 record is about 20 words.

**READY** --the file is ready to print.
**PRINTING** --the job is being Printed.
**SPOOLING** --the job is being sent to the Spooler.

## SPOOLER JOB LIST

When you go to the Master Terminal to print your job you must call up the 'Spool printer Job List'. If the Job List is not already showing on the Master Terminal, you can call it up from the command prompt with the command **A>SPOOL WAKE <CR>**. **SPOOL WAKE** will bring up the Job List, which looks like this:

```
A>SPOOL WAKE <CR>
***GROUCHO Ready to print
A <CR> = Abort
W <CR> = Wait
S <CR> = Serial
P <CR> = Parallel
<CR>   = Next
Choice: []

***CHICO  Ready to print
A <CR> = Abort
W <CR> = Wait
S <CR> = Serial
P <CR> = Parallel
<CR>   = Next
Choice:
```

The letters (A, W, S) represent options for your job that you may choose. These menu options are explained below.

The cursor will be flashing next to one of the entries. (In the above table [] represents the cursor.) If there is more than one entry you must place the cursor next to the job that you wish to activate. This is done by hitting <CR>, which moves the list so that the cursor is indicating another entry. If you reach the bottom of the list another <CR> will recycle you back to the top.

----------NOTE----------
Every time you signal the Spooler that you have completed sending your text (that is, each time you get the **'Spooled'** message), your User Name will be listed on the Job Ready List as a separate job. If you have sent more than one job your name will appear more than once on the Job Ready List and each such entry will have to be printed separately.
---

**MANUAL MODE PRINTING**

Once the cursor is at the appropriate entry of the Job Ready List you type one of the four symbols followed by a <CR> to instruct the computer what to do with the job. The symbol of the option you choose will be displayed to the right of the entry.

**A<CR>** -- **ABORT** the job.
**S<CR>** -- **PRINT** the job on a **Serial** Printer.
**W<CR>** -- put the job in **WAIT** status.

If the Master is a DMS-3/501, the printer connected to the Spooler must be a Serial type printer.

----------NOTE----------
**S<CR>** is a 'GO' command. Once you type this, the printer will IMMEDIATELY begin printing your job (assuming it's turned on and 'on-line', of course). Thus, before issuing the GO command you should make sure that the printer, paper and ribbon are ready.
---

**WAIT** (the **W** menu option) is used when you wish to store a job overnight, or during a time when the Master Computer and HiNet system is turned off. As soon as someone enters the command **SPOOL WAKE** (see below) any jobs that had been put in WAIT status will be returned to the active job list.

**ABORT** (the **A** menu option) is the ERASE command and, as you would expect, it erases your job from the Spooler.

### 6.2.3 SPOOLER COMMANDS

The Spooler and Spool Printer recognize the following commands which must be entered from the Master Terminal:

**SPOOL**---Calls up a screen giving the various options and commands available. Issued from the Command Prompt (**A>SPOOL** <CR>).

**SPOOL WAKE**---Calls up the list of print jobs awaiting action. Issued from the Command Prompt (**A>SPOOL WAKE** <CR>).

**SPOOL ABORT**---Stops the printer while it is printing and ERASES the entire job from the Spooler.

**SPOOL RETRY**---If the Spool Printer is in Manual Mode, typing **SPOOL RETRY** while the printer is printing will stop it and bring up the Job Ready List Menu without erasing the job from the Spooler.

SPOOL MODE

----------NOTE----------

If the Spool Printer is in automatic mode **SPOOL RETRY** will cause the Spooler to IMMEDIATELY begin RE-TYPING your file from the beginning. Since the program will not pause to let you set up a clean page of paper, it is recommended that you take the printer 'Off Line' before entering the SPOOL RETRY command (see section 6.5, 'Stopping the Printer').

---

## 6.3 STOPPING THE PRINTER

While you are printing a job it may become necessary to stop the printer before the job is finished. The paper may not be feeding properly for example, or the ribbon might need changing, or you could be called away from the printer.

If you simply turn off the printer's power you will lose part or all of the job you are printing. Even if it resumes printing when you turn it back on, it will not pick up the job where you stopped it.

To suspend the printer without having it lose its place in your text you must take it 'OFF LINE'. When you take a printer off line, it finishes the line it was on and then stops printing. When it is put back 'ON LINE' it will resume printing exactly where it left off . The switch that does this is given different names by different companies ('On Line', 'Ready', etc). Check your printer's instruction manual.

You can also stop the printer with a keyboard command (for example SPOOL ABORT from the Master Terminal for the Spool Printer) or a special Suspend print command in a word processing program. But these keyboard commands will either erase your job (like SPOOL ABORT) or delay for some time before stopping the printer.

## 6.4 DIRECT CONNECT PRINTERS

It is possible to connect a Serial Printer directly to a DMS-816 through Port 2 at the back of the cabinet. This allows you to print files without using the HiNet Master Terminal or the Spool Printer. However, a printer connected in this manner could only be activated from that particular station and anyone wishing to use it would have to log in to that specific workstation.

### 6.4.1 SERIAL PRINTERS

If your printer has the same type of connector you may be able to use a standard RS-232C cable. These cables may be purchased from Digital Microsystems or from computer supply stores.

----------NOTE----------
There is no adequate standardization in the way Serial Printers are connected to computers. It is possible that your station may have to be modified to use a particular printer, or that a special cable will be required. If this is necessary you should consult a qualified technician. Section 6.6 explains the use of internal jumper blocks to configure the DMS-816 to various types of printers.
---

To use a Serial Printer connected to your workstation you must first assign the printer to the Serial Port 2. This is done with the ASSIGN command (**B>ASSIGN P PORT2 <CR>**). The screen

should then display the **ASSIGNMENT ACCEPTED** message and list your current assignments. See section 2.11.5 for more information on the ASSIGN command.

After assigning the printer to PORT 2 you must next set the Baud Rate with the DIP switches on the back of the DMS-816's cabinet.

To make the Serial or Parallel Printer your **default printer setting**--instead of Spool--the System Administrator must make a change in the HiNet MACHINE Table. The printer assignment for your User Name can be changed to:

PORT2 to assign the printer to serial Port 2.

PORTP to assign the printer to the Parallel Port.

SPOOL to make Spool the default printer assignment.

The MACHINE Table can be altered from your workstation if you are running HIDOS (CP/M-80). Call up the MACHINE program from the CSYSTEM partition (A:MACHINE <CR>). Use the Modify option to change the default printer assignment.

Once the printer is properly readied as described in its instructions, you are ready to print from your DMS-816 (Refer also to Section 6.1.2.)

----------NOTE----------

If your printer assignment is for a directly-connected printer (e.g., PORT2 or PORTP) but the printer cable is not physically connected (or is turned off), then any print commands will cause

the DMS-816 to "hang" and not respond to any further instructions. If this happens you will have to RESET the DMS-816. When you RESET your workstation you will lose any work that you have not SAVED in a file. If the printer is connected but off, you can probably correct the 'hang' simply by turning the printer on. You may have to abort the print job and start over again.

---

### 6.4.2 PARALLEL PRINTERS

Normally, a printer that uses a parallel port to communicate with a printer will not require special modifications to the cable. Naturally this is not true 100% of the time. The more sophisticated a printer's capabilites are, the more likely there will have to be some modifications. Digital Microsystems recommends that you research a printer's requirments before purchasing one. A table of the DMS-816's parallel port input/output signals is supplied in Appendix C. Your DMS dealer or printer supplier should be able to tell from this information whether a printer will work with the DMS-816 without modifications. An experienced technician should be able to prepare a special cable if necessary.

If a printer does not need modifications then you only need to plug one end of a 36 wire cable with Centronics type connectors into the DMS-816's parallel port and the other end of the cable into the printer's parallel port.

## 6.5 SETTING THE BAUD RATE

If you wish to connect a device to the DMS-816 through the serial port at the back of the unit (a printer, a modem, etc., it is necessary to set the BAUD rate with the DIP switches located next to the serial port. The BAUD setting governs the rate (bits per second) at which information is transferred to and from the workstation through the port. Different devices require different BAUD rates; you should check the instructions that come with the device for the correct rate.

### SETTING THE SERIAL PORT BAUD RATE

The DIP switches are used to match the requirements of the printer, modem, or othr device you are using to the rate at which output from the workstation flows through the serial port. There is a row of 10 tiny switches next to the Serial Port; 1 through 9 are used to select the BAUD rate. All but one of the switches must be in the down position in order for the Serial Port to work. The one switch that is in a up position determines the BAUD rate setting. The following rates can be selected:

| SERIAL PORT BAUD RATE | DIP SWITCH NUMBER SWITCH IN UP POSITION |
|---|---|
| 19200 | 1 |
| 9600 | 2 |
| 4800 | 3 |
| 2400 | 4 |
| 1200 | 5 |
| 600 | 6 |
| 300 | 7 |
| 150 | 8 |
| 75 | 9 |

## 6.6 INTERFACING PRINTERS

Getting a printer (particularly a Serial printer) to work properly with a workstation is probably the most difficult part of using computers. This section will describe some of what needs to be done to interface printers with DMS computers (the DMS-816 in particular).

Various elements need to be coordinated to ensure proper functioning of a printer. Depending on the type of printer you are using, you will have to consider one or more of the following elements:

1- Printer-Computer communications protocol (see Section 6.6.1)

2- Appropriate I/O Port Jumper Block or cable (see Section 6.6.2)

3- Correct setting of printer DIP switches (see your printer's instruction manual)

4- Correct configuration of software (if necessary) (see your software user's manual)

5- Assign correct port (see Section 6.3)

6- Set correct Baud rate (Serial Printer only) (see Section 6.5)

Protocol refers to the method of communication between the printer and the computer which allows the printer to properly handle the flow of data. Printer Jumper Blocks or special cables may be necessary when using Hardware Handshaking protocol with Serial Printers. For the correct setting of printer DIP switches consult your printer's instruction manual or your dealer. Some types of applications software must be configured for the particular printer you are using; see your software manual or consult with your dealer.

Assigning a port to a printer can be done with the ASSIGN Command (see section 6.3), or with the MACHINE Table. With a Serial Printer you must also set the correct BAUD RATE (see section 6.5).

### 6.6.1 PROTOCOLS

The protocol is the method by which the printer tells the computer when to transmit characters to be printed. Printers can only

print characters at a certain speed and can only store a limited number of characters. If the computer sends data faster than the printer can handle, overflowing the printer's capacity for storage, an overflow error will result and data will be lost. (Usually the printer will begin to drop characters in the text.) Thus the printer must have a way to regulate the flow of data and this is called the 'protocol' or 'handshaking'.

In essence, the protocol allows the printer to tell the computer when to start and stop sending data. When the printer has received as much as it can handle for the moment, it commands the computer to stop. When it has finished with the first batch, it tells the computer to start sending data again.

Every type of printer is designed to operate using particular protocols. Many printers allow the user to select the protocol to be used.

**HARDWARE HANDSHAKING**

A Hardware Handshaking protocol (sometimes called 'Out of Band Flow Control) uses a particular wire in the cable to communicate between the computer and printer. In other words, there is a special 'printer busy line' which the printer uses to tell the computer when to start and stop sending data. For this to work the appropriate line from the printer must be connected to the computer's CTS (Clear To Send) INPUT line. Since different printers use

different wires in the cable for this purpose, a Jumper Block may be necessary to insure the proper connection (see Section 6.7.2).

**X/ON X/OFF**

With the X/On X/Off protocol the printer sends a particular character to the computer to start sending data and another one to stop sending data. The DMS Spool Printer is able to use the X/On X/Off protocol. Consult your printer's manual for any special exceptions or settings which may be necessary.

**ETX/ACK**

At this time the HiNet Spool printer does not support (handle) the ETX/ACK (End of Text/Acknowledge) protocol. But other printers on your network that are connected directly to a workstation may use this protocol. Refer to the manual for your printer to see if it requires this protocol.

## 6.6.2 JUMPER BLOCKS

When a peripheral device (such as a printer or modem) is connected to a computer via an RS-232 cable, each pin in the cable's plug matches a specific wire attached to a particular socket hole. Unfortunately, there is little standardization among peripherals as to which wire should correspond to which pin. Therefore, the

wires may have to be switched to match the needs of a particular device.

The easiest way to alter these wiring patterns is to use a Jumper Block to alter the wiring of the Serial Port to match the requirements of the peripheral. The other method is to re-wire the cable by removing one of the cable's connectors and re-soldering the wires to the pins in a different pattern.

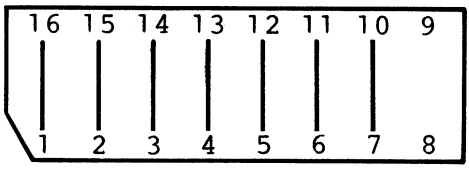
The wires going to a Serial Port are permanently embedded in the main green plastic circuit board. However, near the port they all end at a Jumper Block socket and then continue from the other side of the socket. That is, the socket is an empty space disconnecting the wires. This space is bridged by a Jumper Block which plugs into the socket (like a chip) and has wires arching from one side of the block to the other.

On a standard Jumper Block the wire bridges are all parallel so that each wire connects to the one directly across the gap. However, by soldering insulated wires from one part of the block to another, and/or cutting the copper bridges, the flow of electricity can be switched into new patterns to match the wiring pattern of the peripheral.

Note---If there is no Jumper Block in the socket, the port will not function at all.

Jumper Blocks configured for standard printers and modems are available from DMS (see below) or you can make them yourself.

## MAKING JUMPER BLOCKS

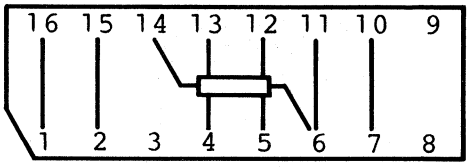



Standard

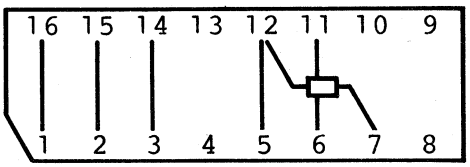
(NOTE---The numbers do not actually appear on the Jumper Block. They are indicated for reference only)

## DIAGRAMS OF POPULAR JUMPER BLOCKS

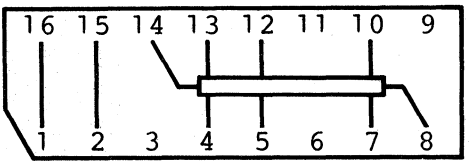
For Texas Instruments' 810 and all Qume Printers.



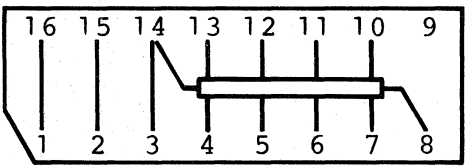

For the NEC Spinwriter



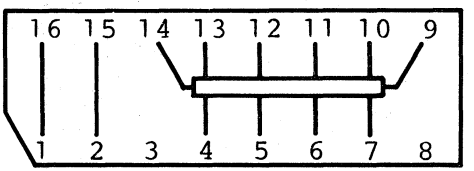
For Microline Printers




For the Diablo 630




Teletype Model 40




### 6.6.3 INSTALLING JUMPER BLOCKS

----------WARNING----------

The bottom portion of the DMS-816 cabinet can safely be opened to change the jumper block. Always turn off the power and unplug the electrical cord first. The top portion of the DMS-816 should not be opened except by a qualified technician. The CRT and Power Supply in the top cabinet contain dangerously high

voltages that are present long after the unit is turned off.

---

To install a new Jumper Block, remove the four screws on the bottom cover of the workstation's cabinet and then remove the cover. There is a wire connecting the speaker on the cover to jumper pins on the circuit board. Be careful not to disconnect the wires. If you do, be sure to reconnect the wires to pin number W13 (near the keyboard connector socket) before replacing the cover. It does not matter which way the wires are connected to W13.

The DMS-816's Serial Port Jumper Block is located on the main board inside the cabinet, next to the serial port connector. It is labeled U116 on the circuit board.

The Jumper Block is removed and inserted just like an IC (integrated circuit) chip. Pull out the old block with a chip puller and carefully plug in the new block. Make sure that the pins are properly aligned and are not bent.

**IMPORTANT NOTE**---One corner of the Jumper Block is slightly **shaved** away. This notched corner should always be oriented as indicated in diagram 6-1 on the following page.

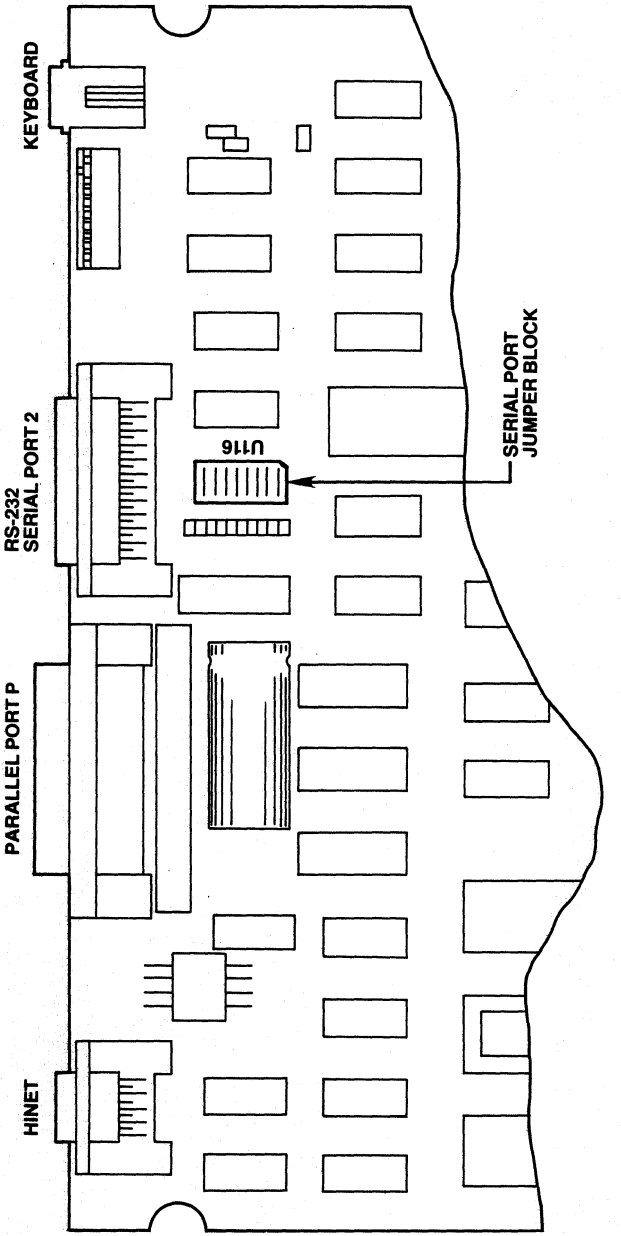

KEYBOARD
RS-232
SERIAL PORT 2
U116
SERIAL PORT
JUMPER BLOCK
PARALLEL PORT P
HINET

DIAGRAM 6-1

# 7.0 DATA STORAGE

This section normally contains information about the use of Floppy Disk and Hard Disk Drives. The DMS-816 does not have any "Local" Storage features as it is intended as a HiNet Network workstation. All of the applications programs and data files for the DMS-816 are stored on the Network's Hard Disks in partitions.

The DMS-3/F, DMS-3/501, DMS-3 and DMS-4 have local Floppy Disk storage which would be covered in this section.

# 8.0 ELECTRONIC MAIL

----------NOTE----------
Electronic Mail does not yet have an MS-DOS version. The Mail program will only run on the DMS-816 when it is using HIDOS (CP/M-80) or CP/M-86.
---

## 8.1 INTRODUCTION

Electronic Mail is an easy and efficient way to communicate with other Users on the Network. Your workstation essentially becomes your mailbox where other Network Users send memos, letters and reports to you. These documents can be reviewed by you at any time. They can be stored, erased or printed. You can even send an instant reply in response to an important electronic note.

This section explains how to use E-Mail from a workstation on the HiNet Network. The procedure for setting up E-Mail on the Network is described in your HiNet Master's Manual.

## 8.2 LOGGING IN TO E-MAIL

Before accessing the E-Mail system, make sure that your B drive is assigned to MAIL. (**ASSIGN B MAIL <CR>**) The MAIL.COM or MAIL.CMD programs may reside in any partition that you

are assigned to (except the MAIL partition). Normally they are kept on the CSYSTEM partition which is assigned to your A drive. In this case, call up the MAIL program by entering **A:MAIL** <CR> after your logged partition prompt.

If the MAIL partition is properly initialized, you will be asked for your E-Mail Name with the question:

**To whom do I have the pleasure of speaking? [ ]**

Type the name that was entered in the MAILINIT program as your User Name for E-Mail. It does not matter if you use upper- or lower-case letters.

Next you will be asked for a password. If you do not have one for your E-Mail Name just hit return. If a password is required, enter it exactly as it was in the MAILINIT program. For Passwords you must use lower-case letters.

To log in to E-Mail from a workstation that is different from the kind linked to your E-Mail User Name, follow this procedure:

Enter **A:MAIL** <CR>

Enter an @ sign and a RETURN the first time you are asked for a Name. Then enter the name of a person who normally uses that type of terminal. If the E-Mail User Name List contains names of emulations, use those instead. You will then be asked again for YOUR Name; enter it to get your messages. Here is how the dialogue looks on the screen:

```
To whom do I have the pleasure of speaking ? [@ <CR>]

Whose terminal are you using? [ADDS<CR>]

To whom do I have the pleasure of speaking? [MARTHA <CR>]

Password [      <CR>]
```

Once the password is accepted the full E-Mail Menu is displayed on the screen. It looks like this:

```
1   Status: You have no messages.
2
3   Waiting for Mail
4
5         Review ALL old mail                [A]
6         Review CATEGORIZED mail            [C]
7         Review RESPONSE REQUIRED mail      [R]
8         Review NOTES                       [N]
9         Review UNREAD mail                 [U]
10        Send mail from FILE                [F]
11        SEND mail from keyboard            [S]
12        QUIT                               [Q]
13                                  Which?   [ ]
14
15   Waiting for Mail
```

----------NOTE----------
The numerals in the left column of the menu are not part of the menu as it would appear on the screen. They are presented here for reference.
---

As you look at the E-Mail menu, line 1 is the 'status line'. It describes either the current state of events (in the example below: 'You have no messages') or the last operation you performed. For example, if you sent a message to Jane, the status line would read 'Done sending to Jane'.

## 8.3 WAITING FOR MAIL MODE

If you have no unread messages, you will be in the Waiting for Mail mode (see menu above). The cursor will wait in the brackets on line 13 and an asterisk will flash off and on where the cursor is. The asterisk indicates that the Mail System is waiting for new messages to be sent to you. If you have nothing else to do at your workstation, it may be convenient to leave it in the Waiting for Mail mode.

### [A] Review ALL old mail

If you enter an A, E-Mail will display all of your messages. The presentation includes any message, read or unread, that has not been deleted. It also includes all notes and all messages of every category. The messages are presented in reverse chronological order.

----------NOTE----------
You can discontinue the reviewing mode any time through one of the Waiting for Mail mode options. See [Q]uit below.
---

**[C] Review CATEGORIZED mail**

If you enter **C**, E-Mail will let you review mail that you have previously categorized. You will see the message below on screen.

Reviewing old, categorized mail:

Which Category? [1-7] [ ]

At this point, the system waits for you to enter a number between 1 and 7 (inclusive), specifying which previously categorized message you'd like to review. Newly received messages cannot be accessed with this command. For information on catagorizing messages, see the discussion on Category [1-7] in section 10.4, Reviewing Mail.

**[R] RESPONSE REQUIRED mail**

If you enter **R**, E-Mail will display all old messages which you have marked 'response required'. As usual, these messages are shown in reverse chronological order and you need not go

through the entire sequence. See the [Q]uit option of section 8.4, Reviewing Mail.

**[N] Review NOTES**

As far as E-Mail is concerned, notes are basically messages that you've sent to yourself. These messages, however, are treated in a slightly different manner than those sent to you by others. If someone else sends you a message while you are in the Waiting for Mail mode, the screen will clear, your terminal will beep and the messages will be displayed. If you send a message to yourself, you'll be returned to the Waiting for Mail mode. E-Mail remarks that a 'Note (from you) is available' by placing that phrase on the status line.

**[U] Review UNREAD mail**

There is one situation in which you can have unread messages that the E-Mail system doesn't tell you about. This arises when you don't look at all your unread mail when it is first available. If you believe that this may be the case, strike **U** and you'll be able to look through any unread mail that you have.

**[F] Send mail from FILE**

You can use word processing programs to prepare a message and then, by striking **F**, send the prepared message to someone. When you strike F, the screen will clear and you'll see the message, 'Send a message to whom (<CR> to cancel) ?'.

E-Mail wants to know where to send your message. If you decide at this point that you don't want to send a message, hit <CR>. The Waiting for Mail mode menu will return to the screen. If you enter a name, the screen will again clear and you'll see the message below.

```
Send Message from File Module:

Please enter the file name.
    Just hit <CR> to quit.
                    File: [              ]
```

----------NOTE----------
If you change your mind, simply strike the RETURN key, and you'll be returned to the Waiting for Mail mode.
---

Suppose the file you have prepared is on drive D: and is named TERRY. You would enter **D:TERRY<CR>**.

E-Mail will report that it is 'Sending file TERRY' and will display a plus sign (+) on-screen after each line of your file is sent. After the entire file has been sent, you will be returned to the Waiting for Mail mode.

## [S] SEND mail from keyboard

When you strike S, the screen will clear and E-Mail will ask, 'Send a message to whom (<CR> to cancel) ?'

E-Mail wants to know where to send your message. If you change your mind, hit <CR>. The Waiting for Mail mode menu will return to the screen. If you enter an existing E-Mail Name, the screen will clear again and the message below will be displayed on the screen:

**Enter message (strike CTRL-Z to send, ESC to cancel)**

---

The cursor will be waiting in the leftmost column just below the dashed line. E-Mail will wait for you to type your message. Use the backspace key to make any corrections. However, you can backspace only along the current cursor line. If you try to backspace farther than the first column of the line you are in, nothing will happen. When you finish entering your message, hold down the **CTRL** key and tap **Z**. This signals E-Mail to send the message.

If you decide not to send the message, hit the ESC key to cancel the message.

Your messages can be as long as you like. The screen will scroll upward to make room for new lines. Keep in mind, though, that it's usually simpler to prepare a long or complicated message with a word processing program and then send it via the 'Send from File' command [F].

**[ ] QUIT**

Striking a Q tells E-Mail that you want to return to CP/M. It is a good practice to always exit a program before logging off the Network; just in case you forgot to save a file or send some mail. You should also release any write ownership before turning off your workstation; especially if you are going to work at another station.

## 8.4 REVIEWING MAIL

Mail can be reviewed through one of the five mail reviewing options or as it arrives.

When a new message arrives, E-Mail will switch to the Reviewing Mail mode, the screen will clear and the new message will be displayed.

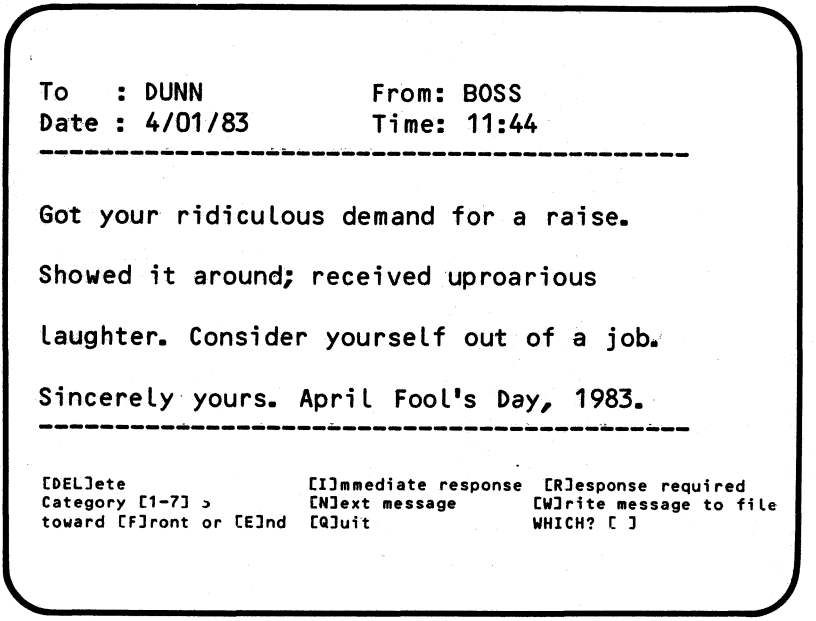
The five Review options include:

Review ALL mail,
Review CATAGORIZED mail,
Review RESPONSE REQUIRED mail,
Review NOTES,
Review UNREAD mail.

Below is an example of what it is like to receive a message.

Suppose Dunn's boss sent him his most recent response required message. After calling

on the Review RESPONSE REQUIRED option, Dunn would see something like:




We call the material at the top of the screen the **'header'**. The header tells who sent the message and when it was received. The material between the lines is known as the **'window'**. In this case the entire message is short enough to fit into one window (this isn't always the case). The information at the bottom of the screen is called the **'footer'**.

The prompt at the bottom of the screen shows you what your options are and how the message is currently classified. Your entries are denoted by the contents of the

brackets ([ ]). If, for example, you wanted to delete a message, your entry would be **DEL.**

Each of the response-required options is described below.

**[DEL]ete**

To delete a message that you are looking at in the Reviewing Mail mode, simply strike the DELETE key on your keyboard. After a brief delay, the message will be erased. E-Mail will continue with the Review sequence that you selected unless there are no remaining messages of the type you were reviewing. In that case, you would be returned to the Waiting for Mail mode.

----------NOTE----------
The D key will not delete messages. You have to use the DELETE key. E-Mail was programmed that way in order to make accidental erasure more difficult.
---

----------WARNING----------
If two people enter E-Mail as the same User and try to delete one of that User's messages at the same time, other messages may also be damaged.
---

**Category [1-7]**

If you choose to categorize a message, press any of the category numbers (1-7) while the message is under review. From then on you can

review this message, or any other message of its category, through the Review CATEGORIZED mail option in the Waiting for Mail mode.

Presumably, you will use the numbers as some kind of code. Once you've decided how you will use the seven categories, you'll probably want to make note of your categorization and keep it in a safe place.

**Toward [F]ront or [E]nd**

Although most messages you send and receive will probably be short, some will have more lines than the screen can accommodate. When a message is first displayed, the first screenful of it will be shown. To see the next screenful, strike **E**. The bottom two lines of the first screen will be the top two lines of the second screen, and so forth. If you want to see the beginning of a message again, strike **F**.

**[I]mmediate response**

If you ever feel the need to respond immediately to a message under review, enter **I** to begin the process. E-Mail would move to the Send Mail mode and prepare to send a return message to the author of the message under review. Moreover, you would not enter any name. E-Mail, knowing who sent the original message, would direct the immediate response to that person automatically.

After sending your response, you would be returned to the Reviewing Mail mode; the original message would be displayed on-screen.

**[N]ext message**

Strike an **N.** E-Mail will move to the next message in the category you are reviewing. When you reach the end of the messages awaiting review in any one category, you'll be returned to the Waiting for Mail mode.

**[Q]uit**

Strike Q and you'll be returned to the Waiting for Mail mode.

You may decide that you do not want to review all the messages at once. The [Q]uit option is the simplest way to get out of the reviewing process. However, once you begin reviewing messages the Reviewing mode assumes that you are going to review all messages; it does not know if you have quit in the middle. Thus, it may not be aware that there are unread messages; you have to remember that yourself and read those messages later under the **Review Unread Mail** option.

**[R]esponse required**

When a response required message is first received, the response required field [] is filled with NO. Once you look at the message,

you can change the NO to a YES or the YES to a NO by striking R. Try it a few times in a row, and you'll see that YES and NO flip back and forth, or 'toggle'.

All messages that have YES in the response-required field will be selected when you choose to review response required mail.

### [W]rite message to file

You can send a copy of a message to a file or to the printer (HiNet spooler). After you strike a W in the Reviewing Mail mode, you will see the messages below.

```
Write Message to File Module:

Please enter the file name.
    Use   LST:   for the printer.
Just hit <CR> to quit.
                        File: [              ]
```

If at this point you strike <CR>, you will be returned to the message you were looking at. If you enter LST: and then <CR>, a copy of the message will be sent to the printer. Otherwise, enter the name of a CP/M file and <CR>. E-Mail will check the file name you have given. You will then see one of the messages below.

File exists. Write over it? [y/n] [ ]

Sorry, but you may not use the
Mail Partition for this file.

Sending message to <file name>.

The first and third messages should be clear. The second always refers to the HiNet partition that is used to store messages and User information. It cannot be used for any other purpose. In fact, if you look at it with STAT, it will always appear full.

## 8.5 FATAL ERRORS

A fatal error is an error which E-Mail cannot correct. When a fatal error occurs, you will see one of the messages below and you will be returned to CP/M. Following each set of error messages are descriptions of what the errors mean and what might be done about them.

### 1. Can't find INDEX.ML

This error could be due to: 1) the Mail partition is not assigned to the B drive or 2) some of the Mail Partition has been corrupted.

### 2. Can't find MSG.ML

See 1 above.

**3. Confused by command line**

See 1 above.

**4. Disk full**

This error can occur when trouble is encountered in [W]riting a message to file or to the printer. Usually it indicates that the file you wanted to write to is on a disk that is full. The HiNet spooler could be full, too.

**5. Illegal Drive for Mail Partition**

See 1 above.

6. **No More Room for Messages!**

Every available part of the Mail partition is filled with active messages. Go into the Mail System again and delete some of your old messages. Tell everybody you know to do the same. Someone may be using the Mail System for something other than messages.

**7. Not a valid Password**

If you chose a password, it must be typed exactly. The program is even sensitive to upper- and lower-case letters.

**8. Read Error!**

Usually means that the Mail Partition has been corrupted. This could be due to a bug in the Mail System itself. It is probably not due to a disk read error since the operating system itself will give an error before E-Mail discovers it.

**9. Spool error**

See 4 above.

**10. Trouble Closing File**

This can occur when you're [W]riting a message to a file on a diskette. It usually means that the diskette is write-protected.

**11. Trouble creating file**

See 4 above.

**12. Trouble opening file**

This error can arise when you're sending a message from a file. Look at the file from CP/M (TYPE or DUMP) or with your word processor to try to find out what's wrong with the file.

**13. Trouble writing**

See 4 above.

# 9.0 CONFIGURING SOFTWARE

As described in Section 1.6, the DMS-816 uses two different screen "emulations" when running applications programs--the ADDS REGENT 25 and the IBM-PC (IBM-XT).

The ADDS REGENT emulation is used for generic applications programs written for CP/M-80 (HIDOS), CPM-86 and MS-DOS. These programs will usually have a configuration section that asks questions about the screen addressing codes of the workstation you are using. The codes given in Section 1.6 should be entered in response to the appropriate questions in the installation section of the program. The program may also simply ask if the terminal (workstation) is an ADDS REGENT 25; if so, answer yes and the installation should be complete.

----------NOTE----------
The screen display for the DMS-816 is set at 25 lines by default. Some programs for ADDS Regent type terminals are for 24 line display. If this is so, the program should be reconfigured for 25 lines or the DMS-816's display should be changed to 24 lines. See Section 1.6 for more information on screen display.
---

Programs that are for "IBM-PC compatible" microcomputers will probably not need to be configured in any special way. As long as the applications program does not require a colour

monitor or have any graphics displays, the DMS-816 should be able to run it. However, not all PC-DOS programs can be guaranteed to run perfectly on the DMS-816. The following list gives some of the PC-DOS applications programs that Digital Microsystems has tested and found compatible with the DMS-816:

WORD PROCESSING

| | |
|---|---|
| WORDSTAR | MICROPRO INC. |
| NEWWORD | ROCKY MOUNTAIN SOFTWARE VERSION 1.25 |
| PERFECT WRITER | PERFECT SOFTWARE |
| PALANTIR | PALANTIR SOFTWARE |
| SPELLBINDER (MS-DOS) | LEXISOFT |
| SELECT | SELECT INFORMATION SYSTEMS |
| PEACHTEXT 5000 TEXT, SPELLER, THESAURUS, LIST MANAGER. | PEACHTREE SOFTWARE |

ACCOUNTING PACKAGES

| | |
|---|---|
| REALWORLD BUSINESS SOFTWARE | MBSI, division of REALWORLD INC. |
| CYMA | CYMA INC. |

DATA BASES

| | |
|---|---|
| dBASE II and SED (with patch) | ASHTON TATE |
| FRIDAY! (with patch) | ASHTON TATE |
| LAN:DATASTORE (multi-user data base) | SOFTWARE CONNECTIONS |
| R:BASE 4000 | MICRORIM |

SPREAD SHEETS

| | |
|---|---|
| SUPER CALC 3 | SORCIM INC. |
| PEACH CALC | PEACHTREE SOFTWARE |
| MULTIPLAN (MS-DOS) (must be installed) | MICROSOFT |
| EASY PLANNER | INFORMATION UNLIMITED SOFTWARE |

LANGUAGES

| | |
|---|---|
| MICROSOFT BASIC (MS-DOS) | MICROSOFT |
| MICROSOFT PASCAL (MS-DOS) | MICROSOFT |
| MICROSOFT FORTRAN (MS-DOS) | MICROSOFT |

OTHER SOFTWARE

| | |
|---|---|
| POWER | COMPUTING |
| MENU | COMPUTING |
| SERIES ONE PLUS (integrated spreadsheet, word processor, filer, and report writer) | EXECUTEC CORP. |
| MAIL MONITOR (electronic mail for HiNet) | SOFTWARE CONNECTIONS |
| LAN:DATACORE (applications development software for LAN:DATASTORE) | SOFTWARE CONNECTIONS |

SPECIAL PROCEDURES FOR INSTALLING dBASEII AND FRIDAY! BY ASHTON TATE.

The following procedures can be used to "patch" both dBASE II and FRIDAY to make them run on the DMS-816. The procedures must be

followed exactly in a step-by-step process. BEFORE BEGINNING, MAKE A COPY OF THE PROGRAM DISK IN CASE OF AN ERROR.

You will use the MS-DOS DEBUG utility to add a few lines of code to the command file of dBASE II and/or FRIDAY!. In the following example, the lines that you enter are underlined and boldfaced. Any characters displayed by the DEBUG program are represented in normal type. An underline character (_) by itself means that you should insert a space into the line.

Begin the process by entering DEBUG and the name of the program to be modified, including the .COM extension. First we will alter the DBASE II program.

dBASE II (PC-DOS VERSION) PATCH FOR THE DMS-816

A>**DEBUG DBASEII.COM<CR>**
**-E53F8<CR>**

091D:53F8 0A.**90** C5.**90<CR>**

**-E7C16<CR>**

091D:7C16 20.**41<CR>**

**-W<CR>**

WRITING 7E00 BYTES
**-Q<CR>**

IMPORTANT NOTE!---If the responses to your inputs are not exactly the same as those given above, do not continue with the alterations. The

version of dBASEII you have is different from the one recommended, so the changes will not work properly. Enter CTRL C to abort DEBUG without making any changes to the program or test out the patched version; it may work correctly.

After DEBUG writes the altered file to the Hard Disk, the procedure is completed. Test out dBASE II to see if it works properly.

Next we will show the patch for FRIDAY!. You will notice that the entries you make while in DEBUG are the same as for dBASE II. However, the reponses to your entries will be slightly different. If these reponses do not match those below, your version of FRIDAY! is different than the recommended one. The patch may not work in this case. Be sure to make a copy of the program and do the alteration on the copy, not the original. Here is the DEBUG sequence for FRIDAY!:

FRIDAY! (PC-DOS VERSION) PATCH FOR THE DMS-816

```
A>DEBUG FRIDAY!.COM<CR>
-E53F8<CR>

12FF:53F8   0A.90    C5.90<CR>

-E7C16<CR>

12FF:7C16   00.41<CR>

-W<CR>

WRITING 7E00 BYTES
-Q<CR>
```

# 10.0 TELE-COMMUNICATIONS

This section is sent with HiNet installations that use a Digital Microsystems' Network as a Gateway to mainframe computers. The workstations are a part of the Local Area Network with access to data on the mainframe. Data can be manipulated on the Network without requiring processing time from the time-shared mainframe. This same data can then be downloaded back to the mainframe for further processing as needed.

DMS currently supports a Gateway to Sperry UNIVAC Mainframes. HiNet workstations emulate the UTS-20 Terminal when communicating with the UNIVAC.

For further information about Digital Microsystems Gateway installations, you may be interested in an article in the March 1983 issue of MINI-MICRO SYSTEMS Magazine entitled "Micro Network Unburdens Lawrence Livermore's Supercomputers" by Alex Cecil.

## APPENDIX A--ERROR MESSAGES

The error messages in this appendix are listed in alphabetical order to make it easier to look them up. Some of the error messages are for the HiNet Network; others occur when using either Floppy Disks or Hard Disks. Error messages with *** displayed before them are DMS hardware/software errors. Messages without the three asterisks are CP/M errors.

**ABORTED**

Indicates the process is terminated.

**BDOS ERROR ON X:**

BDOS stands for Basic Disk Operating System. The letter following the BDOS ERROR will be one of your four drives A-D. There are five main types of BDOS ERRORS:

**BDOS ERROR ON X: BAD SECTOR:**

A write error has occurred on a Floppy Disk. Hit any key to ignore or enter CTRL C to reboot. CTRL C will erase any work stored in memory and not saved to disk. This error no longer applies to the Network's Hard Disks.

**BDOS ERROR ON X: R/O** (for Read Only).

The drive is marked read-only and cannot be written to. Hit any key to reboot. NOTE-- This will cause you to lose everything you have done since your last 'save' command.

**BDOS ERROR ON X: SELECT.**

Means that CP/M can not find the drive you specified. Probably you typed in a letter that

was not A, B, C, or D. To recover from this error enter a CTRL-C Command. If that fails to work you will have to RESET your workstation. In both cases you will lose all of your work since your last 'Save' command.

**BDOS ERROR ON X: FILE R/O**

The file you are trying to write to (edit) is marked Read-Only. Hit any key to reboot. Work stored in memory and not saved to disk will be lost.

**BDOS ERROR ON X: NO LOCKS**

The Master's Lock Table is full. This message is for shared partitions only. Hit any key to retry or enter CTRL C to reboot.

**Can't find file named XXX.**

CUSTOMIZ can not find the file you have named. Check to make sure you are typing in the correct name and that the file is stored on the drive you are specifying. You may wish to exit CUSTOMIZ and use DIR or SD to verify the file's location and name.

**Can't find file on that drive either.**

This message may follow the one above if you have named another drive and the file is not there. Exit CUSTOMIZ and use DIR or SD to locate the proper file.

**Can't find needed character set in CHARSET.CST file.**

This indicates that the file CHARSET.CST is either missing or defective. PIP a clean version of CHARSET.CST to your working drive.

**Can't find overlay file CustX.ovl.**

One of the Overlay files is missing. PIP the missing file to your working drive.

**Can't read character set. This is a FOX.**

Neither the DMS-3/F nor the DMS-15 can handle a User Defined Character Set. This message may appear if you load to one of these workstations a Settings File that was created on a DMS-5000. Except for the Character Set everything else in the File should function normally.

**Can't read in function keys, table too big.**

This message will appear if a very large number of Special Function Keys have been programmed outside of CUSTOMIZ.

**Can't write to file. See if disk is full.**

This message will appear if there is some disk-related problem.

**command?**

Any error message ending in a question mark indicates that the system could not find the command you typed. Check for typing errors. You can use DIR or SD to check the correct spelling of commands in the directory.

**Couldn't load up language. Do you want to continue?.**

This message appears when you are trying to create a Character Set and have selected a User Defined Character Set to begin with but CUSTOMIZ can not find that file.

**Couldn't read information from that file.**
You have specified a file that is not a valid CUSTOMIZ Settings File. Check the filename.

**Couldn't read language from that file.**
You have specified a file that does not contain a valid User Defined language.

**DESTINATION IS R/O**
Usually occurs during a PIP operation. The file you are trying to send material to is a 'Read-Only' file. There is usually a query associated with this message asking if you wish to delete the file. If you answer **'Y'**, the R/O file will be erased and replaced with the new file you were trying to send to it. If this fails to work consult the person in charge of your system.

**DISK READ ERROR**
Occurs during PIP or some other disk-reading operation. Indicates the computer is having a problem reading what is on the Hard Disk memory. Try again. If the problem persists, see the person in charge of your system.

**DISK WRITE ERROR**
Occurs during PIP or some other writing to disk storage operation. Indicates the computer is having a problem writing material to the Hard Disk, probably due to a full partition. Also is displayed if you do not OWN a partition for writing. Use ASSIGN W to gain write ownership if possible.

**DRIVE __ CANNOT BE WRITTEN TO.**
**YOU DON'T HAVE WRITE OWNERSHIP OF IT.**

When you try to write to a partition that you do not own, this message will appear. Under HIDOS on the DMS-816 you will have to press the CTRL-ALT-INS keys down at the same time to Interrupt the workstation. Under MS-DOS you will be asked to Retry, Ignore or Abort. Press A to abort. Then use ASSIGN W to try to gain write ownership of partition.

**Failed to read entire file.**

This message appears when there is something wrong with a CUSTOMIZ Settings File you are trying to read in.

**filename?**

When you are using the REN (Rename) command and a filename is repeated with a question mark it means that you have incorrectly used a wildcard symbol.

**FILE EXISTS**

This may occur when you are renaming a file with the REN command. It indicates that a file already exists with the new name you have chosen for the old file. The simplest solution is to choose another new name for the file you are renaming. Otherwise you must either change the existing file's name, erase it, or use the PIP program (sect 3.6.1) to overwrite it.

**FILE NOT FOUND**

The computer cannot find the file(s) you named. Check to see if you typed the filename(s) correctly. If you did, then the file(s) no longer exist.

*****HARD error**

HARD DISK DATA ERROR. Data within the Master Hard Disk has been damaged. Consult with the person in charge of your network.

*****HARS error**

HARD DISK SECTOR ERROR. This means part of a sector on the Master Hard disk has been damaged. Consult with the person in charge of your network.

**INVALID FORMAT**

The format you have specified is not valid. Check for typing errors, punctuation, and spaces.

**INVALID PIP FORMAT**

Check your punctuation marks (for example, a ';' instead of a ':' will give this message). Specifying an incorrect drive will also give this message.

**INVALID SEPARATER**

Check your punctuation.

**NO FILE**

The computer can not find the file(s) you named. Check to see if you typed the filename(s) correctly. If you did, then the file(s) no longer exist.

**Not a valid CP/M filename. Please re-enter name.**

You have specified a filename that does not conform to standard CP/M filename conventions.

**DRIVE __ CANNOT BE WRITTEN TO.**
**YOU DON'T HAVE WRITE OWNERSHIP OF IT.**

When you try to write to a partition that you do not own, this message will appear. Under HIDOS on the DMS-816 you will have to press the CTRL-ALT-INS keys down at the same time to Interrupt the workstation. Under MS-DOS you will be asked to Retry, Ignore or Abort. Press A to abort. Then use ASSIGN W to try to gain write ownership of partition.

**Failed to read entire file.**

This message appears when there is something wrong with a CUSTOMIZ Settings File you are trying to read in.

**filename?**

When you are using the REN (Rename) command and a filename is repeated with a question mark it means that you have incorrectly used a wildcard symbol.

**FILE EXISTS**

This may occur when you are renaming a file with the REN command. It indicates that a file already exists with the new name you have chosen for the old file. The simplest solution is to choose another new name for the file you are renaming. Otherwise you must either change the existing file's name, erase it, or use the PIP program (sect 3.6.1) to overwrite it.

**FILE NOT FOUND**

The computer cannot find the file(s) you named. Check to see if you typed the filename(s) correctly. If you did, then the file(s) no longer exist.

*****HARD error**

HARD DISK DATA ERROR. Data within the Master Hard Disk has been damaged. Consult with the person in charge of your network.

*****HARS error**

HARD DISK SECTOR ERROR. This means part of a sector on the Master Hard disk has been damaged. Consult with the person in charge of your network.

**INVALID FORMAT**

The format you have specified is not valid. Check for typing errors, punctuation, and spaces.

**INVALID PIP FORMAT**

Check your punctuation marks (for example, a ';' instead of a ':' will give this message). Specifying an incorrect drive will also give this message.

**INVALID SEPARATER**

Check your punctuation.

**NO FILE**

The computer can not find the file(s) you named. Check to see if you typed the filename(s) correctly. If you did, then the file(s) no longer exist.

**Not a valid CP/M filename. Please re-enter name.**

You have specified a filename that does not conform to standard CP/M filename conventions.

**Not a valid drive char. Valid chars are A,B,C and D.**
You have hit the wrong letter in specifying a drive.

**NOT FOUND**
The computer can not find the file(s) you named. Check to see if you typed the filename correctly. If you did, then the file(s) no longer exists.

**On logged drive can't find file: XXX.**
The file you have named is not stored on the logged drive. Try another drive letter, or search for the file with DIR or SD.

**<PARTITION NAME> LOCKED**
A message for shared partitions only. The partition in use has been locked for four seconds. An indication of serious internal HIDOS error. Hit any key to retry, enter CTRL C to reboot.

**<PARTITION NAME> NOT LOCKED**
A message for shared partitions only. An attempt was made to unlock a partition that was not locked. A sign of a serious internal HIDOS error. Hit any key to ignore, enter CTRL C to reboot.

**SHRALLOC**
May be repeated across the screen until you reset the computer. This message indicates that you have tried to access a partition that is marked as shared in the ALLOC Table but has not had the SHRALLOC program run on it. The Network Administrator should mark the partition as ownable, run SHRALLOC while logged to the

partition to be shared and then remark the partition as shared in the ALLOC Table.

*****SPOOL ERROR**

This probably indicates that the Spooler is full, and no new print jobs can be stored until some of those already on the Spooler have been removed, either by printing them or erasing them. **CTRL-C** will abort your job and put you back into CP/M; **<CR>** will make another try at sending your job to the Spooler.

**That is not a valid intensity level.**

When setting Screen Intensity Level CUSTOMIZ only recognizes the numbers 1-15.

**There is no user defined version present.**

You have selected a user defined keyboard or language but none is loaded into CUSTOMIZ's workspace. You need to load a file containing your User Defined Character Set or Keyboard.

**User language is the wrong size. I can't read it in.**

When the DMS-5000 is in the vertical mode it can use only Small Character Sets. This message will appear if you have tried to load a large size User Defined Character Set.

*****WAITING**

This message occurs when the station is waiting to communicate with the Master Computer. It usually indicates a minor problem with the HiNet master. Do not RESET or turn off your workstation, as doing so will cause you to lose the work you have done since your last 'Save' command. If the WAIT message does not clear off

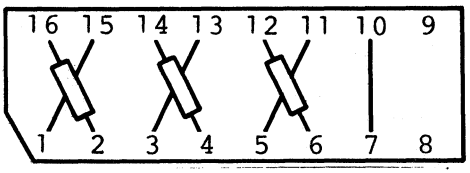
in a short period of time, consult the person in charge of your network.

**Was unable to read language successfully.**

This message will appear on the DMS-3/F or DMS-3/501 if there is some problem with the file LANGUAGE.CST.

## APPENDIX B -- MODEM JUMPER BLOCK

Serial Port 2 can also be used to connect to a Modem. Modems are devices allowing one computer to interface with another computer over the telephone lines. In order to use a Modem you must either have a specially configured Modem RS-232 Cable, or have installed a Modem Jumper Block on the CPU Board. Below is a standard Modem Jumper Block.




Modem Jumper Block

| Jumper Block Pin Number | Function | Pin & Chip number | |
|---|---|---|---|
| 9 | Ground | | |
| 10 | Power (+12) | | |
| 11 | Data Carrier Detected | 10 | U115 |
| 12 | Data Terminal Ready | 8 | U114 |
| 13 | Request To Send | 11 | U114 |
| 14 | Clear To Send | 4 | U115 |
| 15 | Transmit Data | 6 | U114 |
| 16 | Receive Data | 13 | U115 |

(Pin 10 is connected to power (+12) through a 4.7K Ohm resistor.)

**NOTE**---Some modems come with a cable that already has some wires swapped (thus eliminating or changing the need for a Jumper Block as diagrammed above). Consult your dealer or modem manual.

# APPENDIX C -- PORT I/O INFORMATION

## PARALLEL PRINTER CABLE PIN CONNECTIONS.

The following table lists the pin connections required to connect a DMS-816 to a Printer using a Centronics-type parallel interface.

| Parallel Port 1 J5 on CPU board | | Centronics Connector | | |
|---|---|---|---|---|
| Signal Name | Pin Number | Signal Name | Pin Number | In or Out of Printer |
| DB0 | Pin 2 | DATA 1 | Pin 2 | Output |
| DB1 | Pin 3 | DATA 2 | Pin 3 | Output |
| DB2 | Pin 4 | DATA 3 | Pin 4 | Output |
| DB3 | Pin 5 | DATA 4 | Pin 5 | Output |
| DB4 | Pin 6 | DATA 5 | Pin 6 | Output |
| DB5 | Pin 7 | DATA 6 | Pin 7 | Output |
| DB6 | Pin 8 | DATA 7 | Pin 8 | Output |
| DB7 | Pin 9 | DATA 8 | Pin 9 | Output |
| OE/ | Pin 11 | OUTPUT ENABLE | Pin 20 | GND |
| OUT 00/ | Pin 21 | DATA STROBE | Pin 1 | CPORTS/ |
| STAT1B | Pin 17 | BUSY | Pin 11 | CPBUSY |
| GND | Pin 1 | GND | Pin 19 | GND |
| GND | Pin 10 | GND | Pin 20 | GND |
| GND | Pin 12 | GND | Pin 21 | GND |
| GND | Pin 14 | GND | Pin 22 | GND |
| GND | Pin 16 | GND | Pin 23 | GND |
| GND | Pin 18 | GND | Pin 24 | GND |
| GND | Pin 20 | GND | Pin 25 | GND |
| GND | Pin 22 | GND | Pin 26 | GND |
| GND | Pin 24 | GND | Pin 29 | GND |
| GND | Pin 26 | GND | Pin 36 | GND |

Note that Pin 11 on J3 of the CPU board must be grounded in the cable to enable the port outputs. Also, Pin 36 on the Printer connector must be grounded when using an EPSON Printer unless the disable switch on the printer is used. The following pins of J3 on the CPU board are not connected to the Centronics connector: 13, 15, 19, 23, 25. The following pins of the printer connector are not connected and need not be attached in the cable: 9, 10, 12, 14 thru 18, 27, 28, 30 thru 35.

**SERIAL PORT 2 SIGNALS**

Serial port 2 (connector J3)

| DB25S (J3) | jumper block | ZSBC 3/4 serial ports |
|---|---|---|
| pin 1 | (for CRT) | chassis ground |
| pin 2 | pin 1-pin 16 | U115 pin 13 RxD |
| pin 3 | pin 2-pin 15 | U114 pin 6 TxD |
| pin 4 | pin 3-pin 14 | U115 pin 4 CTS |
| pin 5 | pin 4-pin 13 | U114 pin 11 RTS |
| pin 6 | pin 5-pin 12 | U114 pin 8 DTR |
| pin 7 | signal ground | logic ground |
| pin 8 | pin 7-pin 10 | |
| pin 11 | pin 8 | |
| pin 14 | pin 9 | |
| pin 20 | pin 6-pin 11 | U115 pin 10 DCD |

# INDEX

D

E

O



P