Digital Microsystems DMS™

DMS-3/F MANUAL

Version 1.0

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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.

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 Environment) covers the CP/M operating system.

- Section 4 (Customizing) will explain how to alter the operating characteristics of the workstation to suit your applications and needs. The DMS program CUSTOMIZ is the primary means of adapting your computer to your specific needs.

- Section 5 (Using Printers) discusses how to use printers with DMS equipment and the HiNet Network.

- Section 6 (HiNet Master) describes the DMS equipment that can be used to run a HiNet Network (DMS-15 and DMS-3/4 series). It also explains how to set up a HiNet Local Area Network. This section is not included in manuals for equipement that are not HiNet Masters.

- Section 7 (Local Storage) applies to DMS computers that have local storage capabilities (e.g., Floppy Disks or Hard Disks).

- Section 8 (Graphics) details how to use various applications packages with the DMS-5000's graphic capabilities. (Not included in the DMS-15 or DMS-3/F manuals.)

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

- Section 10 (Electronic Mail) explains how to use DMS electronic mail program. This system lets you send and receive messages through your HiNet computer network.

- Section 11 (Tele-Communications) covers the use of Modems and other forms of tele-communications with DMS computers and HiNet.

- The Appendix contains a list of the most common error messages and their meanings, and a list of ESC and CTRL codes that you may need to

know to configure your DMS equipment to printers and word processing programs.

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. We have included a Customer Feedback form for you to use, and comments are welcome from you at any time. (All comments and suggestions become the property of Digital Microsystems.)

HINET.

HiNet is a Local Area Network. A local area network is a varied group of computers which communicate with each other via a cable that goes from machine to machine. The great advantage of this system is that many people can work together, storing their work in central Hard Disk Memory units, and sharing many kinds of computer resources (hardware, printers, software, databases, etc.). See section 2.

If desired, a printer or other device can also be connected separately to an individual workstation (see section 5.4).

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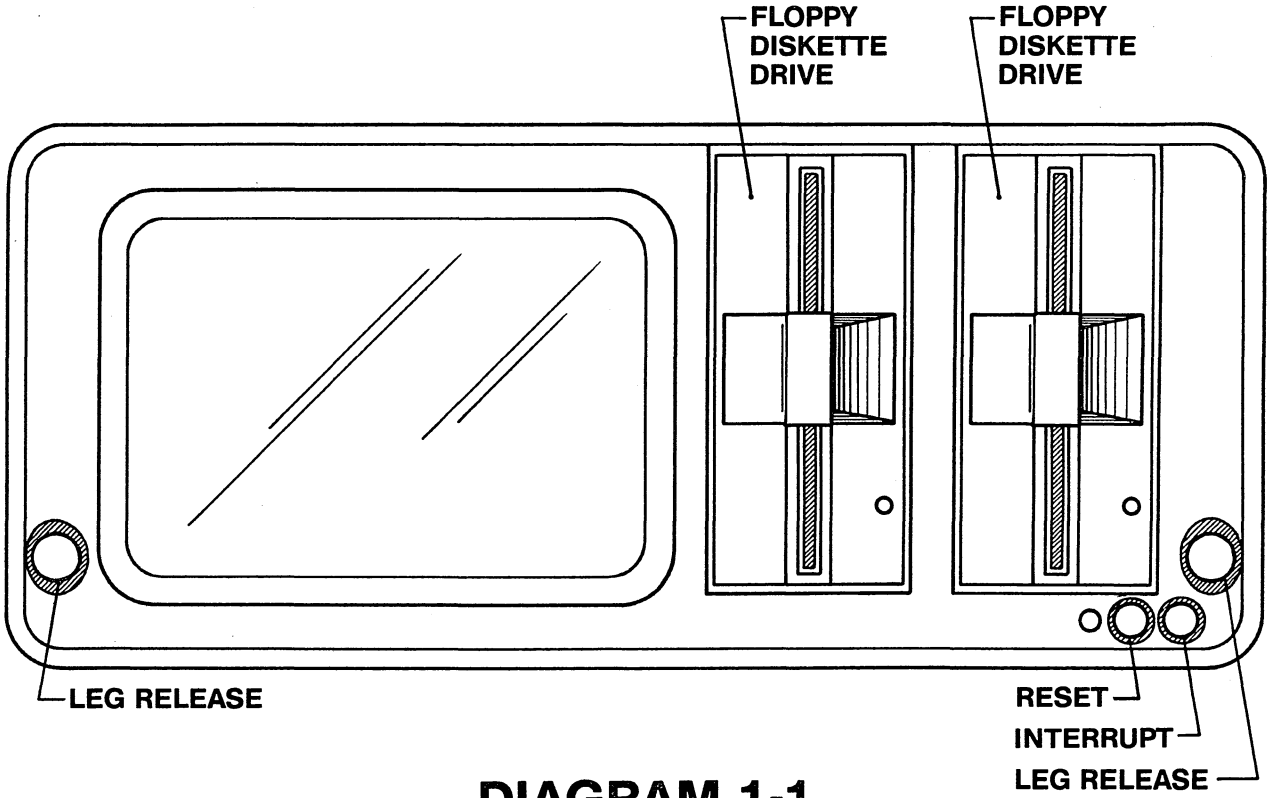
FLOPPY DISKETTE DRIVE
FLOPPY DISKETTE DRIVE
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LEG RELEASE

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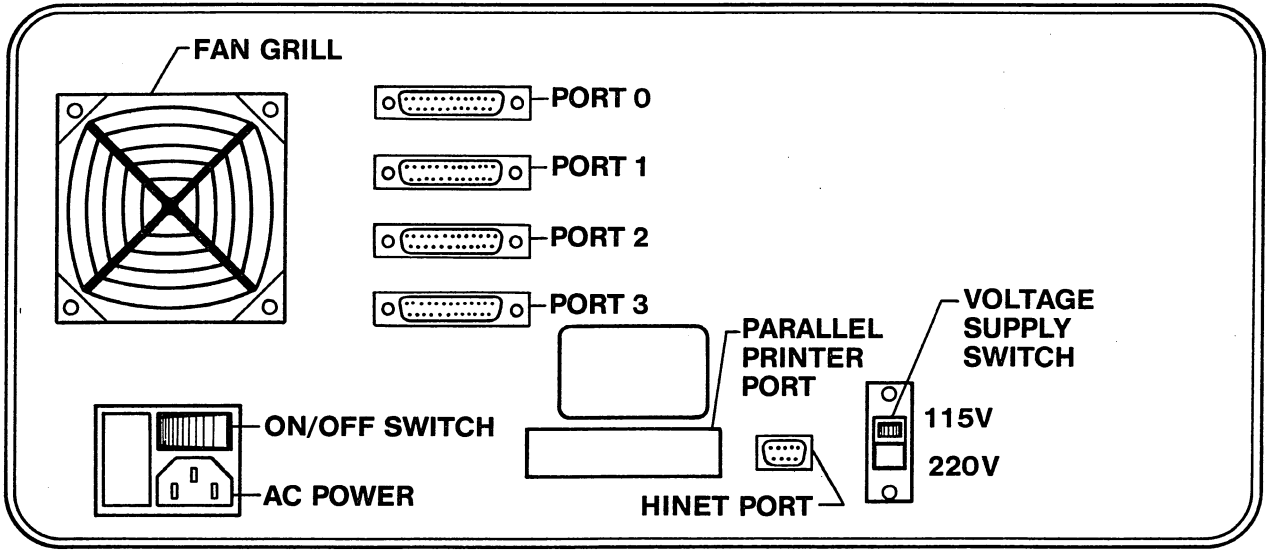
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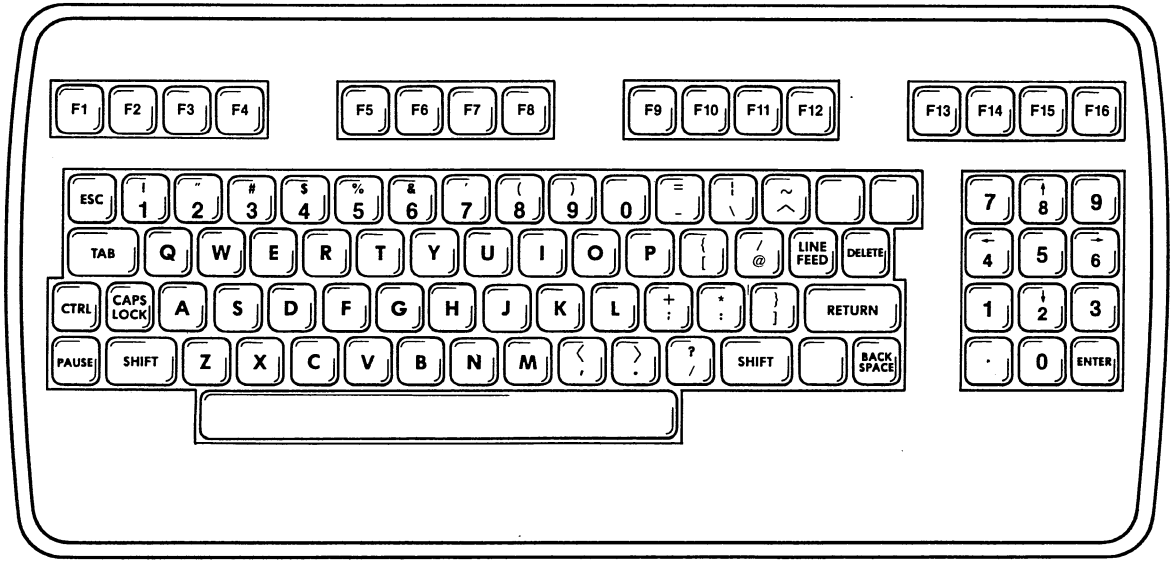
F1 F2 F3 F4
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7 8 9
4 5 6
1 2 3
0 ENTER

DIAGRAM 1-3

1.0 INTRODUCTION TO THE DMS-3/F

1.1 OVERVIEW

The DMS-3/F is a powerful eight-bit microcomputer. It is capable of operating as a self-contained stand-alone unit or a HiNet station with local storage. The DMS-3/F has a nine-inch green phosphor CRT monitor, a detachable keyboard with 30 function keys--each programmable with 3 functions--and two 5.25-inch double-density, double-sided Floppy Diskette Drives.

Additional software (such as word processing and data base management programs) may have come with the DMS-3/F.

1.2 SETTING UP THE DMS-3/F

After unpacking the DMS-3/F from its shipping carton, examine the unit for damage. Make sure that the CRT screen is not broken. (Do not touch any broken glass; the coating on the glass is toxic.) If there is any visible damage to the DMS-3/F, do not plug it into an electrical outlet. Contact your dealer or DMS 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 the main computer cabinet, the keyboard, a power cord, this manual, the DMS distribution Diskettes and a screen cleaning cloth.

Diagram 1-1 indicates the various parts of the DMS-3/F. Notice the two buttons (labeled 'Leg Release' in the diagram) on either side of the front of the cabinet. To raise the front of the computer cabinet, push these down with your thumbs. The legs are spring-loaded so they will snap downward. While holding down the release buttons, raise the front of the cabinet so that it is elevated two or three inches.

NOTE---There are ventilation slots on the bottom of the cabinet. Make sure that these slots are not obstructed when the unit is in use.

THE CRT SCREEN.

The DMS-3/F's 9-inch CRT screen can display 25 lines with 80 characters per line. The screen can operate in two video modes: normal (green characters on black background) or reverse (black characters on green background). (See section 4 for information on how to select a video mode.) In certain lighting conditions you may find reverse video more comfortable for your eyes. The screen brightness may also be adjusted with the Customiz program.

A non-glare nylon screen covers the CRT. To avoid scratching it, use only the cleaning cloth

supplied with the DMS-3/F or a soft brush to clean the screen.

NOTE---Do not turn the DMS-3/F on and then immediately off. As with all video equipment, this could cause a bright dot to form on the middle of the screen which might damage the CRT. Make sure the power switch is OFF before plugging the unit into an electrical outlet.

KEYBOARD CORD.

Plug the keyboard cord into the left side of the DMS-3/F's cabinet. The clip on the keyboard cord is shaped so that it will fit into the socket only one way. If you wish to detach the keyboard later, be sure to press the tab on the clip to release it from the cabinet.

FLOPPY DISKETTE DRIVE INSERT

Before turning on the DMS-3/F you will have to remove the shipping inserts from the Floppy Diskette Drives. The Floppy Diskette Drives are located to the right of the video screen. (See diagram 1-1.) Open the door of a Drive by pulling the door's latch toward you. The door will spring open. Remove the cardboard insert. (Save it in case you wish to transport the DMS-3/F for a long distance.) Close the Drive's door to help keep out dust.

LINE VOLTAGE SWITCH

The DMS-3/F 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 back of the cabinet near the right side. The switch moves vertically and is manipulated with a pointed object such as a ball point pen tip.

WARNING---If you are not sure of the voltage in your area, do not plug in the DMS-3/F until you have checked with a technician. Damage may result from an incorrect voltage setting.

POWER CORD

Before plugging in the DMS-3/F, make sure that the power switch--on the lower left corner on the back of the cabinet--is pushed in on the side labeled **O** (OFF). The power cord plugs into the back of the DMS-3/F's cabinet. (See diagram 1-2.) Plug the end of the cord with no prongs into the back of the cabinet before you plug the other end into a three-hole grounded electrical outlet.

HiNet CABLE.

If you are going to use the DMS-3/F as a HiNet workstation, plug the HiNet cable into the HiNet port. The HiNet port is located near the center of the back of the cabinet. (See diagram 1-2.) The cable connector will fit into the socket only one way.

RESET AND INTERRUPT.

On the lower right corner of the front of the DMS-3/F's cabinet are two small push-button switches. The left button is the RESET switch. The right button is the INTERRUPT switch. The RESET button completely resets the Central Processing Unit (CPU). This will result in the loss of any work not stored on a Diskette or the network's Hard Disk. The INTERRUPT button will end most user programs and return you to CP/M. Again, however, any unstored work will be lost.

1.3 TURNING ON THE DMS-3/F

Turn on the DMS-3/F by pushing the ON/OFF switch in on the side labeled **I**. The red light near the RESET button should glow.

Normally, when the DMS-3/F is first turned on, it will try to boot directly from a Floppy Diskette in the A drive (the left hand drive). However, your DMS-3/F may be configured differently; it may be set to boot directly from the HiNet network.

USING THE DMS-3/F AS A STAND-ALONE COMPUTER

When using the DMS-3/F as a stand-alone computer, the operating system is loaded from a Floppy Diskette. This is called 'booting from a floppy'. The Floppy Diskette must have the CP/M operating system recorded on its first three tracks. (See section 7.3--SYSGEN.)

To load CP/M into the computer's memory, insert a CP/M Diskette into the left-hand drive. (The DMS Distribution Diskette that came with your system will have the CP/M system tracks recorded on it.) The screen will show:

```
CP/M x.xx
A>
```

The DMS-3/F is now ready to receive commands from you. If you need to know more about CP/M, read section 3.

The default CP/M Drives for a stand-alone DMS-3/F are all assigned to the Floppy Diskette Drives. Drives A and C are assigned to Diskette Drive M0 (the left-hand drive). Drives B and D are assigned to Diskette Drive M1 (right-hand drive). The default printer assignment is set for Serial Port 2. For a further explanation about assigning CP/M Drives, see section 2.

NOTE---Certain sections of this manual assume that the DMS-3/F will be used in a HiNet environment. Therefore many of the terms and examples used here relate to the HiNet network. If you are using the DMS-3/F as a stand-alone computer and not as a HiNet workstation, then some of the principles will not apply to your work. (Such as sharing partitions and logging into the network.) However, the majority of the information presented in this manual about CP/M,

files and operating programs, applies to all DMS equipment.

USING THE DMS-3/F AS A HINET WORKSTATION.

If you wish to use the DMS-3/F as a HiNet workstation (with local storage), you must use a slightly different procedure after you turn the computer on. The computer may be set to boot either from the Floppy Dikette or the HiNet network. If it's set for the network it will automatically load the operating system from the HiNet Master.

The DMS-3/F can be selectively booted, no matter how it's set internally, by entering the PROM Monitor. Push in and hold the Interrupt button and press the Reset button once; release the Interrupt button. A colon should appear at the lower-left corner of the screen. Type in the letters **BN** (Boot Network) after the colon if you want to boot the from the Network or the letters **BF** (Boot Floppy) to boot from the Floppy Diskette.

1.4 THE KEYBOARD.

(Refer to Diagram 2).

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.

1.4.1 NUMERIC PAD.

On the right side of the keyboard unit is a numeric keypad for entering numeric data. It is similar in layout to that of most adding machines or calculators; with the digits 0-9, a decimal point, and an ENTER key. The ENTER key has the same effect as the RETURN key.

The number values for the keypad are not permanently assigned. The Distribution Floppy Diskette has a cold boot command which will read a CUSTOMIZ file called PADKEYS.SF that loads the numeric keypad with the correct numbers and assigns values to the function keys F1 through F16. You can use the CUSTOMIZ program to assign whatever codes or strings that you wish to the keypad keys. (For example you may want to program a word processing program's cursor control codes into the keys to make editing easier.) If you change the keypad's keys values with CUSTOMIZ, make sure you either run the CUSTOMIZ program manually or change the cold-boot command with SYSGEN. (See section 7.3) Remember that you can program three different values into each numeric keypad key (except for the Enter key).

NOTE---If the DMS-15 is used as a stand-alone, the Hard Disk does not have a cold boot command capability. If the DMS-15 is a HiNet Master you can use the USERS program to create a cold boot command that will load a CUSTOMIZ file.

Most people find it easier to use the numeric keypad for entering a large amount of

numeric data. The numeric pad numbers 2, 4, 6,

and 8 are also used in some application programs to control the cursor.

1.4.2 FUNCTION KEYS.

Across the top of the keyboard are four groups of four keys each, labeled F1 through F16. These are the Special Function Keys. These keys can be programmed using Digital Microsystems' Customiz program. The number keys in the numeric keypad (along with the three blank keys in the main section) can also be programmed to perform as Special Function Keys. Each function key can be programmed with three values--one for the key alone, one for the shift value of the key and one for the CTRL value of the key. See section 4.0, Customizing.

If the keypad is loaded with the Customiz file PADKEYS.SF, then the function keys F1 through F16 will be assigned the following values:

F1	ASSIGN	F9	LOAD
F2	SD (SUPER DIRECTORY)	F10	SAVE
F3	PIP	F11	SETBAUD
F4	STAT	F12	SETIME <CR>
F5	TYPE	F13	TIME <CR>
F6	SUBMIT	F14	CUSTOMIZ
F7	REN (RENAME a file)	F15	DIRNET
F8	ERA (ERASE a file)	F16	WHO

Some of these functions must have additional information following the command or

a RETURN. The CP/M functions are explained in section 3. DMS HiNet commands are explained throughout the manual. See the index for specific references.

Each function key in the the top row has a CTRL/SHIFT value that is permanently set at the factory. These values cannot be reset with the Customiz program. The CTRL/SHIFT values are:

CTRL/SHIFT F1 Load function key from keyboard.
CTRL/SHIFT F2 Enter Local Mode.
CTRL/SHIFT F16 Trap Mode.
CTRL/SHIFT F29 Reset CRT controller ROM.
CTRL/SHIFT F30 Flush CRT controller buffer.

See section 4 for more information about loading functions keys from the keyboard with the CTRL/SHIFT F1 key.

Local Mode allows you to send ESC codes directly to the CRT controller so that you may change the display. Pressing F2 will display the word LOCAL in the upper right corner of the screen. In Local Mode you can reverse the screen display by pressing ESC and then capitol T. Pressing ESC T again will return the screen to normal (green characters on black background). Pressing ESC b while in Local Mode increases the screen intensity by one increment. (There are a total of 15 increments.) ESC d will decrease the screen intensity. See Appendix B for other ESC codes.

The Trap Mode is used by programmers to see the Hexadecimal value of a character before it is processed by the computer. CTRL/SHIFT F16

toggles this mode (press it once for on, press it again for off). The Hex value is displayed in the upper left corner of the screen. Pressing CTRL/SHIFT F15 will send the character to be processed.

For programmers, CTRL/SHIFT F29 (upper right blank key in main section) resets the CRT controller ROM thus emptying the programmed values in the function keys. CTRL/SHIFT F30 (bottom right blank key) flushes the CRT controller buffer if the function keys are in an endless loop.

1.4.3 MAIN SECTION.

For the most part, the main section of the keyboard is 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.

On the far left of the second row from the bottom is a key labled CTRL. This is the **CONTROL** key. When you hold down the CONTROL key with the little finger of your left hand, 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 D** would mean strike the D 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, and 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 both the word **RETURN** and the symbol **<CR>** to indicate a Carriage Return in command sequences.

For example, when you turn on the Workstation and get the log-on 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 and 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 get hung up and unable to respond to normal commands (hence the name 'Escape'). Your application 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 letters. In a word processing program, hitting the DELETE key causes the Cursor to move one space to the **left** and erase that character (or space).

In other programs or environments, such as CP/M (see section 3), the DELETE key operates by displaying the character it has just deleted. For example, if you were in CP/M and 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 and erases whatever is there.)

When the DELETE Key is used with the SHIFT Key held down, it types out the Underline Character like this: _____.

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 some other type of

program, or CP/M, it may 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 some programs, the computer sends lines of data or text to the screen faster than you can read them. 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 which is used to stop and re-start this screen scrolling. When you hit the PAUSE Key (or CTRL-S) the screen stops in place. When you hit the PAUSE Key again, the computer resumes adding lines to the bottom of the screen and everything continues scrolling upward.

LINE FEED.

The LINE FEED Key is located on the right side of the second row from the top. In some programs and operations it is used to move the cursor down one line.

BLANK KEYS.

There are three blank keys on the right side of the main section. These are extra Programmable Keys which can be programmed for a variety of functions. See section 4 to learn how to program these keys along with the function keys.

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 on the DMS-3/F only affects the letter keys. It has no effect whatsoever on the symbol and number keys. When the CAPS LOCK is down, use of the SHIFT Key causes letters to be typed in lower case.

REPEATING KEYS.

All of the keys on the DMS-3/F (including the command keys) are repeating keys. If you hold them down they will automatically repeatttttttttt until you release them.

1.5 DMS-3/F PORTS.

(Refer to Diagram 1)

The DMS-3/F has several ports for connecting the station to various devices (printers, modems, etc). In addition to the HiNet network Serial Port, there are four RS-232C Serial Ports on the back of the computer's cabinet. Starting from the top down, the ports are numbered PORT0, PORT1, PORT2 and PORT3.

PORT 0 is configured for a CRT.

PORT 1 is not usable when the DMS-3/F is operating under HiNet. Otherwise it may be

configured with a jumper block.

PORT 2 is configured for a RS-232C serial printer. A jumper block is provided to customize the output for particular printers.

PORT 3 is can be used for a Modem.

PORT F--PARALLEL PORT is used to connect a parallel printer directly to the DMS-3/F.

See sections 5 for information about connecting printers and Modems to these ports.

1.6 MAINTENANCE

The DMS-3/F requires simple but periodic maintenance. The CRT screen should be cleaned only with the soft cloth that came with the computer or a soft brush. The CRT is covered with a nylon anti-glare screen; cleaning it with coarse cloths may scratch it. Do not use liquid cleaners of any type.

FAN FILTER

The cooling fan filter must be cleaned routinely; especially in a dusty or polluted environment. If the fan filter becomes clogged with dust, the components inside the computer could overheat and be damaged. Cleaning the fan filter is easy, just follow these steps.

1. Remove any Floppy Diskettes from the disk drives and turn off the power. Dust from the filter may get on the Floppy Diskettes and possibly ruin them if you leave them in the drives while cleaning the filter.

2. On the back of the DMS-3/F's cabinet is the fan grill. This can be removed with a sharp pointed tool such as a penknife or nailfile. Gently pry the plastic grill off. Behind the grill is a foam filter and wire screen.

3. Remove the foam filter and wire screen. Preferably you should take the foam filter away from the computer and wash it in some water until it is clean. Squeeze it or press it between paper towels until it is dry. (If you just knock it on the side of your desk, the dust will still be in the air around the computer.)

4. Replace the wire screen first and then the foam filter. Snap the plastic fan cover back into place. Turn the DMS-3/F on and let the fan throughly dry the filter for a few minutes before reinserting any diskettes.

READ/WRITE HEADS

The Read/Write heads in the Floppy Diskette Drives should also be periodically cleaned. The only recommended way to do this is to purchase a 5.25 inch Diskette Head Cleaning Kit from a computer store. Follow the directions that come with the kit carefully.

2.0 USING THE WORKSTATION WITH HINET

2.1 INTRODUCTION.

This chapter will provide the basic information necessary for operating most DMS workstations on the HiNet local area network. It will not attempt to cover all aspects of the system. Additional information is available in the HiNet Master Section of your Network's Master's User Manual.

The DMS-3/F can be used as a HiNet station. This chapter is a generic explanation of HiNet and DMS workstations. Most details will apply to the DMS-3/F if it is used as a network station. Any discrepancies will be pointed out.

2.2 BEFORE STARTING.

Before beginning this section, 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) of the application program(s) you will be using.

- 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 flashing underline of light or a solid block 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 login at any station by turning on the power or, if the power is already on and someone else logged in, by either pushing the RESET button or entering the command **LOGIN** <CR> after the A> prompt. On the workstation's screen you will see the words:

```
HiNet x.x
Login please
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:**.

```
HiNet x.x
Login please
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 simply type 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.

NOTE---A network can consist of two different types of workstations, serial and parallel. Your User Name will access only one type of workstation at a time. If your user name is for a parallel workstation (e.g., DMS-5000, DMS-3/F), then you will not be able to login to a serial station (e.g., DMS-1280). The workstation will 'hang' after you enter the password. You must have two different User Names, one for

each type of workstation, in order to login to both kinds. Refer to the HiNet Master section in the manual for your network's Master.

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 (see section 3.0). Application programs usually have their own forms of prompts such as **:** or **OK.** 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.)

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 only recognize 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 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.

CANCELLING AND CORRECTING COMMANDS

A command line may be corrected and/or cancelled 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. This will erase the line all the way back to the CP/M prompt.

If you have made a mistake in a command line that was particularly complex, you have the

option of preserving the command line with the mistake and then 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 faster then the screen responds to them.

2.8 LOGGING OFF.

To log off, first be sure you have saved your work, then exit from the application program to CP/M. (Your application program's user's manual will tell you how to do this.) You can then log off the network by either pushing RESET, turning off the power or by entering the command **A:LOGIN<CR>**. The LOGIN command logs off the last user on the workstation and brings up a new login message.

NOTE---Saving your work means that you are storing your text or programs on the Master Hard Disk. There the information is not affected by anything that might happen to your workstation, such as when you reset it or log off the network.

When you see the CP/M Command Prompt (**A>** or **B>**, etc.) you can either reset the station or turn it off. If someone else wishes to use the workstation, push the RESET button and it will automatically log off the last user and bring up the login message. If no one else is going to use the workstation, turn off the power with the ON/OFF rocker switch.

NOTE---If you turn off (or reset) the workstation before saving your work, whatever you have done since the last time you saved your work will be lost. The procedures used to save your work are different in each application program; they are explained in each program's user's manual.

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 a Hard Disk Memory to store information for everyone on the network. This Hard Disk Memory is divided into Partitions that contain files. You can think of the Hard Disk Memory as a very large filing cabinet with dozens of drawers. Each partition is like a separate file drawer that contains many or few 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.

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 to be used 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 the new version placed into the file. Some applications programs will rename the original file and save it as a backup file.

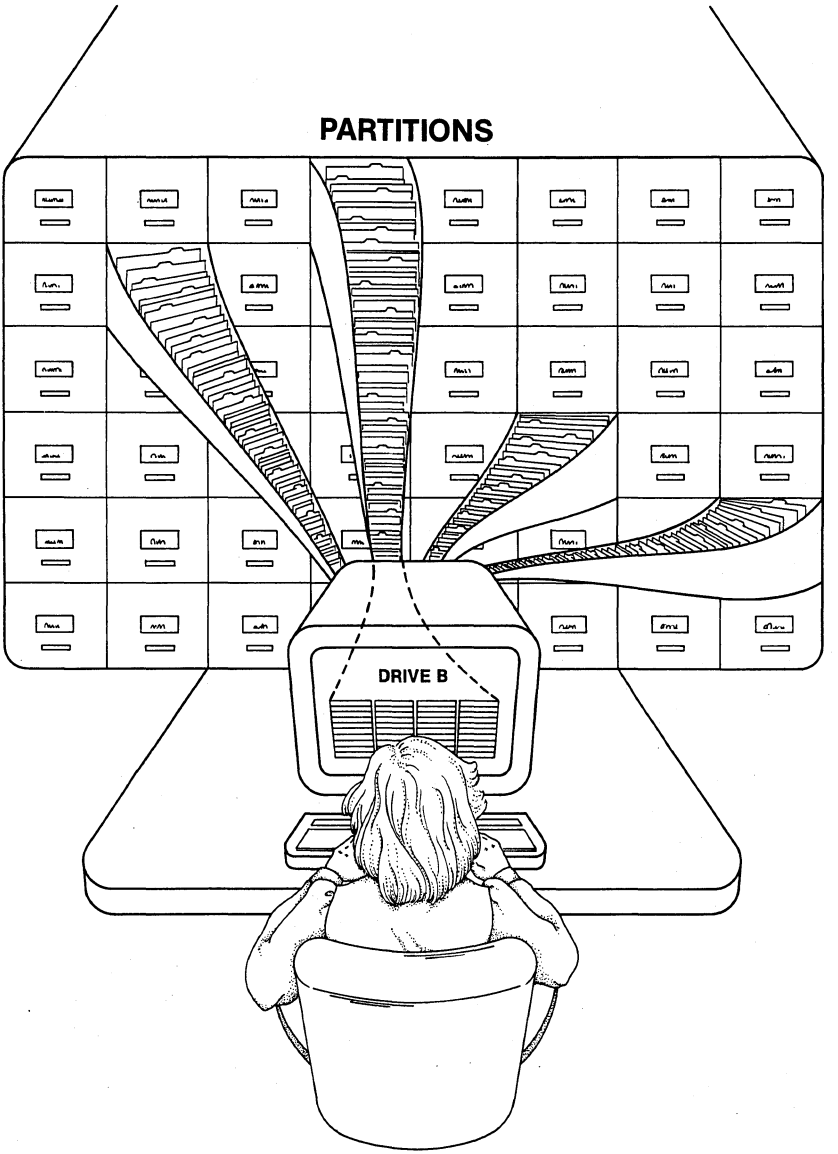
DRIVES.

Inside a DMS workstation are 4 connections, 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'.

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 of the partitions on the Master Hard Disk.

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 them, 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, or the DMS-3/F, for example). At those stations you can assign one of your four network drives to a Floppy Disk Drive or a Local Hard Disk partition instead of a Master Memory Hard Disk partition.


PARTITIONS
DRIVE B

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 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 will give it its name. Files can also 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 the 14 forbidden characters: > < , ; : + ? *] [ ) (. and TAB. (These characters are reserved for special CP/M instructions. E.g., 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 ca lead to one or both files being destroyed. CP/M will not allow you to have the same filename twice in one partition. If you copy a file into another partition that has a file with the same filename, the file in the destination partition will be overwritten, effectively erasing it. Program files normally exist in several different partitions because they have the exact same content.

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.

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's Hard Disks has been given a name. Some may be given the names of the people who use them for their own work. Such names may be the same as their System User Name. A System User Name, remember, allows a person to login to the HiNet network; it is like a key allowing you access to the HiNet system. A named partition is somebody'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

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

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 thousands of bytes. A byte is one character or space in written text, and an average single-spaced typed page is about 3,000 bytes, usually abbreviated 3K. The K stands for 'Kilo' (the metric word for thousand). A million bytes would be abbreviated 1M (M for 'Mega').

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 that can be stored within a given partition. Thus, if you had a 512K partition, you could put into it one file of 512,000 bytes, or any combination of files that added up to no more than 512K.

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 default partition assignments were:

A: SYSTEM
B: MAIL
C: PAT
D: M0

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

By typing **ASSIGN** (**B>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 temporarily assign different partitions to any of your drives. Of course, temporary assignments only last until you log off (or change them again). Whenever you login 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, people usually have their own desks or workspaces, and 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.

2.11.5 ASSIGN COMMAND.

The Assign command is used to see what partitions (if any) 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 5).

To see a list of your current assignments type ASSIGN at the command prompt (**A>ASSIGN <CR>**). Your screen will display a table like this:

```
A>assign

ASSIGN for BIOS x.x and later, Version x.x

Current Disk Assignments
------------------------

A-  HiNet Partition  SYSTEM    size 1M   bytes
B-  HiNet Partition  MAIL      size 512K bytes
C-  HiNet Partition  ACCOUNTS  size 512K bytes
D-  HiNet Partition  MO        size 640K bytes

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

In this example, SYSTEM, MAIL, ACCOUNTS and MO, are partitions assigned to the A, B, C, and D drives. The SYSTEM partition usually contains the various programs used by everyone on the network and it is commonly assigned to drive A. MAIL is the name given to the partition used for the network electronic mail program (see section 10). The MAIL partition must be assigned to your B drive in order for you to access it.

You can assign any drive to one of your local storage devices. Normally the C or D Drives are assigned to the Floppy Diskette Drives on the 3/F. You may wish to assign only one of them if you want quicker access to three Network partitions instead of another Diskette Drive.

It is not necessary to have partitions assigned to all of your drives. You can leave a

drive unassigned by entering **U:** after the drive letter.

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-15 has one Mini-Floppy Disk Drive and the DMS-3/4 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 (Floppy Disk Designator)

The Floppy Disk Drives on each unit have different designators depending on the size of the drive, and the model type. The DMS-3/F and DMS-3/F 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/F) and M1 (for the right drive on the 3/F). 8-inch Floppy Disk Drives are designated as D0 and D1 for Double Density Disks; S0 and S1 for Single Density Disks.

Floppy Disk Drive Designators

DMs-3/F	Left Side = M0	Right Side = M1
DMS-15	Left Side = M0	
DMS-3	Left Side = D1,S1	Right Side = D0,S0
DMS-4	Top = D0,S0	Bottom = D1,S1

CHANGING A DRIVE ASSIGNMENT.

To change a drive assignment, type the command **ASSIGN**, a space, the **letter** of the drive you want to change, a space, the **name** of the new partition you want assigned to it, and RETURN. For example, **A>ASSIGN B PILAR <CR>** would remove partition MAIL from drive B and replace it with partition PILAR. Naturally the partition you ask for must be one of those listed in the DIRNET table; if you call for a nonexistent partition, or mistype the partition's name, the system will respond with a message asking for the password. If there is no partition there will be no password and therefore any password that you enter will be wrong. After three attempts the message **ASSIGNMENT DENIED** will show on the screen. Thus:

A> ASSIGN <CR> lists current assignments.
A> ASSIGN (drive **letter**) (partition **name**) changes the assignment.

ASSIGNING A PRINTER.

When you type the ASSIGN Command, the table 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 then 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 3, then nothing is going to reach the printer until you change the assignment.

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 Port 2.

ASSIGN ERROR MESSAGE.

If you use the ASSIGN command incorrectly you will get a **SYNTAX ERROR** message and a screen that describes how to use the ASSIGN command. You can see this ASSIGN command information screen by entering the command **ASSIGN HELP <CR>.**

2.11.6 PASSWORDS.

Partitions may be secured against unauthorized access by use of a password. If this is the case, the word **'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. If you type an incorrect password the station will respond **'ASSIGNMENT DENIED'.**

2.12 USING PARTITIONS AND FILES.

The best practice 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 their workspace partitions, the Hard Disk Memory would become full of duplicated programs. By having a single partition devoted only to programs, 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 2.12.1 below describes how to move from one partition to another, and section 2.12.2 explains how to use programs stored in one partition and data files stored in another.

2.12.1 CHANGING DRIVES AND PARTITIONS.

Whenever you are using your workstation you are 'logged' to one of your four 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, and 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) you 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 drives, you must first use the ASSIGN command to put it on one of the drives. See section 2.11.5.

2.12.2 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 bring a temporary copy of a program (or other file) from

another drive/partition into your computer's workspace. This is done from the command prompt by typing the letter of the drive/partition where the file is stored, a colon, the file's name, and carriage return.

For example, **B>A:XYZ<CR>** would bring a temporary copy of the XYZ program from the partition assigned to drive A 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).

While you are using a temporary copy of that applications program in your station's workspace, other network users could also be using temporary copies of the same program to work with in their own partitions on their own workstation.

NOTE---When invoking a program for use it is not necessary to include the file type identifier (e.g., .COM or .CMD). Only the part of the file name before the period need be used. For example, **D>A:THIMK<CR>** would call up the THIMK.COM program.

Of course, as soon as you exit the program, reset your workstation, or turn it off, the temporary copy of the program would disappear from your station's workspace. (If you wanted a permanent copy of the program stored 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 open the partition assigned to drive A, bring a temporary copy of file ACROSS.PAR into the workstaton's memory and remain logged on to drive C.

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

Here are some of the different ways you can use the CP/M 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.

2.12.3 PARTITION SIZES AND 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 partition, there can be stored only a total of 128 files, even if each file has only 2 Kbytes stored in it. Therefore, even though only half of the partition is filled with files, you would not be able to add any more files.

In a situation like this you would get a **Directory Full** 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, be sure to 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 should also store important old letters and memos on clearly labeled Floppy Diskettes.

2.13 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 HiNet-CP/M network only allow 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, the you will have to enter a CTRL 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 back-up 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 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.

2.13.1 HIDOS

HiNet-HIDOS is an upcoming release that can be purchased from Digital Microsystems. 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 that allows multiple users to work with different files in the same partition without error. As a modification of CP/M, HIDOS is completely compatible with CP/M 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.

To allow more than one person to work in a partition without getting R/O errors you must first install the HIDOS operating system on your network as explained below. Once that is done, you must flag with the ALLOC program (section 7.7) the partitions that you wish made accessible to more than one person at a time (these are called Shared Partitions).

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. The NETLOCK utility must be used to prevent two people from accidentally entering the same file (see section 2.13.2).

NOTE---It is possible to adapt software applications programs to provide for automatic file- and record-locking which makes it impossible for two people to cause each other shared-partition errors. Such adaptation also allows simultaneous updating of different records in the same database file. Details can be obtained by writing to the Documentation Department at Digital Microsystems.

2.13.2 NETLOCK

If more than one person uses files in the same partition, NETLOCK can be used to avoid BDOS R/O errors (or other errors) which cause the loss of some data. A BDOS R/O error occurs when two people are logged in to a partition at the same time. NETLOCK is a warning signal that, **if you use it**, warns people when a partition is already being accessed.

Using NETLOCK.

To avoid errors, before you log in to a partition on one of your drives, type **NETLOCK** followed by the **Partition's Name** and a **RETURN** (for example: **A>Netlock Account3<CR>**). In this case, the partition name, ACCOUNT3, is called a **'lockstring'** because the NETLOCK program stores the name and looks to see if it is already in use whenever someone invokes it.

NOTE---HIDOS. If you are sharing a partition under the HIDOS operating system, use the **file name as the lockstring.** In other words,

since HIDOS allows you to share a partition but not a file, you should enter after NETLOCK the name of the file you intended to work with instead of the partition name.

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 the partition must use NETLOCK. Thus, everyone who is likely to use the same partition(s) should regularly use NETLOCK before logging on to such a partition.

If no one has already entered that particular lockstring (partition or file name) in NETLOCK's table, you will get a message ending with: **Your lock string is stored in the lock table.**

If someone has ALREADY used NETLOCK to enter that name, your message will end: **** This file or partition is locked.** This means that someone is currently accessing that partition (or file if using HIDOS) and you should not login to that partition (or file). (If you do log in to an in-use partition or file one or both of you will get errors and lose some or all of your work.)

As far as NETLOCK is concerned, a lock-string can be any combination of 13 characters or less, but it is best to use the actual partition name (or file name if using HIDOS) so that everyone enters and looks for the same string. For example, if someone using the ACCOUNT3 partition entered the lockstring ACT3, another person entering the lockstring

ACCOUNT3 would get the message accepting the string and would think the partition was not in use.

When the first person leaves the partition the NETLOCK lockstring should be erased so that others will not be erroneously told the partition is in use. To erase a lock, type **A>UNLOCK Lockstring name<CR>**, that is, UNLOCK followed by whatever lockstring name you wish to erase.

NOTE---Resetting your workstation or doing a 'warm boot' (CTRL C) will also 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 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 UNLOCK, do a CTRL C, or Reset.

2.13.3 USING TWO STATIONS AT ONCE.

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

There is no problem if you login and work at two different stations and 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, if you are logged onto two stations--both of which are accessing the same non-HIDOS 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 (you will get a **BDOS ERROR R/O** message and will lose your work since your last Save). To avoid problems if you must change files on the same partition, always enter a **CTRL C** after the CP/M prompt each time you change workstations and before entering any new data.

If you choose to implement the upcoming release of HiNet-HIDOS, you can add or change different files in the same 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.

2.14 THE WHO COMMAND.

You may find out who is currently using the network by typing in the command **A> WHO <CR>**. Your CRT will display a table listing the

current users by their User Name. It will show the time each user last logged on, the last time they requested information from the system, and whether they have written anything to the disk or only read from it. 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 (see section 5.2) 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.

```
A>WHO

    Who for BIOS x.x and later, version x.x

                HiNet Status as of 11:15:07

User No  User Name  Login Time  Last Req Time  request  status
-------  ---------  ----------  -------------  -------  ------
00       MASTER     09:00:04    09:22:59       read     active
01       JOY        09:11:12    11:11:07       read     active
03       PILAR      09:35:47    10:58:32       write    active
06       LEROY      10:01:55    10:11:44       read     active
09       CHOU       10:17:02    10:59:16       read     read
14       AKIKO T    10:21:55    11:14:34       write    active
17       DR.GEO     10:45:39    10:50:51       read     active
21       MS.MAVEN   11:12:58    11:15:11       who      active

User Name   Spool Time  File Length  Status
---------   ----------  -----------  --------
CHOU        10:13:19    287 records  printing
MELVIN      10:32:58    5   records  ready
CHOU        10:45:13    23  records  ready
SUPE3       11:12:32    25  records  spooling
A>
```

2.14.1 WHO HIST COMMAND.

By typing **A> WHO HIST <CR>** you can see a table showing who has used the system that day and the various times they have logged on and logged off.

2.15 RESET.

The RESET button is the left button of the pair located on the lower right corner of the front of the 15. It is used both to log off the network and also to recover from problems that cause the computer to become unresponsive to normal commands.

LOG OFF.

As explained in sections 2.4 and 2.8 you may use the RESET button to logoff the Network and bring up a new login message. You can also use the LOGIN command to log the last user on a workstation off the network and bring up a new login message. **REMEMBER——If you push the RESET button or enter LOGIN, everything you have done since your last 'save' command will be lost.**

HANGS.

Sometimes a problem in the system, a bug in a program, or a mistaken command can cause the computer to 'hang'. In computer jargon a 'hang' is when none of the keyboard commands have any affect on the system. In other words, no matter what keys you strike, or what control commands you issue, there are no visible results. When this happens you must use the Reset switch. This will log you off the system and bring up the login message.

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 CP/M system that comes with the HiNet network and your workstation, CP/M-80, is an extensive and sophisticated program. In this manual we will describe only those commands and functions most often used by workstation operators. Further information on CP/M can be obtained from the various DMS Manuals, Digital Research's own manuals, 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 3.11.5).

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 by using the 'wildcard' symbols * and ? (see section 3.10.4). 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.

3.3 SD (Super Directory).

SD (for Super 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.

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).

REN 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 see a 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 told **FILE EXISTS.**

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. When the

erasure is completed the computer will display the command prompt. If you wish to make sure the correct file was erased, call up a directory with DIR or SD.

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 bbegan 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 re-confirm your command. It will instantly erase what you have told it to erase, so be very sure you specify the correct drive and filename to be rubbed out.

3.6 PIP (Copying and Transferring Files).

PIP 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 login 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).

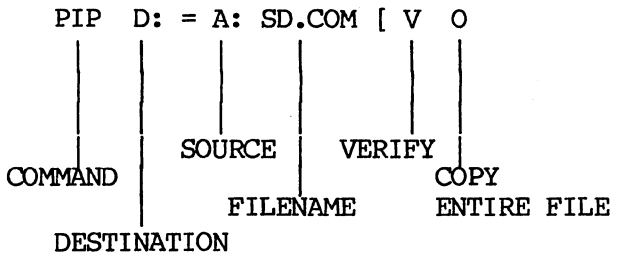
To copy a file from one partition to another you type **PIP, Destination Drive Letter, Colon, Complete Filename, Equals Sign, Origin Drive Letter, Colon, Complete Filename, RETURN.** For example, **A>PIP c:sd.com=a:sd.com<CR>** would copy the SD.COM file from drive A to drive C. The format is always **DESTINATION=ORIGIN** (or, in essence, 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.

Here is that same PIP command diagrammed for clarity with a command for verification of complete copy appended to the basic PIP command sequence. 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.



REMEMBER——PIP only makes copies of files, it does not move them from one place to another. If you wish a file permanently moved to a new partition you must 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 first type PIP 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 on drive B that ended in TXT 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 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 PROGRAM FILES.

Sometimes you may need to make absolutely sure that all the data in a file is copied when you use PIP. In some files, the text part of a file ends with a special CTRL character (CTRL Z). However, there may be additional information that must be copied along with the text. 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>.

3.6.5 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 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>
```

3.6.6 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: CHAPTER1, CHAPTER2, and CHAPTER3 into one file called FINAL.DOC that contains all three chapters in order, use the PIP command:

```
PIP FINAL.DOC=CHAPTER1,CHAPTER2,CHAPTER3[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 and 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.

3.6.7 PIPPING FILES TO OTHER PARTITIONS

When you transfer files from your partition to another partition 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 Save any work he or she will get a R/O error message and lose the entire file.

The correct method of transfering 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 before trying to save any files after you PIP one to their partition.

Alternatively, a person can always PIP a fil 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 only graphics or 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.

If the file you wish to look at contains more lines than can fit on your CRT screen, the file will scroll up across the screen very fast until the end is reached. In other words, long files flash across the screen much too fast to be 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 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.)

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 5 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.)

NOTE---Files created with word processors and other applications programs often place special computer command symbols in the file that can be successfully read only by that particular application program. If you try to read such a file with the TYPE command it may cause your workstation to display bizarre material on the screen or stop functioning until it is Reset with the RESET switch (see section 2.14).

3.8 CTRL P (Typing to Paper).

If you have a printer connected to either your workstation or the HiNet spooler (see section 5) 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 5 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.

NOTE---If you wish to print a file created either with a word processing program or some oth 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 can neither understand nor carry out.

3.9 USING SUBMIT FILES ON HINET

To avoid serious errors, the proper partition must be assigned to your A drive when using CP/M's Submit utility. When using a Submit file you must be logged to the partition on Drive A, and the partition you have logged to Drive A must not be a partition that anyone else could be logged to while you are running the Submit file. If someone else is logged to your A drive partition while you are using Submit, one or both of you may get a BDOS R/O ERROR, your Submit file may malfunction, or random portions of your Submit file may harm someone else's work.

(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.)

1- **NEVER have the SYSTEM partition assigned to your A drive while you are using Submit.**

2- Be sure that no one else will be logged to the partition you have assigned to your A drive. In other words, if you have Partition CHICO assigned to your Drive A, make sure that no one else will log into the CHICO Partition (on any of their drives) while you are using Submit.

To be safe, follow this procedure when using Submit:

A- If the SYSTEM Partition is assigned to your Drive A, re-assign it to another partition (**A>Assign C: SYSTEM<CR>**). See Section 2.11.5 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.XXX<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.

4.0 CUSTOMIZING

4.1 INTRODUCTION

The DMS-15, DMS-3/F, and DMS-5000 series are extraordinarily versaitile computers which allow the user to select a wide range of operating modes. This section of the manual will describe the use and operation of their various features and capabilities. The special features available with these computers are accessed through the CUSTOMIZ utility, a few of them are available only on the DMS-5000 or the DMS-15/DMS-3F and these exceptions will be noted in the text.

NOTE---See Section 4.11 for the proper version of Customiz to use with your terminal.

The CUSTOMIZ utility is used to individually customize your DMS-5000, DMS-15, or DMS-3/F workstation. CUSTOMIZ is an easy-to-operate menu-driven utility, that can be used to:

- Specify various screen features.
- Assign definitions to your Special Function Keys.
- Reconfigure the DMS-3/F and DMS-15 to emulate a variety of terminals.
- Choose a foreign language or special character set.
- Rearrange your keyboard.

See Section 4.11 for the system requirements and program files necessary to use CUSTOMIZ.

4.1.1 SCREEN ATTRIBUTES — OVERVIEW

CUSTOMIZ can be used to customize your CRT display by:

- Setting brightness to the most comfortable level (Section 4.3).
- Choosing regular or inverse video (Section 4.4).
- Selecting a style of cursor for the DMS-5000 (Section 4.5).
- Designating large or small characters for the DMS-5000 in horizontal mode (Section 4.6).

4.1.2 SPECIAL FUNCTION KEYS — OVERVIEW

There are a total of 90 Special Function Keys which you may program as you wish. See Section 4.7 for details on setting up Special Function Keys.

Special Function Keys are used to eliminate frequently repeated keystroke chains. During the writing of this manual, for example, the frequently written word 'CUSTOMIZ' was assigned to Function Key F1; thus every time 'CUSTOMIZ' was used, only that one key had to be struck. Additional Special Function Keys were assigned other frequently repeated names and phrases.

Special Function Keys may also be used to chain computer commands. For example, one single key might be designated to load and configure a word processor (or other Applications Program) while other keys could be set to carry out frequently used command sequences. Special Function Keys may also be nested, with one invoking another for maximum flexibility. See Section 4.7.9 for some possible Special Function Key ideas.

4.1.3 TERMINAL EMULATIONS — OVERVIEW

The DMS-15 and the DMS-3/F will emulate several different terminals. This allows software designed to run on one of those particular terminals to run on a DMS-3/F or DMS-15. By using the CUSTOMIZ utility you may easily switch among emulations. See Section 4.8.

4.1.4 CHARACTER SETS — OVERVIEW

The DMS-5000, DMS-3/F, and DMS-15 offer the ASCII (American Standard) Character Set as the standard settingg. You may use the CUSTOMIZ utility to install any of the European character sets supplied by DMS. With the DMS-5000 you have the additional capability of designing your own character set. See Section 4.9.

4.1.5 KEYBOARD RE-ARRANGEMENT — OVERVIEW

With the CUSTOMIZ utility you can redefine the keys on your keyboard. For example, the

placement of semi-colons, quotation marks, etc., can be changed to the positions they occupy on standard office typewriter keyboards, or the entire layout changed from the standard QWERTY arrangement to another format such as the DVORAK. Since different keyboard layouts can be stored in files, it is a quick and simple matter to change from one to another. See Section 4.10 for more on keyboard layouts.

NOTE---DMS provides TYPERITE.KBD, a Settings File containing a standard office typewriter keyboard which can be easily loaded with CUSTOMIZ. See Section 4.2.2 for more on loading files.

4.1.6 USING THIS PART OF THE MANUAL

Section 4.2 of this manual explains how CUSTOMIZ is used to make settings and save Settings Files. Because the CUSTOMIZ menus are largely self-explanatory, you may not need to read beyond Section 4.2 for most CUSTOMIZ operatons.

Sections 4.3 through 4.10 give detailed descriptions of the different types of settings, how they are used, and how they are created. Most of these sections begin with a step-by-step tutorial demonstrating how to carry out the particular operation; followed by sub-sections giving informational notes regarding the specific subject.

Section 4.11 contains information on the programs and workstation requirements needed to

use CUSTOMIZ. The Appendix contains a list of error messages, an index, and keyboard diagrams.

In the text of this manual, the menu item Highlighted on your screen by inverse video will be indicated in this manual's screen depictions by **BOLDFACED ALL CAPS.**

4.2 USING CUSTOMIZ

4.2.1 INTRODUCTION

CUSTOMIZ provides menu screens used to select various settings, define Function Keys, rearrange the keyboard, and choose a character set (see Section 4.2.3). Most of your selections will be implemented on your workstation as soon as you choose them. However, some types of settings do not become operative until you exit the CUSTOMIZ utility, and for some others you will be asked if you wish to start using the selection at once (load it) or only include it in a Settings File.

Once you leave the CUSTOMIZ utility, your selected settings will remain operative on your workstation until you turn it off or Reset it, or until you make different choices with CUSTOMIZ.

The Save Settings option of the CUSTOMIZ MAIN MENU COLUMN is used to store your choices in a Settings File. Once your selections reside in a Settings File, you can load them into your workstation with one simple command (see next section).

4.2.2 USING SETTINGS FILES.

A Settings File contains a record of the settings you selected and saved while using the CUSTOMIZ menus (see Section 4.2.3 Save Settings). Naturally, you can save as many different Settings Files as you wish. To load (or make operative) a Settings File, simply type **CUSTOMIZ filename<CR>** from the CP/M prompt. For example, **A>CUSTOMIZ SF2<CR>** will immediately implement all of the settings in file SF2 without taking you through the menus.

To load a Settings File, only the Settings File and the program file CUSTOMIZ.COM need be present in the logged partition or on the logged disk. In other words, all of the other CUSTOMIZ files (see Section 4.11) are only necessary for creating a Settings File, not using one.

4.2.3 CUSTOMIZ MENU SCREEN

The CUSTOMIZ MENU is used to select settings. After you leave the CUSTOMIZ utility your settings will remain in effect until you change them, or the workstation is turned off or reset. You can also use the CUSTOMIZ MENU to save your choices in a Settings File.

STARTING WITH CUSTOMIZ STEP BY STEP.

All of the CUSTOMIZ program files must be present in an assigned partition or on a logged disk. See Section 4.11 for system requirements and a list of the program files.

NOTE---CUSTOMIZ cannot be used to define settings on the DMS-3/F or DMS-15 while those workstations are emulating some other terminal. If you intend to use one of the terminal emulations you must first use CUSTOMIZ to create your settings, and then enter emulation mode. See Section 4.8 for more on terminal emulations.

1- To call up CUSTOMIZ:
From a logged disk drive, **A>CUSTOMIZ<CR>**,
From a work partition, **C>A:CUSTOMIZ<CR>.**

2- You will now see the CUSTOMIZ Menu Screen.

```
        SCREEN AND KEYBOARD CUSTOMIZATION
    Use arrow keys to move through a selection.
         Press RETURN to make a selection.

MAIN MENU          CURRENT SETTING | BRIGHTNESS LEVEL
 BRIGHTNESS                        |   Set Level
 Screen Type                       |  >No Changes
 Cursor Type                       |
 Screen Size                       |
 Function Keys                     |
 Language                          |
 Screen Emulation                  |
 Keyboard Layout                   |
                                   |
 Create Language                   |
 Create a Keyboard                 |
                                   |
 Recall Settings                   |
 Save Settings                     |
                                   |
 Sign Off                          |
```

At the left of the CUSTOMIZ Screen is the MAIN MENU COLUMN which lists the various types of settings available. This list will vary according to the workstation you are using (DMS-5000 or DMS-3/F & DMS-15). Reverse video will highlight one of the items in the MAIN MENU COLUMN. At the right of the screen is the Sub-Menu associated with the highlighted item.

NOTE---On the DMS-3/F and DMS-15 you should see the words **'NO PROG'** in the upper right corner of this screen.

3- The highlight is moved through the MAIN MENU COLUMN with the Number Pad UP and DOWN ARROW keys (8 and 2). As you move through the MAIN MENU COLUMN the various Sub-Menus belonging to the Highlighted entries will be displayed on the right side of the screen. These sub-menus show the various choices available. Hitting RETURN will select the highlighted item and activate the associated Sub-Menu. The Sub-Menu is then used to choose your setting. Use of the individual Sub-Menus will be explained in more detail in the appropriate sections.

As you use the Sub-Menus to make settings, the CURRENT SETTINGS COLUMN at the center of your screen will display your choices. Any Settings Files you create with the Save Settings option will contain whatever selections are listed in the CURRENT SETTINGS COLUMN.

MAIN MENU COLUMN

The MAIN MENU COLUMN is used to select a type of setting or operation. In other words, it lists the various capabilities of the CUSTOMIZ utility. The items in the MAIN MENU COLUMN are highlighted one at a time with reverse video. You can move this Highlight through the list with the Number Pad UP and DOWN ARROW keys (8 and 2). Hitting RETURN activates the Sub-Menu associated with the highlighted Main Menu item. The appropriate Sub-Menu is used to choose a setting or perform some other operation.

SUB-MENUS

The right side of the screen displays the Sub-Menu associated with a particular item in the MAIN MENU COLUMN. As you move the Highlight through the MAIN MENU COLUMN, new Sub-Menus will appear on the right half of the screen. These Sub-Menus show what settings choices are available. The currently set choice is indicated in the Sub-Menu by an arrowhead.

When a Sub-Menu is activated by moving the Highlight through the MAIN MENU COLUMN and hitting RETURN, the Highlight moves to the currently set choice in the Sub-Menu. While in the Sub-Menu the corresponding MAIN MENU COLUMN item is indicated by an arrowhead. Just as with the MAIN MENU COLUMN, the Number Pad UP and DOWN ARROW keys will move the Highlight through the Sub-Menu. Similarly, striking RETURN will select the highlighted Sub-Menu choice (and in most cases list it in the CURRENT SETTINGS COLUMN).

If you wish to exit the Sub-Menu without making any choice hit ESC.

NO CHANGES

All of the settings Sub-Menus have a NO CHANGES choice which is the normal (default) setting. NO CHANGES means that CUSTOMIZ will leave that aspect of your workstation alone. For example, a Brightness Level of NO CHANGES means CUSTOMIZ will leave the intensity of your CRT at its current setting. Since NO CHANGES is the default, a setting of NO CHANGES will be included in any Settings File you create, unless you go to a Sub-Menu and choose some other setting.

Normally, if you do not wish to designate a particular category of setting you should simply ignore that item in the MAIN MENU COLUMN and never enter the Sub-Menu.

When NO CHANGES is the setting for a category the Current Settings Column is left blank, indicating that CUSTOMIZ will do nothing with the item. Thus, when you create a Settings File any item that has no corresponding entry in the CURRENT SETTINGS COLUMN will be set at NO CHANGES.

CURRENT SETTINGS COLUMN

When CUSTOMIZ is first invoked the CURRENT SETTINGS COLUMN will be blank. As you use the various Sub-Menus, or read in a Settings File

with the Recall Settings option (see Section 4.2.3 Recall Settings), your selections will be listed in the CURRENT SETTINGS COLUMN. For example, if you use the Brightness Menu to set your CRT screen at level 13, the words **level 13** will be displayed. Each time you change a setting, the new setting will be listed in the CURRENT SETTINGS COLUMN. The contents of the CURRENT SETTINGS COLUMN show what will be included in any Settings File you save with the Save Settings option as explained in Section 4.2.3 (Save Settings).

NOTE---For some items, Language and Keyboard, for example, what is listed in the CURRENT SETTINGS COLUMN may be different from the settings actually in effect on your CRT and keyboard. This is because some items may be selected but not activated (in other words, listed in the CURRENT SETTINGS COLUMN for the purposes of creating a Settings File, but not put into immediate operation). Thus it is important to remember that only what is listed in the CURRENT SETTINGS COLUMN will be saved into a permanent Settings File.

SAVE SETTINGS

The 'Save Settings' choice will store all of your selections in a Settings File. This permanent record can then be loaded into your workstation without going through the menu by typing **A:CUSTOMIZ C:filename<CR>.**

Step by step

1- Move the MAIN MENU COLUMN Highlight to the SAVE SETTINGS option and hit RETURN as described in Section 4.2.3.

2- At the bottom of your screen you will be asked to enter a filename. Be sure to specify the drive where you wish the file to be stored (**C:XYZ.SF**, for example). The filename you choose for your Settings File must conform to the standard CP/M file name conventions. After typing in the filename hit RETURN. You will be asked to confirm the filename you have typed in. If you hit '**Y**' for 'Yes' CUSTOMIZ will create the file and return you to the MAIN MENU COLUMN. If you hit '**N**' for 'No' you will be asked for another filename.

REMEMBER---When you save settings into a file it is the selections listed in the CURRENT SETTINGS COLUMN that are recorded. Because you have the option of selecting some types of settings (Language, Keyboard) without having them immediately take effect, some of the items listed in the CURRENT SETTINGS COLUMN may not correspond to what shows on the screen or the keyboard you are using at the moment.

OVERWRITE

When you save a file and give a name that is already present on the logged disk or partition, CUSTOMIZ will inform you that the file already exists and ask if you wish to overwrite it. When you overwrite a file you

erase the old contents and put in the new contents. If you have modified or expanded an existing file you will probably wish to overwrite the old Settings File so you would respond with a 'Y' for 'Yes Overwrite'. If you answer 'N' for 'No don't overwrite', you will be asked to supply another filename.

RECALL SETTINGS

The Recall Settings option is used to load the contents of a Settings File into the CUSTOMIZ utility. This is done when you wish to alter or update an existing Settings File. Recall Settings can also be used when you wish to use part, or all, of an existing file in the creation of a new file.

Step by step

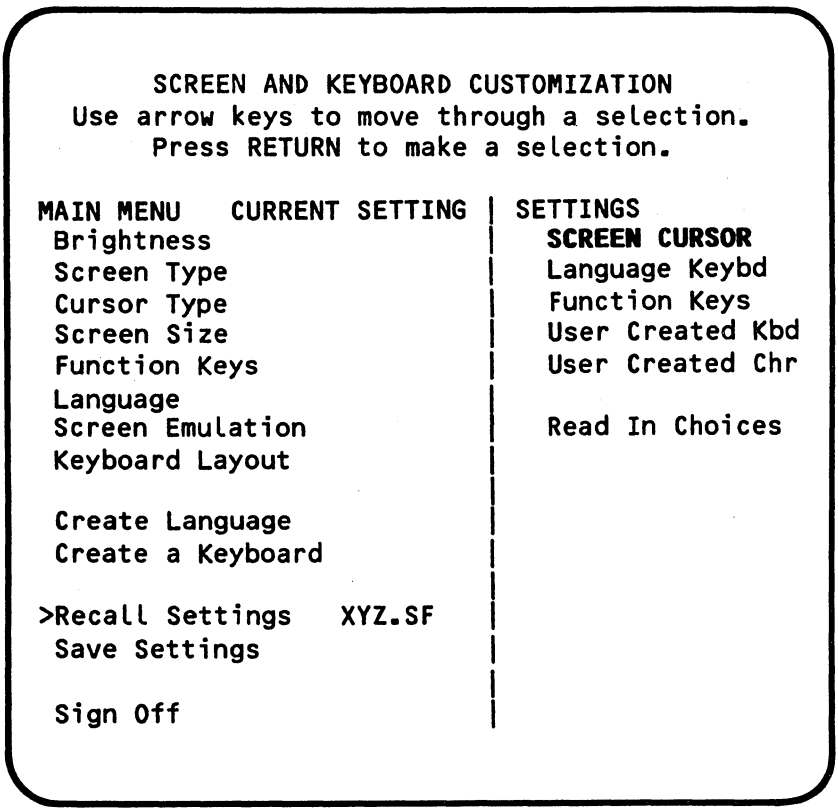
1- Move the MAIN MENU COLUMN highlight to the RECALL SETTINGS option and hit RETURN as described in Section 4.2.3.

2- At the bottom of your screen you will be asked to enter the filename you wish to load. Type in the filename and hit RETURN. The filename will appear in the CURRENT SETTINGS COLUMN opposite Recall Settings.

3- You will then be asked if you wish all settings in the file to be read in. If you respond 'Y' for 'Yes', everything in the file will be loaded and the appropriate entries made in the CURRENT SETTINGS COLUMN. You will then be

returned to the MAIN MENU COLUMN.

4- If you responded '**N**' for 'No don't read in all settings', a list of settings categories will be displayed at the right side of your screen.



5- The Sub-Menu now lists the categories of settings which you can select to be loaded. As usual, you move the highlight through the list with the Arrow Keys and select the items

you want by pressing RETURN. The categories you pick will be marked with an arrowhead. You may choose one or more items in any combination. If you change your mind about an item, hitting RETURN a second time will cancel its selection. In other words RETURN acts as a toggle switch selecting and un-selecting an item.

NOTE---**User Created Keyboard** and **User Created Characters** only load a character set or keyboard into CUSTOMIZ's workspace for alteration with MAIN MENU COLUMN items **Create Language** or **Create a Keyboard;** or for selection with the **Language** and **Keyboard Layout** items.

When you have made your choices place the Highlight over the **Read-In Marked Choices** option and hit RETURN. The appropriate settings will be loaded into CUSTOMIZ and displayed in the Current Settings Column. You will then be returned to the Main Menu Column.

NOTE---If you read in more than one Settings File, the last settings loaded will overwrite any existing settings. However, if you choose to read in only certain categories of settings from one file, you can then read categories from another Settings File into the empty slots and thus combine groups of settings from more than one file.

This ability to select the type of setting you wish loaded is very useful for creating a series of Settings Files that have some settings in common. For example, if you do word processing in several languages you may wish to have several Settings Files containing the same

Special Function Keys but different foreign language Character Sets. By modifying one Settings File, or combining parts of different Settings Files, and saving the results under new filenames, you can easily create a series of files appropriate to every necessity. (Manager Mode is often used for this purpose; see Section 4.2.6 Manager Mode.)

DMS-3/F & DMS-15

Since neither the DMS-3/F nor the DMS-15 are able to accommodate User Defined Character Sets, the message **Cannot load character set, this is a FOX** will appear if you load a file that was created on a DMS-5000. You can, however, use all other aspects of CUSTOMIZ including the standard Foreign Language Character Sets.

LEAVING CUSTOMIZ

To exit the CUSTOMIZ utility, move the Highlight over the **Signoff** choice in the MAIN MENU COLUMN, then hit RETURN.

If you made no changes in any settings since the last time you created a Settings File, you will be returned to CP/M. If you have made a setting that has not been saved to a file you will be reminded and asked if you still wish to exit. If you answer '**Y**' for 'Yes, I want to signoff' you will be returned CP/M. If you answer '**N**' for 'No, I don't want to leave' you will be returned to the MAIN MENU COLUMN. (Some

Applications Programs allow you to leave temporarily and run some other program. If you have entered CUSTOMIZ from an Applications Program CUSTOMIZ will return you to that program, not to CP/M.)

NOTE---Your settings will remain in force on your screen and keyboard whether you save your settings to file or not. They will remain in force as you have chosen them until you use CUSTOMIZ to alter them or reset or turn off your workstation.

UPDATING A SETTINGS FILE.

To update, expand, or alter an existing Settings File it is first necessary to load the file into CUSTOMIZ with the Recall item in the MAIN MENU COLUMN.

Because settings remain in effect on your screen and keyboard after you leave CUSTOMIZ, and even after you re-enter CUSTOMIZ, it is easy to forget that you first have to load the file in order to amend it.

For example, you may load a Settings File, begin to work with it, and then decide to add another Special Function Key. When you re-enter CUSTOMIZ your screen will continue to display all of the currently loaded settings, but as far as CUSTOMIZ is concerned there is nothing in the CURRENT SETTINGS COLUMN. If you now add the new key and re-save the Settings File, the only thing left in that file will be the new key; everything else will have been erased

(overwritten). Since the settings erased from the file are still operational on your workstation until you turn it off, you won't know anything is wrong until you restart your workstation and reload that file, at which time you will discover that all your settings (except the one new key) are gone.

4.2.4 CUSTOMIZ AND HINET LOGIN

The person in charge of your network can, if you wish, assign CUSTOMIZ to your Network User Name's type-ahead buffer. This would automatically call up CUSTOMIZ every time you logged onto the network. Below are three possible ways to take advantage of this capability:

1- If you always use your workstation with the same Applications Program (a word processor or accounting program, for example), you could have CUSTOMIZ, a Settings File, and your application program all attached to your User Name. Thus, whenever you logged onto the network your terminal would automatically be customized to your preference, the appropriate function keys designated, and your Applications Program brought up ready to go.

2- If you use more than one Applications Program, but still wish to have your workstation customized to some specified standard settings, you can easily do so by attaching CUSTOMIZ and a Settings File to your user name. This way, the terminal would be automatically adapted to your needs whenever you logged on. You could also

assign each Applications Program and appropriate Settings File to a different Special Function Key and thus invoke and configure with a single keystroke.

3- If you vary the manner in which you customize your workstation you can still have the CUSTOMIZ utility assigned to your User Name. When you log in this would either bring you right to the CUSTOMIZ Main Menu, or allow you to specify which Settings File you wish to use.

4.2.5 CUSTOMIZ ON THE DMS-5000

Function Key F14 has been assigned to CUSTOMIZ on the DMS-5000 workstation. Thus, after you log in to HiNet, hitting F14 will automatically type in CUSTOMIZ. From there you could type in the name of a Settings File followed by a RETURN or go to the menus by hitting RETURN without any Settings File name.

(NOTE---As a default setting, the assignment of CUSTOMIZ to F14 will remain in force until it is changed through use of the CUSTOMIZ utility.)

4.2.6 SETTINGS FILE INTERCHANGEABILITY

Settings Files are interchangeable between the two types of workstations (DMS-5000 and DMS-3/F & DMS-15), but Terminal Emulations will not work on the DMS-5000. The DMS-3/F and the DMS-15 cannot use different cursors, the Small Character Sets, or User Defined Character Sets.

MANAGER MODE

Manager Mode can be entered by typing **MGR** after CUSTOMIZ (**A>Customiz mgr<CR>**). Manager Mode is used to create Settings Files for later use on the two different types of terminals. When used on a DMS-5000 this mode displays a menu that contains all of the possible choices for both the DMS-5000 and the DMS-3/F/15, thus allowing you to create files applicable to either type of workstation.

While files created on one type of workstation are usable on the other, you are still limited by a particular station's capabilities. If a Settings File contains a setting that a particular unit cannot handle, that portion of the file will be inoperable. For example, you can load a file containing a User Defined Character Set into a DMS-15 but the Character Setting will not work.

4.3 SCREEN BRIGHTNESS

The brightness of the screen is measured in increments from 1 to 15, with 15 the maximum and 1 so dim as to be practically invisible. As with all CRTs, the brighter intensity levels may cause a slight blurring of the characters.

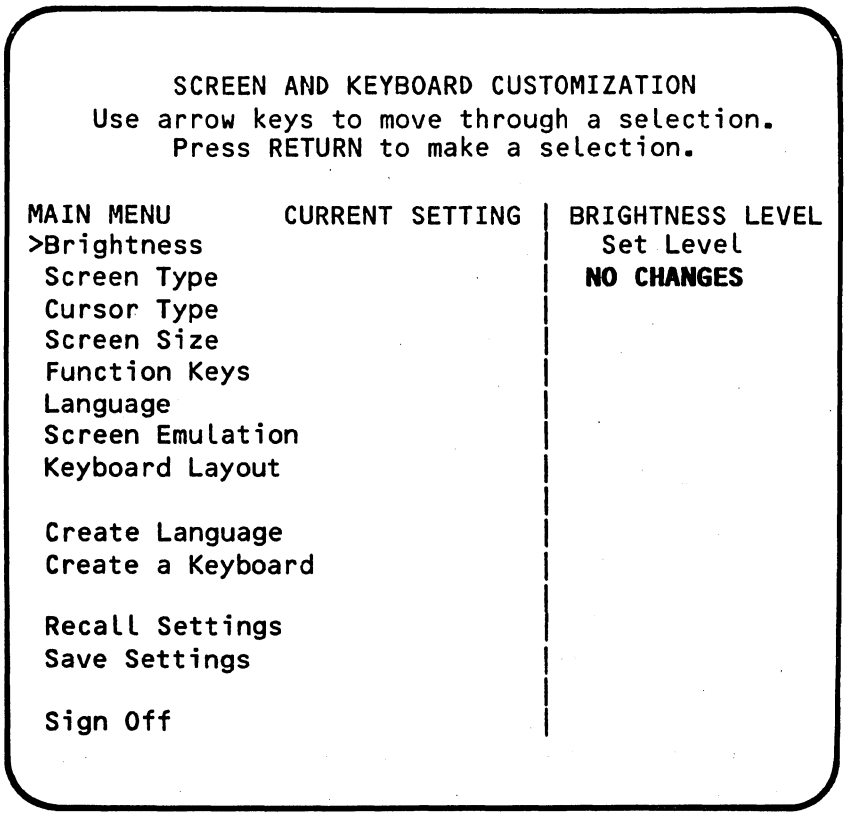
NOTE---The most comfortable brightness level will vary from person to person, and may change as the amount of light in the room increases and decreases.

SETTING INTENSITY STEP BY STEP

1- Move the MAIN MENU COLUMN highlight to the **BRIGHTNESS** option and hit RETURN as described in Section 4.2.3.

2- The current (default) Brightness Sub-Menu choice will be Highlighted in reverse video. Use the Arrow Keys to place the Highlight over your choice and hit RETURN. (ESC will bring you back to the MAIN MENU COLUMN without making any alterations in any settings.)

3- If you select the **NO CHANGES** option you will be returned to the MAIN MENU COLUMN and nothing will be listed in the CURRENT SETTINGS COLUMN opposite **'Brightness'**. See Section 4.2.3 for an explanation of the No Changes option.



4- If you select **SET LEVEL** the command line **>>> ENTER A BRIGHTNESS LEVEL BETWEEN 1 AND 15:** will appear at the bottom of your screen. Type in the number of the desired intensity level and hit RETURN. Your CRT screen will immediately go to the specified brightness level and you will be returned to the MAIN MENU COLUMN. The level you chose will be listed in the CURRENT SETTINGS COLUMN opposite the Brightness item.

DMS-5000

It is possible to adjust the screen intensity on the DMS-5000 without using CUSTOMIZ. Each time you strike **CTRL/SHIFT F2** (the F2 key with both the CTRL and SHIFT keys held down) the screen will brighten one increment (up to the limit of the screen's capability). **CTRL/SHIFT F1** will dim it one increment. These CTRL/SHIFT commands may be used at any time even while using an Applications Program. However, any adjustments made with a CTRL/SHIFT key are temporary; they are erased each time your workstation is turned off, or reset, or if you use the CUSTOMIZ utility.

4.4 SCREEN TYPE

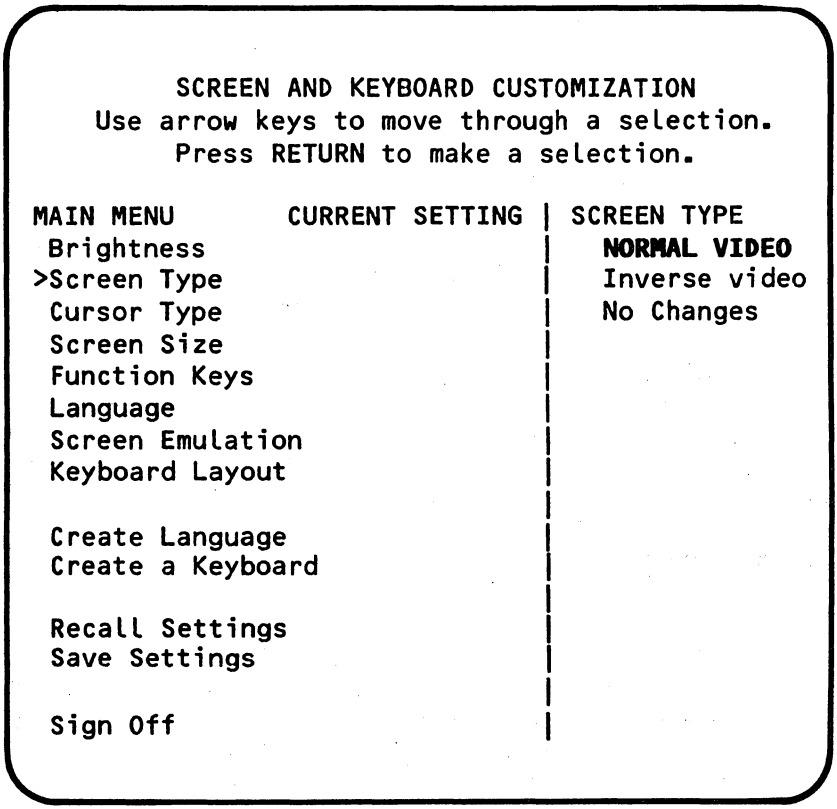
There are two types of screen available on the DMS-5000, DMS-3/F & DMS-15 workstations -- **Normal Video** (green glowing characters on a dark screen) and **Inverse Video** (black characters on a green screen). You should choose whichever is more

SCREEN TYPE STEP BY STEP

1- Move the MAIN MENU COLUMN highlight to the **Screen Type** option and hit RETURN as described in Section 4.2.3.

2- The current (default) Screen Type Sub-Menu choice will be Highlighted in reverse video. Use the Arrow Keys to place the Highlight over your choice and hit RETURN. (ESC will bring

you back to the MAIN MENU COLUMN without making any alterations in any settings.)



3- If you selected the **NO CHANGES** option you will be returned to the MAIN MENU COLUMN and nothing will be listed in the CURRENT SETTINGS COLUMN opposite **SCREEN TYPE.** See Section 4.2.3 for an explanation of the No Changes option.

4- If you selected either **NORMAL VIDEO** or **INVERSE VIDEO** your screen will immediately

become the type you have specified and you will be returned to the MAIN MENU COLUMN. Your selection will be listed in the CURRENT SETTINGS COLUMN opposite **SCREEN TYPE.**

DMS-5000

When using the DMS-5000 you may switch between regular and inverse video at any time without using the CUSTOMIZ utility. This is done by striking **CTRL/SHIFT F3** (the F3 key with both the CTRL and SHIFT keys simultaneously held down). You can do this on the DMS-5000 even while working in an applications program. Using CTRL/SHIFT F3 to alternate between regular and inverse video will not affect any other CUSTOMIZ settings or any Settings File.

DMS-3/F and DMS-15

When using the DMS-3/F or the DMS-15 you may switch between Normal and Inverse Video from the CP/M Command Prompt (**A>, B>,** etc.) without using the CUSTOMIZ utility. This is done by striking first the ESC key and then a capitol **'T'** followed by a RETURN (**A>ESC T <CR>**). Each time this is done the screen will alternate between regular and inverse video. Using ESC T will not affect any other CUSTOMIZ settings or any Settings File. ESC T should not be used while you are working in an Applications Program.

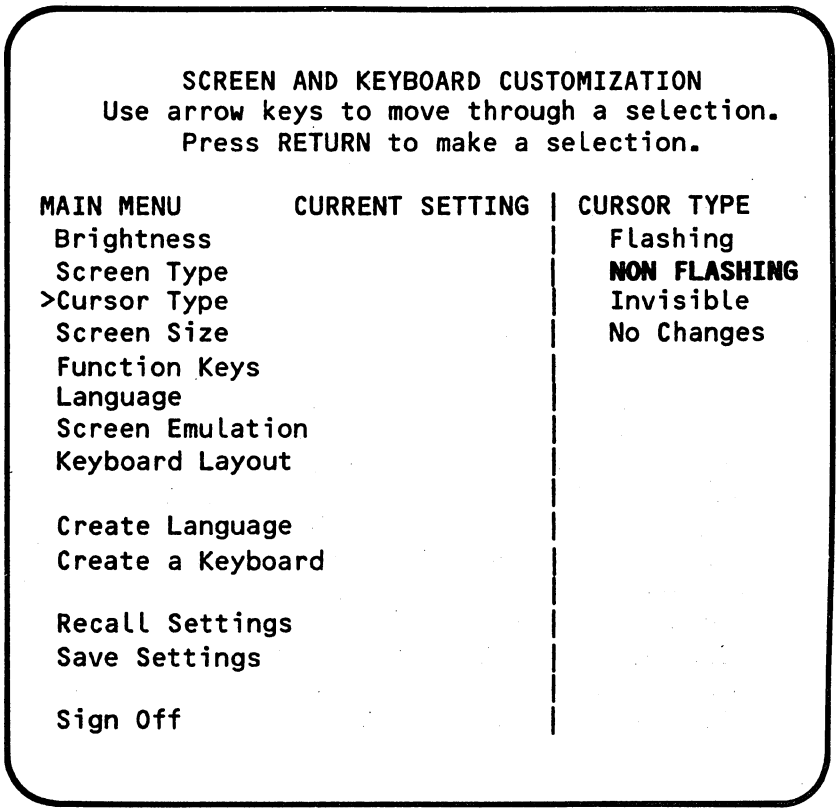
4.5 CHOOSING A CURSOR TYPE (DMS-5000 only)

The DMS-5000 has the capability of displaying three types of cursors: Flashing, Non-Flashing, and Invisible.

CURSOR TYPE STEP BY STEP

1- Move the MAIN MENU COLUMN highlight to the RECALL SETTINGS option and hit RETURN as described in Section 4.2.3.

Your screen should now look like this:



2- The current (default) Cursor Sub-Menu choice will be Highlighted in reverse video. Use the Arrow Keys to place the Highlight over your choice and hit RETURN. (ESC will bring you back to the MAIN MENU COLUMN without making any alterations in any settings.)

3- If you selected the **NO CHANGES** option you will be returned to the MAIN MENU COLUMN and nothing will be listed in the CURRENT SETTINGS COLUMN opposite **'Cursor'**. See Section 4.2.3 for an explanation of the NO CHANGES option.

4- If you selected one of the three Cursor types you will be returned to the MAIN MENU COLUMN and your selection listed in the Current Settings Column opposite **'Cursor'**. Choosing a Cursor type will not affect the Highlight or the CUSTOMIZ screen. However, as soon as you leave the CUSTOMIZ utility the cursor you have chosen will be in effect.

4.6 SCREEN SIZE (DMS-5000 only)

There are two character sizes available to the DMS-5000 when it is being used in the horizontal position. The Small character size allows the screen to display 132 characters per line, with a total of 50 lines. This size is often used for bookkeeping, spreadsheets, and statistical work. The Large character size allows the screen to display 80 characters per line and either 24 or 26 lines. Most applications programs are written for a screen that contains 24 lines but a few require 26

that contains 24 lines but a few require 26 lines. You should select the option appropriate to the applications program you are using. If you select the wrong number of lines the program may not scroll properly.

SCREEN SIZE STEP BY STEP

1- Move the MAIN MENU COLUMN highlight to the SCREEN SIZE option and hit RETURN as described in Section 4.2.3.

Your screen should now look like this:

```
        SCREEN AND KEYBOARD CUSTOMIZATION
    Use arrow keys to move through a selection.
        Press RETURN to make a selection.

MAIN MENU          CURRENT SETTING | SCREEN SIZE
 Brightness                        |   Small (132x50
 Screen Type                       |   NORMAL (80x24
 Cursor Type                       |   Extra (80x26)
>Screen Size                       |   No Changes
 Function Keys                     |
 Language                          |
 Screen Emulation                  |
 Keyboard Layout                   |
                                   |
 Create Language                   |
 Create a Keyboard                 |
                                   |
 Recall Settings                   |
 Save Settings                     |
                                   |
 Sign Off                          |
```

2- The current (default) Screen Size Sub-Menu choice will be Highlighted in reverse video. Use the Arrow Keys to place the Highlight over your choice and hit RETURN. (ESC will bring you back to the MAIN MENU COLUMN without making any alterations in any settings.)

3- If you selected the **NO CHANGES** option you will be returned to the MAIN MENU COLUMN and nothing will be listed in the CURRENT SETTINGS COLUMN opposite **'Screen Size'** See Section 4.2.3 for an explanation of the No Changes option.

4- If you selected a size option your choice will be listed in the CURRENT SETTINGS COLUMN opposite SCREEN SIZE. If the option you picked is a different character size than what is currently displayed, your screen will clear and the CUSTOMIZ Screen reappear in the new character size.

4.7 SPECIAL FUNCTION KEYS

Both character strings and computer command chains may be assigned to individual Special Function Keys. For example, during the writing of this manual a Special Function Key was defined with the word 'CUSTOMIZ', and hitting that single key produced the entire word. Similarly, a Special Function Key was assigned the entire chain of commands used to call up and configure the word processing program which was used to write this manual. See Section 4.7.9 for examples of typical Special Function Key uses.

4.7.1 DEFINING/ERASING A FUNCTION KEY STEP BY STEP

1- Move the MAIN MENU COLUMN highlight to the FUNCTION KEYS option and hit RETURN as described in Section 4.2.3.

Note---**Bytes Left in Buffer** tells you how many more characters may be assigned to various Special Function Keys. A total of 934 characters may be assigned to Special Function Keys for the DMS-5000, and 1958 for the DMS-3/F or DMS-15.

2- The current (default) FUNCTION KEYS Sub-Menu option will be Highlighted in reverse video. The Sub-Menu choices are explained below. If you wish to create a new key, erase a key, or replace the contents of an existing key, choose the CREATE/ERASE option. If you wish to modify an existing key select the EDIT option. Use the

Arrow Keys to place the Highlight over the choice you wish to select and hit RETURN. (ESC will bring you back to the MAIN MENU COLUMN without making any alterations in any settings.)

```
        SCREEN AND KEYBOARD CUSTOMIZATION
    Use arrow keys to move through a selection.
         Press RETURN to make a selection.

MAIN MENU          CURRENT SETTING | FUNCTION KEYS
 Brightness                        |   CREATE/ERASE
 Screen Type                       |   Edit a String
 Cursor Type                       |   Display Key
 Screen Size                       |   Read In Pres.
>Function Keys                     |
 Language                          | Bytes Left Buf.
 Screen Emulation                  |
 Keyboard Layout                   | ESC to Leave
                                   |
 Create Language                   |
 Create a Keyboard                 |
                                   |
 Recall Settings                   |
 Save Settings                     |
                                   |
 Sign Off                          |
```

CREATE/ERASE

This menu item is used both to create and to erase a Special Function Key. When this option is selected the message **>>> PRESS FUNCTION KEY YOU WISH TO CREATE OR ERASE** will

appear at the bottom of your screen.

ERASING

There are 90 Special Function Keys (see Section 4.7.4). Pressing one of them will automatically erase everything currently assigned to it and you will see the message: **DEFINING FUNCTION KEY xx.** If you do not wish to assign anything new to the key, hit RETURN and the key will remain empty. You will now be back at the **>>> PRESS FUNCTION KEY YOU WISH TO CREATE OR ERASE** message. From there you can either erase/define another Special Function Key or return to the MAIN MENU COLUMN or FUNCTION KEY Sub-Menu.

DEFINING

When you see the message **DEFINING FUNCTION KEY xx** you may begin typing in the characters and control commands you wish to assign to that key. What you type will appear at the bottom of your screen. When you are finished hit RETURN and you will be returned to the **>>> PRESS FUNCTION KEY YOU WISH TO CREATE OR ERASE** message. From there you can either erase/define another Special Function Key or return to the MAIN MENU COLUMN or FUNCTION KEY Sub-Menu.

EDITING A SPECIAL FUNCTION KEY

The Sub-Menu option **Edit a String** is used to modify an already existing Special Function

Key. When you place the Highlight over this choice and hit RETURN the message **>>> PRESS FUNCTION KEY YOU WISH TO EDIT:** will appear on the bottom of your screen.

When you press the Special Function Key you wish to modify, the string of characters and commands currently assigned to that key will appear on the bottom of your screen along with a flashing cursor.

When you are finished editing the string hit RETURN and you will be returned to the **>>>PRESS FUNCTION KEY YOU WISH TO EDIT** message. From here you can either edit another key or return to the other menus.

CORRECTING ERRORS

You can move the cursor through the string with the Number Pad LEFT and RIGHT ARROW keys (4 and 6). Wherever the cursor is placed you can type in new characters. If you make an error, use the DEL key to erase the character to the left of the cursor.

THE @ AND COMMAND KEYS

CUSTOMIZ recognizes RETURN, DELETE, LEFT ARROW (4), RIGHT ARROW (6), ESC, and @ as command signals for this part of the program. If you want to assign one of these characters to a Special Function Key you must first order CUSTOMIZ not to treat it as a command signal.

This is done by entering an **@**. The '@' commands the CUSTOMIZ utility not to obey the next character you enter, but rather to assign it to the Special Function Key. Since the '@' is a command signal it will not show on the screen or be assigned to your Special Function Key unless you first precede it by another '@'.

For example, to include the DELETE character in a Special Function Key string you would first type **@** (which would not appear on the screen) followed by the DELETE key which will appear on the screen as **DEL.**

To Include in a Special Function Key Definition:

Character	Type in	Appear on screen
DELETE	**@DELETE**	**DEL**
RETURN	**@RETURN**	**^M** (Arrow/Capital M)
@	**@@**	**@**
LEFT ARROW	**@4**	**F18** (Number Pad 4)
RIGHT ARROW	**@6**	**F24** (Number Pad 6)
ESC	**@ESC**	**ESC**

NESTING FUNCTION KEYS

It is possible to 'nest' Special Function Keys, in other words, to have one Special Function Key refer (or call on) another. For example, if Function Key F4 was programmed with the string **1 2 3 4 F9 A B C,** and Function Key F9 was assigned the string **X Y Z = @,** then hitting Special Function Key F4 would produce the string **1 2 3 4 X Y Z = @ A B C.** Naturally, if the character string assigned to F9 were altered the change would also affect the output of F4.

CHARACTER LIMIT

'Bytes Left in Buffer' tells you how many characters are available to be assigned to various Special Function Keys. A total of 934 characters may be assigned to Special Function Keys for the DMS-5000, and 1,958 for the DMS-3/F and DMS-15.

There is also a maximum limit to the number of characters you can assign to any single Special Function Key. With the DMS-5000 this maximum is 125 characters per Key. For the DMS-3/F and DMS-15 250 characters may be assigned to any given Key.

NOTE---When nesting Special Function Keys the character count of the nested key does not count against the number credited to the first key. Thus, by nesting keys a much longer string may be invoked by a single key.

4.7.2 DISPLAY ALL KEYS

The **DISPLAY ALL KEYS** Sub-Menu option is used to show the contents of all currently loaded Special Function Keys, in other words, those keys that were contained in a Settings File loaded by Recall Settings and/or programmed with the FUNCTION KEYS Sub-Menu screen during this present use of the CUSTOMIZ utility.

When you place the Highlight over this choice and hit RETURN a message will appear instructing you to hit any key to begin the display, or hit ESC to abandon it. The

definitions of all designated Special Function Keys will be listed on the left side of your screen. If there are too many to fit on a single screen, hitting any key will clear the first screen and show the next one.

4.7.3 READ IN PRESENT SETTINGS (DMS-3/F & DMS-15 ONLY)

The FUNCTION KEYS Sub-Menu option **Read In Present Settings** will only appear if you are using a DMS-3/F or a DMS-15. With the DMS-3/F & DMS-15 you can program Special Function Keys without using the CUSTOMIZ utility (see Section 4.7.8). The Read In Present Settings Sub-Menu option is used to load such independently programmed Function Keys into CUSTOMIZ so that they may be included in a CUSTOMIZ Settings File.

To do so, place the Highlight over the **Read In Present Settings** option and hit RETURN. You will be asked to confirm your choice. If you hit '**Y**' for 'Yes' whatever Special Function Keys are currently in operation on your keyboard (from whatever source) will be read into the CUSTOMIZ utility.

4.7.4 AVAILABLE SPECIAL FUNCTION KEYS

There are 90 Special Function Keys available for you to define.

Across the top of the keyboard are 16 Special Function Keys labeled F1-F16. The three blank keys in the Main Section of the keyboard

are Special Function Keys. The 11 keys of the Number Pad (0-9 plus the period) are also Special Function Keys (ENTER is the same as RETURN and is not a programmable Special Function Key). This adds up to 30 keys, each of which can be used normally, with the CONTROL key held down, or with the SHIFT key held down for a total of 90 Special Function Keys (30 x 3).

7-1 SPECIAL FUNCTION KEY TABLE

KEY	Regular	CTRL	SHIFT
	(Top Row Section)		
F1	F1	^F1	$F1
F2	F2	^F2	$F2
F3	F3	^F3	$F3
F4	F4	^F4	$F4
F5	F5	^F5	$F5
F6	F6	^F6	$F6
F7	F7	^F7	$F7
F8	F8	^F8	$F8
F9	F9	^F9	$F9
F10	F10	^F10	$F10
F11	F11	^F11	$F11
F12	F12	^F12	$F12
F13	F13	^F13	$F13
F14	F14	^F14	$F14
F15	F15	^F15	$F15
F16	F16	^F16	$F16
	(Number Pad Section)		
7	F17	^F17	$F17
8	F18	^F18	$F18
9	F19	^F19	$F19
4	F20	^F20	$F20
5	F21	^F21	$F21

SPECIAL FUNCTION KEY TABLE CONTINUED

KEY	Regular	CTRL	SHIFT
6	F22	^F22	$F22
1	F23	^F23	$F23
2	F24	^F24	$F24
3	F25	^F25	$F25
.	F26	^F26	$F26
0	F27	^F27	$F27
	(Main Section Blank Keys		
Upper	F28	^F28	$F28
Upper	F29	^F29	$F29
Lower	F30	^F30	$F30

Each Special Function Key has a unique number (see table 7-1). When used with the CONTROL key held down, an Up Arrow (^) is placed in front of the Function Key's number. When used with the SHIFT key held down, the number is preceded on the screen by a dollar sign ($).

NOTE---When you look at the Special Function Keys Table you will see that the Function Key numbers for the Number Pad keys do not run sequentially. This might seem confusing at first, but if you look at the arrangement of the keys on the key board you will see that the 3 top keys of the Number Pad (7,8,9) are F17, F18, F19; the next row (4,5,6) contains Special Function Keys F20, F21, F22; and so on. In other words, the Special Function Key number sequence runs through the Number Pad from left to right, top to bottom, like text in a book.

NOTE— CONTROL/SHIFT Keys.

The DMS-5000, DMS-3/F, and DMS-15 use CTRL/SHIFT KEYS for various functions. These keys are not programmable by the user.

4.7.5 SPECIAL FUNCTION KEYS AND APPLICATIONS PROGRAM

When you use a Special Function Key in association with an applications program (such as a word processor) the key will occasionally fail to operate correctly. This is usually caused by the computer entering the key's assigned characters too fast for that particular program to handle them. This problem can often be remedied by including a meaningless character (such as BACKSPACE) at the beginning of the key's character string, or before whatever character the program is having difficulty catching. (When defining Special Function Key character strings the BACKSPACE key is displayed on the CUSTOMIZ screen as ^H.)

4.7.6 NUMBER PAD KEYS

DMS-3/F & DMS-15

The DMS-3/F and DMS-15 Number Pad keys are not automatically programmed to act as numbers. If you want to use the Number Pad for entering numbers you must first use the FUNCTION KEYS option of CUSTOMIZ to define each key as its appropriate number. In other words, the Number Pad keys are empty Special Function Keys until you assign them a Number character.

DMS-5000

The DMS-5000 Number Pad keys have already been given number settings which remain in effect until they are changed with CUSTOMIZ.

4.7.7 DMS-5000 DEFAULT SETTINGS.

Certain of the DMS-5000 Function Keys have been given default settings that are automatically in operation unless changed by you with the CUSTOMIZ utility. These default settings are not read by CUSTOMIZ and do not appear on any CUSTOMIZ listings of settings. The DMS-5000 default settings are:

F1	ASSIGN	F9	LOAD
F2	DIR	F10	SAVE
F3	PIP	F11	SETBAUD
F4	STAT	F12	SETTIME
F5	TYPE	F13	TIME
F6	SUBMIT	F14	CUSTOMIZ
F7	REN	F15	DIRNET
F8	ERA	F16	WHO

F17	(Number Pad 7)	7
F18	(Number Pad 8)	8
F19	(Number Pad 9)	9
F20	(Number Pad 4)	4
F21	(Number Pad 5)	5
F22	(Number Pad 6)	6
F23	(Number Pad 1)	1
F24	(Number Pad 2)	2
F25	(Number Pad 3)	3
F26	(Number Pad .)	.
F27	(Number Pad 0)	0

As you can see, F14 is assigned to CUSTOMIZ. You can use this key at any time, assuming you have not changed it's definition, to call up the CUSTOMIZ utility. (Of course you have to follow it with a <CR>).

NOTE---Only the regular (non-CTRL, non-SHIFT) keys have default settings.

4.7.8 TEMPORARY S.F.K.s WITH THE DMS-3/F & DMS-15

On the DMS-3/F and the DMS-15 it is possible to define Special Function Keys without using the CUSTOMIZ utility. These definitions are temporary (that is, they are erased whenever the workstation is Reset or turned off); they can, however, be saved into a file with CUSTOMIZ.

To temporarily assign a character string to a Special Function Key first hit CTRL/SHIFT F1 (key F1 with the CTRL and SHIFT keys simultaneously held down). You will then be asked to hit the key you want to define. When you have done so you will see the symbol > <.

You now type in the characters or commands you wish to assign to the key. As you do so the characters will appear between the arrowheads. Striking CTRL/SHIFT F2 will erase the last character in the string. When you are finished hit CTRL/SHIFT F1 again and you will be returned to whatever you were doing when you started. If you want to designate another Special Function Key, hit CTRL/SHIFT F1 again and repeat the process.

Keys defined in this way can be saved in a CUSTOMIZ Settings File by using the **READ IN PRESENT SETTINGS** option of the FUNCTION KEYS Sub-Menu.

4.7.9 SOME IDEAS FOR FUNCTION KEYS

1- Some people regularly use several different Applications Programs. A key could be assigned to call up and configure each of those programs. For example, F1 might be designated: **A:PWxxxxxxxxxx<CR>** (the xxxx represent filenames and/or special configuring commands).

By programming a Special Function Key with CUSTOMIZ, Settings Filename, RETURN, and the Function Key assigned to call up an Applications Program, you could simultaneously load the appropriate Settings File and invoke each Applications Program. For example F2, might be: **A:CUSTOMIZ SFPW1<CR>F1.**

If you included these Special Function Keys in every Settings File, you could move from one Applications Program to another with the stroke of a single key.

2- A programmer working on assembly code might wish to assign a key to each program filename (F3 for example), then have keys designated ASM F3, LOAD F3, (word processing program)F3, etc.

3- Headers for form letters could be stored on Special Function Keys. Special Function Keys could also be used to call up

files containing standard text.

4- The command string used to call up Electronic Mail and identify yourself could be assigned to a Special Function Key.

5- Special Function Keys could be assigned the command strings necessary to configure Application Programs for 66 lines or 132 columns. (NOTE---Only some Applications Programs have such capabilities.)

4.8 TERMINAL EMULATIONS

4.8.1 REQUIREMENTS

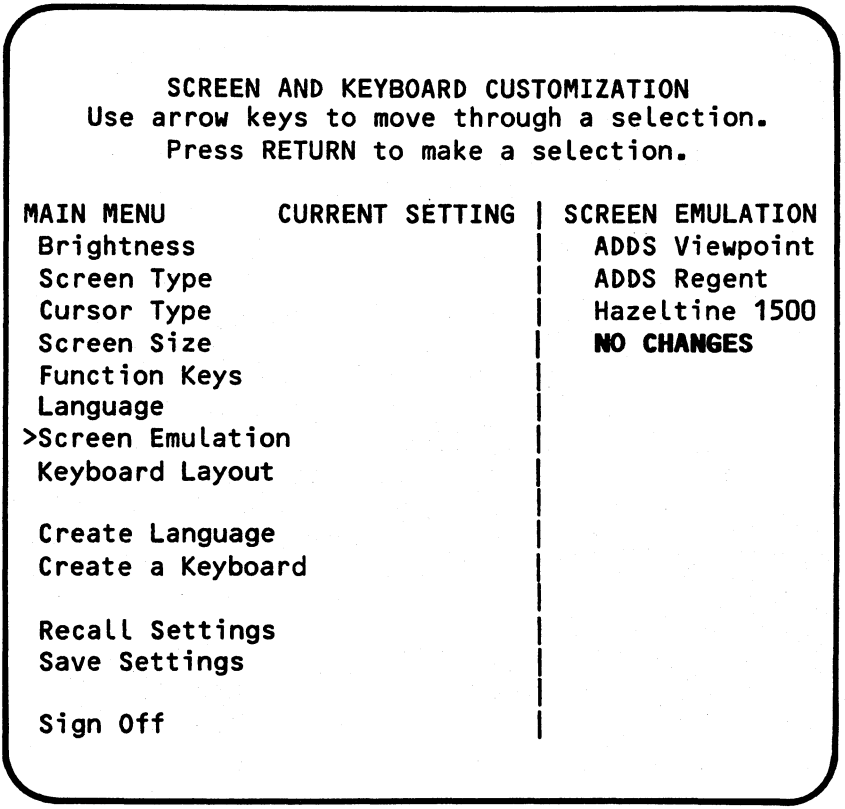
Terminal Emulations can only be done with the DMS-3/F and the DMS-15. In addition to their standard DMS configuration, these workstations can emulate three other terminals --Adds Regent 20/25, the Adds Viewpoint, and the Hazeltine 1500. In order to change emulations the appropriate emulation program must be available in memory storage (a logged partition, a floppy disk, or a hard disk).

Terminal Emulation	Program
Adds Regent 20/25	Regent.Com
Adds Viewpoint	View.Com
Hazeltine 1500	Haz15.Com

4.8.2 TERMINAL EMULATION WITH CUSTOMIZ

1- Move the MAIN MENU COLUMN highlight to the SCREEN EMULATION option and hit RETURN as described in Section 2.3.1.

2- The current (default) Emulations Sub-Menu choice will be Highlighted in reverse video. Use the Arrow Keys to place the Highlight over your choice and hit RETURN. (ESC will bring you back to the MAIN MENU COLUMN without making any alterations in any settings.)



3- If you selected the **NO CHANGES** option you will be returned to the MAIN MENU COLUMN and nothing will be listed in the CURRENT SETTINGS COLUMN opposite 'Screen Emulation'. See Section 2.3.3 for an explanation of the No Changes option.

4- If you selected one of the emulation options you will be returned to the MAIN MENU COLUMN and your selection will be listed in the CURRENT SETTINGS COLUMN opposite **Screen Emulation.** As soon as you exit the CUSTOMIZ

utility your workstation will be adapted to run software designed for the terminal you have selected. (When you leave CUSTOMIZ the words **'DOWNLOAD STARTING'** and **'DOWNLOAD COMPLETED'** should flash across your screen before the CP/M prompt appears.)

While using an emulation your screen will display an abbreviation identifying the emulation you are in. You may change to another emulation by loading another emulation program in the same manner.

NOTE---Since there is no specific program for the standard DMS terminal the only way to go from an emulation back to standard is to reset your machine.

4.8.3 EMULATION WITHOUT CUSTOMIZ

A Terminal Emulation may be adopted without using the CUSTOMIZ utility (but only CUSTOMIZ can include an emulation in a Settings File). From the CP/M command prompt simply invoke the appropriate Terminal Emulation COM file as you would any other program --type the name of the program without the period or COM and hit <CR>. For example, **A>Haz15<CR>** would command your DMS-3/F or DMS-15 to emulate the Hazeltine 1500.

4.9 CHARACTER SETS

A Character Set is the group of letters, numbers, and symbols assigned to the Main Keyboard Section keys, in other words, everything in the Main Section except Special Function Keys and Computer Command Keys.

The standard (default) Character Set is ASCII (American) containing the characters used in the English language and commonly found on American computer keyboards. CUSTOMIZ allows you to select Character Sets containing special letters and symbols used in a number of other languages. These European Sets assign to some of the keys at the right side of the Main Section those letters not contained in the ASCII set. (See Section 4.9.2 for a full description of the Language Character Sets.)

If you are using a DMS-5000 you also have the option of creating your own Character Set. In other words, you can draw any set of letters or symbols you wish and assign them to your keys. (See Section 4.9.4.)

4.9.1 SELECTING A CHARACTER SET

1- Move the MAIN MENU COLUMN highlight to the LANGUAGE option and hit RETURN as described in Section 4.2.3.

Your screen should now look like this:

```
        SCREEN AND KEYBOARD CUSTOMIZATION
    Use arrow keys to move through a selection.
         Press RETURN to make a selection.

MAIN MENU          CURRENT SETTING | LANGUAGES
 Brightness                        |   ASCII
 Screen Type                       |   British
 Cursor Type                       |   Danish
 Screen Size                       |   Dutch
 Function Keys                     |   French
>Language                          |   German
 Screen Emulation                  |   Italian
 Keyboard Layout                   |   Norwegian
                                   |   Swedish
 Create Language                   |   User Defined
 Create a Keyboard                 |   NO CHANGES
                                   |
 Recall Settings                   |
 Save Settings                     |
                                   |
 Sign Off                          |
```

2- The current (default) LANGUAGES Sub-Menu choice will be Highlighted in reverse video. Use the Arrow Keys to place the Highlight over the choice you wish to select and hit RETURN. (ESC will bring you back to the MAIN MENU COLUMN without making any alterations in any settings.)

3- If you selected the **NO CHANGES** option you will be returned to the MAIN MENU COLUMN and nothing will be listed in the CURRENT SETTINGS COLUMN opposite **'Language'.** See Section 4.2.3

for an explanation of the No Changes option.

4- If you selected one of the Language Character Sets a message at the bottom of the screen will ask if you wish that Language Set loaded onto your screen and keyboard at this time.

If you type 'Y' for 'Yes' the Language Set you selected will be loaded to your screen and keyboard, and listed in the CURRENT SETTINGS COLUMN. You will then be returned to the MAIN MENU COLUMN. However, no foreign characters will appear on your screen until CUSTOMIZ has occasion to change the current menu, or you type a foreign character in a filename.

(NOTE---Since the European Language Character Sets replace some of the symbol keys with special alphabet characters, and since the CUSTOMIZ screens use some of those same symbols to draw lines with, the CUSTOMIZ screens may look different once in operation with a Language Character Set. This will not affect the operation of CUSTOMIZ.)

If you hit 'N' for 'No, you do not want to load the Language Character Set now' you will be returned to the MAIN MENU COLUMN. The Language Set you selected will be listed in the CURRENT SETTINGS COLUMN but not activated on your screen or keyboard. However, since it is the Current Setting for the purpose of creating Settings Files it will be included when you save a file with the Save Settings option. When you load a file that includes a Character Set, the Character Set is then activated.

Thus, if you wished to immediately use a Language Character Set you would tell CUSTOMIZ to load it now. If you are creating a list of settings to be included in a Settings File for later use, you would answer that you did not want the Language Set loaded now.

4.9.2 THE LANGUAGE SETS

The European Language Sets use five keys on the right side of the keyboard plus the # key for special characters that are not standard on American keyboards. In other words, when you load a Language Character Set the non-alphabet characters normally assigned to these keys are replaced with specific language characters.

```
ASCII      #   = | ~ { ' * }   - \ ↑ [ @ : ]
BRITISH    £   = | ~ { ' * }   - \ ↑ [ @ : ]
DANISH     #   = Ø Ü Æ ' * Å   - ø ü æ @ : å
DUTCH      £   = IJ ~ { ' * }  - ij ↑ [ @ : ]
FRENCH     £   = ç ↑ ˚ à * §   - ù ê é ' : è
GERMAN     #   = Ö ↑ Ä § * Ü   - ö ß ä ' : ü
ITALIAN    £   = ò ì à ù * è   - ç ↑ ˚ § : é
NORWEGIAN  #   = Ø ~ Æ @ * Å   - ø ↑ æ ˚ : å
SPANISH    #   = Ñ ~ { ` * }   - ñ ↑ ¡ @ : ¿
SWEDISH    #   = Ö Ü Ä É * Å   - ö ü ä é : å
```

SPANISH CHARACTER SET

Due to the lack of a standard Spanish Language Character Set for computers, Spanish is available at this time only with the DMS-5000, which can accommodate user created charcters. The Spanish Set has been specially drawn with the Create Character Set MAIN MENU COLUMN option (see Section 4.9.3) and must be loaded as a User Defined Character Set. In other words, to use the Spanish Character Set you must select **User Defined** in the Language Sub-Menu and specify the Spanish Character Set file you wish to use: **SPANISH.CSL** (large characters) or **SPANISH.CSS** (small characters).

4.9.3 USER DEFINED CHARACTER SET (DMS-5000 only)

The DMS-5000 allows you to select a User Defined Character Set in place of a standard Language Character Set. A User Defined Character Set is one that you create with the CREATE CHARACTER SET item in the MAIN MENU COLUMN. A User Defined Character Set can have any number of characters specially drawn by you; an entire alphabet, one or two special characters, or whatever you wish.

When you select **User Defined** in the LANGUAGES Sub-Menu, CUSTOMIZ will need the name of the file which contains the User Defined Character Set. If there is no User Defined Character Set present (listed by filename in the CURRENT SETTINGS COLUMN opposite CREATE CHARACTER SET) you will be asked to type in the

filename of the Character Set you wish to use.

As with the standard Language Sets, once you have told CUSTOMIZ what file to use you will be asked if you wish to load the Character Set now.

4.9.4 CREATING A CHARACTER SET

Place the Highlight over the CREATE CHARACTER SET option in the MAIN MENU COLUMN and hit RETURN. This will bring you to a list of Language Character Set options you may choose as a starting place for creating your own set.

WARNING---The Create Character Set portion of CUSTOMIZ is very large and if you enter CUSTOMIZ from an applications program there may be insufficient room in your workstation's memory for the neccessary portions of both programs. This will result in a hang (for example, a **'Please Wait'** message that never goes away), or some form of crash (various error messages or garbage). If this problem occurs you will have to Reset your workstation.

STARTING A CHARACTER SET

If you wish to modify an existing Language Set you would choose that set as your starting base. By choosing an already existing set you can load the drawing grid (see below) with a character and alter its appearance or shape without having to draw in the character from scratch.

If you have already done some work on a User Defined Character Set, and stored what you have done as a file, you would select the **User Defined** choice and follow the prompts to identify the file you wish to use. If you select the **None** option you will be starting from scratch with everything completely blank.

DEFINING CHARACTERS

After selecting and confirming your starting Character Set it will be shown at the bottom of your screen. This display will always show the current state of the set you are working on. As you create, modify, or replace characters the new versions are shown. Thus, when you save what you have done to a User Defined Character Set file, the contents of the file will be what is shown at the bottom of the screen.

From this screen you can:

1- DEFINE A KEY. Pressing one of the definable keys will bring you to the Grid Screen (see below) and whatever modifications or new character you create will be assigned to that key (Normal or Shift according to what you hit).

2- SAVE TO FILE. Pressing Special Function Key F1 will save the currently displayed Character Set to a file (you will be asked to name the file).

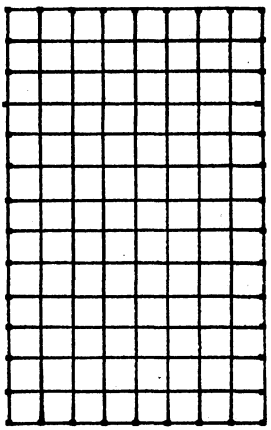
3- END SESSION. Pressing RETURN will take you back to the MAIN MENU COLUMN.

THE CHARACTER GRID

When you press a key to be defined (see above) you will be taken to the GRID SCREEN.

```
DEFINING CHARACTER: X ASCII value: XX

FILL or BLANK a cell--- Number Pad 5 or SPACE BAR
MOVE cursor------------ Number Pad arrow keys.
LOAD grid with a char-- F2, then character.
CLEAR grid------------- F3.
Change DESCENDER LINE-- F4.
```



```
Character looks like this >

RETURN - ENTER character
ESC    - ABANDON character

CURRENT CHARACTER SET IS: !"#$%&'()*+,-./01234567
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefgh
ijklmnopqrstuvwxyz{|}~
```

The Character Grid is used to draw your character. The Large Character Set Grid is 9 x 13, the Small Character Set Grid is 5 x 7. Each square cell of the Grid represents one dot of light (or pixel) on the screen. Filling a cell in the Grid creates a corresponding dot on the screen. To the right of the Grid you can see exactly what the character looks like as you work on it.

DEFINING CHARACTER: shows what keyboard character is currently being drawn in the Grid. **ASCII value:** gives the Hexadecimal number assigned to that key.

FILL OR BLANK A CELL. Filling a cell in the Grid creates a dot in the character. A cell is filled by placing the cursor in an empty cell and then hitting the 5 in the Number Pad or the SPACE BAR. Blanking (or erasing) a cell in the Grid removes a dot from the character. To erase a Grid cell place the Cursor in a filled cell and hit the Number Pad 5 or SPACE BAR. Thus, Number Pad 5 and SPACE BAR act as toggle switches, filling and blanking the cell marked by the cursor.

MOVING THE CURSOR. The X shaped cursor can be moved around the Grid by using the Number Pad arrow keys (2,4,6,8). The Number Pad corner keys (1,3,7,9) will move the cursor diagonally.

LOAD THE GRID. You can copy into the Grid the shape of a character that already exists in the Current Character Set displayed at the bottom of the screen. This is done by first hitting Special Function Key **F2** and then hitting

the key that corresponds to the shape you wish to load.

CLEAR THE GRID. To empty the Grid completely hit Special Function Key **F3.**

DESCENDER LINE. 'Descender line' refers to the imaginary line that runs along the bottom of letters as they appear on a page or CRT screen. Sometimes a character descends below this line (g, y, q, etc.). Function Key **F4** will allow you to draw a character that descends below the line. Hitting **F4** will cause a broken line to appear in the Grid four cells high (2 cells high in Small character Set). This broken line represents the normal bottom line of a character and thus allows you to draw below it. Hitting **F4** again toggles the line down to the bottom of the Grid.

ENTER THE CHARACTER. Hitting **RETURN** enters the shape in the Grid into the Current Character Set for whatever key was being defined. In other words, when you have drawn the shape you want in the Grid, hit **RETURN** and the key you were defining will now have the new shape. If you do this to a blank Grid there will be emptiness shown on the screen for that key.

ABANDON A CHARACTER. If you wish to abandon work on a particular character hit the **ESC** key. If you do this the key you were defining will retain whatever shape it had when you began work on it.

CHARACTER SIZE

Whenever you create a Character Set you create it only in a particular size. If your screen was displaying the Large Character Set when you invoked the **CREATE CHARACTER SET** menu option the characters you draw will all be of the Large size and the Grid will be the Grid for Large Characters. If you were using the Small Character size when you started you would get the small Grid and produce small characters.

You can only use a Large Character Set when the DMS-5000 is in the horizontal position.

In the horizontal position loading a Character Set automatically resets the screen size. For example, if you were using the Small screen size and loaded a Large User Defined Character Set, your screen size would be reset to Large (24 lines). similarly, changing the screen size will automatically unload a User Defined Character Set of the wrong size. In other words, the screen size has to match the Character Set size and the last command you issue dominates.

4.9.5 USING LANGUAGE CHARACTER SETS WITH PRINTERS

When you strike a key it sends a code (called a Hex Code) to the computer. This Hex Code informs the computer which character to display on the screen. When you are linked to a printer the code originally sent by your keyboard is relayed by the computer to the printer. The printer is designed to print a

specific character for each different Hex Code.

Unfortunately not all printers print the same symbol for the same code. In other words one printer may print { for a certain hex code while another prints >. (In most cases these differences affect the non-alphabet symbols.) The result is that the symbols (or special characters) of a particular printer may not match what is shown on your screen.

With a few of the more sophisticated printers the match-up between code and character can be altered to equal the match between keyboard and CRT screen, but with most printers that is not possible.

DMS-5000

With the DMS-5000 this problem can be circumvented by a User Defined Character Set that is created to match the idiosyncrasies of a particular printer. In other words, you could see what character the printer prints when a key is struck, and then use CUSTOMIZ to draw for that key a character that matched what the printer was printing. (In most cases you would not actually have to re-draw the character from scratch because you can use **F2** to load the grid with the desired character.)

NOTE---Redefining the keyboard with the Create Keyboard menu option will not solve this problem. When you create a keyboard all you do is change the code sent to the computer by the key. If you are faced with a situation where the

same code produces **different results** between printer and screen, changing the code sent by a key will not help.

DMS-3/F & DMS-15

Since the DMS-3/F and the DMS-15 can not accommodate a User Defined Character Set the only way to approach a printer-CRT-keyboard matchup problem for these workstations is to alter the Hex Code assignments with the CP/M utility DDT. This should be done by an experienced computer programer.

USER DEFINED CHARACTERS

There are three basic ways to obtain printouts with a User Defined Character Set:

1- Draw your characters to match those of the printer you wish to use.

2- Obtain a dot-matrix or other type printer that allows you to program its character set.

3- If using a letter quality printer, have wheels or thimbles custom made by the manufacturor to match your character set. If using a dot-matrix type printer, obtain custom made PROMs containing your character set.

SCREEN DUMP

It is also possible to use the DMS-5000's Screen Dump capability to reproduce with a printer exactly what is shown on the screen. However, this is very slow and produces an outsized copy that is not practical for most word processing tasks.

4.10 KEYBOARD LAYOUT

The CUSTOMIZ utility allows you to redefine most of the keys on your keyboard. In other words, you can tell the keys to send different characters to the computer. One use for this capability would be to rearrange the location of punctuation symbols so that they match the keyboards of standard office typewriters (see Section 4.10.1 Typists Keyboard). Or you could make more drastic modifications such as changing the entire alphabet layout from QWERTY (the American standard layout) to DVORAK (a layout specially designed for maximum typeing speed).

Naturally, since the CUSTOMIZ utility only changes what is sent from the keyboard into the computer the plastic keys on the keyboard will remain exactly as they are unless you physically move or replace them (see Section 4.10.3).

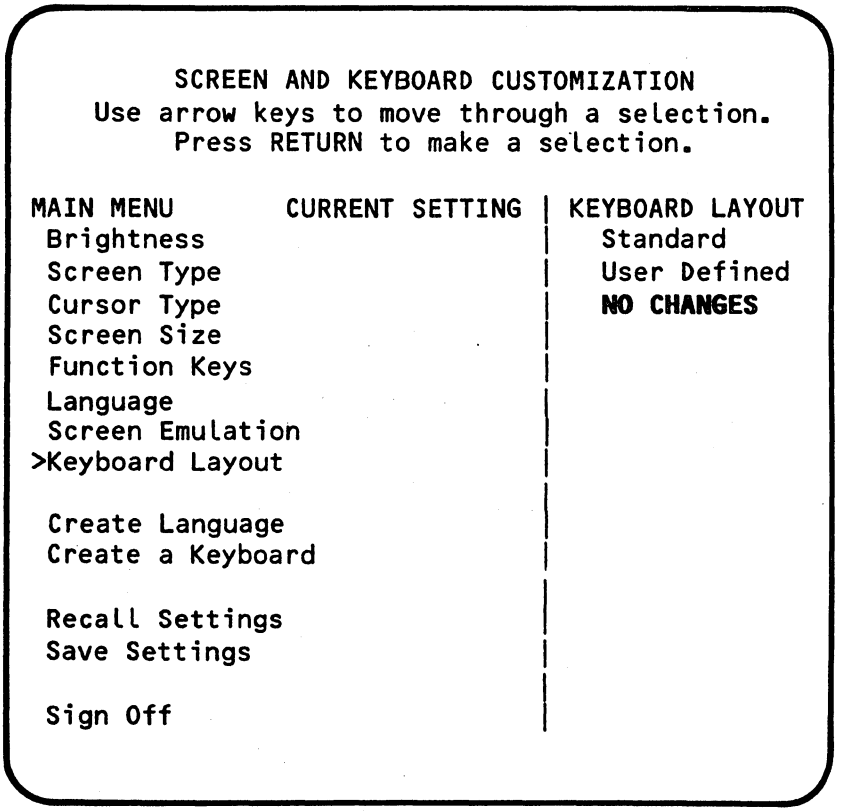
4.10.1 CHOOSING A KEYBOARD

There are two keybooard items in the CUSTOMIZ MAIN MENU COLUMN: **CREATE KEYBOARD** and **KEYBOARD LAYOUT.** CREATE KEYBOARD is used only tc build a User Defined Keyboard File (see Section 4.10.2). KEYBOARD LAYOUT is only for selecting the keyboard you wish to actually use.

With KEYBOARD LAYOUT you can choose either the standard DMS keyboard or a User Defined keyboard that you have designed with CREATE

KEYBOARD. Thus, if you want to use a keyboard different from the standard DMS board, you first have to define the keys you want with the CREATE option and store them in a file, and then use the LAYOUT option to make the file operational.

Step by step



1- To make operational a specially defined keyboard (for example, an office

typewriter key arrangement), or to include that configuration in a Settings File, place the MAIN MENU COLUMN Highlight over the **KEYBOARD LAYOUT** option and hit RETURN as described in Section 4.2.3. This will bring you to the KEYBOARD Sub-Menu where there are two choices --**STANDARD** and **USER DEFINED.** Place the Highlight over USER DEFINED and hit RETURN.

The message **USER DEFINED** will appear in the CURRENT SETTINGS COLUMN opposite **KEYBOARD LAYOUT.** (**'Standard'** means the original key arrangement provided by Digital Microsystems; if that is selected nothing will appear in the CURRENT SETTINGS COLUMN).

2- If there is no User Defined Keyboard present (from a recent use of the **Create Keyboard** option or from a file) you will be asked for the file that contains the keyboard arrangement you wish to use. Type in the filename (such as **B:TYPERITE.KBF<cr>** for the office typewriter key arrangement). The filename you specify will appear in the CURRENT SETTINGS COLUMN opposite the **CREATE KEYBOARD** menu item.

3- Once you have selected which special keyboard you wish to use (either the one already present or one from a file) you will be asked if you wish to load the User Defined Keyboard now.

If you answer **'N'** for 'No, don't load it now', the special keyboard will not become immediately operational on your keyboard but it will be included in any Settings Files you save. When you later load a Settings File containing a User Defined keyboard, the board will become

operational at that time.

If you answer '**Y**' for 'Yes, load it now', the new configuration will immediately take effect (under your finger tips, so to speak). You can also save it in a Settings File for later use.

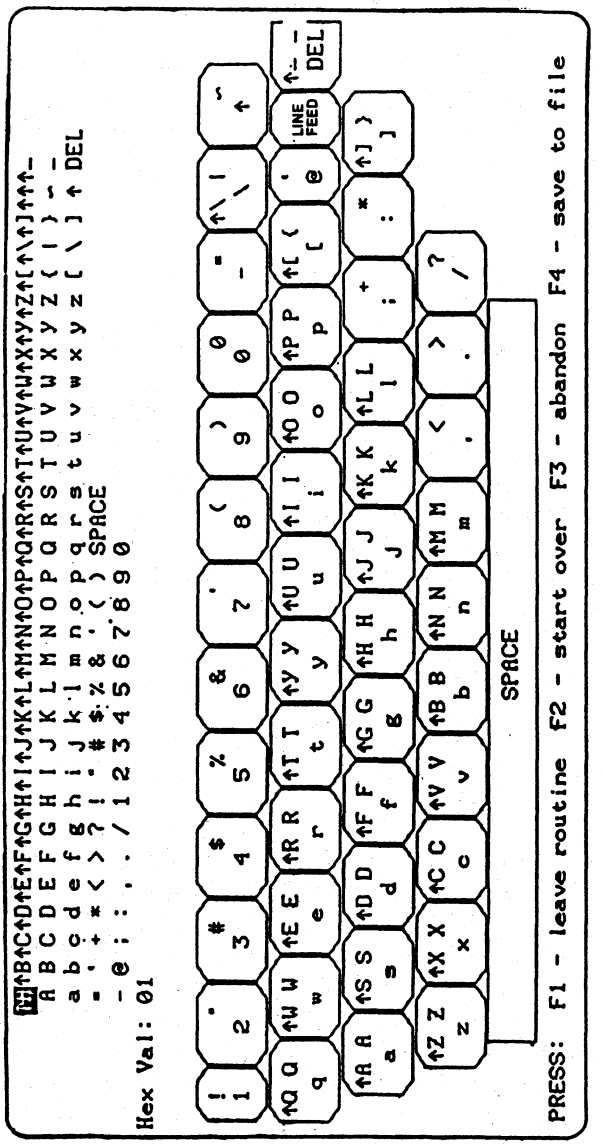
THE TYPIST'S KEYBOARD

We have included on the distribution disk a sample keyboard file called **Typerite.kbd.** This file will redefine your punctuation keys to approximate the layout of standard office typewriters. (See the appendix for a picture of the keyboard layout.) If you wish a different key arrangement you can use the **CREATE KEYBOARD** menu item to design any board you wish.

4.10.2 CREATING YOUR OWN KEYBOARD

The **CREATE KEYBOARD** item in the MAIN MENU COLUMN is used to design your own key arrangement.

After placing the Highlight over the **CREATE KEYBOARD** item in the MAIN MENU COLUMN and hitting RETURN you will see an instruction reminder screen. When you finish reading the screen hit RETURN. (If you already know the instructions, hitting RETURN twice at the MAIN MENU COLUMN will bypass the screen.) A diagram of the keyboard showing the keys you can redefine and the characters it is possible to assign will now appear on your CRT.


Hex Val: 01
SPACE
DEL
LINE FEED
PRESS: F1 - leave routine F2 - start over F3 - abandon F4 - save to file

CHARACTERS

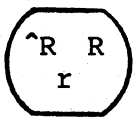
At the top of your screen are five rows of characters. You can assign any of these characters to any key (Normal, SHIFT, or CONTROL).

Control Characters. The top row contains the CONTROL characters which can be assigned to a key. Control characters are computer command signals and are indicated by an UP ARROW preceding the character. Even though Control characters use letters for identification purposes they are not part of the alphabet, rather they are a separate set of signals that are used to issue instructions to the computer. Normally a Control Character is assigned to a key's CONTROL VALUE (a key struck while holding down the CTRL Key). However you can assign a Control Character to a key's NORMAL or SHIFT VALUE if you wish.

KEYBOARD DIAGRAM

Each key has two values, NORMAL and SHIFT. A Normal value is sent to the computer when you hit the key. A SHIFT value is sent to the computer when you strike the key while also holding down the SHIFT KEY. Some keys also have a CONTROL value which is sent to the computer when you press the key while holding down the CTRL KEY.

In the keyboard diagram the character sent to the computer when the key is struck normally is shown on the lower part of the key square. The character sent to the computer when the key is struck with SHIFT Key held down is shown in the upper right portion of the key square. The character sent to the computer when the key is hit while the CTRL key is held down (if any) is shown in the upper left portion of the key square.



Upper Right = CONTROL VALUE
Upper Left = SHIFT VALUE
Lower = NORMAL VALUE

NOTE---Since the Number Pad keys are programmable Special Function Keys they can not be reassigned with CREATE KEYBOARD.

REASSIGNING KEYS

Inverse video will highlight one of the Characters at the top of the screen. You can use the Number Pad arrow keys (8,6,2, and 4) to move the Highlight through the Character Set.

Striking a definable key on the keyboard will assign the Highlighted character to that key. For example, if the Highlight is over the capital 'K' and you hit the 'g' key without SHIFT held down, the capital 'K' will then be assigned to the NORMAL (lower case) 'g' key. When the board is used with this configuration, striking the 'g' without SHIFT will send a

capital 'K' to the computer.

You can assign any of the characters at the top of the screen to any of the keys and any of their values. You could, for instance, reassign all of the Control Characters to keys at Normal Values (so that hitting the key without CTRL held down would send the computer a Control Value).

When a new character is assigned to a key the old character is erased. If you are rearranging many keys you may wish to maintain a list of which characters are eliminated. This would help keep track of what characters still need to be reassigned to some key.

SAVING YOUR KEYBOARD

The **F4** key is used to save a User Defined Keyboard to a file. You will be asked for the name of the file. When you have typed in the filename, and confirmed it, you will be brought back to the KEYBOARD DIAGRAM.

To leave the KEYBOARD DIAGRAM hit F1. This will take you back to the MAIN MENU COLUMN.

STARTING OVER

Hitting **F2** while working with the Keyboard Diagram will erase all of the changes you have made and return the board to the layout that is

standard for whatever language you are using.

ABANDONING YOUR WORK

Hitting **F3** will erase any changes you have made to the keyboard and bring you back to the MAIN MENU COLUMN. Nothing you have done since your lats 'save' will be saved remembered by CUSTOMIZ.

COMMAND KEYS WARNING

Your computer accepts certain Control Characters as commands. For example, Control H (^H) is the BACKSPACE command and when the 'H' Key is struck with the CTRL Key held down a Control H is sent to the computer causing the cursor to move one space to the left.

There are six Special Command Keys on your keyboard (RETURN, TAB, etc). These keys duplicate the Control Characters assigned to specific alphabet keys. Thus, the BACKSPACE Key is assigned to send to the computer the Control Value of the H Key.

RETURN key	=	CTRL M (^M)
ESC key	=	CTRL [(^[)
LINE FEED key	=	CTRL J (^J)
BACKSPACE key	=	CTRL H (^H)
PAUSE key	=	CTRL S (^S)
TAB key	=	CTRL I (^I)

If you reassign one of these alphabet key's Control Values the matching Command Key will send to the computer the alphabet key's new Control Value and the computer will not recognize it. In other words, if you assign something other than Control H (^H) to the Control Value of the H Key, the BACKSPACE Key will no longer operate because it now sends to the computer something other than a Control H.

If you attempt to reassign the Control Value of one of these special keys you will get the message: **WARNING you have asked to redefine a command key. Please confirm (y/n).** If you answer '**Y**' for 'Yes' you can go ahead and reassign that value.

4.10.3 CHANGING THE KEYCAPS

Reassigning the keys with CUSTOMIZ will not, of course, change the plastic key caps on your keyboard. If you wish you can change the caps or place new decals over them.

WARNING---Be sure the workstation is **turned off** before changing keycaps.

The key caps can be pulled straight up and removed. Since it is difficult to get an adequate grip on the side of the key it is necessary to pull it up from the bottom. The best way to do this is to use a key pulling tool which fits down between the keys and hooks around under the key's bottom. If no key puller is available, pressing down the surrounding keys

or removing the keyboard cover may make it easier to get hold of the bottom of the key. To put keycaps back on simply push them straight down over the peg.

WARNING!---DO NOT PUSH DOWN TOO HARD ON THE KEYCAP AS THIS MAY DAMAGE THE BOARD!

4.11 CUSTOMIZ SYSTEM REQUIREMENTS

4.11.1 CRT VERSIONS

The CUSTOMIZ utility (Version 1.2) will run on the:

DMS-5000	CRT version **1.3** or above
DMS-3/F	CRT version **1.9** or above
DMS-15	CRT version **1.9** or above

NOTE——DMS-5000. The current CUSTOMIZ version is 1.2. Both CUSTOMIZ 1.0 and 1.2 (or higher) will work identicaly on the DMS-15 and DMS-3/F. However, if your DMS-5000 CRT version is 1.2, then you should use CUSTOMIZ version 1.0. If your DMS-5000 is version 1.3 or higher then you should use CUSTOMIZ version 1.2.

4.11.2 KEYBOARD VERSIONS

In order to use the Typist's keyboard portion of CUSTOMIZ (TYPERITE.KBD Settings File) it is necessary to have keyboard version 2.2 or above. The remaining portions of CUSTOMIZ will operate on earlier versions of DMS-5000, DMS-3/F, and DMS-15, keyboards.

4.11.3 OBTAINING VERSION NUMBERS

If you are not certain of the version installed in your workstation, a Version Read Out will supply this information. From the CP/M Command Prompt type ESC, Capitol V, RETURN (**C>ESC V<CR>**). You will see **5000** (or **FOX**) followed by a version number, and **KYBD** followed by a version number.

4.11.4 PROGRAM FILES

To use the CUSTOMIZ utility the following program files must be available in a logged partition or disk drive:

DMS-3/F, DMS-15, & DMS-5080	DMS-5086
CUSTOMIZ. COM	CUSTOM2.CMD
CUSTOM2.COM	CUSTOMIZ.CMD
CUST1.OVL	
CUST2.OVL	
CUST3.OVL	
CUST4.OVL	
CUST5.OVL	
LANGUAGE.CST	
CHARSET.CST (DMS-5000 series only -- for creating character sets)	

Plus any Settings Files you may wish to use.

TYPERITE.KBD	Typists Keyboard Setting File
SPANISH.CSL	Spanish Character Set (Large)
SPANISH.CSS	Spanish Character Set (Small)

To emulate different terminals with the DMS-3/F and DMS-15 the proper Emulation Files

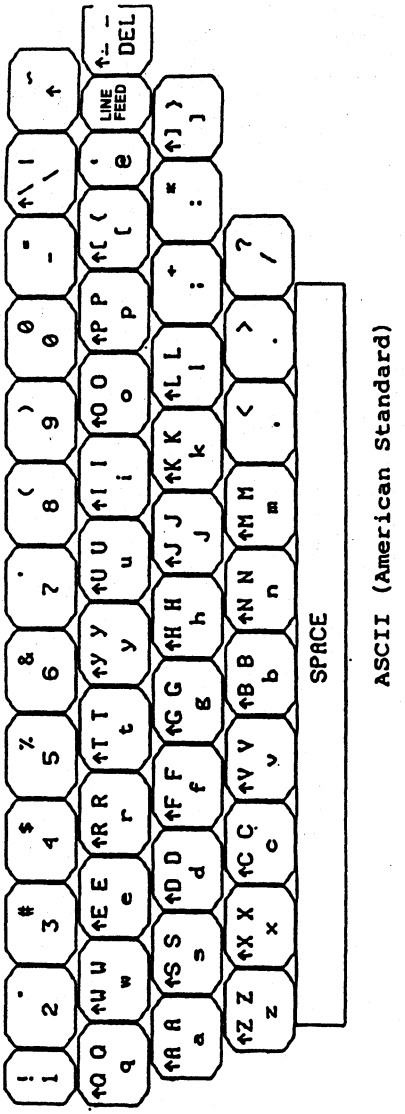
must also be present:

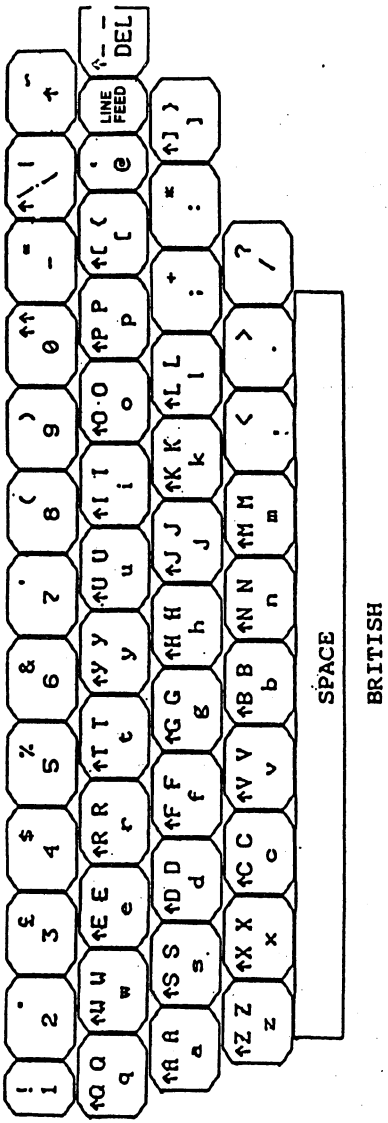
HAZ15.COM (Hazeltine 1500)
REGENT.COM (for Adds Regent 20/25)
VIEW.COM (for Adds Viewpoint)

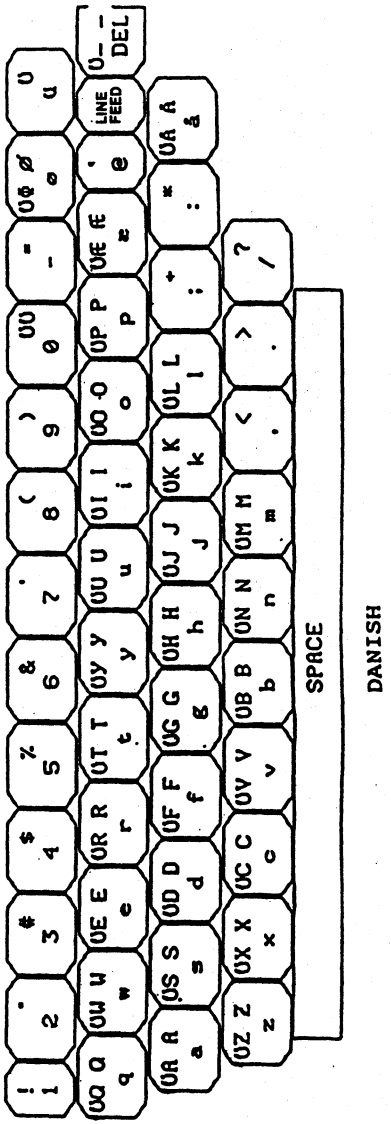
4.11.5 SAVING DISK SPACE

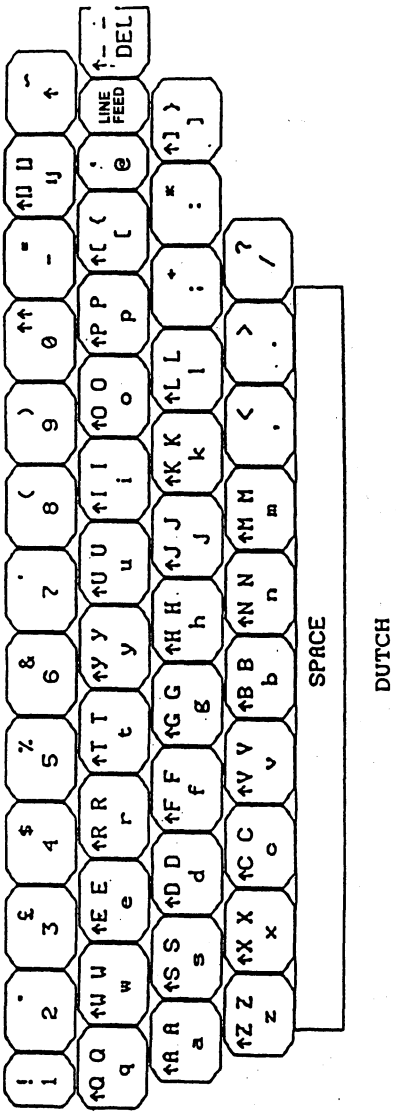
Once a Settings File is created the only program necessary to load it is CUSTOMIZ.COM (or CUSTOMIZ.CMD for the 5086). Thus, if disk space is limited, CUSTOMIZ.COM (or CMD) and a Settings File alone could be used to configure your workstation. For example, CUSTOMIZ.COM and a Settings File could be copied to a Data Base Management Disk. However, you cannot modify a Settings File unless you have the appropriate program files present.

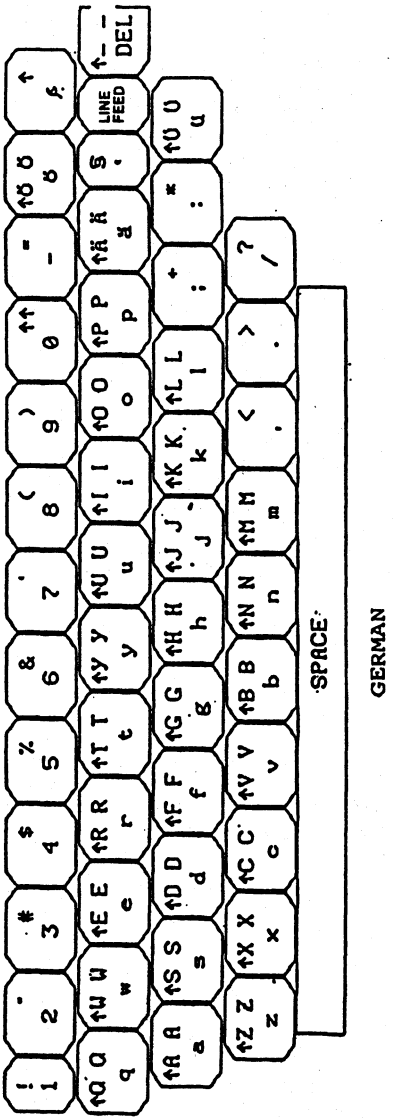
Note---If your Settings File contains a Terminal Emulation, the appropriate Emulation File must also be present.

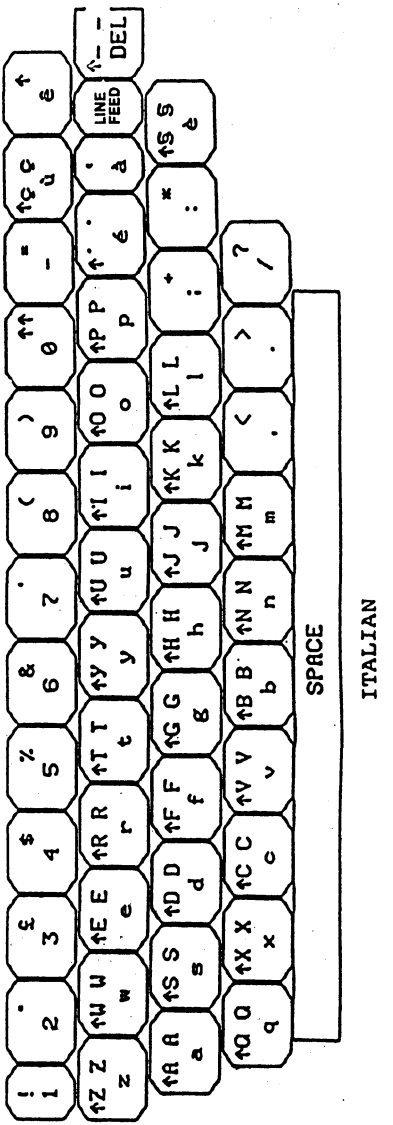

ASCII (American Standard)
SPACE
DEL
LINE FEED

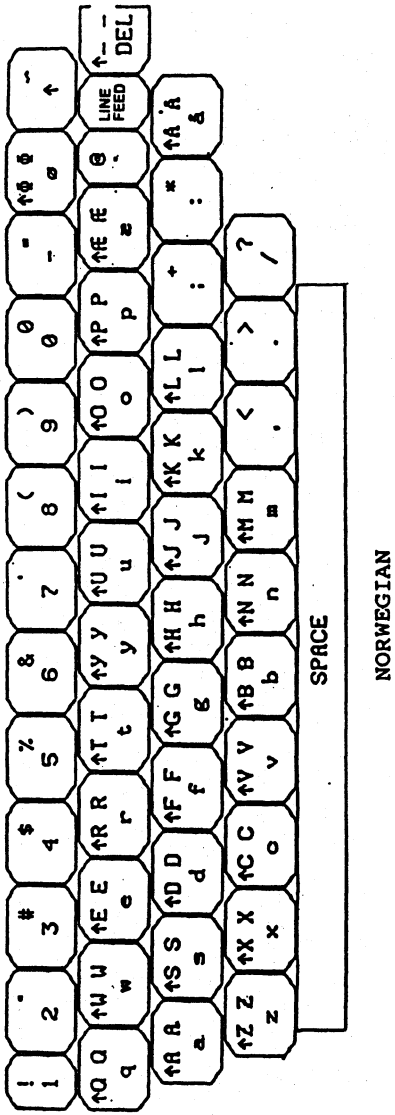

DEL
LINE FEED
SPACE
BRITISH

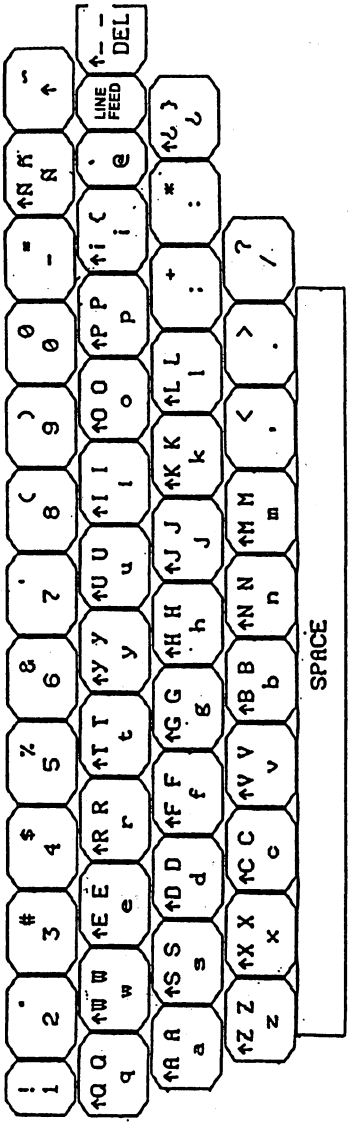

DANISH
SPACE
LINE FEED
DEL

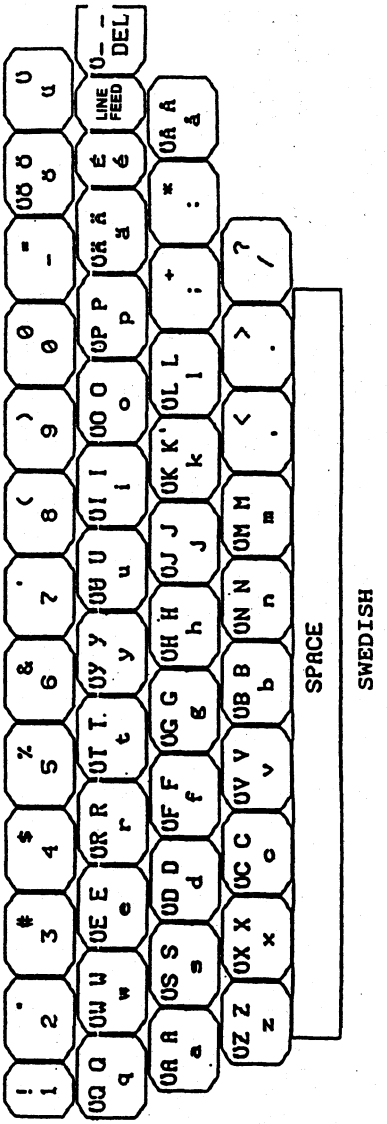

DEL
LINE FEED
SPACE
DUTCH

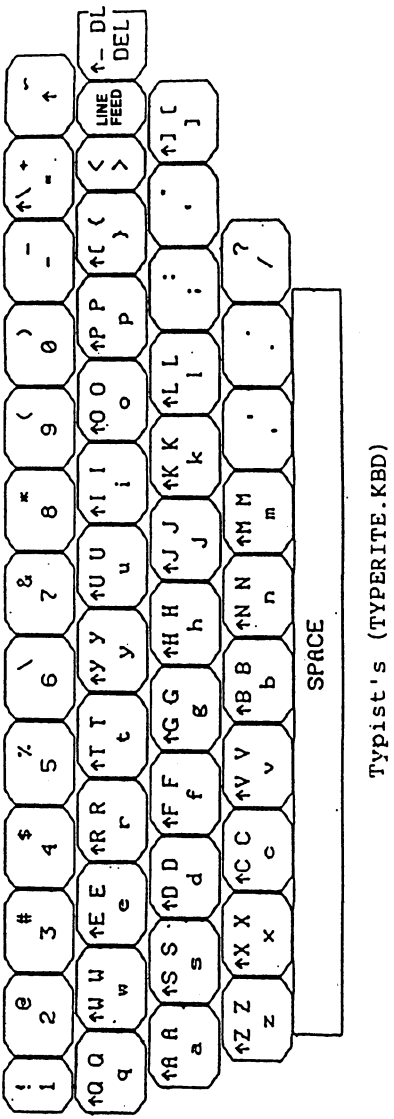

SPACE
GERMAN
LINE FEED
DEL


LINE FEED
DEL
SPACE
ITALIAN


NORWEGIAN
SPACE
LINE FEED
DEL


SPACE
SPANISH
LINE FEED
DEL


SPACE
SWEDISH
LINE FEED
DEL


SPACE
LINE FEED
DEL
Typist's (TYPERITE.KBD)

5.0 USING PRINTERS.

5.1 INTRODUCTION.

5.1.1 LINKING TO A PRINTER.

There are two ways to link your DMS-3/F to a Printer:

1--Through the HiNet network to a central Printer connected to the Master Hard Disk (the 'Spool Printer'). See section 5.2.

2--Directly to a single workstation through the RS-232C Serial Ports or the Parallel Port on the back of the DMS-3/F (see diagram 1). Serial and Parallel Printers are discussed in section 5.3.1.

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 the I/O Byte in the USERS Table; it can be either the Spool Printer, Serial Port 2 or Parallel Port F. If the DMS-3/F is used as a stand-alone then the default Printer port is Serial Port 2.

5.1.2 SENDING TEXT TO A PRINTER.

There are two general methods of sending text to a Printer--through an applications program and through CP/M. 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.

If you are operating in the CP/M environment (see section 3), 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. See section 4.8 for more on CTRL P.

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., boldfacing, underlining), then PIPping the file to the LST: device will not result in the document being printed with those special

commands. You should use the word processing program's Print commands to achieve the desired results.

5.2 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.

5.2.1 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 5.1.2).

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.

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 TO IT THAT YOU HAVE COMPLETED THE SPOOLING OPERATION. IT CANNOT BEGIN TO PRINT YOUR MATERIAL UNTIL THIS HAS BEEN DONE. The Spooler can not start printing until it has received everything that will be included as part of that 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 begin processing your job.

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 CP/M.** Your application program's user manual will tell you how to do this. By returning to CP/M you order the Spooler to proceed with your print job.

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.)

When the correct signal has been sent to the Spooler your screen should show:

```
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 print your job automatically, but if it is in Manual Mode you will have to go to the Master Terminal to activate the Spool Printer (see next section 5.2.2).

In some cases, however, your screen may show:

```
***Spool Error
Depress <CTL-C> to abort or <CR> to retry
```

This probably indicates that the Spooler is full, and no new jobs can be stored until some of those already on the Spooler have been removed, either by printing them or by 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.

5.2.2 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. (See section 3.13 for more on the WHO command.) 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>
***GROUCHO Ready to print
A <CR> = Abort
W <CR> = Wait
S <CR> = Serial
<CR>   = Next
Choice: S

***CHICO  Ready to print
A <CR> = Abort
W <CR> = Wait
S <CR> = Serial
<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-15, 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.

5.2.3 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 Spool.

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 5.5, 'Stopping the Printer').

5.3 DIRECT CONNECT PRINTERS.

It is possible to connect a Serial Printer directly to a DMS-3/F through Port 2 at the back of the cabinet. In addition, a Parallel Printer may be connected to Parallel PortF. This would allow printing 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 Login to that specific workstation.

5.3.1 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 5.6 explains the use of internal jumper blocks to configure the DMS-3/F 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.

If you are using the DMS-3/F as a stand-alone computer without HiNet, then Port 2 is your default printer assignment.

After assigning the Printer to PORT 2 you must next set the Baud Rate with the SETBAUD COMMAND. For example, **B>SETBAUD 2 1200 <CR>** would set the Baud Rate of PORT 2 at 1200.

To make the Serial or Parallel Printer your default Printer setting--instead of Spool--the System Administrator must make a change in the HiNet User Table. The I/O Byte for your User Name must be changed to:

56 (Hex) to assign the Printer to serial Port 2.

F6 (Hex) to make Spool the default Printer assignment.

96 (Hex) to assign the printer to the local parallel port (PORTF).

The User Table can only be altered from the HiNet Master station. See the person in charge of your network or refer to the HiNet Master section of your Master's User Manual.

Once the Printer is properly readied as described in its instructions, you are ready to print from your DMS-3/F. (Refer also to section 5.1.2.)

NOTE---If your Printer assignment is for a directly-connected Printer (e.g., PORT2 or PORTF) but the Printer is not connected (or it is off), then any print commands will cause the DMS-3/F to "hang" and not respond to any further instructions. If this happens you will have to RESET the DMS-3/F. When you RESET your workstation you will lose any work that you have done and not SAVED in a file. If the printer is connected but off then you can probably correct the 'hang' simply by turning the printer on. You

may have to abort the print job and start over again.

5.3.2 PARALLEL PRINTERS

Parallel Printers do not require jumper blocks in order to interface with the DMS-3/F. However, the cable that connects the printer to the computer may have to be altered for some types of printers. If you wish to use a parallel printer with the DMS-3/F you should order it with a Centronics/MX-80 type connector.

The Parallel Port on the DMS-3/F is located near the middle of the bottom of the back panel of the cabinet. The standard parallel port cable from DMS is a one to one, 36 pin cable with Centronics type connectors on each end. One end of this cable attaches directly to the DMS-3/F's rear panel and the other end to the Printer.

When assigning a parallel printer to the DMS-3/F's parallel port, use **PORTF** as the designator. (ASSIGN P PORTF <CR>)

See Appendix D for the pin assignments for a parallel port cable.

5.4 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.

5.5 SETTING THE BAUD RATE

You may wish to connect a device to the DMS-3/F through one of the three serial ports at the back of the unit (a Printer, a modem, etc). When using these serial ports it is necessary to set the BAUD RATE with the SETBAUD command. The BAUD RATE governs the speed at which information is transferred to and from the workstation through the port. Different devices

require different BAUD RATES; you must check the instructions that come with the device for the correct rate.

THE SETBAUD COMMAND.

The SETBAUD command is used to match the requirements of the Printer, Modem, or device you are using. From the command prompt you type **SETBAUD**, the **Port Number** of the port you wish to set, and the **rate**. For example: **B>SETBAUD 3 1200** would set a BAUD RATE of 1200 for port number 3. Successfully setting the BAUD RATE will result in a screen that looks like this:

```
A> setbaud 2 9600

SETBAUD VERSION x.x
Set the serial port baud rate.

A>
```

The SETBAUD command will accept the following BAUD RATES: 110, 300, 600, 1200, 1800, 2400, 4800, and 9600.

If you make an error the computer will display a full screen of information entitled **SYNTAX ERROR.** This screen provides additional instructions and examples for setting the BAUD RATE.

5.6 INTERFACING PRINTERS

Getting a Printer (particularly a Serial Printer) to work properly with a computer or workstation is probably the most difficult part of using printers. This section will describe some of what needs to be done to interface Printers with DMS computers (the DMS-3/F 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 5.6.1)
2- Appropriate I/O Port Jumper Block or cable (see Section 5.6.2)
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 5.3)
6- Set correct Baud rate (Serial Printer only) (see Section 5.5)

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 5.3), or with the log-on Users Table (see HiNet Master section). With a Serial Printer you must also set the correct BAUD RATE (see section 5.5).

5.6.1 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, and overflows the Printer's capacity for storage, there will be an overflow error 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 with a particular type of protocol and 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 5.7.2).

X/ON X/OFF

With the X/On X/Off protocol the Printer sends a particular character to the computer to toggle on and off the sending of 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 protocol. But other Printers that you may have on your network that are connected directly to a workstation may use this protocol. ETX/ACK stands for End of Text/Acknowledge. Refer to the manual for your printer to see if it requires this protocol.

5.6.2 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, thus 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 a 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

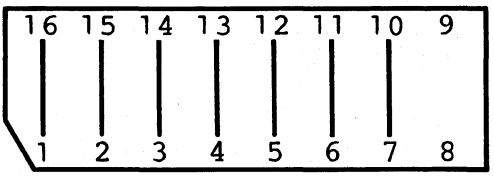
space is bridged by a Jumper Block which plugs into the socket (like a chip) and has copper wires arching from one side of the block to the other. In other words, the Jumper Block is like a series of wire bridges leaping across a canyon.

On a standard Jumper Block the copper 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)

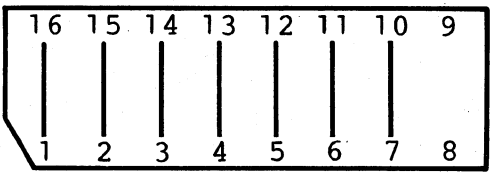
When the Jumper Block is properly installed pins 1-8 are on the side of the socket leading towards the Serial Port, while pins 9-16 are on the side of the block leading into the computer. Below is a table giving the function of pins 9-16, the corresponding CPU card pin numbers, and the corresponding J5 I/O board pin numbers (J1 on ZSBC-3/4) for Serial Port 2 (the standard Printer port):

SERIAL PORT 2

Jumper Block Pin Number	Function	I/O Board Pin Number	CPU Card Pin Number
9	Ground	14	
10	Power (+12)	19	
11	Data Carrier Detected	11	U4
12	Data Terminal Ready	15	U1
13	Request To Send	18	U3
14	Clear To Send	12	U4
15	Transmit Data	24	U1
16	Receive Data	17	U2

In addition there must be a 4.7K OHM resistor between jumper block pin 10 and the power input.

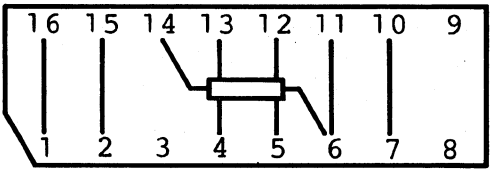
DIAGRAMS OF POPULAR JUMPER BLOCKS



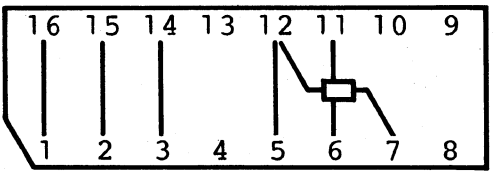
Standard RS-232 signal.

(NOTE---The numbers do not actually appear on the Jumper Block. They are indicated for reference only.)

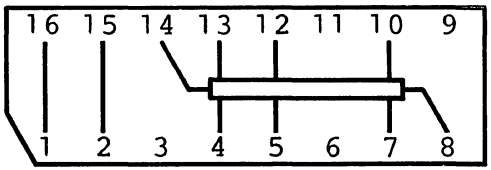
For Texas Instruments' 810 and all Qume Printers.



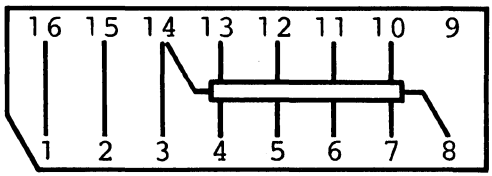
For the NEC Spinwriter



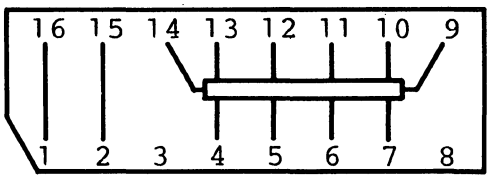
For Microline Printers



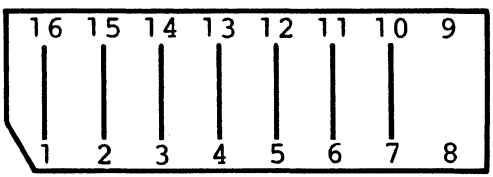
For the Diablo 630



Teletype Model 40



Use this diagram to record your own jumper block if different.



MODEM JUMPER BLOCK

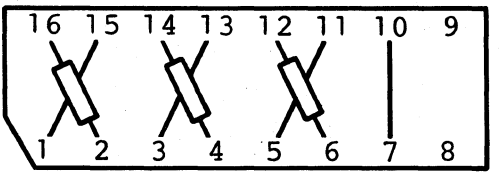
Serial Port 3 is the port used for Modems. Modems are devices allowing one computer to interface with another computer over the telephone lines. In order to use a Modem you must either have a specially configured Modem RS-232 Cable, or have installed a Modem Jumper Block on the I/O Board.

SERIAL PORT 3—MODEM

Jumper Block Pin Number	Function	I/O Board Pin Number	CPU Card Pin Number
9	Ground	14	
10	Power (+12)	19	
11	Data Carrier Detected	22	U4
12	Data Terminal Ready	23	U3
13	Request To Send	26	U3
14	Clear To Send	20	U4
15	Transmit Data	25	U3
16	Receive Data	21	U2

In addition there must be a 4.7K OHM resistor between jumper block pin 10 and the power pin.

Modem Jumper Block



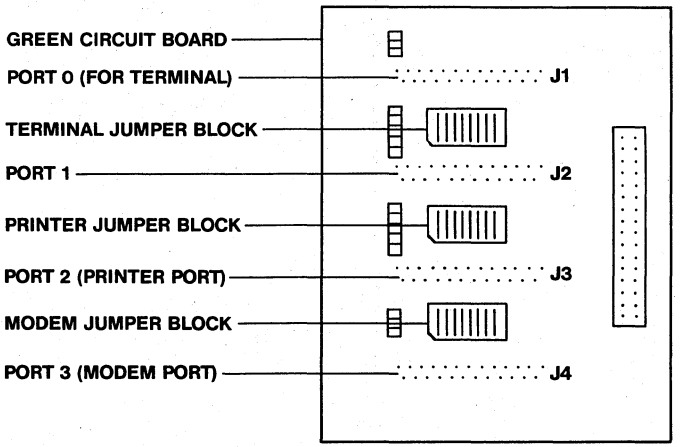
5.6.7 INSTALLING JUMPER BLOCKS

WARNING!---The DMS-3/F cabinet should be opened only by a qualified technician. The CRT and Power Supply contain dangerously high voltages that are present long after the unit is turned off. The information presented in this section is for service technicians only. Service technicians should unplug the DMS-3/F and wait two hours before opening up the cabinet.

To install a new Jumper Block, remove the cover of your computer or workstation and locate the I/O Board. (See Appendix C for a step by step procedure for opening the computer cabinet.) On the DMS-3/F and DMS-15 the Serial I/O board is located on the inside of the back panel of the cabinet, right where the Ports come out of the cabinet.

The jumper blocks are always part of the green Serial Port I/O circuit board (see diagram below). The Jumper Blocks are removed and inserted just like IC (integrated circuit) chips. Pull out the old block with a chip puller and carefully plug in the new block making 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 must **FACE DOWN** on the **DMS-3, 3/B, 3/F, 4, 86,** and **DMS-15.**



INSIDE VIEW OF SERIAL PORT I/O BOARDS
DMS-3, DMS-3/F, DMS-4, DMS-15

6.0 HINET MASTER

The DMS-3/F is not capable of being a HiNet Master. This section normally applies to either the DMS-3/4 Series or the DMS-15 which can be used as Network Masters when purchased with HiNet software.

7.0 LOCAL STORAGE.

This section of the manual will explain how to use the local storage capabilities of the DMS-3/F. The DMS-3/F is equipped with two Floppy Diskette Drives. The Drives use 5.25-inch double-sided, double-density Diskettes. Each Diskette can store up to 640 Kbytes of data. That translates into about 200 pages of single-spaced text per Diskette. The DMS-3/F has a total storage capacity of 1.28 Mbytes when using 2 Floppy Disks. This section of the manual will explain how to handle Floppy Diskettes and the procedures for formatting and copying Diskettes.

7.1 FLOPPY DISKETTES.

The Floppy Diskette Drives can read and write files that are stored on 5.25-inch double-sided, double-density Diskettes. When you receive software from DMS, it is written onto the Diskette in a way that is compatible with the DMS-3/F's Floppy Diskette Drive (or your HiNet Master's Disk Drive). New Diskettes must first be formatted with the FORMAT5 program before data can be written onto them.

7.1.1 HANDLING FLOPPY DISKS.

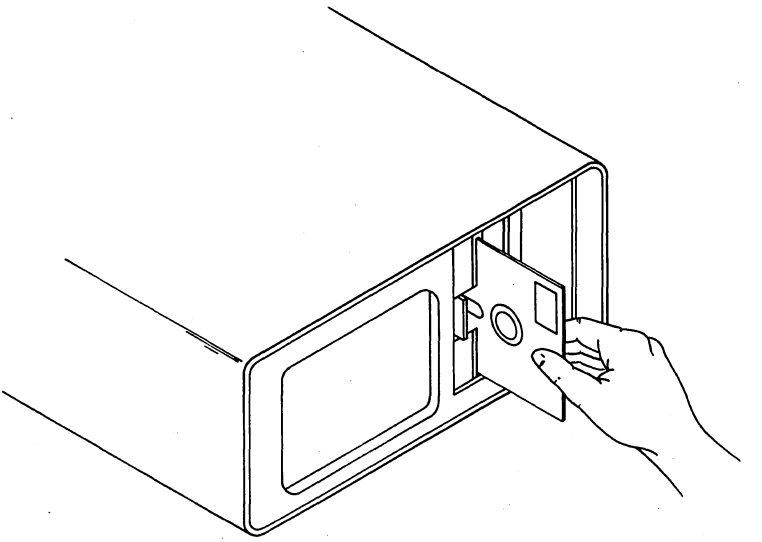
Floppy Diskettes store information on a thin flexible Diskette. The Diskette itself is enclosed in a special protective square sleeve. Never try to take the magnetic Diskette out of its sleeve. There are openings in the sleeve that allow the Diskette Drive's heads to read from and write onto the Diskette. The Diskette and sleeve come in an envelope that help keep out dust and dirt.

Here are some basic rules to follow when using Floppy Diskettes.

- Never touch the Diskette itself. A fingerprint can wipe-out data on the Diskette.
- Don't bend the Diskette or place heavy objects on top of it.
- Always keep the floppy Diskette in its paper envelope when you are not using it.
- Keep the Diskette away from heat and electrical equipment.
- Always make copies of any original software Diskettes and keep the originals in a safe, protected place.
- When labeling Diskettes, use the adhesive labels supplied with the Diskettes and write on them only with a felt-tip pen.

7.1.2 INSERTING FLOPPY DISKS.

Remove the floppy Diskette from its envelope. Hold the Floppy Diskette in your right hand so that your thumb is placed over the manufacturer's label. Insert the Floppy Diskette into the Drive while holding it in this manner. The manufacturer's label must be facing towards the CRT screen. Refer to the diagram below. The Floppy Diskette must be inserted correctly into the Drive for it to work.



INSERTING FLOPPY DISKETTE

Open the door to the Diskette Drive and insert the Floppy Diskette. Gently push it all the way in. Close the Drive's door.

When a command is given that requires information to be read from or written to the

Floppy Diskette, the Diskette Drive light will flash on and off and the Drive will make a buzzing sound. Whenever a Drive's light is on, it means that the read/write heads are either reading information from the Diskette or writing new data onto the Diskette. The buzzing sound indicates that the read/write heads are being moved to another track on the Diskette. Never remove the Floppy Diskette from the Drive when the Drive light is on or the Drive is making a buzzing sound.

Do not leave a Floppy Diskette in the Drive when you turn off the DMS-3/F or insert a Diskette before turning it on. A power surge could cause erroneous data to be written onto the Diskette or scramble data already on the Diskette.

CHANGING DISKETTES.

It is important to remember that the operating system does not know when you have changed diskettes in a drive. You must signal the computer everytime you change the diskette in the logged disk drive. By entering a CTRL C after you have inserted a different diskette, the computer will read the new disk's directory into memory. The new disk must have the CP/M operating system on it. (See SYSGEN.) If you do not warm boot (CTRL C) after changing diskettes, the diskette will be marked as Read/Only; you will get a BDOS error when you try to write to it and lose your unstored work.

To prevent this from happening, don't change your working diskette (the diskette you are writing to) in the middle of an applications program. You can change the diskette in the second drive if you are not accessing it at the time and wish to read information from it.

7.1.4 DISK DRIVE DESIGNATORS.

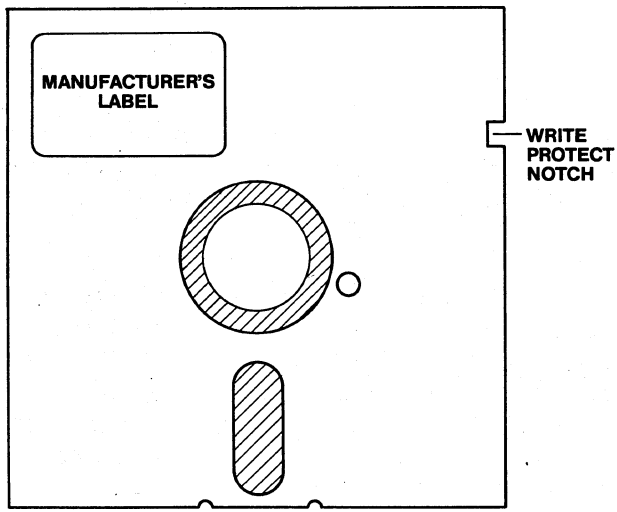
Programs that use Floppy Diskettes as sources or destinations of data often require that you enter the names, or designators, of the Drives that the Diskette is in. Various programs sometimes use different ways of naming the Diskette Drives.

The DMS-3/F's Diskette Drives are designated in two ways; by number and by letter. The Left Drive is called either **0** (M0 when using ASSIGN) or **A.** The Right Drive is called either **1** (M1) or **B.** The numbers are used to refer to the physical device and the letters are used to refer to a CP/M logical Drive.

When FORMAT5 and FDCOPY5 ask which Drive holds the Diskette to be formatted or copied, you must specify a number (0 or 1). When SYSGEN asks for source and destination Diskette Drives you must enter a letter (A or B). The program will usually display the Drive choices in the form that is required.

7.1.4 WRITE PROTECT NOTCH.

Floppy Diskettes have a notch that allows you to make the Diskette Read Only (or Write Protected). This protects Diskettes from accidently being written to, erased or formatted.



5¼" FLOPPY DISKETTE

On 5.25-inch Floppy Diskettes, the notch is located near the upper right corner of the Diskette when the manufacturer's label is face up (towards you) and in the upper-left corner. When this notch is uncovered, the Diskette can be written to by the read/write heads. If the notch is covered by a tab--such as the shiny adhesive tabs that come with the Diskettes--then

you cannot write data to the Diskette. With the notch covered, the Diskette cannot be erased with the ERA command or be reformatted with FORMAT5.

7.1.5 STAT--PROTECTING FILES AND DISKS.

STAT is a CP/M command that lets you set files or entire Diskettes to either Read/Only or Read/Write. This gives you added protection against loss of data by erasure or accidental overwrites.

Normally a file is designated as R/W. This means you can both read the file and write to it (change its contents). To make a file R/O (Read/Only) enter the following command:

A>**STAT FILENAME $R/O <CR>**

Be sure to enter a $ (dollar sign) before the status.

To verify that the file was changed to R/O status, enter **STAT FILENAME <CR>**. The filename will be listed along with its R/W status and its size in Kbytes. You can change the status back to Read/Write by entering:

A>**STAT FILENAME $R/W <CR>.**

You can also Write Protect an entire Floppy Diskette (or partition). Instead of entering a particular filename, enter *.* to represent every file on the Diskette. (E.g., **STAT *.* $R/O <CR>** will change every file on

your currently logged disk or partition to Read/Only.) The R/O status will stay that way until you change it again with the STAT command.

NOTE---If you change Floppy Diskettes without entering a CTRL C afterwards, CP/M makes the new Diskette R/O when it checks the directory again. This prevents a program that may be in progress from accidentally writing a part of a file to a different Diskette where it would be lost.

STAT has several other useful features that are not covered in this manual. Refer to a book on CP/M for details.

7.2 FORMATTING A FLOPPY DISK.

All new Diskettes must be formatted before data can be recorded on them. Formatting a Diskette prepares it to receive data in a way that is special to the Floppy Diskette Drive. The program supplied by DMS that formats 5.25 inch (double-sided, double-density) Diskettes is called FORMAT5. Diskettes that are not formatted by FORMAT5 will most likely give you the error message ***DENS error when you try to read from it. See the appendix for a listing of other possible error messages.

WARNING!---FORMAT5 will ERASE any files that are recorded on a Diskette. You should use FORMAT5 only on new Diskettes or on Diskettes that you wish to erase completely.

7.2.1 USING FORMAT5.

Insert a System Diskette with FORMAT5.COM on it into Drive 0 (the left Drive). Enter FORMAT5 after the A> prompt. (Alternatively you could call the FORMAT5 program from the Master Hard Disk if the DMS-3/F is connected to HiNet.) Insert the Floppy Diskette that is to be formatted into Drive 1 (the right Drive).

Here are the screen messages for a complete run of the FORMAT5 program.

```
A>FORMAT5

5 inch Floppy Diskette format program.

Use ESC to restart, Control C to abort.

ENTER DISK NUMBER (0-7): 1

TYPE RETURN TO START   <cr>

FORMAT COMPLETED

ENTER DISK NUMBER (0-7): CTRL C

A>
```

Be sure to enter the correct Diskette number to be formatted. If you specify 0 instead of 1 the System Diskette will be formatted and all the files on it will be erased. It may be a

good idea to cover the Write Protect Notch on the System Diskette to protect it from being accidently formatted.

After the statement, FORMAT COMPLETED, you can remove the Floppy Diskette from the Drive and insert another Diskette that you want to be formatted. Enter 1 again after ENTER DISK NUMBER, and the new Diskette will be formatted. When you are done formatting, enter a **CTRL C**. The CP/M prompt will return.

7.3 SYSGEN--COPYING THE CP/M SYSTEM TRACKS.

SYSGEN copies the CP/M operating system from one Floppy Diskette to another. CP/M reserves the first three tracks on 5.25-inch Diskettes for storing the operating system. (FDCOPY5 will also copy the system tracks if you specify either the S or the A options.)

The advantage of having the operating system on your Floppy Diskettes is that you can do a warm boot (CTRL C) or a RESET anytime you have to without changing Floppy Diskettes.

Digital Microsystems' version of SYSGEN will let you record on the Diskette, along with the system information, commands that will be executed whenever you do a cold boot--i.e., when you RESET the computer. These commands can include ESC and CTRL codes and can be up to 120 characters in length. However only one RETURN can be included in the command line.

USING SYSGEN.

To copy the CP/M system tracks from one Diskette to another, insert a Floppy Diskette that has the CP/M operating system and SYSGEN.COM on it, into Diskette Drive A (the left Drive). Type **SYSGEN** **<CR>**. The screen will show:

```
A>SYSGEN

SYSGEN for DMS 5" & 8" Floppy Diskettes, Version x.

Source Disk name: (return to reboot) A
SOURCE ON A, type return to continue. <CR>

CP/M lets you execute a CP/M command on cold boot
Your current command is: No cold boot command

 Hit RETURN for no change to this command
     C       to enter a new command
     ESC     to eliminate this command
     CTRL C to Exit the program

(The old command is erased when you enter the
new one.)

Enter a RET, C, ESC, or CTRL C:  C
  Note: Entering only RETURN will eliminate the
  current command.
Enter new command (use RETURN to end, DEL or BS
  to erase.)

>ASSIGN P PORT2 <CR>
```

In the above example, there initially was no specified command that would be executed after a cold boot (RESET). The program lets you type in whatever CP/M command you desire. You could, for example, run a CUSTOMIZ program that would set up default values for your system. For this example, the ASSIGN command was used to assign the printer to Port2.

NOTE---Unlike the type-ahead buffer in the USERS program, you do NOT enter an @ sign for a RETURN in the cold boot command. This means that you can only enter one cold boot command string per Diskette.

After the command is entered, the program will ask for the Destination Drive. Insert the Diskette that you want the system tracks copied onto in Diskette Drive B (the right Drive). Enter the letter B. The screen will show:

```
Destination Diskette name: B
DESTINATION ON B, type <CR> to continue. <CR>

Destination Drive name: (type <CR> to reboot) <CR>

Exit SYSGEN
A>
```

The program will confirm the designated destination Drive and, after you hit RETURN, will copy the system tracks onto the new Diskette. When the copying is completed, you

that you want the CP/M system copied onto or returning to the CP/M prompt.

NOTE---You can change the cold boot command on the current Diskette by specifying the A Drive for the destination Diskette.

7.4 COPYING FLOPPY DISKETTES.

Copying your Floppy Diskettes is one of the most important procedures that you must perform. On a computer system which stores all of your work on a media that can be lost, misplaced or damaged, having backup copies of your work is very important.

Any original software Diskette you receive should immediately be copied twice and stored in a safe place. Use the copies of the Diskette to work with on your system. When you work on a project, take the time to make backup copies of your work frequently. A minor accident to an important Diskette can ruin hours of work. If you have copies of that work, you'll be safer. It is not necessary to copy your work files onto diskettes if you are working on the HiNet network. The files are stored on the Master Hard Disks and should be regularly backed up by your System Administrator.

The program that copies entire Floppy Diskettes on the DMS-3/F is called FDCOPY5. Many other manufacturer's systems require you to PIP each file on a Diskette individually to another Diskette. DMS' program FDCOPY5 will quickly copy an entire Diskette for you with a minimum of key

an entire Diskette for you with a minimum of key strokes. (If you have only a few files to copy then PIP is quicker to use.)

Call up the copying program either from the Network or from a diskette in the A drive by typing after the prompt **FDCOPY5 <CR>**.

To copy a Diskette, insert the original into the Left Drive (Drive 0) and the formatted Diskette in the Right Drive (Drive 1).

NOTE---Make sure that the Diskette to be copied to is either blank or does not have any files you need to save. FDCOPY5 writes over any data already stored on the Diskette.

To copy the Floppy Diskette in Drive 0 to a Diskette in Drive 1, enter **FDCOPY5 <CR>** after the CP/M prompt. The screen will show:

```
A>FDCOPY5 <CR>

Source Diskette: (0-7) :
```

The first step is to enter the source Diskette Drive. Usually it will be Drive 0. Then enter the destination Diskette Drive. You can use either Drive for the source Diskette and destination Diskette. However, it is best to stick to one format to avoid confusion. If you specify the wrong Diskette Drive as the destination Drive, all of the data on that

Diskette will be destroyed. It is a good idea to cover the write protect notch on original Diskettes that you will be copying frequently.

FDCOPY5 next requests if you wish to copy the SYSTEM (S) tracks, the Data (D) tracks or All (A) of the tracks.

After entering your choice of which tracks you want to copy, the program will proceed to copy from the source Diskette to the destination Diskette, track by track. Here are the screen messages for FDCOPY5:

```
Source Diskette : 0

Destination Diskette : 1

COPY: System tracks, Data tracks, or
All tracks? (S,D or A) ? A

Hit RETURN when ready <CR>

Track xx copied

** JOB COMPLETED **

Source Diskette: (0-7) : CTRL C
```

After the message "JOB COMPLETED", you can either insert a new source Diskette to be copied and a new destination Diskette or enter a CTRL C to return to CP/M.

8.0 GRAPHICS

The DMS-3/F does not have any special graphics capabilities. This section normally pertains to the DMS-5000 series which have bit-mapped CRT screens. The DMS-5000 series workstations are capable of displaying graphs, charts and Computer Aided Design (CAD) drawings for engineers and scientists.

9.0 MISC. UTILITIES

9.1 TIME & SETTIME

Can Be Used On:	
Single User System	**YES**
HiNet Master Station	**YES**
HiNet workstation	**YES**

Files Needed:
TIME.COM

TIME and SETTIME are used to set and display on your CRT screen the correct date and time. These dates and times can also be accessed by applications software (E-MAIL for example) with provisions for recording or printing such information.

Date and time is set by using the **SETTIME** Command. (When used on a Master Station, SETTIME establishes the date and time for the entire network.) When a workstation logs on to the network its internal clock reads the date/time from the Master Station and begins running. (If SETTIME is used to reset a workstation's clock, then that particular station will have a date/time different from the rest of the network.)

SETTIME is invoked by typing **A>SETTIME<CR>** from the CP/M prompt. You will see the message: **Enter date MM/DD/YY -** (for Month, Day, Year) followed by **Enter time HH:MM** (for Hours, Minutes).

You must enter two digits for each Month, Day, and Year (e.g. January 9th, 1983, would be 01/09/83) and you must also type in the slash mark (/). After typing in the date you will see the **'Enter Time HH:MM-'** message. Like the date you must use two digits and include the colon (:).

NOTE---SETTIME uses the 24-hour clock; thus, 1 AM would be 01:00, while 1 PM would be 13:00.

Once the date and time are entered, HiNet will maintain an electronic clock accurate to 1/62nd of a second and display the correct date and time at any workstation whenever the command **A>TIME<CR>** is entered.

10.0 ELECTRONIC MAIL

USING ELECTRONIC MAIL (Short Course).

1- To use E-MAIL your name, password (if any), and terminal type, must be registered in E-MAIL`s memory by the person in charge of E-MAIL. The MAIL partition must be assigned to your B: drive.

2- When using E-MAIL you should be logged to a work partition on drives C: or D:. E-MAIL is invoked by **C>A:Mail<CR>**.

3- When E-MAIL is invoked it will ask you for your name (**To whom do I have the pleasure of speaking?[ ]**). If you are not using the type of workstation or terminal registered in E-MAIL's memory for your name, answer the first question with the 'AT SIGN' (**@**). You will then be asked for the name of a person who normally uses the type of terminal you are working at. After giving that name you will be asked again for your own name.

4- When E-MAIL is called up any mail not yet read by you will appear on your screen. An option menu of things you can do with the message will be displayed at the bottom of your screen. You can specify more than one option. Using the menu you can:

- Delete the message (**DEL**).
- File it in one of 7 categories (**C 1-7**).
- Send an Immediate response (**I**).
- Flag the message Response Required (**R**).
- Write the message to a file stored in your logged partition (**W**).
- Read the next message (**N**).
- Quit (**Q**).

NOTE---Deleting a message will delete the file from the screen and ALSO from where it is stored in a category. If you save a message in a category, press N for the next message to clear the screen, don't press the DEL key.

5- When you are finished reading your messages, or if there are no messages, you will see the Main Menu. Using this menu you can:

- Review ALL old (previously read) mail (**A**)
- Review mail by category (**C**)
- Review only those messages flagged response Required (**R**)
- Review Notes written to yourself (**N**)
- Review any Unread mail (**U**)
- Send mail from a File (**F**)
- Send mail from the keyboard (**S**)
- Quit (**Q**)

6- SENDING MAIL FROM A FILE. From Main Menu hit the **F** key. You will be asked who you wish to send a message to, then the name of the file containing the message. Be sure to specify the drive letter of the partition containing the file. Files can be created by any wordprocessor such as Wordstar or Perfect Writer.

7- SENDING MAIL FROM KEYBOARD. From Main Menu hit the `S` key. You will be asked who you wish to send the message to, then you can type in the message. When finished with the message hit **CTRL-Z** to send it. The backspace key will erase the letter to the left of the cursor (but not farther than the line you are on).

8- NOTES. If you send a message to yourself it will be stored under the category NOTES which you may read by hitting the **'N'** key in the Main Menu.

9- PASSWORDS. All passwords must be typed in **lowercase** letters, not capitals.

10- USING OTHER TERMINALS. If you are going to use a different type of terminal from the kind you usually use, hit the @ key when E-Mail first asks for your name. For the second question, type in the name of a person on your network who normally uses that type of terminal. Then give your name in response to the third question.

11.0 TELE-COMMUNICATIONS

This section will be sent to you immediately upon release.

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 A:

BDOS stands for Basic Disk Operating System. The letter following the BDOS ERROR will be one of your four drives A-D. There are three main types of BDOS ERRORS:

BDOS ERROR ON B: BAD SECTOR:

Indicates a problem with the Hard Disk system. Consult the person in charge of your Network.

BDOS ERROR ON C: R/O (for Read Only).

This usually means that someone else has been using your partition. To recover from this error enter a CTRL-C Command. NOTE-- This will cause you to lose everything you have done since your last 'save' command.

BDOS ERROR ON G: 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.

***** CALL error**

A non-available BIOS feature has been requested. The user has tried to access an unassigned drive or non-existent hardware. Follow the screen messages to retry or reboot.

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.

***** DATA error**

Data CRC error. This error can only occur on a disk read. It indicates that the data on the diskette has been damaged. If you type a RETURN, you may be able to recover the data. However, if the error is in the directory, the diskette may be unusable. It is possible that you may recover the data by reading the diskette on another drive, or by repeating the current operation. Re-writing the offending sector is likely to eliminate this error, but will also destroy old data. Follow the screen messages to retry or reboot.

Persistent errors can be caused by diskette wear, improper diskette care, bad diskette quality, malfunctioning disk drive or disk controller, or bad power supply levels.

***** DENS error**

Missing address mark. The diskette is probably formatted in the wrong density. For example, this error is generated when a single density diskette is read on a drive assigned as double density, or when an unformatted diskette is read. It is also possible that your diskette has been damaged. Follow the screen messages to retry or reboot.

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 in 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 operation that writes to disk storage. Indicates the computer is having a problem writing material to the memory disk. Probably due to a full partition. Try again. If the problem persists, see the person in charge of your system.

***** ENDT error**

Access beyond end-of-track. The DMA chip has failed to interrupt the CPU at the completion of a DMA operation. This can happen when interrupts are disabled, even for a short period of time. This can also happen if the Z-80 I register is disturbed. You will have to RESET the computer.

FILENAME?

When you are using the REN (Rename) command and a file name 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 can not find the file(s) you named. Check to see if you typed the file name correctly. If you did, then the file(s) no longer exist.

***** HALT error**

An attempt was made to execute a HALT instruction. The address of the HALT instruction will be printed.

***** HARC error**

Hard Disk command error. This error usually means that an attempt has been made to access a sector beyond the end of the storage allocated for the partition.

*****HARD error**

HARD DISK DATA ERROR. Data on the Master Hard Disk has been damaged. Consult with the person in charge of your network.

***** HARF error**

Hard disk fault. This error usually means that the Hard Disk is not connected to the CPU board, or that the Hard Disk power has failed. Check all cable and power connections, and verify that the Hard Disk is spinning.

*****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.

***** ID error**

ID CRC error. This error indicates the an ID field on a diskette has been damaged. The same comments apply to ID errors and DATA errors, except that rewriting the offending sector will probably not eliminate this type of error.

***** INT error**

Bad interrupt. An interrupt has occurred, but the wrong vector was used. This usually indicates a software error.

***** I/O Error nnnn**

Occurs when attempting to boot CP/M. Can be caused by any of a number of problems. Your diskette may be damaged. The hardware may have failed. If this error persists after trying a known good diskette, then it is likely that the hardware has failed. If the error number is between 0 and 3FFh, then the error occurred while attempting to read sectors 0 and 1; if the error number is between 9000 and 90FFh, then the error occurred while attempting to read elsewhere on track 0 or 1. The controller's result string is stored beginning at location 9380h; it must be examined to determine the cause of the error.

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 SEPARATOR

Check your punctuation.

***** MADR error**

Missing address mark on Floppy. The address mark was not found when trying to perform a Floppy disk operation. This may mean that the diskette is damaged, or the Floppy drive is not functioning properly. Retry the

disk operation, and if it still fails, try a freshly formatted diskette.

***** MIMC error**

If the error is followed by *** WAITING, and the system is in heavy use, view the error as informational. If the error appears alone, an incorrect command was sent to the mimic Hard Disk. HiNet recovers from this error.

NO FILE

The computer can not find the file(s) you named. Check to see if you typed the file name correctly. If you did, then the file(s) no longer exists.

NOT FOUND

The computer cannot find the file(s) you named. Check to see if you typed the file name correctly. If you did, then the file(s) no longer exists.

***** ORUN error**

The Floppy controller was not serviced promptly. This error may be caused by a DMA chip failure or a software failure.

***** PROT error**

The diskette is write-protected. To write to the diskette, the notch next to the label must be uncovered on 5.25-inch diskettes and covered on 8-inch disks

***** SECT error**

Sector cannot be found. This error indicates that the ID field for the current sector cannot be found on the current track.

The diskette may be damaged, or the drive may have failed to step properly during the previous seek operation, or the software may have erroneously requested a non-existent sector. Follow screen messages to retry or reboot.

***** SEEK error**

Occurs when a Floppy disk drive has failed while stepping to a new track. Follow screen messages to retry or reboot.

***** SYNC error**

The NEC765 controller chip is out of phase with the CPU chip. Indicates that the NEC chip was misprogrammed, or that interrupts have been disabled or missed. You will have to RESET.

*****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.

***** TRAC error**

The disk read/write head is positioned over the wrong track. The previous seek operation failed to position the read/write head over the proper track. To fix this problem, try entering a CTRL C. If the error persists, the controller or the drive is probably at fault.

***** User NN error**

This message will appear on the master console if a protocol error has occurred. The majority of protocol errors are recoverable, and an occassional error can safely be ignored. Many error messages may indicate faulty cabling or marginal operation of one or more of the HiNet stations. The error message is followed by the address in the operating system at which the error was detected. This address must be compared against a current listing of the operating system to determine the precise cause of failure. User error messages are normally suppressed; to enable them, the mode byte in location 4Eh must be altered. See section 6.12.2 in the HiNet Master section.

*****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.

APPENDIX B ESC AND CTRL COMMANDS

This section contains the ESC and CTRL codes that may be necessary to know when you configure a printer or a software package for the DMS-15 or DMS-3/F. A command with an (L) before it means that you must access this code either from Local Mode (CTRL/SHIFT F2) or from a program.

CHARACTER SET COMMANDS

(L) ESC a Substitute alternate character set from cursor on.

(L) ESC A Substitute alternate character set for entire screen.

(L) ESC s Show the CRT driver's current character set.

(L) ESC S Set the CRT drivers character set to standard ASCII.

SCREEN BRIGHTNESS CONTROL

(L) ESC b Sets the screen one increment brighter.

(L) ESC d Sets the screen one increment dimmer.

SCREEN CONFIGURATION COMMANDS

(L) ESC H Set to highlight (half intensity) following character position occupied by cursor.

(L) ESC N Set screen to normal (no highlight, local reverse, underline, blinking or special character set) following position occupied by cursor.

(L) ESC B Set screen to blink following the character position occupied by cursor.

(L) ESC R Set screen to reverse video following position occupied by cursor.

(L) ESC U Set screen to underline following position occupied by cursor.

BELL COMMANDS

(L) Press ESC CTRL-G and then 6 ASCII digits to program the bell tone. The first three ASCII digits count the number of beats of the tone. This affects the duration of the tone. The second three ASCII digits shorten or lengthen the beats which raises or lowers the tone. Decreasing the number raises the tone and will shorten the duration because the number of beats per second is higher. The reverse happens if you lower the tone because the beat is slower. The default bell tone has a duration of 100 and a tone of 055.

CURSOR CONTROL COMMANDS

Key	Hex Character	Key position and Description
(L) 'blank' or CTRL-A	1h	First row, rightmost key Home the cursor to the upper left corner.
(L) 'blank' or CTRL-F	6h	Bottom row, one from the right Move the cursor one character to the right. At the end of the line go to the beginning of the next line down. At the bottom of the screen, scroll the screen up.
'backspace'	8h	Bottom row, rightmost key Move the cursor one character to the left. At the beginning of the line, go to the end of the next line up. At the top of the screen, go to the bottom of the screen.
'linefeed'	0Ah	Second row, first from right Move the cursor down one line. At the bottom of the screen, scroll the screen up.
(L) 'blank' or CTRL-Z	1Ah	First row, second from right Move the cursor up one line. At the top of the screen, move the cursor to the bottom of the screen.

(L) CTRL-L	0Ch	Home the cursor to the upper left corner and clear the screen
(L) CTRL-M	0Dh	Move the cursor to the left-most position of the current line.
'TAB'	9h	Tabs are set at every eighth character. At the end of the line, go to the beginning of the next line. At the bottom of the screen, scroll.

MISCELLANEOUS COMMANDS

ESC C Load 1000h bytes of code at 4000h and execute. This allows the user to reconfigure the CRT.

ESC E character Set the available attribute.

Set the following bits high (1b) to enable the resulting screen attributes.

bit 0 - half intensity
bit 1 - blink
bit 2 - unused
bit 3 - alternate character set
bit 4 - reverse video
bit 5 - underline

ESC g function key
Get a programmed function key string. The first character returned is the length of the string, followed by the string itself.

ESC h Hide (remove) attribute character. Only 16 attribute characters are allowed per line. This provides a means of removing them.

ESC i Get the screen intensity and normal/reverse video byte Byte returned with high bit set for normal video, or reset for reverse video. Low four bits are intensity. Intensity levels range from 0 to 15.

ESC I intensity
Set screen intensity. Byte information bits are the same as for ESC E.

ESC k Erase from cursor to end of screen

ESC K Erase to the end of the line.

ESC l key, length of buffer, characters
Load the designated key's programmable key buffer from the host computer.

ESC p Send the function key's byte as a literal. The value is set as follows: Bit 7 is set, bit 6 is set if CTRL is pressed, bit 5 is set if SHIFT is pressed and bits 4 through 0 are the function key's value. (i.e. F1=81h, CTRL-F1=C1h, SHIFT-F1=A1h, CTRL-SHIFT-F1=E1h)

ESC P Send the program string or literal for a function key in the programmable key buffer to the host. This condition is set on power-up or reset.

ESC T Toggle screen reverse video. No character position is occupied.

ESC V The version will now be returned to host rather than just displayed on the screen. Its format will be:

```
FOX  2.0aNPL
KYBD 2.0
```

The characters following the version are as follows:

a assembly code. Changes every assembly. It should be blank in the released version.

N normal video. Can be R to indicate reverse video.

P production version. Would be X if experimental version release.

L for long delay on powerup. S for short delay on powerup.

ESC X 4 byte address
Display the byte addressed on the upper left of the screen.

ESC w 128 characters
Transpose keyboard characters.
Causes transposition of keyboard characters before further processing. Entire new transposition table must be sent.

ESC W 128 characters
Transpose CRT character display. Causes transposition of CRT characters before they are displayed on screen. Entire new transposition table must be sent.

ESC X hexdigit hexdigit hexdigit hexdigit
Examine the memory contents of the byte addressed. Value will be displayed on upper left of status line.

ESC Y row+20h,col+20h
Set cursor position to row and column. Row and Column start at 0,0. (20,20) is intersection of row 1 and column 1 in upper left corner.

ESC z Zero keyboard transposition table. Each keyboard character is substituted for itself. You return to a normal keyboard. NOTE---1Eh is transposed to 30h.

ESC Z Zero display transposition table.

APPENDIX C

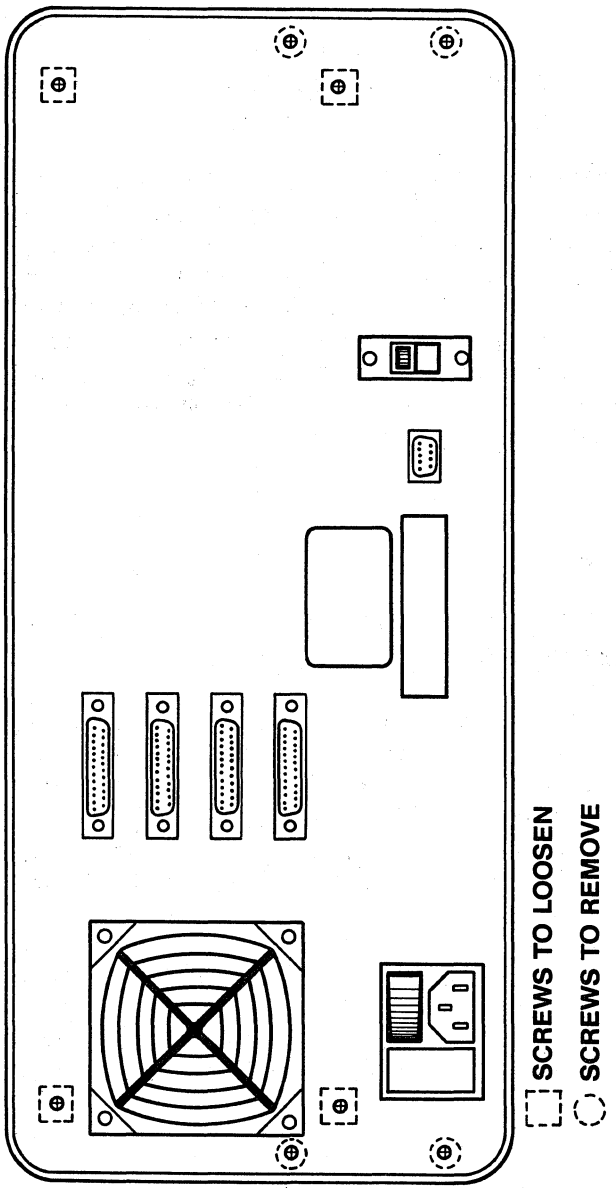
MODIFYING THE DMS-3/F JUMPER PINS

WARNING!——The DMS-3/F cabinet should be opened only by a qualified technician. The CRT and the Power Supply contain dangerously high voltages that are present long after the unit is turned off. The information presented in this section is for service technicians only. Service technicians should unplug the DMS-3/F and wait two hours before dismantling the cabinet.

DISASSEMBLY.

PREPARATION.

To begin, you will need a phillips-head screwdriver (at least 6"long) and a large table top clear of anything which might damage the DMS-3/F screen. To conduct this operation safely, make sure that there are no floppy disks in the disk drive, that the DMS-3/F has been turned off for at least two hours and that all wires and cords at the back of the cabinet are disconnected. Now disconnect the keyboard and set it aside. The DMS-3/F is a delicate machine; handle it carefully to avoid damaging it. The DMS-3/F's screen should be facing you.


SCREWS TO LOOSEN
SCREWS TO REMOVE

REMOVING THE UPPER AND LOWER CASINGS.

THE UPPER CASING.

For the sake of clarity, the metal sheet covering the top portion of the DMS-3/F will be called the **upper casing;** the bottom portion will be called the **lower casing.** Notice that the upper and lower casings fold around the DMS-3/F and are fastened to the machine along its sides.

A- Remove the six screws (three on each side) which connect the upper and lower casings of the DMS3/F.

B- Rotate the DMS-3/F gently forward, so that it rests on its face (screen down). The upper casing should now be facing you; the lower casing, facing away from you; and what we will call the back panel of the machine, distinguished by its many screws and outlets, should be facing upward.

C- At the back panel of the machine, loosen (by **six** full revolutions) the four screws marked "loosen" in the diagram. Be careful not to remove these screws.

D- Look along the sides of the DMS-3/F where the upper and lower casings meet. Notice that these casings rest here along the black rim of the DMS-3/F's face. Placing a finger along each side of this rim, slide the upper casing away from the lower casing about 1". If you move the upper

casing back and forth along the rim, you can see the back panel (now facing upward) give where you have loosened it.

E- To remove the upper casing, slide it toward you along this rim until you feel some resistance.

F- Now, without letting the upper casing regress, pull outward at its sides so that they clear the black rim.

G- Pull the upper casing downward slowly, but firmly, until it is free. Set it aside.

NOTE---This is as far as you have to go if you are only going to be changing the I/O port's Jumper Blocks. (See section 5.6.)

THE RADIATION SHIELD.

Before removing the lower casing, you must first remove the radiation shield. Notice the narrow opening on both the right and left sides of the DMS-3/F. The radiation shield is located in the opening on the left, by the keyboard cord socket. To remove it, unscrew the single screw.

THE LOWER CASING.

A- At the rear casing (now facing upward), remove the four screws marked "remove" in the diagram C-1.

B- Turn the DMS-3/F around, on its face, 180 degrees. The lower casing, with its two legs, should now be facing you.

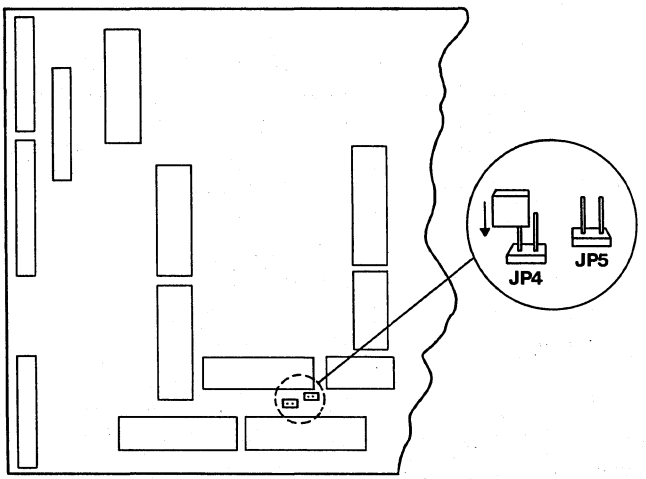
C- At the top of the lower casing, locate the three screws and remove them.

D- Placing your thumbs at the ends of the DMS-3/F legs, pull the lower casing toward you to remove it. If the casing resists you at all, pull out lightly on its sides until free and set aside.

CHANGING THE DMS-3/F's JUMPER PINS

THE CPU BOARD.

You should now be facing a large green rectangular board, about the size of a small placemat, with flat ribbon cables running from all directions to its left edge. This is the Central Processing Unit (CPU) board. Notice that the CPU board is divided into two sections: left and right. You need not concern yourself with the right section at all in this operation. On the left section, lying horizontally near the bottom edge of the CPU board, there are two rectangular chips, each roughly two inches in length. Just above the chip on the right, two jumper points are labled JP4 and JP5 (refer to diagram). The operation takes place here.



JUMPER PINS ON CPU BOARD
BOOT FLOPPY DISK

JUMPER POINTS/JUMPER PLUGS.

JP4 and JP5 are the only two Jumper Points that concern us in this operation. Above each of the labels a small brown rectangle juts out from the CPU board. From each rectangle two small metallic pins protrude. One set of these pins should be covered by a little plastic black rectangle (if this piece is missing, contact DMS or your dealer). This rectangle is called the JUMPER PLUG.

MOVING JUMPER PLUGS.

The Jumper Plug can be easily removed. Clench the black Jumper Plug tightly between thumb and forefinger and pull it away from the board; examine it closely. At one end of the plug, there are two miniature shafts to accomodate Jumper Points; at the other end, there is no such accomodation. Thus, only one end of the plug fits correctly on the Jumper Points.

ARRANGEMENT OF THE JUMPER PLUGS.

It is the arrangement of the JUMPER PLUG on the JUMPER POINTS which determines whether the DMS-15 will automatically boot the from the Floppy Disk, the Hard Disk or the Network.

AUTOMATIC BOOT FROM FLOPPY DISK.

The DMS-3/F is designed to boot the floppy disk automatically, even without a Jumper Plug. However, since you may wish to change the function of your DMS-3/F in the future, it's a good idea to store the plug on the CPU board.

A- To boot the **floppy disk** (and store the Jumper Plug safely), place the plug so that only **one** of the metallic points on JP4 is covered by a Jumper Plug shaft. This arrangement is known technically as "JP4 open."

AUTOMATIC BOOT---NETWORK

Arranging the Jumper Plug to boot the network is like plugging an electrical cord into a socket at home: in order to succeed, both metallic pins must be fit snugly into the corresponding shafts of a jumper plug.

A- To boot the **network** automatically, place the Jumper Plug so that it completely covers **both** metallic pins at JP4. This is known as "JP4 closed."

When you are satisfied with the Jumper Plug arrangement, you are ready to reassemble the DMS-3/F.

REASSEMBLY

REPLACING THE LOWER CASING.

A- Grasp the lower casing near the rear edge so that your thumbs cover the openings for the legs.

B- Tilt the casing forward, fitting the fold (located just inside the top edge) under the rear panel.

C- Nudge the rear panel upward with this fold and slide your hands forward so that the lower edge of the lower casing rests along the black rim of the front panel. (You may have to pull the side of the lower casing outward slightly for a correct fitting.)

D- Replace the three screws of the lower casing (now facing you).

THE PURPOSE OF THE RADIATION SHIELD.

The Radiation Shield assures that the DMS-3/F does not interfere with the reception of radio waves in its immediate area. Without the shield, there is a chance that the DMS-3/F will hinder television and radio reception in its vicinity. The Federal Communications Commission requires its installation, though the DMS-15 works without it.

REPLACING THE RADIATION SHIELD.

A- Turn the DMS-3/F around, on its face, 180 degrees (the back casing should now face away from you).

B- Align the Radiation Shield with the threaded screw housing of the lower casing and replace the screw.

REPLACING THE UPPER CASING.

A- Slide the upper casing back into place. (NOTE---There are three flanged attachments on the underside of this casing. The center attachment has a lip which must fit under the fold of the rear panel, while the upper casing itself fits over the fold.)

COMPLETING REASSEMBLY.

A- Be sure that all screw holes are aligned with their threaded housings. The side holes may not align exactly because the upper and lower casings are not yet tightened down. You may have to pull the lower and upper casings gently together.

B- Tighten down all screws securely.

C- Reconnect the keyboard, HiNet cable, power cord, and printer (if applicable).

D- Turn on the power and check to see that the DMS-3/F is functioning as desired. If not, recheck the directions to see that they were followed accurately.

APPENDIX D

PARALLEL PRINTER CABLE PIN CONNECTIONS.

The following table lists the pin connections required to connect a DMS-3/F to a Printer using a Centronics type parallel interface.

Parallel Port 1 J3 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	Input
STAT1B	Pin 17	BUSY	Pin 11	Output
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.

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