Digital Microsystems **DM** ™

DMS-5000 MANUAL
Version 1.2

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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.

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PREFACE

THE MANUAL

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

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

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

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

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

● Section 5 (Customizing) will explain how
to alter the operating characteristics of the
workstation to suit your applications and needs.

The DMS program CUSTOMIZ is the primary means of adapting the computer to your requirements.

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

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

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

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

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

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

MANUAL CONVENTIONS.

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

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

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

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

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

NOTES

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

---NOTE---

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

---NOTE---

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

---WARNING!---

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

PART NUMBERS

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

FEEDBACK FROM YOU.

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

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1.0   INTRODUCTION TO THE DMS-5000

1.1   OVERVIEW

You will be working with one of the DMS-5000 series workstations (DMS-5080, DMS-5086, DMS-5087, etc.) on the HiNet Network. For the most part the instructions for operating these workstations will be the same. We will point out the differences in operation as we go along.

Your DMS-5000 workstation can be used for a broad range of applications including: word-processing, accounting, forecasting, database management, scientific calculations, programming, forms, charts, graphs, and digitized drawings.

Your DMS-5000 workstation consists of a computer/monitor, a base that allows the unit to be tilted to suit your needs, and a detachable keyboard. The computer/monitor is a computer housed in a cabinet along with a Video Display Tube (VDT).

The DMS 5000 series workstations have several special features. They can be used to display graphics as well as text and numbers, and they can be set on their bases in either a vertical or horizontal position. With simple keyboard commands it is possible to customize a

workstation to your individual preferences. You
can adjust the screen brightness, operate in
regular or inverse video, and use the vertical
or horizontal mode (see section 4.0). Foreign
language character sets and personalized
keyboards can also be created and selected. The
30 programmable Function Keys can be loaded
directly from the keyboard of through the DMS
CUSTOMIZ program.

THE VDT SCREEN

In the vertical position, your DMS-5000 can
display a full 8.5 X 11 inch page of text
(maximum of 80 characters across by 66 rows
down). In the horizontal position you have a
choice of two character sizes on your screen.
The large character set allows for 80 characters
across by 24 rows down, while the small
character set allows for 132 characters across
by 50 rows down. The small character set is
often used for bookkeeping, spreadsheets, or
other statistical work.

Vertical (Small Only)   80 Characters x 66 Rows

Horizontal Large   80 Characters x 24 Rows

Horizontal Small   132 Characters x 50 Rows

The DMS-5000's VDT 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 brightness of the screen may also be
adjusted for your comfort. As described in
Section 4, the Customiz program will perform
this adjustment. You may also change the screen
brightness using the following keys at any time:

CTRL-SHIFT F1 - Dimmer by increments

CTRL-SHIFT F2 - Brighter by increments

CTRL-SHIFT F3 - Toggles inverse and normal video

A non-glare nylon screen covers the VDT. To
avoid scratching it you should use only the
cleaning cloth supplied with the DMS-5000 or a
soft brush to clean the screen.

----------------------NOTE---------------------
Do not turn the DMS-5000 on and then immediately
off. This could cause a very bright dot to form
on the middle of the screen which might damage
the VDT. Make sure the power switch is OFF
before plugging the unit into an electrical
outlet.

1.2 SETTING UP THE DMS-5000

After unpacking the DMS-5000 from its
shipping carton, examine the unit for damage.
Make sure that the VDT screen is not broken. (Do
not touch any broken glass; the coating on the
inside of the VDT screen is toxic.) If there is
any visible damage to the DMS-5000, do not plug it

into an electrical outlet. Contact your dealer
or DMS at once for instructions. You should also
contact the shipping company if the damage seems
to have occurred during transit.

You will find in the shipping carton:
o   The Computer/Monitor
o   The Keyboard
o   The power cord
o   This Manual
o   A screen cleaning cloth

1.2.1 PLUGGING IN THE WORKSTATION.
(Refer to Diagram 1).

Line Voltage Switch.

The DMS-5000 can operate on either 115V or
220V. You must set the voltage supply switch for
the voltage in your area.

At the back of the computer/monitor you
will see a brown hourglass-shaped line voltage
switch. Before you plug in the workstation's
power cord, set this switch to either 115 or 230
volts as appropriate. The switch slides up and
down, and can be manipulated with a ballpoint
pen or other narrow object.

Power Line.

```
---------------------NOTE---------------------
```
Before plugging in the power line cord, set the
DMS-5000 ON/OFF switch to OFF.

```
---------------------------------------------
```

        Plug the power line cord into the line cord
receptacle on the monitor, and plug the other
end into the power outlet. This cord can only be
plugged in one way.

HiNet Cable.

        The workstation is now ready to be con-
nected to the HiNet network via a cable. Plug
the network cable into the nine pin socket
labeled **HINET** at the back of the computer/
monitor. This plug will only fit into the socket
one way.

```
---------------------NOTE---------------------
```
There are two different sockets which the HiNet
cable will fit---one labeled **ALT NET** (for
Alternate Network), and one labeled **HINET**.
Unless instructed otherwise by the person in
charge of your system, you should use the socket
labeled HINET. (If the HiNet cables are not yet
set up the procedure for doing so is described
in the HiNet Master Section of the User Manual
that came with your HiNet Master Computer.)

```
---------------------------------------------
```

Keyboard Cord.

Plug your keyboard cord into the back of
the Computer/Monitor at the receptacle labeled
KYBD. This plug is similar to that of a modular
telephone jack and only goes in one way.

---------------------NOTE---------------------
When <u>unplugging</u> the keyboard cable be sure to
squeeze in the little plastic tab to release the
catch before pulling out the plug.

Tilting the VDT.

The VDT screen is on a base that allows it
to tilt forward or back at the top to adjust the
viewing angle of the screen. Tilting the screen
is often helpful in reducing reflected light or
glare from outside sources.

1.2.2   TURNING ON THE WORKSTATION.

The ON/OFF control is the black rocker
switch located next to the power cord socket
(see diagram 1). When you turn the unit on there
should be three beeps. After a short warm-up
period the screen of the 5080 should read:

```
DMS Series 5000 Version x.x
HiNet x.x
Login please
Name:
```

The screen of the 5086 and 5087 should display:

```
Series 5000 Version x.x
Network User Name =>
```

If there are no beeps and no words, check
to make sure the power cord is properly plugged
in to both the station and power socket. Also
check that the line voltage switch is properly
set.

If you get beeps but only the words **DMS
Series 5000 Version x.x** appear then either the
HiNet network is not properly plugged in, or the
network is not currently running. Make sure the
HiNet cable is plugged into the proper socket on
the DMS-5000 (either HiNet or Alt Net as
instructed). If the cable is properly plugged
in, check with the person in charge of your
network to see if the HiNet system is
temporarily down for maintenance or backup. If
the network is operational, have a qualified
person inspect and test your unit for
malfunction.

1.3 MAINTENANCE.

1.3.1 CLEANING THE FAN FILTER.

The cooling fan filter must be regularly
cleaned, especially in a dusty or polluted
environment. If the fan filter becomes clogged
with dust, the components inside the computer
may overheat and be damaged.

To clean the filter, remove the black vent
panel on the back of the workstation (this is
the grilled panel with no sockets or plugs, see
diagram 1). The panel is held in place with
self-locking material (similar to velcro). Put
your finger in the finger notch and pop the
panel off. The filter foam and a protective mesh
screen will now come out.

Wash off the foam, ring it out well, and
blot dry. Replace first the metal mesh screen
and then the foam. The black back panel that
holds them in place snaps back in with a small
amount of pressure. Leave the monitor running
for a few minutes to make sure that the filter
dries thoroughly.

1.3.2 CLEANING THE VDT SCREEN.

The VDT (TV monitor) screen of the DMS 5000
is made from an anti-glare nylon filament. It
scratches easily so you should only use the soft
cloth that came with the DMS-5000 or a brush to
clean it. Do not use your finger or fingernail.

1.4 RESET AND INTERRUPT

On the front panel of the DMS-5000's
cabinet you will see a rocker switch labeled
RES-INT. This is the RESET switch. Pushing the
rocker towards INT sends an INTERRUPT command to
the computer. The effect of an Intrrupt Command
will vary depending on the kind of program you
are running and the particular workstation your
are using. In most cases on the 5080 it will
return you to the CP/M prompt. With the 5086 and
5087 it will usually return you to the PROM
Monitor. In both these situations you will loose
any work that you have not saved to disk memory.
Pushing the button towards RES will completely
RESET your workstation's Central Processing Unit
(CPU), and you will have to log in to the
network again. **All of the work you have done
since the last time you Saved your work to Hard
Disk memory will be lost.** See Section 2.14 for
more information on RESET and INTERRUPT.

1.5 THE KEYBOARD.

As you look at the keyboard you can see six
groups of keys: the Main Section, the Numeric
Pad, and four groups of four Function Keys along
the top of the keyboard. Refer to diagram 1-3.

1.5.1   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 Numeric Pad number keys are the same as
the numerals along the top row of the Main
Keyboard Section, except that the Numeric Pad
keys do not have the same SHIFT values as the
Main Section keys. 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.

----------------------NOTE----------------------
The number values for the keypad are not
permanently assigned. You can use the CUSTOMIZ
program to assign whatever codes or strings to
these keys that you wish. (For example, you may
want to install a word processing program's
cursor control codes into the arrow keys to make
editing easier.)

1.5.2   FUNCTION KEYS.

Across the top of the keyboard are four
groups of four keys each, labeled F1 through
F16. These are 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. See section 4.0.

The Function Keys can also be programmed directly from the keyboard. However, the values programmed into the keys will not remain when the workstation is reset or shut off unless you use the CUSTOMIZ program to READ IN PRESENT SETTINGS and then save them in a file. See Section 4.7.9.

To program a Function key from the keyboard, press CTRL/SHIFT F13, that is, hold down the CTRL and SHIFT keys while pressing F13. A line will clear at the top of the screen with the words "WHICH FUNCTION KEY?" at the left side of the screen. Press any of the 16 function keys, the keys on the number pad or the three blank keys that you wish to program a string into. You can also press SHIFT and CTRL along with a Function Key to program three values per key. The line at the top of the screen will show the number of the Function Key that you pressed. Enter the character or CTRL string that you want in the Function Key. Use CTRL/SHIFT F14 to backspace over and delete any errors in the string. Press the CTRL/SHIFT F13 key to end the input and store the string in the Function Key buffer.

----------------------NOTE---------------------
Once you press a Function Key after CTRL/SHIFT F13, whatever was stored in that key is erased. This feature does not allow you to edit whatever is already in the Function Key.

1.5.3   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 Key.

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. Just as with the SHIFT
key, you hold down the CONTROL key while
striking the other keys.

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

RETURN Key.

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

This manual will use either the word **RETURN**
or the symbol **<CR>** to indicate a Carriage Return
in command sequences.

For example, when you turn on the
workstation and get the 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 fits your words into
lines of proper length; you only need to hit
RETURN to indicate the end of a paragraph. See
your word processor program manual for further
information on using the RETURN key.

ESC Key.

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 to 'escape' when
an error has caused the computer to 'hang' (no
longer respond to normal commands). Your
application program manuals will describe their
uses of ESC.

---------------------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, erasing
one character at a time.)

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

BACK SPACE Key.

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 <u>without</u> 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 Key.

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 Key.

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 Special Function Keys which can be
programmed for a variety of functions. See
section 4 to learn how to program these keys.

CAPS LOCK Key.

Like a typewriter, the CAPS LOCK Key makes
all of the letters type out as upper case. How-
ever, unlike a typewriter, the CAPS LOCK on the
DMS-5000 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-5000 (including
the command keys) are repeating keys. If you
hold them down they will automatically
repeatttttttttt until you release them.

1.6 DMS-5000 PORTS
(Refer to Diagram 1)

The DMS-5000 workstation has several ports
for connecting the station to various devices
(printers, modems, etc). In addition to the two
HiNet network Ports (HiNet and Alt Net) there
are a Centronics Parallel Port and three RS232c
Serial Ports.

1.6.1 PARALLEL PORT.

There is a blue Centronics Parallel port at
the rear of the DMS-5000 which may be used with
standard Centronics Parallel port cables. It is
labeled PARALLEL PORT. See Diagram 1.

1.6.2 SERIAL PORTS.

There are three black 26 pinhole serial
ports at the back of the DMS-5000 numbered **PORT
0, PORT 2,** and **PORT** 3. On some units Port 0 may
have no port number. To avoid error, check the
labels carefully and refer to Diagram 1.

PORT 0 is labeled **G5-PORT 0 RS232c** (may
not have a port number).

PORT 2 is labeled **G3-PORT 2   RS232c.**

PORT 3 is labeled **G4-PORT 3   RS232c.**

For information on connecting printers to these ports see Section 5.

2.0   HINET UTILITIES

2.1   INTRODUCTION.

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

The DMS-5080 can run either HIDOS or
regular CP/M 2.2 and access shared HIDOS
partitions. The DMS-5086 and -5087 can run
either CP/M-86 or MS-DOS but cannot access
shared HIDOS partitions.

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

2.2   BEFORE STARTING.

Each User on the Network should have the
following information available to them:

● Their user name (and password, if any).

● The name (and password, if any) of the
   partitions they will be using for saving
   work files.

● The file name(s) and partition name(s)
   where the application program(s) are
   stored.

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

   This manual will assume that the applica-
tions programs for your Network are located on
the CSYSTEM or MSYSTEM partition which is
assigned to the User's A Drive.

2.3   THE CURSOR.

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

   As you type characters on the keyboard, the
cursor moves to the right and shows where the
next character will be entered. In a sense, the
cursor is like the tip of a pen placed against
paper; your next mark will be made wherever it

is located. Just as you can lift a pen up off
the paper and put it down anywhere else you
want, it is possible to shift the cursor around
the screen, or through the pages of your text,
with commands from the keyboard.

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

2.4 LOGGING ON.

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

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

You then type in the User Name you have
been given, followed by a Carriage Return. If
you make a mistake while typing in your User

Name hit **RETURN** twice and you will be returned
to **NAME:** so you can start over.

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

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

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

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

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

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

list of workstations and their compatible
operating systems.

2.5   **THE PROMPT**

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

2.6   **USING COMPUTER COMMANDS.**

CAPITALS VS. LOWER CASE.

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

SPACES.

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

CARRIAGE RETURNS.

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

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

CANCELING AND CORRECTING COMMANDS.

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

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

next line down so that you may reenter the
command.

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

2.7 THE TYPE AHEAD BUFFER.

        You will notice that it often takes a
moment for the screen to respond to the commands
you have entered into the computer. Because DMS
workstations are equipped with a 'Type Ahead
Buffer' it is not necessary for you to wait for
the screen to catch up before going on to your
next command. Since the computer will remember
what you have typed, and will carry out your
commands in sequence, you can type in commands
or text faster than the screen responds to them.
However, some commands, such as CP/M's DIR and
TYPE, will abort if you enter additional
characters or RETURNS while the command is being
processed.

2.8 LOGGING OFF THE NETWORK

        Normally it is not necessary for you to
log off the network formally. Simply turning
your workstation off or resetting it will result

in the Network Master automatically logging you
out. Sometimes, however, if the network is very
busy, it can take several minutes to log out
officially. If your present partition
assignments are owned for writing only by you,
then no one else will be able to write to your
assigned partitions until the Master logs you
out.

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

    It is particularly important to use LOGOUT
if you plan to turn off one workstation and go
work on another one. If the Master has not
logged you off the first workstation by the time
you log in to the second station, you will not
be able to write to your assigned partitions (if
they are set to be OWNED by you). If this
happens you will have to get the System
Administrator to clear your write protection
with the ALLOC program. (See Section 2.11.5 for
more information on owning partitions.)

    The RELEASE W (drive letter): command
should be used to release write ownership of a
partition if you will not be logging out of the
network but need to write to one of your
partitions at another workstation. See Section
2.14.3.

2.9   FILES AND PARTITIONS, OVERVIEW.

This section will provide a general over-
view 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 informa-
tion 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 many
drawers. Each partition is like a separate file
drawer that can contain many files.

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

       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
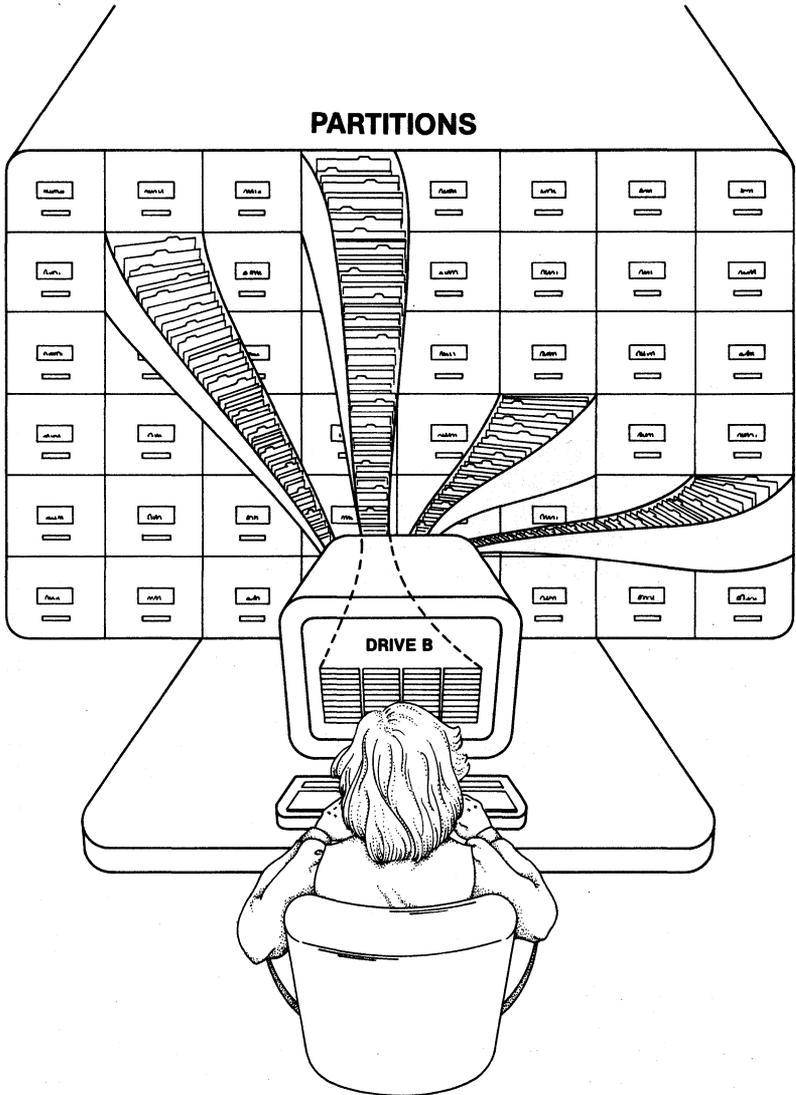
PARTITIONS

DRIVE B

the file. Some applications programs will rename
the original file and save it as a backup file.

DRIVES

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

When the DMS-5080 is running under CP/M-80,
there are four drives available to assign to
partitions. When the DMS-5086 or DMS-5087 is
running either CP/M-86 or MS-DOS there are eight
drives available.

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

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

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

2.10 FILES.

        Programs and data are stored in files. Like
a file drawer, each partition may contain many
files. Once you are logged onto the system and
accessing the proper partition, most of your work
will concern 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 charac-
ters 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 per-
formed 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 17
forbidden characters: > < , ; : + ? *] [ ) (.
/ | \ and TAB. (These characters are reserved
for special CP/M and MS-DOS instructions. For
example, the period is used as a file separator.)

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

partition to another see section 3.6.

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

```
-------------------------------------------------
```


2.10.4 FILENAME WILDCARD SYMBOLS.

     When listing files for certain commands
(ERASE, for example) you can identify a group of
files by using the characters that their names
have in common, plus the wildcard symbols * and
?, to stand for those characters that are
different. A question mark will stand for any
single character, and an asterisk will stand for
everything on one side of the period.

     ? stands for **ANY SINGLE CHARACTER.**

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

     For example, **FI??.DOC** would represent any
file with **FI** as the first two letters of its

name, any additional two letters, and **DOC** after
the period (**FISH.DOC, FILM.DOC, FIRM.DOC,** etc).
*.LST would stand for any file of the type **.LST**
(**SHOP.LST, MAILING.LST, POOBAH.LST, R2D2.LST,**
etc). Since ***** stands for everything to one side
of the period, ***.*** would stand for every single
file in a partition. FI*.DOC would stand for
every file beginning with FI and ending in .DOC.

DIRECTORY.

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

2.11   PARTITIONS.

2.11.1   PARTITION NAMES.

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

Other partition names might identify the
partition's contents (Ledgers, Forms, Inventory)

or the department that uses the partition
(Sales, Personnel, Research). Usually the
partition named SYSTEM is used to hold all of
the programs used by everyone on the network.

-------------------**WARNING**--------------------
     You should never erase, change, or add
anything to the SYSTEM partition (or the SYSTEM
partition's files) without first discuss-
ing 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 parti-
tions on the Hard Disk. The screen will display
a table similar to this:

```
A>DIRNET <CR>

DIRNET Version x.x

Partitions on Volume 0 vol0Mastr

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

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

2.11.3   PARTITION SIZES.

When you look at the DIRNET directory you
can see that each partition name is followed by
a number. This gives the partition size in
bytes. A byte is one character or space in
written text. An average single-spaced typed
page is about 3,000 bytes, usually abbreviated
3K. The K stands for 'Kilo' the metric word for
thousand. (However, in computer terminology K =
1024 bytes). A million bytes--which is actually
1024 X 1024 = 1,048,576--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 within a given partition. Thus, if
you had a 512K partition--which has a 4K
directory--you could put into it one file of
520,192 bytes, or any combination of files that
added up to no more than 508K or more than 128
individual files.

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 automati-
cally be in effect. Thus, if your HIDOS default
partition assignments were:

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

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

By typing **ASSIGN (A>ASSIGN <CR>)** you can
see a table showing your current partition
assignments. The ASSIGN command (as explained in
section 2.11.5) also allows you to assign
different partitions temporarily to any of your
drives. Of course, temporary assignments only
last until you log off (or change them again).
Whenever you log in again you will get your
default assignments.

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

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

Every User Name is linked to a specific
operating system. If you use more than one
operating system, you will need more than one
User Name. Here is a list of Digital
Microsystems' workstations and the operating
systems that they are capable of using.

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

2.11.5   ASSIGN COMMAND.

The Assign command is used to see what
partitions are currently assigned to your
drives, and to temporarily change those
assignments if desired. It also is used to
assign various types of printers to your
workstation (see Section 6).

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

```
A>assign

ASSIGN Utility -- Version x.xx for Separated Boot

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

A: CSYSTEM    1M   HiNet Partition   Read-Only
B: MAIL       512K HiNet Partition   Read/Write
C: ACCOUNTS   512K HiNet Partition   Ownable
F: MO         628K 5" double-sided   Local

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

In this example, CSYSTEM, MAIL and ACCOUNTS
are partitions assigned to the A, B, and C
drives. The CSYSTEM partition usually contains
the various CP/M programs used by everyone on
the network and is commonly assigned to drive A.

MAIL is the name given to the partition used for the network electronic mail program. The MAIL partition must be assigned to your B drive in order for you to access it.

Other drives can be assigned to various HiNet partitions. These partitions can be owned by you or by another person, shared by more than one user, write protected entirely or accessible by anyone. These various attributes will be covered in the following sections.

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. Since there is no partition with that name, there will be no password; 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 WRITE ENABLE.

By using the ASSIGN command's W option you can reserve partitions for your write use only if they are marked as Ownable in the ALLOC Table. The command sequence:

ASSIGN W A: B: C: <CR>

would make the partitions assigned to your A, B and C drives Read/Write for you but Read-Only for everyone else on the network. However, if any of the partitions were already owned for writing by someone else the message:

WARNING: PARTITION ASSIGNED TO DRIVE __ IS ALREADY OWNED BY username

would be displayed and you would only be able to read from that partition.

The same type of message may be displayed when you login to the network if your default assignments are for OWNABLE partitions or have an ASSIGN W command in the login command.

When you have finished writing to a partition that someone else may want to use, you should either unassign it from your drive, reassign that drive or, if you still wish to read from it, use the RELEASE command to change its protection status back to OWNABLE. (See RELEASE, section 2.14.3.)

If you wish to log in to more than one workstation, and your assigned partitions are write-protected, you will have to use RELEASE

each time you switch workstations and write to a
partition. Before doing any work, make sure that
you update the second workstation's memory by
entering a CTRL C.

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

***Error: drive __ is not ownable.

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

ASSIGNING A PRINTER.

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

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

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

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

ASSIGN HELP SCREEN.

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

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

SAVING ASSIGNMENTS IN A FILE

        When you log into a workstation, four of
your drives are automatically assigned. On 16-
bit workstations you can assign up to eight
drives to eight different partitions. It would
be tedious if you had to reenter the remaining
partition assignments every time you logged onto
the network. Therefore, ASSIGN gives you a way to
save all of the assignments in a file. These
assignments can later be read to restore all of
your drive assignments. This file can be used in

the login command to restore all of your drive
assignments automatically whenever you log in to
the network.

To save your assignments in a file follow
this procedure:

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

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

ASSIGN S filename <CR>

To restore your drive assignments use the
command sequence:

ASSIGN R filename <CR>

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

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

TEMPORARY ASSIGNMENTS TO MS-DOS PARTITIONS

In order to copy MS-DOS or PC-DOS format diskettes to a Hard Disk MS-DOS partition, you have to be able to assign a CP/M drive to the MS-DOS "target" partition. Normally the ASSIGN program will not allow this type of assignment in order to prevent accidental writes between partitions with different operating system. Such an assignment, however, will allow you to use the Transfer programs (PC2MAST, PC2NET, PC2SFOX) on the DMS-3/501 and the DMS-3/F to copy PC-DOS format diskettes to a Network partition.

To assign an MS-DOS partition to one of the Master's CP/M drives enter the command in this format:

ASSIGN T (CP/M drive letter) (MS-DOS partition name)

-------------------WARNING-------------------
Always be sure to reassign the drive to a CP/M partition when you are done using one of these programs. Never write to a partition of the opposite operating system with any utility other than FILECOPY or one of the PC2 programs. Using PIP or an applications program to copy files will corrupt the directory of the partition of the other operating system and the associated files will be lost.

ASSIGN COMMAND SUMMARY.

   ASSIGN <CR> lists current assignments.

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

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

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

   ASSIGN R filename -- restores the drive assign-
   ments that were previously stored in a file.

   ASSIGN W (drive **letter:**) -- grants write
   privileges to ownable partitions assigned to
   specified drives if those drives are not already
   owned.

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

   ASSIGN P SPOOL -- assigns printer to spool.

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

   ASSIGN T (drive letter) (MS-DOS partition) --
   allows a CP/M drive to be assigned to an MS-DOS
   partition so that the TRANSFER program can be run.

   ASSIGN ? -- displays summary of ASSIGN commands.

2.11.6   PASSWORDS.

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

2.11.7   PARTITION PROTECTION.

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

MS-DOS cannot tell if two people are
writing to the same partition. If this occurs,
more than one file in the partition will

probably be destroyed. More disastrous still is
the possibility of the directory being destroyed
thus causing the loss of all the files in the
partition. It is therefore very important to use
partition protection to guard against this kind
of error on the network. The ASSIGN command lets
you determine whether you own a partition for
writing, if someone else owns write privileges
or if the partition is Read/Only or Read/Write.
MS-DOS partitions must be set to either Ownable
or Read-Only.

The HiNet Network has four different modes
of partition protection.

R/W Read/Write--anyone can read from and
write to a partition. This is the standard CP/M
default status of a partition and affords no
partition protection. This mode is not recom-
mended for **any** partitions, HIDOS or MS-DOS.

R-O Read-Only--anyone can read from a
partition but no one can write to it unless
the status is changed in the ALLOC Table. (The
ALLOC Table keeps track of the partitions on the
Hard Disk.) This is normally what the SYSTEM
partition is set to so that program files cannot
be accidentally erased or altered. This parti-
tion protection attribute is available for both
CP/M and MS-DOS.

OWNABLE--the user who owns a partition is
the only person who can write to it until he or
she resets, logs out, or uses the RELEASE
command (section 2.13.3). This is the preferred
partition protection method for all unshared
partitions. It prevents Read-Only errors in CP/M

partitions and loss of files due to accidental
writes by two people to MS-DOS partitions.

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

OWNABLE means that the partition can still
be written to by anyone.

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

OWNED BY YOU indicates that you have write
priveledges to a partition from the workstation
you are currently at. You will not be able to
write to that partition from another workstation
until you release ownership of the partition
with the RELEASE command (see section 2.14.3).
**All MS-DOS partitions must be either Ownable or
Read Only.**

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

SHARED--HIDOS is an enhanced version of
CP/M that allows two or more people to write to
the same partition but not to the same file. See
section 2.13 for more information on using
shared partitions.

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
his or her workspace partitions, the Hard Disk
Storage would become full of duplicated
programs. By having a single partition devoted
to storage of commonly used utilities and
software, everyone can share their use without
massive duplication. Also, since application
programs are often upgraded, having everyone
share a single copy on the SYSTEM partition
ensures that everyone has access to the latest
version.

Section 2.12.1 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 (or eigtht)
drives, and the partition assigned to your
logged drive is the one you are accessing. In a
sense the logged drive/partition is like an open

file drawer; unless you specify otherwise,
whatever you do will relate to that drive and
partition. If you ask for a file and do not
specify a particular drive, the computer will
automatically search the open partition. If you
enter a command the computer will assume you
mean it to affect the partition on the logged
drive unless you tell it otherwise.

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

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

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

For example, the command **B>A:XYZ<CR>** will
run 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).

```
----------------------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:CUSTOMIZ<CR>** would call up the
CUSTOMIZ.COM (or CUSTOMIZ.CMD) program.
```
------------------------------------------------
```

Of course, as soon as you exit the program,
reset your workstation, or turn it off, the
stored copy of the program would disappear from
your station's memory. (If you wanted a

permanent copy of the file in your partition,
you would have to use the PIP or COPY command as
explained in sections 3.6 and 4.5.)

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.) <u>Letter,</u> <u>colon,</u> <u>RETURN</u> orders the
computer to change the logged drive to that of
the specified letter.

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

3.) <u>Command</u>, <u>letter</u>, <u>colon</u>, <u>RETURN</u> 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 and MS-DOS drives to work with
partitions and files:

A>B:<CR>   Change logged partition.

B>A:ASSIGN<CR>   Use a program that is
                         stored in another partition.

B>SD D:<CR>   Apply a program to one or
                         more files in another
                         partition.

B>A:SD D:<CR>   Use a program stored in
                         one partition and apply
                         it to another partition.

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

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

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

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

WARNING!---In the case of word processing and other programs that do not create 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

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

HIDOS is a modified version of CP/M-80 2.2
that allows multiple users to work with
different files in the same partition without
error. These partitions are specially prepared
SHARED partitions. Not all partitions on a HIDOS
Network need be shared. Only partitions marked
as shared in the Network Master's ALLOC Table
and prepared with the SHRALLOC program can be
written to by more than one User at a time. See
your Network Master's Installation Manual for
information on preparing Shared partitions.

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

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

Except as noted below, people working in a
shared partition must work with different files.
Two people trying to work on the same file at
the same time will cause each other serious
errors and one, or both, may lose some or all of
their work. These errors will occur without any
warning or error message appearing on the
screen. To avoid such problems, the NETLOCK
utility must be used to warn people that a file
is in use. (see section 2.13.2).

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

2.13.2 NETLOCK AND PARTITION SECURITY

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 into 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.

As an alternative to NETLOCK, you may want
to use the ASSIGN W option to make an Ownable
partition temporarily Owned by you. This lets
other users read files from the partition but
prevents them from writing to it and causing
errors. Protecting a partition this way tells
you if the partition is already being written
to. When you are done writing to a partition,
use the RELEASE command to unlock the ownership
so that others can use the partition if
necessary.

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.

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, the message will end: **** This
file or partition is already 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 try to alter a
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 parti-
tion is in use. To erase a lock, type **A>NETUNLOK**
ACCOUNT3 <CR>, that is, NETUNLOK followed by the
lockstring name exactly as it was entered.

```
--------------------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 also erase a Lockstring.
However, simply exiting the partition in which
you have entered a lockstring will not, by
itself, erase the warning; you must use NETUNLOK,
enter a CTRL C, or Reset the workstation.
```
-----------------------------------------------
```

2.13.3 RELEASE COMMAND

The RELEASE command allows you to
selectively release a lockstring on a file,
partition, or drive. It also ends a spool file
and clears the write ownership of a partition.

To clear a lockstring from a partition or file use the command:

RELEASE LOCKS <CR>

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

RELEASE W A: B: <CR>

where A: and B: are the drives that are assigned to the partitions you wish to clear. You can enter one or all eight drive designators if necessary.

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

RELEASE SPOOL <CR>

This will end the job that was spooling and allow you to print it on the spool printer. See section 5 for more details on using the spool printer.

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

RELEASE BOTH <CR>

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

RELEASE ALL <CR>

This command will clear write ownership on your partitions, any lockstrings that you have for

your files and partitions and will spool any
print jobs you have pending.

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

2.13.4   USING TWO STATIONS AT ONCE.

While it is possible for one user to
log in simultaneously to multiple workstations
(that is, log in with the same User Name to more
than one station at a time), the current
versions of HiNet-CP/M, HiNet-HIDOS and MS-DOS
place some restrictions on what can be done
under these circumstances.
There is no problem if you log in and work
at two different stations if the work you do at
each station is stored on different partitions
(or if you only make changes to files at one
workstation). The same is true if you only want
to look at files, copy them to some other
partition, or print them. However, some word
processing programs create a temporary file in
the partition when you open a file just to read
it. This changes the directory structure and may
cause problems for someone else who is writing
to the partition.

If you are logged onto two stations--both
of which are accessing the same non-HIDOS or
non-shared partition--and you modify work on one
of them, you will not be able to read your work
correctly (that is, as you've changed it) on the
other. If you save work on one station you will
not be able to save work to the same partition
at the other station until you release ownership

of the partition from the first station with the
RELEASE program. At that point the partition
will again be ownable. Before writing to the
partition from the second workstation you must
be sure that the directory of the partition is
completely up to date by entering a CTRL C
(under CP/M and HIDOS) or reassigning the drive
to the same partition (under MS-DOS).

-------------------WARNING--------------------
If a workstation does not have the current
directory of a non-shared partition that has
been altered, any writes to the partition from
the workstation can erase or corrupt the
previously added files.

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

-------------------NOTE-----------------------
       Some programs, such as a few word proces-
ors and compilers, create temporary files with
the same name (e.g., ED.$$$). If two people are
using a program of this type in the same shared
partition, the two files with the same name will
overwrite each other causing many errors that
may not be immediately detectable. Be aware of
these types of programs and use them in shared
partitions with utmost care! To detect the
presence of these temporary files, begin an edit

of a fairly long work file (greater than 20K)
and jump to the end of the file. Next, jump back
to the beginning or the middle of the file. From
another workstation look at the directory of the
partition that the file is in and search for a
file with an extension such as $$$; that is, a
file with illegal characters that is not
normally in the directory. If one is found, the
program cannot be used in a shared partition by
more than one person at a time.

2.14   COPYING FILES BETWEEN OPERATING SYSTEMS

The FILECOPY program is used to copy <u>data
files</u> to and from partitions that have different
operating systems. It also allows you to copy
program files from Floppy Diskettes that were
written by or for an IBM PC to an MS-DOS
partition on your network's Hard Disks. The CP/M
copy program PIP and the MS-DOS program COPY
should be used to copy files between partitions
with the same operating system.

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

FILECOPY defines partitions in two ways:
Native and Foreign. The Operating System
(abbreviated as OS) that you are currently
running is the Native OS. The other operating

system that you will be copying from or to is
considered the Foreign OS.

The partition name of the Foreign OS is
used because you cannot assign a partition of
one operating system to one of your drives while
you are in another operating system. The
FILECOPY program makes a temporary internal
assign just for the purpose of copying the files
that are specified in the command line.

When you specify a file to be copied, first
tell FILECOPY where it is. A file in the Native
operating system is located by the **drive letter**
that is assigned to the partition the file is
in. A file in the Foreign operating system is
located by the **name** of the partition the file
is in.

NATIVE OS — USE DRIVE LETTER: (A: – H:)

FOREIGN OS — USE PARTITION NAME: (SYSTEM:)

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

FILECOPY SOURCE DESTINATION

For example, you are working under MS-DOS
and wish to copy a file from a CP/M partition
called DEBITS to your current partition that is
assigned to your B: drive. Use the command
sequence:

FILECOPY DEBITS:MARCH B: <CR>

State the partition name that the file is to be
copied FROM first, then the drive letter that
the file is to be copied TO. Notice that a colon
is entered after both the partition name and the
drive letter. A reverse example would involve
copying from your Native OS partition to a
Foreign OS partition. If, while working in CP/M,
the file MARCH was in a CP/M partition assigned
to your B: drive and you wished to copy it to an
MS-DOS partition called DEBITS, the command
would look like this:

FILECOPY B:MARCH DEBITS: <CR>

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

------------------------NOTE--------------------
     If a partition is protected by a password,
Filecopy will request that you enter it before
it will copy a file to or from that protected
partition.

USING FILECOPY WITH DISKETTES

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

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

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

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

Use the command format (all in one line):

FILECOPY

(MS-DOS partition name):filename

(disk drive letter): <CR>

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

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

FILECOPY D:filename MICRO: <CR>
You can use the wildcard symbols ? and * to copy
groups of files. By specifying a different
destination filename the files can be renamed.

FILECOPY--USING MSDOS PATHNAMES.

If the files that you wish to copy are
located in subdirectories of an MS-DOS
partition, FILECOPY allows you to state the
pathname from the root directory to a file in a
subdirectory. (See section 4 of the DMS-816
manual for more information about MS-DOS and
pathnames.) For example, you are working in a
CP/M partition assigned to your C: Drive and
wish to copy from an MS-DOS partition all the
files with the extension .REP in a subdirectory
called JULY. The command:

FILECOPY \JULY*.REP C:

would copy the files OHIO.REP, MASS.REP, etc.,
from the MS-DOS partition JULY and transfer it
to your current partition assigned to drive C:.

When using FILECOPY, you can specify
pathnames to a file in an MS-DOS partition only
if you are in a CP/M partition. If you wish to
copy from a CP/M partition to a subdirectory in
your MS-DOS partition, you must use the CD
(Change Directory) command to move down into the
subdirectory before copying the file. (See the
MS-DOS Section 4 for more information on the
Change Directory and Path commands.)

FILECOPY--DIRECTORIES OF MS-DOS PARTITIONS

FILECOPY also allows you to display a listing of the directories for partitions with a foreign operating system. You can use pathnames for MS-DOS partitions--when they are foreign (you are in CP/M)--and wildcard symbols to search for groups of files. For example, the command:

FILECOPY DEBITS: DIR

will display the directory of the partition DEBITS if it belongs to the foreign operating system. To display the directory of an MS-DOS subdirectory use a pathname as in this example:

FILECOPY DEBITS:\REPORT\WEEK1*.DOC DIR

The result will be a listing of all the files in the WEEK1 subdirectory that have the file extension .DOC (document file).

2.15   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 Names. It will show the time each user last logged on, the last time he or she requested information from the system and whether it was a read or a write. You will notice your own name in the table followed by 'Who' since you are using the WHO command. A second table gives the status of the network

spool printer (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.

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 users have logged on and
logged off.

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

```
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
-------   ---------   ----------   -------------   -------   ------
14        AKIKO T     10:21:55     11:14:34        write     active
09        CHOU        10:17:02     10:59:16        read      read
17        DR.GEO      10:45:39     10:50:51        read      active
01        JOY         09:11:12     11:11:07        read      active
06        LEROY       10:01:55     10:11:44        read      active
00        MASTER      09:00:04     09:22:59        read      active
21        MS.MAVEN    11:12:58     11:15:11        who       active
03        PILAR       09:35:47     10:58:32        write     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>
```

2.16   RAM DISKS ON 16-BIT WORKSTATIONS

2.16.1   INTRODUCTION

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

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

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

2.16.2   SETTING UP A RAM DISK

The procedures for setting up or
"activating" a RAM Disk differ depending on
whether you are running CP/M-86 or MS-DOS.
Remember that only the 16-bit workstations--the
DMS-816, -86, -5086--can use RAM Disk Storage.

CP/M-86 RAM DISKS

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

A>**ASSIGN H ULTRA0**

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

MS-DOS RAM DISKS

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

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

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

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

DEVICE = ULTRA100.SYS

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

----------------------NOTE----------------------
     The ULTRA100.SYS file can be in the A drive
partition. It can also be in a partition that is
assigned to another drive if that drive is
specified in the CONFIG.SYS file. For example,
if ULTRA100.SYS is in a partition assigned to
the D: Drive, the CONFIG.SYS file device
statement should read:

     DEVICE = D:ULTRA100.SYS

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

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

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

     The DMS-5086 is also available with 1 Mbyte
of RAM memory. ULTRA740 creates a 740 Kbytes RAM
Disk out of the total 1Mbyte RAM and ULTRA870
creates a RAM Disk the size of 870 Kbytes.

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

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

     DEVICE = ULTRA100.SYS

     DEVICE = ULTRA360.SYS

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

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

    A more permanent solution is to place a
command line in the CONFIG.SYS file that
specifies where to look for COMMAND.COM if it is
not in the logged drive. The drive letter where
COMMAND.COM will <u>always</u> be must be specified in
the following line:

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

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

2.16.3   USING A RAM DISK

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

The RAM Disk is blank when it is activated.
(There is no need to format the RAM Disk as you
do a Floppy Disk.) Files from the Network's Hard
Disks are PIPped (CP/M) or COPYied (MS-DOS) to
the drive that is assigned to the RAM Disk. The
drive assignments may vary between operating
systems. Of course, files may also be created in
the RAM Disk by application programs.

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

3.0   THE CP/M ENVIRONMENT.

3.1   INTRODUCTION.

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

The 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 in
their names, 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 prefer 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, or even several screens, 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 tp 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).

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 filename, an equals sign, and the old filename. 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 REN 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 repeats your command
with a question mark.

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. CP/M's REN command can only be used
when the screen shows the CP/M 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 began with GONE, had four additional characters in their name, and were of any type.

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

-------------------REMEMBER-------------------
Except when you are erasing all files in a partition, CP/M will not ask you to 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 deleted.

3.6 PIP (Copying and Transferring Files).

DESTINATION=ORIGIN

3.6.1 COPYING FILES

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

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

In other words, if you are logged onto
drive B and the PIP file is on drive A, you can
either use **B>a:<CR>** to switch to drive A, or
B>a:pip<CR> to bring a temporary copy of PIP to
your computer's workspace.

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

To copy a file from one partition to
another 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 filename, 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. A command for verification of a
complete copy has been appended to the basic PIP
sequence (see section 3.6.3 and 3.6.4). Spaces
have been placed between the parts for
readability but **except for the space between PIP
and the first Drive identifier you do NOT enter
spaces anywhere in the command.**

```
PIP   D: = A: SD.COM [ V   O
  |    |      |        |   |
  |    |      |        |   |
  |    |    SOURCE   VERIFY|
COMMAND|              |  COPY
  |    |   FILENAME   | ENTIRE FILE
  |  DESTINATION
```

---------------------**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 type only the destination
drive letter and colon, an equals sign, the
origin drive letter, colon, and filename with
wildcard symbols. You do not name the files on
the destination side of the equals sign.

     Here are two examples of PIP command lines.

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

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

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

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

3.6.3 VERIFYING PIP COPIES.

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

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

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

3.6.4 COPYING PROGRAM FILES.

Sometimes you may need to make absolutely sure that all the data in a file is copied when you use PIP. For example, in some program files part of the file may have a special CTRL

character (CTRL Z) that CP/M normally interprets
as 'end of file'. However, there may be
additional information that must be copied after
the CTRL Z. To ensure that all of the file is
copied, you must add the letter o to the [v
option at the end of the PIP command.

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

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
a file from one partition to another. Therefore,
with the PIP program you can change the name of
the file as you copy it. For example,

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

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

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

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

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

       A series of PIP commands might look like
this:

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

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 CHAPTER 3 into
one file called FINAL.DOC that contains all
three chapters in order, use the PIP command:

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

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

--------------------WARNING--------------------
DO NOT COMBINE PROGRAM FILES WITH PIP. Combining
files is for text or data files only. Never
combine program files.

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 transferring files to
another person's partition is to wait until the
person is out of the partition or off the
network or is prepared to receive the file. (The
other person will have to enter a CTRL C after
the CP/M prompt before trying to save any
files.)

Of course, you can always PIP a file from
another partition into the partition you are
working in without any trouble (assuming no one
else is simutaneously working in the same
partition). If you are trading files with other
people, the best method is to let them PIP the
file from your partition to their partition,
while you PIP the file from their partition to
yours.

3.6.8 PIPPING TO THE PRINTER.

You can use PIP to send files to your
printer by typing **A>PIP LST:=Filename<CR>.** Using
LST: instead of a drive letter tells your
computer to send the file to the printer to be

printed (you must include the colon after LST).
For more on using printers see Section 5.

-------------------------**NOTE**--------------------
If the file you are sending to the printer with
PIP LST: was created with a word processing
program it may not print correctly when sent
with PIP LST:. Files created with word
processors should only be printed with the word
processor's own print commands.

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

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

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

        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 <u>created</u> 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 sec. 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, ready the printer as described in
Section 5 and 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 <u>before</u> the CTRL P
was entered will not be printed. Everything that
appears on the screen <u>after</u> you enter the CTRL P
(including your commands) will be printed until
another CTRL P is issued.

```
------------------------------------------
```

To print out a hard copy of a directory,
for example, enter a CTRL P before the SD or DIR
command. ('Hard copy' is computer jargon for
something printed on a piece of paper.) To
change the names of several files, and obtain a
hard copy record of what was done, use CTRL P
before beginning the REN commands; each of your
REN commands will 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, will send to the printer the command
line, the contents of the file Warnpees.nov and
everything else you do until you send another
CTRL P or a CTRL C.

----------------------NOTE--------------------
To print a file created by a word processing
program or some other applications program with
its own set of print commands, use that
program's print commands and not CTRL P. The
print commands associated with an applications
program allow you much greater control over 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 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 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 in to the CHICO Partition (on any
of their drives) while you are using Submit.

To be safe, follow this procedure:

A-   If the SYSTEM Partition is assigned
to your Drive A, re-assign it to another
partition (**A>Assign C: SYSTEM<CR>**). Section
2.11.5 describes 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 one of the partitions on your other drives, and you can also take the Submit file itself 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.
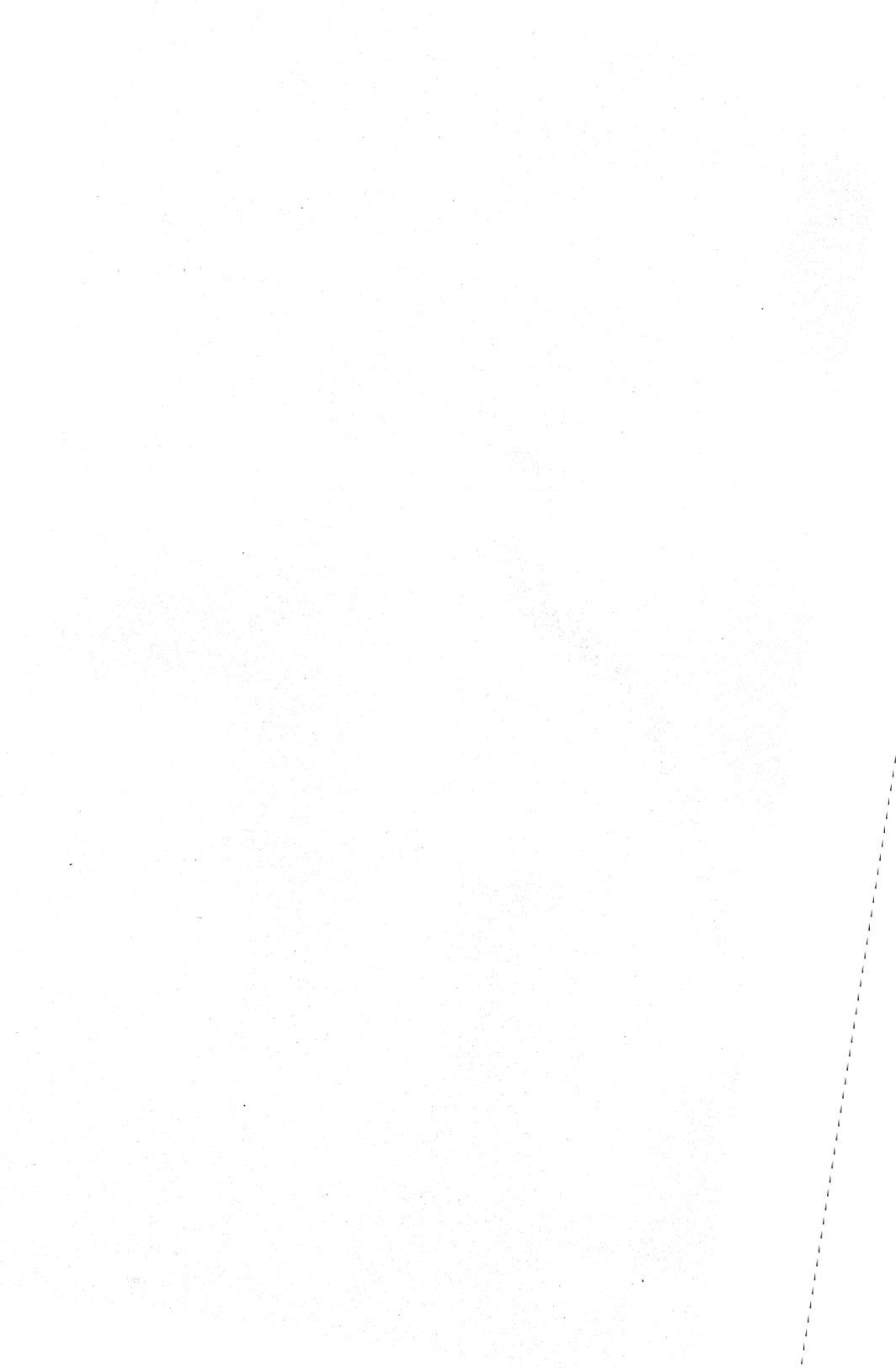
4.0   MS-DOS AND HINET

4.1 INTRODUCTION

The MicroSoft-Disk Operating System (MS-DOS),like CP/M-86, allows you to run programs that are designed for 16-bit computers. With a network made up of any DMS Master and 16-bit workstations, you have the choice of running either CPM-86 and MS-DOS) software. The DMS-5080, an 8-bit microcomputer cannot run MS-DOS. This section of the manual will outline MS-DOS commands, how to use MS-DOS on the HiNet Network, the hierarchical file structure and the main differences between MS-DOS and CP/M. For a complete guide to MS-DOS, refer to the manual from MicroSoft that came with your MS-DOS Distribution Diskettes.

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

The features and capabilities of the MS-DOS operating system will be pointed out to you in this section. For example, you can redirect the

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

DIR   Display the directory of a partition.

MD   Make a subdirectory in a partition.

CD   Change working directories.

PATH   Set a path for MS-DOS to search for
          commands.

TREE\F   Display all directories and files in
          a partition or along specific paths.

RMDIR   Remove an empty subdirectory.

COPY   Copy files between directories.

DEL   Delete files in a directory.

REN   Rename files.

TYPE   Display the contents of a file on the
          screen.

CTRL P   Send data to the printer.

PRINT   MS-DOS background printing utility.

AUTOEXEC   A Batch file that executes
           automatically upon login.

PIPE   Redirect Input and Output of
           commands.

PROMPT   Change the form of the displayed
           prompt.

CHKDSK   Diagnostic report and space saving
           utility for use on MS-DOS partitions.

4.2   FILE STRUCTURE

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

4.2.1   THE ROOT DIRECTORY

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

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

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

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

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

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

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

4.2.2   DIR--DISPLAY THE FILE DIRECTORY

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

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

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

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

DIR/P <CR>

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

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

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

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

COMMAND.COM

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

4.2.3   MD -- THE MAKE DIRECTORY COMMAND

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

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

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

     There are two ways to make a subdirectory:

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

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

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

     B>MD \REPORTS <CR>

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

B>MD \REPORTS\JULY <CR>

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

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

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

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

MD JUNE <CR>

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

4.2.4   CD -- CHANGE DIRECTORY COMMAND.

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

CD \REPORTS\JULY <CR>

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

If you want to move down to the sub-
directory WEEK1, enter the command:

CD WEEK1 <CR>

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

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

CD .. <CR>

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

CD \ <CR>

will put you back in the Root Directory.

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

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

\REPORTS\JULY\WEEK1

\REPORTS\JULY\WEEK2

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

CD ..\WEEK2

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

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

4.2.5   CHANGE THE DIRECTORY IN ANOTHER DRIVE

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

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

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

4.2.6 THE TREE COMMAND

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

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

A>TREE <CR>.

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

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

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

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

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

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

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

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

  \JULY\WEEK2\INVENTORY

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

  \JUNE\PROFITS\filename

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

  TREE/F B:\JULY <CR>

would display a listing like this:

Partition on Drive B: is SALES

     \JULY
        filename filename filename filename

     \JULY\WEEK1
        filename filename filename

     \JULY\WEEK1\ORDERS
        filename filename filename filename

     \JULY\WEEK1\INVENT
        filename filename

     \JULY\WEEK2
        filename filename filename filename
        filename filename filename

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

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

```
                    --------------------------
                    |   ROOT DIRECTORY        |
                    | DATA AND APPLICATIONS   |
                    --------------------------
                      |              |
                    ---------        |
                    | DATA FILES |   |
                    ---------        |
                     |               |
                     |               |
  -------------------------------------------        ----------------
  |                  |                    |           | APPLICATION  |
  |                  |                    |           | PROGRAMS     |
--------         ---------          ----------        ----------------
| JUNE  |        | JULY  |          | AUGUST |          |      |
--------         ---------          ----------          |      |
   |               |       |            |         ------------  -------------
   |               |       |            |         | DATA BASE |  | SPREADSHEET |
-----------    ---------  ---------  -------------| MANAGER   |  -------------
| PRODUCTS |   | WEEK1 |  | WEEK2 |  | PROJECTIONS| ------------
-----------    ---------  ---------  -------------
   |             |
   |             |
------------   ---------------------
| SCHEDULE |   |                   |
------------  ---------       ---------
              | ORDERS |      | INVENTORY |
              ---------       ---------
```
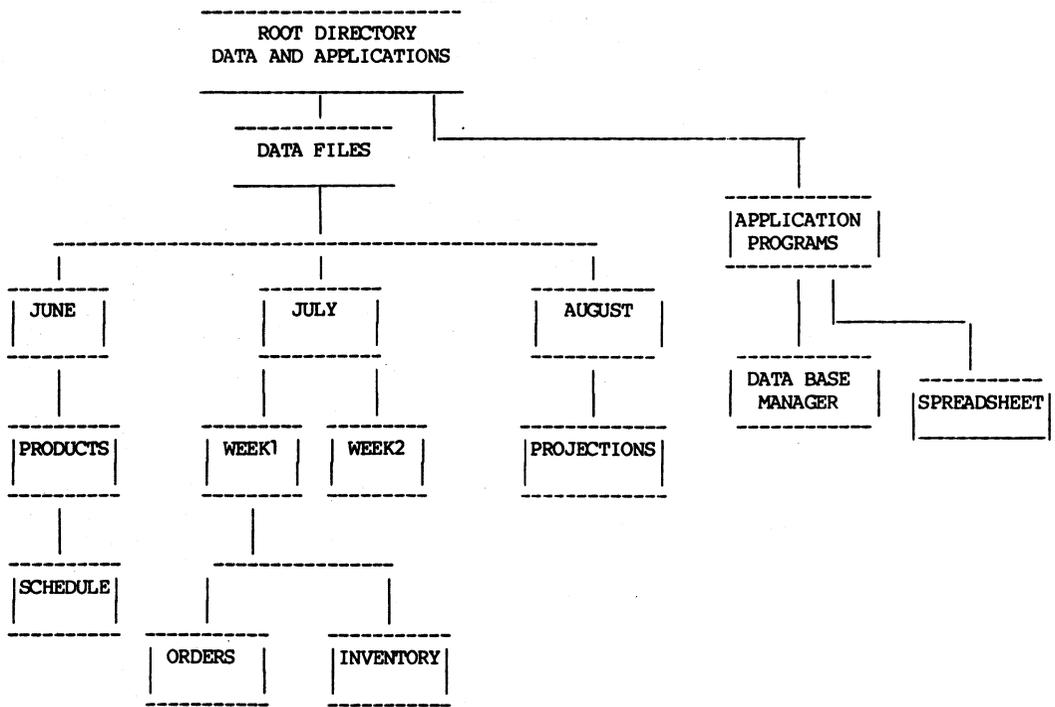
4.3   PATHNAMES -- THE PATH COMMAND

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

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

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

A:\REPORTS\JULY\WEEK1

then you should enter the path command like
this:

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

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

PATH \

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

PATH A:\;B: <CR>

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

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

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

     A:\REPORTS\JULY\WEEK1

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

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

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

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

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

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

4.4   RMDIR--REMOVE A DIRECTORY.

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

      RMDIR \REPORTS\JULY\WEEK1 <CR>

4.5   COPYING FILES -- THE COPY COMMAND.

Under MS-DOS, files can be:

● copied from directory to directory

● copied from MS-DOS partition to MS-DOS
   partition,

● renamed so that two copies of the same
   file can exist in the same directory.

● copied onto the end of another file
   (concatenated).

The MS-DOS COPY command's format is:

[FROM] => [TO]

COPY OLDFILE NEWFILE   or

COPY SOURCE DESTINATION

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

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

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

[TO]   <= [FROM]

PIP NEWFILE=OLDFILE   or

PIP DESTINATION=SOURCE

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

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

4.5.1 VERIFYING COPIES

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

COPY A:ACCOUNT B:ACCOUNT.BAK/V

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

---------------------NOTE----------------------
You cannot transfer files from an
MS-DOS partition to a CP/M partition or vice-
versa with COPY or PIP. The FILECOPY program is
for that purpose. See section 2.13.

4.5.2   COPYING FILES BETWEEN DIRECTORIES.

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

COPY \CUSTOMER\COMPLAIN\CUST1.LTR /V

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

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

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

4.5.3 COPYING FILES WITH WILDCARD SYMBOLS.

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

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

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

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

4.5.4 APPENDING FILES   (MERGING FILES).

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

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

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

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

COPY SECTION1+SECTION2+SECTION3 <CR>

will append SECTION2 and SECTION3 to the end of
SECTION1.

The command:

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

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

4.6 DEL COMMAND -- ERASING FILES.

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

DEL FILENAME <CR>

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

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

4.7   REN -- RENAME A FILE.

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

REN OLDNAME NEWNAME <CR>

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

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

Duplicate file name or file not found

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

4.8 THE TYPE COMMAND -- DISPLAY A FILE.

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

4.9 PIPES AND FILTERS.

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

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

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

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

SORT -- sorts text by alphabetical or numerical
order.

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

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

>> append the data to an already existing
file.

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

4.9.1 PIPING COMMANDS.

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

DIR | MORE <CR>

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

TYPE filename | MORE

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

4.9.2   FILTERS

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

SORT < NAMEFILE > ALPHAFILE <CR>

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

DIR | SORT | MORE <CR>

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

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

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

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

FIND "string" filename <CR>

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

/V   display all lines NOT containing the
     specified string.

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

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

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

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

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

4.9.3   REDIRECTING INPUT AND OUTPUT

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

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

TREE/F > TREEFILE <CR>

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

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

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

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

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

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

4.10 CTRL P -- PRINTING.

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

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

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

CTRL/SHIFT F8 and F9 keys send everything that
is **already on the screen** to a printer connected
to the parallel port. This is called a screen
dump. See section 6 for more information on
using printers and the specific printers
required for screen dumps.

4.11 PRINT--BACKGROUND PRINTING UTILITY.

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

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

Name of LIST Device [PRN:]

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

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

A>PRINT filename <CR>

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

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

Print file has been spooled.

will be displayed on the workstation's screen.

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

There is room for ten files in the print queue.

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

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

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

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

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

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

4.12   THE AUTOEXEC BATCH FILE.

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

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

Enter the command line:

COPY CON: AUTOEXEC.BAT <CR>

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

ASSIGN P PORT2 <CR>

would be on one line by itself. So would:

PATH A:\ <CR>

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

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

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

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

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

You can create many Batch files to carry
out different repetitious processes. However,
there can only be one AUTOEXEC.BAT file that
will be executed when you log in. It must be
stored on a partition that is assigned to the
A drive. That means that your MSYSTEM partition
cannot be assigned to drive A because everyone

would try to store a personal version of
AUTOEXEC in the same partition. Fortunately,
many applications programs that run under MS-DOS
2.0 do not require that the MSYSTEM partition
always be assigned to the A drive. The PATH
command will tell MS-DOS where to look for
command files.

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

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

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

4.13   CHANGING THE PROMPT.

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

PROMPT **$character**

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

table lists the available choices and character code:

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

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

PROMPT ng

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

PROMPT t_$d

4.14 USING CHKDSK

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

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

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

        xxxxxx   bytes total memory
        xxxxxx   bytes free

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

The last two lines in the CHKDSK report
display the total RAM memory built into the
workstation and the amount of RAM available for
applications programs. The basic DMS-5086 has 256
Kbytes of RAM. The operating system requires
about 51 K. This normally leaves about 212
Kbytes free for applications programs and/or RAM

Disks. (The actual numbers displayed by CHKDSK
give the memory figures as multiples of 1024--
e.g., 256 K x 1024 bytes per K = 262144 bytes.)

The command:

   A>CHKDSK/F B: <CR>

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

4.15   SPECIAL EDITING FUNCTIONS.

     Every time you enter a command in MS-DOS, a
copy of it is stored in the Command Template. By
using special ESCAPE codes, the stored commands
can be repeated and/or edited. Ideally, to get
the full benefit from these commands, you should
program nine function keys with these ESCAPE codes
using CUSTOMIZ (see section 5). Otherwise you
can enter the ESCAPE codes directly to get the
same result.

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

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

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

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

COPYALL   Copies all remaining characters in the template.

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

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

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

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

NEWLINE Makes the new command line the new
        template.

CTRL Z   Signals the end of the file.

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

4.16   FEATURES DOCUMENTED IN MS-DOS MANUAL

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

CLS   Clears the Screen and homes cursor.

EDLIN   The MS-DOS Line Editor.

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

EXIT   Exits command and returns to lower
           level.

FC   FILE COMPARE --compares the contents
           of two files and reports differences.

MS-LINK   Combines and 'links' separately
           compiled object files.

REM   Displays a comment in a Batch file.

SET   Sets one string value to another.

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

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

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

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

     FORMAT formats MS-DOS diskettes.

5.0   CUSTOMIZING

5.1   INTRODUCTION

The DMS-3/501, DMS-3/F, and DMS-5000 series
are extraordinarily versatile 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-
3/501/DMS-3/F 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 customize
your DMS-5000, DMS-3/501, or DMS-3/F workstation
individually. 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-3/501 to
        emulate a variety of terminals.

- Choose a foreign language or special character set.

- Rearrange your keyboard.

See Section 5.11 for the system requirements and program files necessary to use CUSTOMIZ.

5.1.1 SCREEN ATTRIBUTES -- OVERVIEW

CUSTOMIZ can be used to customize your CRT display by:

- Setting brightness to the most comfortable level (Section 5.3).

- Choosing regular or inverse video (Section 5.4).

- Selecting a style of cursor for the DMS-5000 (Section 5.5).

- Designating large or small characters for the DMS-5000 in horizontal mode (Section 5.6).

5.1.2 SPECIAL FUNCTION KEYS -- OVERVIEW

There are a total of 90 Special Function Keys which you may program as you wish. See Section 5.7 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 Fl; 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 5.7.9 for some possible Special Function
Key ideas.

5.1.3 TERMINAL EMULATIONS -- OVERVIEW

The DMS-3/501 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-
3/501. By using the CUSTOMIZ utility you may
easily switch among emulations. See Section 5.8.

5.1.4 CHARACTER SETS -- OVERVIEW

The DMS-5000, DMS-3/F, and DMS-3/501 offer the
ASCII (American Standard) Character Set as the
standard setting. 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 5.9.

5.1.5   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 5.10
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 5.2.2 for more on loading files.

5.1.6   USING THIS PART OF THE MANUAL

Section 5.2 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 5.2 for most CUSTOMIZ
operations.

Sections 5.3 through 5.10 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 5.11 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.**

5.2 USING CUSTOMIZ

5.2.1 INTRODUCTION

CUSTOMIZ provides menu screens used to
select various settings, define Function Keys,
rearrange the keyboard, and choose a character
set (see Section 5.2.3). Most of your selections
will be implemented on your workstation as soon
as you choose them. However, some types of
settings will not become operative until you
exit the CUSTOMIZ utility. Also, in some
instances 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).

5.2.2   USING SETTINGS FILES.

A Settings File contains a record of the
settings you selected and saved while using the
CUSTOMIZ menus (see Section 5.2.3 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 5.11) are only necessary for
creating a Settings File, not using one.

5.2.3   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 5.11 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-3/501 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 5.8 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 the MAIN
   MENU COLUMN lists the various types of settings
   available, one of the items being highlighted
   with reverse video. The list will vary according
   to the workstation you are using (DMS-5000, or
   DMS-3/F & DMS-3/501). At the screen's right is the
   Sub-Menu associated with the highlighted item.

-----------------------NOTE--------------------
On the DMS-3/F and DMS-3/501 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
5.2.3 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
5.2.3 (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 5.2.3.

2-   At the bottom of your screen you will
be asked to enter a filename. Be sure to specify

(**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 5.2.3.

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.

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

MAIN MENU      CURRENT SETTING | SETTINGS
 Brightness                    |   SCREEN CURSOR
 Screen Type                   |   Language Keybd
 Cursor Type                   |   Function Keys
 Screen Size                   |   User Created Kbd
 Function Keys                 |   User Created Chr
 Language                      |
 Screen Emulation              |   Read In Choices
 Keyboard Layout               |
                               |
 Create Language               |
 Create a Keyboard             |
                               |
>Recall Settings    XYZ.SF     |
 Save Settings                 |
                               |
 Sign Off                      |
```

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
5.2.6 - Manager Mode.)

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.

5.2.4 CUSTOMIZ AND HINET LOGIN

The person in charge of your network can,
if you wish, enter CUSTOMIZ in your Network User
Name's type-ahead buffer. This will call up
CUSTOMIZ automatically every time you log 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.

5.2.5 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.

5.2.5 SETTINGS FILE INTERCHANGEABILITY

Settings Files are interchangeable between
the two types of workstations (DMS-5000 and DMS-
3/F & DMS-3/501), but Terminal Emulations will not
work on the DMS-5000. Nor can the DMS-3/F and
the DMS-3/501 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>**). In Manager
Mode you can create Settings Files for later use
on the two different types of workstations--the

DMS-5000 series, and the DMS-3/F & -3/501. When
used on a DMS-5000 this mode displays a menu
containing all of the possible choices for any
of the three, allowing you to create files
applicable to either type of workstation.

Although files created on one type of
workstation are usable on the other, their
usefulness is 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-3/501 but the Character Setting will not work.

5.3   SCREEN BRIGHTNESS

The screen's brightness 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, changing 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 5.2.3.

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 5.2.3
for an explanation of the No Changes option.

```
 _____
/                                                         \
|          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                          |                    |
_____/
```

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.

5.4   SCREEN TYPE

There are two types of screen display
available on the DMS-5000, DMS-3/F & DMS-3/501
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 comfortable for your eyes.

SCREEN TYPE STEP BY STEP

  1- Move the MAIN MENU COLUMN highlight to
the **Screen Type** option and hit RETURN as
described in Section 5.2.3.

  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.)

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

  MAIN MENU     CURRENT SETTING | SCREEN TYPE
   Brightness                   |   NORMAL VIDEO
  >Screen Type              .    |   Inverse video
   Cursor Type                  |   No Changes
   Screen Size                  |
   Function Keys                |
   Language                     |
   Screen Emulation             |
   Keyboard Layout              |
                                |
   Create Language              |
   Create a Keyboard            |
                                |
   Recall Settings              |
   Save Settings                |
                                |
   Sign Off                     |
```

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 5.2.3
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.

5.5 CHOOSING A CURSOR TYPE

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 5.2.3.

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 | CURSOR TYPE
  Brightness                       |   Flashing
  Screen Type                      |   NON FLASHING
 >Cursor Type                      |   Invisible
  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) 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 5.2.3 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.

5.6   SCREEN SIZE

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

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 5.2.3.

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.

5.7   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 5.7.9 for
examples of typical Special Function Key uses.

5.7.1   DEFINING/ERASING A FUNCTION KEY

1-   Move the MAIN MENU COLUMN highlight to
the FUNCTION KEYS option and hit RETURN as
described in Section 5.2.3.

----------------------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-3/501.

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 5.7.4). 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.

After editing the string, hit RETURN and you will be returned to the **>>>PRESS FUNCTION KEY YOU WISH TO EDIT** message. Now 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-3/501.

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-3/501 250 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.
```
------------------------------------------
```

5.7.2   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.

5.7.3   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

KEY	Regular	CTRL	SHIFT
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

KEY	Regular	CTRL	SHIFT
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-3/501 use
CTRL/SHIFT KEYS for various functions. These
keys are <u>not</u> programmable by the user.

5.7.4   SPECIAL FUNCTION KEYS & APPLICATIONS PROGRAMS

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. To remedy this, include
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.)

5.7.5   NUMBER PAD KEYS

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

5.7.6   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.

5.7.7 LOADING FUNCTION KEYS FROM THE KEYBOARD

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) and cannot be saved in a regular CUSTOMIZ file.

To assign a character string temporarily to a Special Function Key first hit CTRL/SHIFT F13 (key F13 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 F14 will erase the last character in the string. When you are finished hit CTRL/SHIFT F13 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 F13 again and repeat the process.

5.7.8 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.

5.8   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 5.8.2 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 5.8.4.)

5.8.1   SELECTING A CHARACTER SET

1-   Move the MAIN MENU COLUMN highlight to the LANGUAGE option and hit RETURN as described in Section 5.2.3. 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-   Reverse video will Highlight the
current (default) LANGUAGES Sub-Menu choice. Use
the Arrow Keys to place the Highlight over the
choice you wish to select. 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
the MAIN MENU COLUMN will return. Nothing will
be listed in the CURRENT SETTINGS COLUMN
opposite **'Language'.** See Section 5.5.3 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, 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 use a Language
Character Set immediately 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.

5.8.2 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   #   = Φ ~ 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 5.8.3) 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).

5.8.3   USER DEFINED CHARACTER SET

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

When you select **User Defined** in the
LANGUAGEES 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.

5.8.4   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 that work
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 start from scratch--everything 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 <u>current</u> <u>state</u> of the set you are
working on. As you create, modify, or replace
characters the <u>new</u> <u>versions</u> 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 brings you to the Grid Screen
(see below). 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 saves 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. The screen size has to match the Character Set size. The last command you issue dominates.

5.8.5   USING LANGUAGE CHARACTER SETS WITH PRINTERS

Striking a key sends a code (called a Hex Code) to the computer, informing the computer which character to display on the screen. When you are linked to a printer your computer relays to it the code originally sent by your keyboard. 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. 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 you can alter the code-character match-
up to equal the keyboard-CRT screen match, but
with most printers that is not possible.

You can circumvent this problem on the DMS-
5000 by creating a User Defined Character Set to
match a particular printer's idiosyncrasies. 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 prints. (In most
cases you will not actually have to re-draw the
character from scratch; 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.
Creating a keyboard simply changes 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.

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.

5.9   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 5.10.1 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 5.9.3).

5.9.1 CHOOSING A KEYBOARD

There are two keyboard items in the
CUSTOMIZ MAIN MENU COLUMN: **CREATE KEYBOARD** and
KEYBOARD LAYOUT. CREATE KEYBOARD is used only to
build a User Defined Keyboard File (see Section
5.10.2). 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

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

MAIN MENU          CURRENT SETTING | KEYBOARD LAYOUT
 Brightness                        |    Standard
 Screen Type                       |    User Defined
 Cursor Type                       |    NO CHANGES
 Screen Size                       |
 Function Keys                     |
 Language                          |
 Screen Emulation                  |
>Keyboard Layout                   |
                                   |
 Create Language                   |
 Create a Keyboard                 |
                                   |
 Recall Settings                   |
 Save Settings                     |
                                   |
 Sign Off                          |
```

     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
5.2.3. 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 <u>now.</u>

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.

5.9.2   CREATING YOUR OWN KEYBOARD

The MAIN MENU's **CREATE KEYBOARD** option is
used to design your own key arrangement.

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

```
A↑B↑C↑D↑E↑F↑G↑H↑I↑J↑K↑L↑M↑N↑O↑P↑Q↑R↑S↑T↑U↑V↑W↑X↑Y↑Z↑[↑\↑]↑↑↑_
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z ( | } ~ _
a b c d e f g h i j k l m n o p q r s t u v w x y z [ \ ] ↑ DEL
= ' + * < > ? ! " # $ % & ' ( ) SPACE
- @ ; : , . / 1 2 3 4 5 6 7 8 9 0
```

Hex Val: 01

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
^R   R    Upper Left  = SHIFT VALUE
   r      Lower       = NORMAL VALUE
```

--------------------NOTE--------------------
Since the Number Pad keys are programmable
Special Function Keys they cannot 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. Holding the CTRL
key down and striking the 'H' Key sends a
Control-H to the computer, causing the cursor to
move one space to the left.

Your keyboard has six Special Command Keys
(RETURN, TAB, etc.), which duplicate the Control
Characters assigned to specific alphabet keys--
e.g., BACKSPACE equals Control-H.

        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 <u>reassign</u> one of these alphabet key's
Control Values the matching Command Key will
send to the computer the alphabet key's <u>new</u>
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.

5.9.3 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!

5.10   CUSTOMIZ SYSTEM REQUIREMENTS

5.10.1   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-3/501   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
identically on the DMS-3/501 and DMS-3/F. However,
if your DMS-5000 CRT version is 1.2, you should
use CUSTOMIZ version 1.0. If your DMS-5000 is
version 1.3 or higher you should use CUSTOMIZ
version 1.2.

5.10.2   KEYBOARD VERSIONS

To use the Typist's keyboard portion of
CUSTOMIZ (TYPERITE.KBD Settings Files), you must
have keyboard version 2.2 or higher. The other
Settings Files supplied with CUSTOMIZ will
operate on earlier versions of DMS-5000, DMS-3/F
and DMS-3/501 keyboards.

5.10.3   OBTAINING VERSION NUMBERS

To learn your workstation's version number, obtain a Version Read Out. From the CP/M Command Prompt type ESC, capital V, RETURN (**C>ESC V<CR>**). **5000** or **FOX** will appear, as will **KYBD**, both followed by a version number.

5.10.4   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-3/501, & 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)
PADKEYS.SF	Installs Number Pad numerals and set of default Special Function Key values on the DMS-3/501 and 3/F

To emulate different terminals with the
DMS-3/F and DMS-3/501 the proper Emulation Files
must also be present:

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

5.10.5   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.

5.11   TURNING THE DMS-5000 ON ITS BASE.

The position of the DMS-5000 on its base can be changed back and forth from horizontal to vertical.

1-   Turn off the station and unplug all cables from the rear panel (keyboard, power, HiNet, etc.).

2-   At the rear of the workstation base there is a large thumb-wheel. Loosen it with a clockwise turn. It will not screw completely out of the base because it is held in by a spring, but loosen it enough so that you can pull it up and down a little against the spring's tension.

3-   Grasping the CRT unit firmly, lift it off the base. If it does not come free of the base you may need to loosen the thumb-wheel some more. Sometimes, if a unit has not been turned often, it tends to stick to the base. If this occurs ask someone to hold down the base while you lift off the CRT unit.

4-   Turn the unit and place it back down on the base in the desired position. In the horizontal mode the RES/INT switch and DMS logo should be on the right as you face the CRT screen.

In both the horizontal and vertical modes there are two triangular socket holes and a threaded bolt hole at the bottom of the unit. The two triangular sockets fit over the two pins at the front of the base, and the threaded bolt hole fits over the thumb-wheel screw.

5-　　When the unit is seated firmly on the base, and the base pins are in the triangular sockets, screw the thumb-wheel in until it is tight (turn counter-clockwise).

6-　　Plug the various cables back into their sockets. If you are now in the vertical mode the workstation will automatically select the 80 x 66 character set. If you are in the horizontal mode it will select the large 80 x 24 set. (See Section 5.4.6 for changing to the small character set.)

5.12 KEYBOARD DIAGRAMS.

ASCII (American Standard)

SPACE

BRITISH

! 1	` 2	# 3	$ 4	% 5	& 6	' 7	(8	) 9	⋃⋃ 0	= -	⋃Φ ø	⋃ u

⋃Q q	⋃W w	⋃E e	⋃R r	⋃T t	⋃y y	⋃U u	⋃I i	⋃O o	⋃P p	⋃Æ æ	' e	LINE FEED	⋃_ - DEL

⋃A a	⋃S s	⋃D d	⋃F f	⋃G g	⋃H h	⋃J j	⋃K k	⋃L l	+ ;	* :	⋃Å å

⋃Z z	⋃X x	⋃C c	⋃V v	⋃B b	⋃N n	⋃M m	< ,	> .	? /

SPACE

DANISH

DUTCH

! 1	˙ 2	# 3	$ 4	% 5	& 6	˙ 7	(8	) 9	↑↑ 0	= -	↑Ö Ö ö	↑ ß

↑Q Q q	↑W W w	↑E E e	↑R R r	↑T T t	↑Y y y	↑U U u	↑I I i	↑O O o	↑P P p	↑Ä Ä ä	§ .	LINE FEED	↑_ _ DEL

↑A A a	↑S S s	↑D D d	↑F F f	↑G G g	↑H H h	↑J J j	↑K K k	↑L L l	´ ;	` :	↑Ü Ü ü

↑Z Z z	↑X X x	↑C C c	↑V V v	↑B B b	↑N N n	↑M M m	< ,	> .	? /

SPACE

GERMAN

ITALIAN

NORWEGIAN

! 1	" 2	# 3	$ 4	% 5	& 6	' 7	(8	) 9	0 0	= -	↑Ñ Ñ̃ Ñ	~ ↑

↑Q Q q ↑W W w ↑E É e ↑R R r ↑T T t ↑y y y ↑U U u ↑I I i ↑O O o ↑P P p ↑¡ ¿ i ` @ LINE FEED ↑_ _ DEL

↑A A a ↑S S s ↑D D d ↑F F f ↑G G g ↑H H h ↑J J J ↑K K k ↑L L l + : * : ↑¿ } ¿

↑Z Z z ↑X X x ↑C C c ↑V V v ↑B B b ↑N N n ↑M M m < , > . ? /
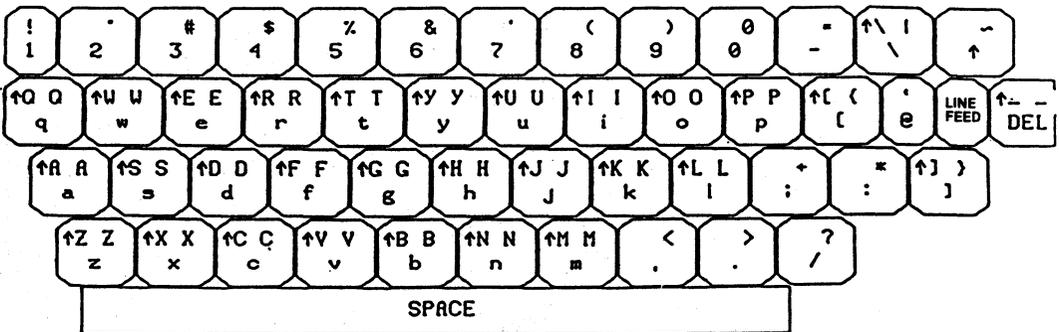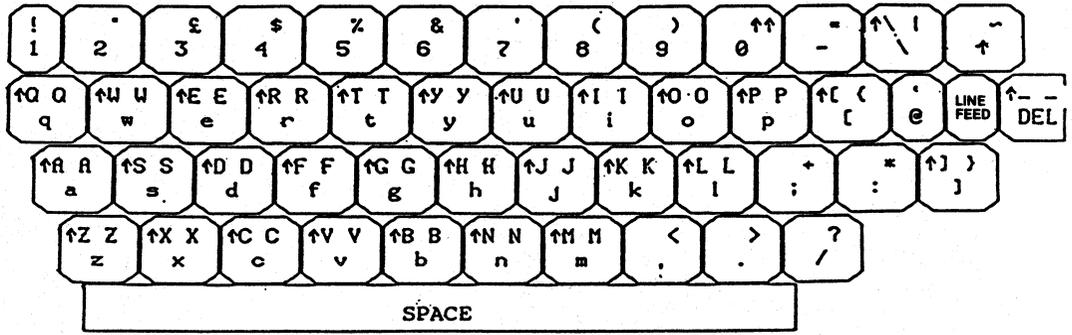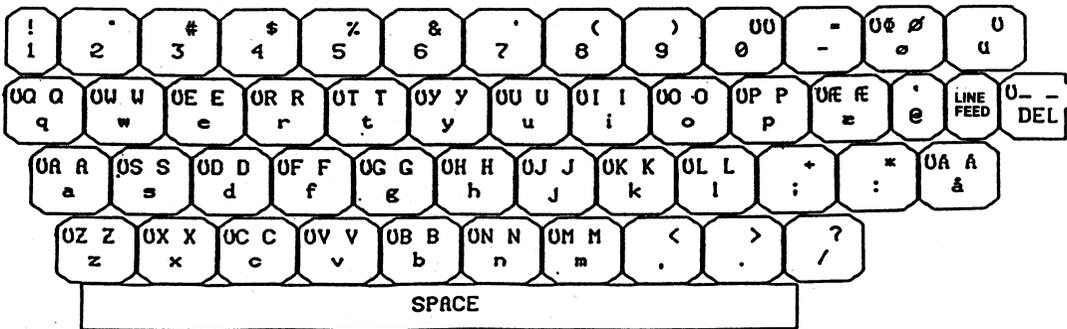
SPACE
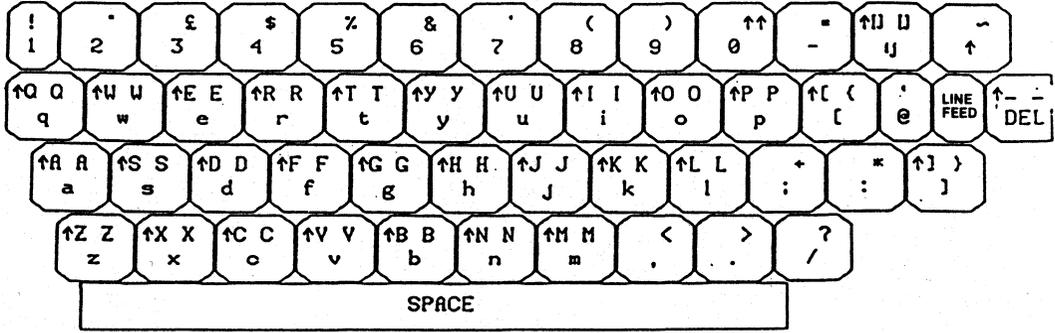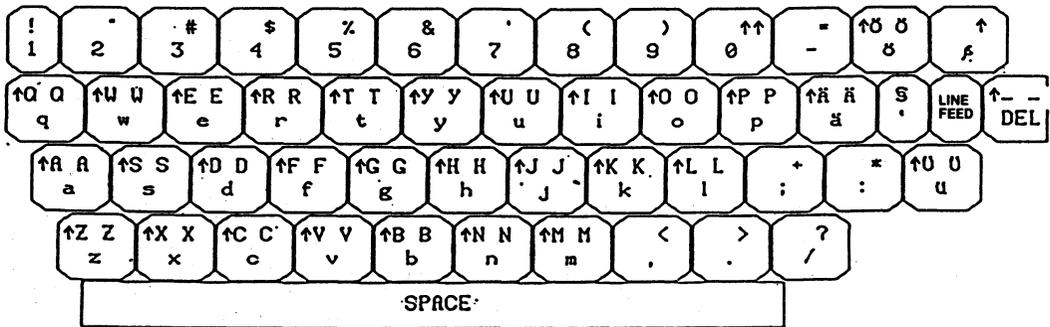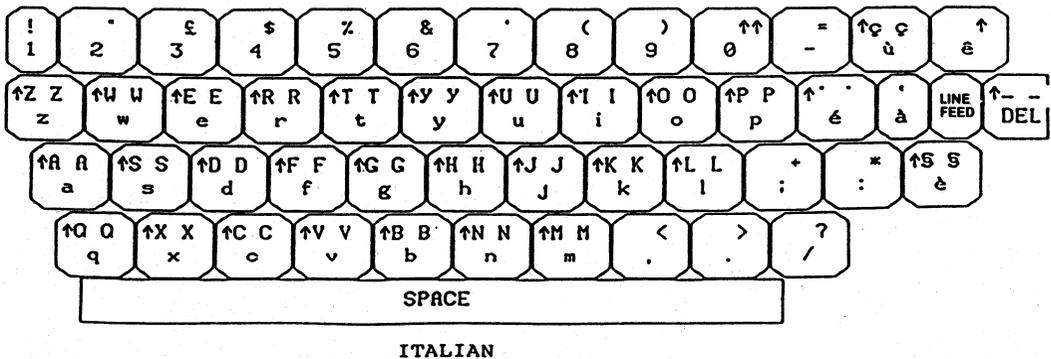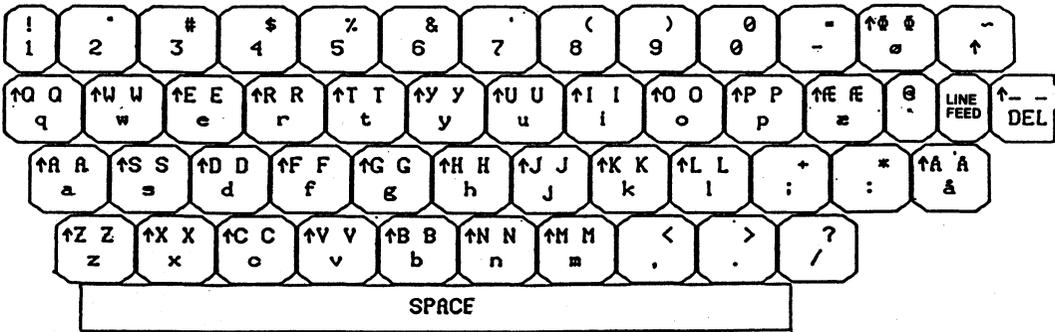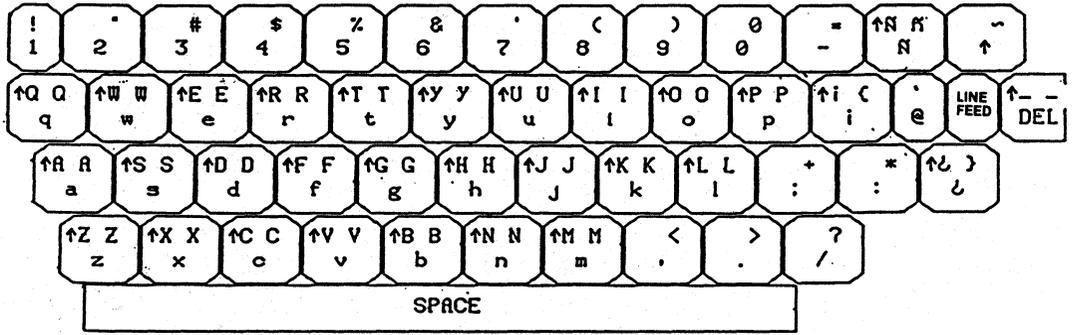
SPANISH
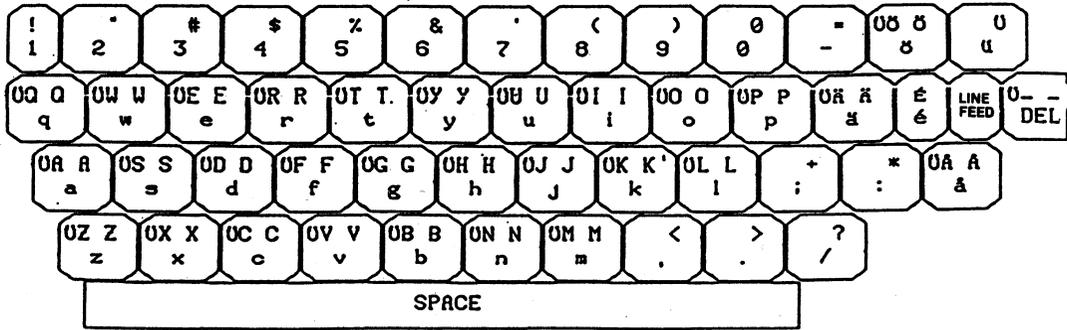
SWEDISH
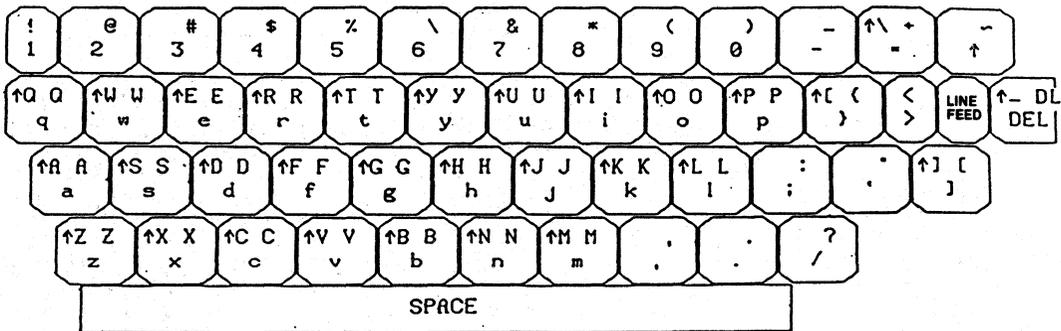
Typist's (TYPERITE.KBD)

6.0   USING PRINTERS

6.1   INTRODUCTION

6.1.1   LINKING TO A PRINTER

There are three ways to link your DMS-5000
to a Printer:

1-   Through the HiNet network to a central
Printer connected to the Master Hard Disk. This
is known as the 'Spool Printer'. See Section
6.2.

2-   Directly to a single workstation
through the RS-232C Serial Ports on the back of
the DMS-5000 (see Diagram 1). Such Printers are
called Serial Printers. They are discussed in
Section 6.3.1.

3-   Directly to a single workstation
through the Centronics Parallel Port at the back
of the DMS-5000 (see Diagram 1 and Section
1.5.2). Such a printer is called a 'Parallel
Printer' and with the DMS-5000 can be used to
print exactly what is being displayed on the
screen (including graphics). See Section 6.4.

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. The default assignment is Spool
Printer.

6.1.2   SENDING TEXT TO A PRINTER.

There are three general methods of sending
text to a Printer--through an applications
program, through the operating system's
commands, and through the DMS-5000's Screen Dump
capability. These methods are described in the
following sections.

PRINTING WITH AN APPLICATIONS PROGRAM.

Many applications programs that you will
use have their own sets of commands for sending
text to a Printer. While working with one of
these programs you will have to use its print
commands. Consult the program manual for the
necessary procedures.

----------------------NOTE----------------------
Many word processing programs require that you
adapt the program to your Printer and/or to your
workstation. This usually means that you must
enter information about the Printer or computer
into a sub-program of the word processing
software package. The sub-program could, for
example, allow you to specify a certain type of
communications protocol required by your
printer, or to set up parameters for using non-
standard paper. Read your word processing manual
for specific information.

PRINTING THROUGH CP/M AND MS-DOS.

If you are operating in CP/M (Section 3) or
MS-DOS (Section 4), you may transmit text to the
Printer by entering the command **CTRL P**. Once you
have issued a **CTRL P** command, everything that
subsequently appears on your screen will be sent
to the Printer until you issue another **CTRL P** or
a **CTRL C** to turn off the 'Transmit-to-Printer'
command. This could include directories,
commands you give to the computer, the contents
of files displayed with the TYPE Command, and so
forth. See Section 3.8 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 also
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. You can use PIP LST: with either
a direct-connect printer or the 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. In some
cases the embedded commands will cause the
printer to malfunction. You should always use
the word processing program's Print commands to
print files created with word processing
programs.

PRINTING A SCREEN DUMP.

        A Screen Dump may be executed at any time
with a CTRL/SHIFT Command. See Section 6.4. A
Screen Dump orders the printer to print an exact
copy of whatever is currently showing on the
screen, including text or graphics. You must
have a printer capable of handling a Screen Dump
attached to your workstation. Only certain
printers have this capability. You cannot use
the Spool Printer for Screen Dumps.

        In a sense, a Screen Dump operates exactly
the reverse of CTRL P, in that CTRL P sends to
the printer everything that appears on the CRT
after the CTRL P is entered, while a Screen Dump
sends to the printer only that which is already
on the screen at the time the Screen Dump
command is entered. Once the Screen Dump command
is issued, nothing can be added to the screen
until the Screen Dump process is completed.

-----------------------NOTE----------------------
Only a Screen Dump can reproduce graphics; the
other methods are limited to text.

6.2 SPOOL PRINTER.

The HiNet system allows all users to share
a Printer that is connected to the HiNet Master
Computer. Text sent to the central printer is
stored on the Master Hard Disk until the printer
is activated. Sending material to be stored in a
central location for later use is called
'Spooling'. As you might expect, the storage
place is referred to as the 'Spooler', and the
printer connected to the Spooler is called the
'Spool Printer'.

If your Spool Printer is operating in
'Automatic Mode' it will begin printing as soon
as you have finished sending text from your
workstation and broken the connection between
workstation and Spooler. If the Spool Printer is
operating in 'Manual Mode' you will have to go
to the Master Terminal to activate it.

If your station is not assigned to the
Spool Printer you can use the ASSIGN command to
re-assign it to the Spooler (A>**ASSIGN P SPOOL**
<CR>). Your station will respond with your
current drive assignments and the message
Printer assigned to SPOOL (HiNet Spool Printer).
See Section 2.11.5 for more information on the
ASSIGN command.

6.2.1 SENDING TEXT TO THE SPOOLER.

You may send text to the Spool Printer
using the PRINT commands associated with an
applications program that has print capabilities
(see your program's manual), or from CP/M with a
CTRL P or a PIP LST: (see 'Sending Text to a
Printer', Section 6.1.2).

While a workstation is Spooling a file
(sending the text of a file to the master disk)
you will not be able to use your workstation.
Once the text of that file is stored in the
Master Hard Disk your workstation can be used
again.

MULTIPLE FILES.

If you are sending files to the Spooler
with the print commands contained in an applica-
tions 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 end of the file is reached and you
will be returned to the A> prompt.

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.

WHEN YOU ARE FINISHED SENDING TO THE
SPOOLER YOU MUST SIGNAL THAT YOU HAVE COMPLETED
THE SPOOLING OPERATION. THE SPOOLER CANNOT BEGIN
TO PRINT YOUR MATERIAL UNTIL THIS HAS BEEN DONE.

The Spooler cannot 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 the operating system.** 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.

IN CP/M

     If you are sending text to the Printer from
the CP/M environment with a **CTRL P** or PIP LST:,
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 re-start a series of operations.)

IN MS-DOS

     In order to signal that you are done
sending text to the spooler when in MS-DOS, you
must use the RELEASE command. After you have
entered the second CTRL P to stop printing,
enter the command:

     RELEASE SPOOL <CR>

If you are sending text to the spooler via a
word processing program, exit the program and
enter the RELEASE SPOOL command to signal that
you are done.

     When the correct signal for either
operating system has been sent to the Spooler
your screen should show:

```
 Print Job Spooled
 A>
```

        This signifies that what you have sent to
the Spooler is now ready for printing and your
workstation is ready for its next task. If your
Spool Printer is operating in Automatic Mode it
will now 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 6.2.2).

        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 sent 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, but if the problem is due to
a full Spooler a retry will not help.

6.2.2   SPOOLER MANUAL MODE.

        If your Spool Printer is operating in
Automatic Mode it will print your job automati-
cally. However, if it 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. 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 2.13 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 use the 'Spool Printer Job
List'. If the Job List is not already showing on
the Master Terminal, you can call it up from

the command prompt with the command **A>SPOOL WAKE**
<CR>. **SPOOL WAKE** will bring up the Job List,
which looks like this:

```
A>SPOOL WAKE <CR>
***GROUCHO Ready to print
A <CR> = Abort
W <CR> = Wait
S <CR> = Serial
P <CR>  = Parallel
<CR>    = Next
Choice: []

***CHICO  Ready to print
A <CR> = Abort
W <CR> = Wait
S <CR> = Serial
P <CR>  = Parallel
<CR>    = Next
Choice: []
```

-----------------------NOTE----------------------
With earlier versions of HiNet the Job List Menu
items looked like this:

      ***GROUCHO Ready to Print
      Enter *, S, P, W, or Return.

This menu is used the same as the newer version
except that the asterisk (*) stands for Abort
(A).

------------------------NOTE----------------------
If your HiNet Master Computer is a DMS-3/501
there will be no P <CR> = **Parallel** option in the
menu.

The letters A, W, S, and P (and * for older
versions of HiNet) 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>,
so that the cursor moves along the list
indicating another entry. If you reach the end
of the list another <CR> will recycle you back
to the top.

-----------------------NOTE-----------------------
Each time you signal the Spooler that you have
completed sending your text (that is, each time
you get the **'Spooled'** message), the Job Ready
List will list your User Name - as a separate
job. Sending more than one job causes your name
to appear more than once on the Job Ready List.
Each such entry must be printed separately.

MANUAL MODE PRINTING.

Once the cursor is at the appropriate entry
of the Job Ready List, 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.
    W<CR> --   put the job in **WAIT** status.
    S<CR> --   **PRINT** the job on a **Serial** printer.
    P<CR> --   **PRINT** the job on a **Parallel** printer.

----------------------**NOTE**--------------------
If your HiNet Master Computer is a DMS-3/501 there
will be no **P<CR>** = **Parallel** option in the menu
as noted above. The DMS-3/501 must have a Serial
type printer connected to it.

On earlier versions of HiNet the symbol for
Abort may be an asterisk (*) rather than an A.

        Some HiNet systems will have only one type
of Spool Printer (Serial or Parallel); others
may have both. Ask the person in charge of your
network which type(s) you should use.

----------------------NOTE--------------------
S<CR> and P<CR> are 'GO' commands. Once you type
one of them, the Printer will IMMEDIATELY begin
printing your job (assuming it's turned on and
'on-line', of course). Thus, before issuing the
GO command you should make sure that the
printer, paper and ribbon are ready.

        WAIT (the **W** menu option) is used when you
wish to store a job overnight, or during a time
when the Master Computer and HiNet system is
turned off. As soon as someone enters the command

SPOOL WAKE (see below) any jobs that had been
put in WAIT status will be returned to the active
job list.

ABORT (the **A** menu option) is the ERASE
command and, as you would expect, it erases your
job from the Spooler.

6.2.3   SPOOLER COMMANDS.

The Spooler and Spool Printer recognize the
following commands which must be entered from
the Master Terminal:

SPOOL---Calls up a screen giving the various
         options and commands available. Issued
         from the Command Prompt (**A>SPOOL <CR>**).

SPOOL WAKE---Calls up the list of print jobs
         awaiting action. Issued from the Command
         Prompt (**A>SPOOL WAKE <CR>**).

SPOOL ABORT---Stops the Printer while it is
         printing and ERASES the entire job from
         the Spooler.

SPOOL RETRY---If the Spool Printer is in Manual
         Mode, typing **SPOOL RETRY** while the Printer
         is printing will stop it and bring up the
         Job Ready List Menu without erasing the
         job from the Spooler.

-----------------------NOTE--------------------
If the Spool Printer is in automatic mode **SPOOL
RETRY** will cause the Spooler to IMMEDIATELY
begin RE-TYPING your file from the beginning.
Since the program will not pause to let you set
up a clean page of paper, it is recommended that
you take the Printer 'Off Line' before entering
the SPOOL RETRY command (see Section 6.5,
'Stopping the Printer').

6.3   DIRECT CONNECT PRINTERS.

It is possible to connect a printer
directly to a DMS-5000 through one of the Ports
at the back of the cabinet. 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 workstation. Anyone wishing
to use it would have to log in to that specific
workstation.

6.3.1   PARALLEL PRINTERS.

The blue 36-pin Parallel Port at the rear
of the DMS-5000 is used for both a Screen Dump
to a Parallel Printer (see Section 6.4), and for
directing printer output from an applications
program such as a word processor to such a
printer.

To allow your DMS-5000 to interact properly
with a parallel printer, run the ENABLE program
that resides on your SYSTEM partition. From any
drive other than that assigned to the SYSTEM
partition, run **>a:enable.** The program will
respond, "ENABLE 1280/5080 Emulation Mode,
Version x.x" and list your options:

        0 = exit
        1 = fr [Freedom 100]
        2 = tv [Televideo]
        3 = haz [Hazeltine]
        4 = adm [ADM]
        5 = adds [Adds Regent]
        6 = 5080

followed by a colon and the cursor, awaiting
your selection of a number. Respond "6" for the
DMS-5000. The screen will echo your selection
and return you to the system prompt (>). You
are now able to print output directly from an
applications program to your local Parallel
Printer.

6.3.2 SERIAL PRINTERS.

A Serial type printer may be connected to
one of the black 25-pin connector sockets at the
back of the DMS-5000. PORT2, labeled SERIAL
PRINTER G3-PORT2 RS 232C; is usually the port
used for a Serial printer (see Diagram 1). If
your Printer has the same type of connector you
may be able to use a standard RS-232C cable.
These cables may be purchased from Digital
Microsystems or from computer supply stores.

-----------------------NOTE---------------------
There is no adequate standardization in the way
Serial Printers are connected to computers. It
is possible that your station may have to be
modified to use a particular Printer, or that a
special cable will be required. If this is
necessary you should consult a qualified
technician. Section 6.7 explains the use of
internal jumper blocks to configure the DMS-5000
to various types of printers.

     To use a Serial Printer connected to your
workstation you must first assign the Printer to
the Serial Port 2. This is done with the ASSIGN
command (B>**ASSIGN** P **PORT2** <CR>). The screen
should then display the **ASSIGNMENT ACCEPTED**
message and list your current assignments. See
Section 2.11.5 for more information on the
ASSIGN command.

     After assigning the Printer to PORT 2 you
must next set the Baudrate with the SETBAUD
COMMAND. For example, B>**SETBAUD** 2 1200 <CR>)
would set the Baudrate of PORT 2 at 1200. See
Section 6.6 for more information on the SETBAUD
Command.

     If you wish, the person in charge of your
network can make a direct connect Serial Printer
your default printer assignment (instead of the
Spool Printer).

     Once the Printer is properly readied as its
instructions describe, you are ready to print
from your DMS-5000. (See also Section 6.1.2.)

------------------------NOTE---------------------
If your Printer assignment is for a directly-
connected Printer (e.g., Port 2) but the Printer
is not connected (or it is off), then any print
commands will cause the DMS-5000 to "hang" and
not respond to any further instructions. If this
happens you will have to RESET the DMS-5000 or
turn the printer on if one is connected. When
you RESET your workstation you will lose any
work that you have not SAVED in a file.

6.4   PRINTING A SCREEN COPY.

   The DMS-5000 has the capability of printing
an exact copy of whatever is showing on the
screen, either text or graphics. In computer
terminology this is called a **'Screen Dump'**
because it takes whatever is on the CRT and
duplicates it on a printer.

   A Screen Dump works the opposite of CTRL P
(the CP/M send-to-the-printer command) in that
CTRL P sends to the printer everything that
appears on the CRT screen after the CTRL P is
entered, while a Screen Dump sends to the
printer only that which is already on the screen
at the time the dump command is entered. **Once
the Screen Dump begins, nothing can be added to
the screen until the dump process is completed.**

   The Screen Dump works completely
independently of all other printing commands and
procedures. There is no printer assignment
through the ASSIGN Command, no need to set the

Baudrate, and no need to issue a CTRL P or
applications program print command.

　　　To execute a Screen Dump with the current
version of the DMS-5000, first connect either an
Epson MX-100 or an Okidata Microline-83A dot
matrix printer to the blue 36-pin Parallel Port
(labeled PARALLEL PRINTER) at the rear of the
workstation. A standard Centronics Parallel
cable is used to connect the printer to the
workstation (available from DMS or computer
supply stores).

----------------------NOTE--------------------
In order to execute a Screen Dump you **must use**
either an **Epson MX-100** with the **Graphtrax
Option,** or an **Okidata Microline-83A** with the
Okigraph I (Okidata part # 575-14902) option.

　　　Once the printer is connected to the
workstation Parallel Port you can reproduce the
screen at any time. **CTRL/SHIFT F8** will send the
screen contents to an Epson MX-100. **CTRL/SHIFT
F9** will send the screen to an Okidata Microline-
83A.

　CTRL/SHIFT F8 for the **EPSON MX-100**
　CTRL/SHIFT F9 for the **OKIDATA MICROLINE-83A**

　　　As soon as you enter the CTRL/SHIFT F8 or
F9 command your cursor will stop flashing and
the printer will begin printing (assuming it's
turned on and connected of course). During the
time the screen is being printed you will not be
able to use your workstation, and no keyboard
commands will function until the Screen Dump is

completed. When the printer is finished
duplicating the screen, your cursor will resume
flashing and you may continue working with the
station. Hitting the CTRL/SHIFT Key twice
will give you two Screen Dumps, that is, the
printer will print two copies of the screen
before releasing control of the workstation back
to you.

-------------------NOTE-------------------
Because the printer is duplicating the screen in
Graphics Mode, it will print more slowly than it
would in an ordinary text printing job.

The screen dump function waits for the parallel
port to clear everytime it sends a character.
Turning off or disconnecting the printer while
the Screen Dump is in progress will abort the
job in 10 seconds. If there is no printer
attached to the parallel port and either
CTRL/SHIFT F8 or F9 is pressed, the cursor will
disappear for 10 seconds and then reappear at
the same position on the screen.

6.5   STOPPING THE PRINTER.

       While you are printing a job you may have
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 <u>not</u> 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 proc-
essing program. But these keyboard commands will
either erase your job (like SPOOL ABORT) or
pause for some time before stopping the printer.

6.6   SETTING THE BAUDRATE.

You may wish to connect a device to the
DMS-5000 through one of the three serial ports
at the back of the unit (a printer, a modem,
etc.). When using these serial ports you must
set the BAUD RATE with the SETBAUD command. The
Baudrate governs the speed at which information
is transferred to and from the workstation
through the port. Different devices require
different Baudrates. Check the instructions that
come with the device for the correct rate.

THE SETBAUD COMMAND.

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

```
A>setbaud 2 9600

SETBAUD VERSION x.x
Set the serial port baudrate.

A>
```

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

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

7.0   LOCAL STORAGE

The DMS-5000 Series workstations do not
currently have any Local Storage capabilities.
DMS-5000 workstations use the Network's Hard
Disks to store all of the programs and files
that you need.

8.0   ELECTRONIC MAIL

8.1   LOGGING IN TO E-MAIL

-------------------------**NOTE**--------------------
The current version of E-MAIL is configured for
8-bit workstations only, and not for 16-bit
workstations such as the DMS-5086 and DMS-5087.
It will run on the DMS-816 only when that
station is logged in as a HIDOS (CP/M-80)
workstation.

    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>.**

    4-   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 at which you are
working. After giving that name you will be
asked again for your own name. Type in your

name (as it is registered in E-MAIL's memory)
followed by a RETURN.

--------------------NOTE--------------------
Different Terminals. 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. (The person in charge of E-
MAIL may have included the names of different
terminals in E-MAIL's registry, if so then you
need only enter the type of terminal you are
using.)

5-   If you have protected your mail with
a password you will be asked to type it in. All
passwords must be typed in **lowercase** letters,
not capitals. (If you are using a different type
of terminal, you will be asked for your name
here instead of password.)

8.2 INCOMING MESSAGES.

When E-MAIL is called up <u>any</u> <u>mail</u> <u>not</u> <u>yet</u>
<u>read</u> <u>by</u> <u>you</u> 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 Next Message to clear the screen,
don't press the DEL key.

8.3 SENDING MESSAGES.

     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**)

SENDING MAIL FROM A FILE.

From the 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 word processor such as Perfect
Writer or Wordstar.

SENDING MAIL FROM THE KEYBOARD.

From the 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).

----------------------NOTE----------------------
When you reach the end of the line E-MAIL will
start a new line below, but it will not bring
down the entire word you were working on. That
is, if you are in the middle of a word when you
reach the end of the line E-MAIL will simply
type the next letter at the begining of the next
line down and your word will be broken into two
parts. You can avoid this by hitting RETURN if
you do not have enough room for the entire word
at the end of the line. In other words, E-MAIL
works like a typewriter except there is no
margin release.

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.

9.0   CONFIGURING SOFTWARE

There are many software packages available
that work on the CP/M operating system. Almost
all of these packages will work on the DMS-5000
and the HiNet network. However, because of the
great variety of computers in the marketplace,
many programs have a configuration sub-program
that adapts the software to the particular
computer.

To make these configuration programs work,
you must enter codes that tell the program what
the 5000 expects to receive when a command is
given. For example, a common command from a
program would be to clear the screen and home
the cursor to the upper left corner of the
screen. For the DMS-5000 the program would have
to send a CTRL L. Some programs will let you
enter that form of the code while others will
demand the Hexadecimal equivalent of the code.

The listings on the next pages will give
you both. Some codes require two numbers (ESC
codes) while others (CTRL) need only one. The
tables always give a Hex number with the letter
H after them. **You do not need to enter the H
along with the number.** It is also possible that
a program will require the decimal equivalent of
a command code. These will be given in the table
as well. There will be no letter after these
numbers.

9.1 ESC CODES

            CODE   HEX   DECIMAL

    turn on full duplex mode
           ESC A....(1BH,41H)...(27,65)

    turn on character blink
           ESC B....(1BH,42H)...(27,66)

    screen brightness up
           ESC b....(1BH,62H)...(27,98)

    clear current plane
           ESC C....(1BH,43H)...(27,67)

    download character set
           ESC c....(1BH,63H)...(27,99)

    screen dump to Okidata
           ESC CAN..(1BH,18H)...(27,24)

    screen brightness down
           ESC d....(1BH,64H)...(27,100

    invisible cursor
           ESC D....(1BH,44H)...(27,68)

    display alignment pattern
           ESC DEL..(1BH,7FH)...(27,127)

    visible cursor
           ESC E....(1BH,45H)...(27,69)

    transmit status to host
           ESC ENQ..(1BH,05H)...(27,5)

screen dump to Epson MX-100
          ESC ETB..(1BH,17H)...(27,23)

non-flashing cursor
          ESC f....(1BH,66H)...(27,102)

flashing cursor
          ESC F....(1BH,46H)...(27,70)

graphics cursor-control from host
          ESC G....(1BH,47H)...(27,71)

half intensity characters
          ESC H....(1BH,48H)...(27,72)

set a plane intensity
          ESC i....(1BH,69H)...(27,105)

select alternate character set
          ESC J....(1BH,4AH)...(27,74)

download an alternate character set
          ESC j....(1BH,6AH)...(27,106)

clear to end of line
          ESC K....(1BH,4BH)...(27,75)

clear to end of screen
          ESC k....(1BH,6BH)...(27,107)

character set access
          ESC L....(1BH,4CH)...(27,76)

80x24 line format
          ESC M....(1BH,4DH)...(27,77)

memorized shape load code
        ESC n....(1BH,6EH)...(27,110)

sets characters to normal
        ESC N....(1BH,4EH)...(27,78)

character overwrite mode
        ESC O....(1BH,4FH)...(27,79)

report function key string mode
        ESC P....(1BH,50H)...(27,80)

report function key number mode
        ESC p....(1BH,70H)...(27,112)

monitor mode off ON
        ESC Q....(1BH,51H)...(27,81)

monitor mode on OFF
        ESC q....(1BH,71H)...(27,113)

inverse video on
        ESC R....(1BH,52H)...(27,82)

dump memory to host
        ESC s....(1BH,73H)...(27,115)

small character format
        ESC S....(1BH,53H)...(27,83)

enter graphic-input mode
        ESC SUB..(1BH,1AH)...(27,26)

toggles full screen inverse video
        ESC T....(1BH,54H)...(27,84)

second plane half-intensity increment
        ESC t....(1BH,74H)...(27,116)

underline on
        ESC U....(1BH,55H)...(27,85)

second plane half-intensity decrement
        ESC u....(1BH,75H)...(27,117)

vert. mode char. in horz. (i.e. characters &
lines run from bottom to top rather then left to
right)
        ESC v....(1BH,76H)...(27,118)

keyboard transposition table
        ESC w....(1BH,77H)...(27,119)

block-fill code
        ESC X....(1BH,58H)...(27,88)

reset transposition table
        ESC x....(1BH,78H)...(27,120)

set absolute cursor position
        ESC Y....(1BH,59H)...(27,121)

reset transposition table
        ESC z....(1BH,7AH)...(27,112)

graphic-input mode
        ESC CTRL Z.(1BH,1AH) (27,26)

display memorized shape
        ESC @....(1BH,40H)...(27,64)

next character to // printer
        ESC [....(1BH,5BH)...(27,91)

disable coordinate scaling
        ESC "....(1BH,22H)...(27,34)
             #   23h

enable coordinate scaling
        ESC %....(1BH,25H)...(27,37)

point written as light point
        ESC |....(1BH,7CH)...(27,124)

point written as dark point
        ESC &....(1BH,26H)...(27,38)

point written as complement
        ESC ~....(1BH,7EH)...(27,126)

turns scrolling off
        ESC (....(1BH,28H)...(27,40)

turns scrolling on
        ESC)....(1BH,29H)...(27,41)

scroll bottom 3 lines only
        ESC !....(1BH,21H)...(27,33)

load character descender table
        ESC '....(1BH,27H)...(27,39)
                        62h

26-line display
        ESC ;....(1BH,3BH)...(27,59)

24-line display
        ESC :....(1BH,3AH)...(27,58)

write to second plane
        ESC {....(1BH,7BH)...(27,123)

    ESC 56h   Version

write to first plane
        ESC }....(1BH,7DH)...(27,125)

extended RAM test
        ESC ^....(1BH,5EH)...(27,94)

load code and jump to it
        ESC >....(1BH,3EH)...(27,62)

9.1.2 CONTROL CODES

cursor to upper left
     CTRL A..(01H)..(1)

cursor one column right
     CTRL F..(06H)..(6)

cursor one column left
     CTRL H..(08H)..(8)

linefeed
     CTRL J..(0AH)..(10)

clears screen,homes cursor
     CTRL L..(0CH)..(12)

cursor to start of line
        CTRL M..(0DH)..(13)

cursor one line up
        CTRL Z..(1AH)..(26)

line drawing mode
        CTRL]..(1DH)..(29)

exit to character mode
        CTRL ^..(1EH)..(30)

point plot mode
        CTRL \..(1CH)..(28)

9.3 CONTROL/SHIFT CODES

CTRL/SHIFT F1	screen brightness down
CTRL/SHIFT F2	screen brightness up
CTRL/SHIFT F3	toggles normal/reverse video
CTRL/SHIFT F4	(Unused)
CTRL/SHIFT F5	second plane brightness down
CTRL/SHIFT F6	second plane brightness up
CTRL/SHIFT F7	(Unused)
CTRL/SHIFT F8	Epson MX-100 Printer Screen Dump
CTRL/SHIFT F9	Okidata Printer Screen Dump
CTRL/SHIFT F10	(Unused)
CTRL/SHIFT F11	(Unused)
CTRL/SHIFT F12	(Unused)
CTRL/SHIFT F13	Load function key from keyboard
CTRL/SHIFT F14	Used by F13 to delete characters
CTRL/SHIFT F15	Local Mode on
CTRL/SHIFT F16	Local Mode off

----------------------NOTE---------------------
Second plane features require the installation
of a memory daughter board on the CRT
Controller. This board gives the DMS-5000 series
features such as blinking and half-intensity
display for use by applications programs. See
your DMS dealer for additional information.
Interested applications programmers may write to
the Documentation Department at DMS for the 5000
Programmer's Manual.

GRAPHICS

Many applications packages will display the
results of calculations and data bases as
graphs, bar charts, pie charts, etc. Not all
workstations can 'draw' these pictorials but the
DMS-5000 Series can.

The DMS-5000 has a bit-mapped screen. This
means that the computer's memory stores a map of
the screen that can be altered by a program.
Each point of light on the screen has a value in
the memory. A program can rearrange this map to
display characters, lines and shapes.

The DMS-5000 Programmer's Manual explains
how to write programs that use the features of
the 5000 Series to display graphics. The manual
can be ordered from Digital Microsystems.

Sections 9.1, 9.2, and 9.3 above contain
the codes that may be needed to configure a
software program with graphics features to work
on the 5000. The user manual for the program
should also explain how to configure your
system. If the package you want to use has the
option of emulating a **Tektronix 4010** then the
graphics capabilities of the 5000 should work
with the program.

Some programs require modification by the
program authors to adapt it to different
systems. If this is the case they will need to
know the information contained in the sections
mentioned above.

10.0   TELE-COMMUNICATIONS

This section is sent with HiNet installa-
tions that use DMS workstations as Gateways to
mainframe computers. The workstations can be a
part of a Local Area HiNet Network and also
access information stored on the mainframe
computer. Data assembled on a HiNet workstation
can be sent to the mainframe to be processed
(e.g., in a large database).

ERROR MESSAGES

ABORTED

Indicates the process is terminated.

BDOS ERROR ON X:

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

BDOS ERROR ON X: BAD SECTOR:

A write error has occurred on a Floppy
Disk. Hit any key to ignore or enter CTRL C to
reboot. CTRL C will erase any work stored in
memory and not saved to disk. This error no
longer applies to the Network's Hard Disks.

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

The drive is marked read-only and cannot be
written to. Hit any key to reboot. NOTE-- This
will cause you to lose everything you have done
since your last 'save' command.

BDOS ERROR ON X: SELECT.

Means that CP/M can not find the drive you
specified. Probably you typed in a letter that
was not A, B, C, or D. To recover from this
error enter a CTRL-C Command. If that fails to
work you will have to RESET your workstation. In
both cases you will lose all of your work since
your last 'Save' command.

BDOS ERROR ON X: FILE R/O
    The file you are trying to write to (edit)
is marked Read-Only. Hit any key to reboot. Work
stored in memory and not saved to disk will be
lost.

BDOS ERROR ON X: NO LOCKS
    The Master's Lock Table is full. This
message is for shared partitions only. Hit any
key to retry or enter CTRL C to reboot.

Can't find file named XXX.
    CUSTOMIZ can not find the file you have
named. Check to make sure you are typing in the
correct name and that the file is stored on the
drive you are specifying. You may wish to exit
CUSTOMIZ and use DIR or SD to verify the file's
location and name.

Can't find file on that drive either.
    This message may follow the one above if
you have named another drive and the file is not
there. Exit CUSTOMIZ and use DIR or SD to locate
the proper file.

Can't find needed character set in CHARSET.CST file.
    This indicates that the file CHARSET.CST is
either missing or defective. PIP a clean version
of CHARSET.CST to your working drive.

Can't find overlay file CustX.ovl.
    One of the Overlay files is missing. PIP
the missing file to your working drive.

Can't read character set. This is a FOX.
     Neither the DMS-3/F nor the DMS-15 can
handle a User Defined Character Set. This
message may appear if you load to one of these
workstations a Settings File that was created on
a DMS-5000. Except for the Character Set
everything else in the File should function
normally.

Can't read in function keys, table too big.
     This message will appear if a very large
number of Special Function Keys have been
programmed outside of CUSTOMIZ.

Can't write to file. See if disk is full.
     This message will appear if there is some
disk-related problem.

command?
     Any error message ending in a question mark
indicates that the system could not find the
command you typed. Check for typing errors. You
can use DIR or SD to check the correct spelling
of commands in the directory.

Couldn't load up language. Do you want to continue?.
     This message appears when you are trying to
create a Character Set and have selected a User
Defined Character Set to begin with but CUSTOMIZ
can not find that file.

Couldn't read information from that file.
     You have specified a file that is not a
valid CUSTOMIZ Settings File. Check the
filename.

Couldn't read language from that file.
 You have specified a file that does not
contain a valid User Defined language.

DESTINATION IS R/O
 Usually occurs during a PIP operation. The
file you are trying to send material to is a
'Read-Only' file. There is usually a query
associated with this message asking if you wish
to delete the file. If you answer **'Y'**, the R/O
file will be erased and replaced with the new
file you were trying to send to it. If this
fails to work consult the person in charge of
your system.

DISK READ ERROR
 Occurs during PIP or some other disk-
reading operation. Indicates the computer is
having a problem reading what is on the Hard
Disk memory. Try again. If the problem persists,
see the person in charge of your system.

DISK WRITE ERROR
 Occurs during PIP or some other writing to
disk storage operation. Indicates the computer
is having a problem writing material to the
memory disk, probably due to a full partition.
Try again. If the problem persists, see the
person in charge of your system.

Failed to read entire file.
 This message appears when there is
something wrong with a Settings File you are
trying to read in.

filename?
      When you are using the REN (Rename) command
and a filename is repeated with a question mark
it means that you have incorrectly used a
wildcard symbol.

FILE EXISTS
      This may occur when you are renaming a file
with the REN command. It indicates that a file
already exists with the new name you have chosen
for the old file. The simplest solution is to
choose another new name for the file you are re-
naming. Otherwise you must either change the
existing file's name, erase it, or use the PIP
program (sect 3.6.1) to overwrite it.

FILE NOT FOUND
      The computer cannot find the file(s) you
named. Check to see if you typed the filename(s)
correctly. If you did, then the file(s) no
longer exist.

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

***HARS error
      HARD DISK SECTOR ERROR. This means part of
a sector on the Master Hard disk has been
damaged. Consult with the person in charge of
your network.

INVALID FORMAT
     The format you have specified is not valid.
Check for typing errors, punctuation, and
spaces.

INVALID PIP FORMAT
     Check your punctuation marks (for example, a
';' instead of a ':' will give this message).
Specifying an incorrect drive will also give
this message.

INVALID SEPARATER
     Check your punctuation.

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

Not a valid CP/M filename. Please re-enter name.
     You have specified a filename that does not
conform to standard CP/M filename conventions.

Not a valid drive char. Valid chars are A,B,C and D.
     You have hit the wrong letter in specifying
a drive.

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

On logged drive can't find file: XXX.
        The file you have named is not stored on
the logged drive. Try another drive letter, or
search for the file with DIR or SD.

<PARTITION NAME> LOCKED
        A message for shared partitions only. The
partition in use has been locked for four
seconds. An indication of serious internal HIDOS
error. Hit any key to retry, enter CTRL C to
reboot.

<PARTITION NAME> NOT LOCKED
        A message for shared partitions only. An
attempt was made to unlock a partition that was
not locked. A sign of a serious internal HIDOS
error. Hit any key to ignore, enter CTRL C to
reboot.

SHRALLOC
        May be repeated across the screen until you
reset the computer. This message indicates that
you have tried to access a partition that is
marked as shared in the ALLOC Table but has not
had the SHRALLOC program run on it. The Network
Administrator should mark the partition as
ownable, run SHRALLOC while logged to the
partition to be shared and then remark the
partition as shared in the ALLOC Table.

***SPOOL ERROR
        This probably indicates that the Spooler is
full, and no new print jobs can be stored until
some of those already on the Spooler have been
removed, either by printing them or erasing
them. **CTRL-C** will abort your job and put you

back into CP/M; <CR> will make another try at
sending your job to the Spooler.

That is not a valid intensity level.
    When setting Screen Intensity Level
CUSTOMIZ only recognizes the numbers 1-15.

There is no user defined version present.
    You have selected a user defined keyboard
or language but none is loaded into CUSTOMIZ's
workspace. You need to load a file containing
your User Defined Character Set or Keyboard.

User language is the wrong size. I can't read it in.
    When the DMS-5000 is in the vertical mode
it can use only Small Character Sets. This
message will appear if you have tried to load a
large size User Defined Character Set.

***WAITING
    This message occurs when the station is
waiting to communicate with the Master Computer.
It usually indicates a minor problem with the
HiNet master. Do not RESET or turn off your
workstation, as doing so will cause you to lose
the work you have done since your last 'Save'
command. If the WAIT message does not clear off
in a short period of time, consult the person in
charge of you network.

Was unable to read language successfully.
    This message will appear on the DMS-3/F or
DMS-15 if there is some problem with the file
LANGUAGE.CST.

OPENING UP THE DMS-5000 CABINET

CAUTION

THE DMS-5000 SHOULD BE OPENED BY QUALIFIED
SERVICE PERSONNEL ONLY. THE DMS-5000 CABINET
CONTAINS A CRT AND A POWER SUPPLY THAT HAS VERY
DANGEROUSLY HIGH VOLTAGES. THESE VOLTAGES
DISCHARGE SLOWLY AND ARE PRESENT LONG AFTER THE
DMS-5000 IS TURNED OFF. CONSEQUENTLY, DO NOT
OPEN THE DMS-5000 CABINET WITH THE POWER CORD
CONNECTED. ALWAYS WAIT 2 HOURS AFTER UNPLUGGING
THE MACHINE BEFORE REMOVING THE TOP.

The following instructions are intended to
guide a qualified service technician should it
become necessary to open up the DMS-5000 cabinet
(to install new PROMs or Jumper Blocks, for
example).

1-   Turn off the DMS-5000 and disconnect
the power cord, keyboard, HiNet cable, and
anything else plugged into the unit. Wait two
hours to allow residual voltages to dissipate.

2-   Loosen the thumb-wheel on the base
(clockwise turn) and lift the DMS-5000 off of
the base. Because it fits tightly you may need
to have someone hold down the base while you
lift off the unit. Place the DMS-5000 face down
(CRT down) on a clean table top. MAKE SURE THERE
IS NOTHING ON THE TABLE SURFACE THAT CAN DAMAGE
THE SCREEN.

3-   The back of the DMS-5000 should now be
facing up. Loosen the four screws marked on
diagram #1. Lift off the cover straight up. If
the cover does not come up easily the screws
need to be loosened some more.

4-   With the case removed you can see the
two green circuit boards on the main chassis.
One of them is on the side next to the fan. The
second circuit board is away from the fan, and
if the DMS-5000 were upright in the vertical
operating mode this circuit board would be at
the bottom of the unit. This bottom board is the
one with the CRT PROMs and Serial Port Jumper
Blocks. See diagram #3.

5-   Your body may be carrying a slight
charge of static electricity which might harm
the circuit board and chips when you handle the
PROMs. Briefly touch the metal box that the
circuit boards are attached to, this will
harmlessly drain off any static electricity.

CHANGING THE CRT PROMS FOR SEPARATED BOOT

Before starting check out the enclosed
PROMs for damage. If the pins are bent out of
alignment they can be easily straightened.

As you look at the bottom circuit board,
the PROMs are the two big (28-pin) chips located
on the left side of the board between the
board's large left side notch and a very large
chip with fins. The labels U66 and U67 are
printed on the circuit board beneath the PROMs.
The PROMs themselves may (or may not) have white

paper labels with identifiers such as U66, U67, ODD, EVEN, 1.2, 54-xxxx, or 54-xxxx.

Using a chip puller like a large tweezers, hook the feet of the puller under the chip's rim and pull out the old PROMs. They come straight out with no twisting or turning. Take care not to damage any of the adjacent circuits. AVOID TOUCHING OTHER PARTS OF THE UNIT, PARTICULARLY THOSE AREAS MARKED **'CAUTION'**.

Plug in the new PROMs.

A-   Make sure you insert the new PROMs into the correct socket. (See the instructions that accompany the PROMs.)

B-   THERE IS A NOTCH AT THE TOP OF EACH PROM. MAKE SURE THIS NOTCH IS **POINTED UP** TOWARDS THE TOP OF THE circuit BOARD. If the PROM is plugged in with the notch down the chip will be destroyed when the power is turned on.

C-   Position the PROM so that all of the little pins are lined up over the socket holes. Make sure none of the pins are bent. With the pins aligned over the holes, and the chip notch pointed up, firmly push the PROM into the socket.

When both the new PROMs are plugged in, replace the case and tighten the screws. Plug in the power cord, HiNet cable, and keyboard. When the power is turned on you should see above the network "Log On" message the notice: **DMS SERIES 5000 VERSION 1.X** (X stands for the number of the PROM version).

If this message does not appear, or if the
workstation does not give three 'beeps' when
turned on, there may be a problem with the PROM
installation. First check that the power cable
is properly plugged in to a socket with
electricity. If the power supply is good, then
disassemble the unit and make sure the PROMs are
in the correct sockets with the PROM notch in
the proper direction. Remove each PROM from its
socket and inspect the pins to see if any have
been bent during insertion, if so straighten the
pins and put the PROMs back in the proper
sockets with the notch in the correct direction.
If the workstation still does not function
correctly call the DMS Service Department (415)
261-1034.

CHANGING THE JUMPER BLOCKS

The Serial Port 2 (printer) Jumper Block is
located near the port at **U3** (see Diagram #3).
The Serial Port 3 (modem) Jumper Block is at
U14. The blocks are removed and inserted just
like 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 not bent.

---------------------**NOTE**--------------------
One corner of the Jumper Block is slightly
**shaved or angled. THIS NOTCHED CORNER MUST FACE
TOWARDS THE SERIAL PORT.**

CHANGING THE KEYBOARD PROM

Before starting check out the enclosed PROM
for damage. If the pins are bent out of
alignment they can be easily straightened.

Disconnect the keyboard unit from the
workstation. The keyboard cable plugs into the
workstation with a telephone-like plug. To
remove it, squeeze the little tab underneath the
black coil cord and pull the plug straight out.
If it does not come out easily you need to
squeeze the tab more.

To remove the cover plate that fits around
the keys, turn the keyboard unit over and use a
Phillips head screw driver to loosen the four
screws at the corner of the unit. Once the
screws are loosened turn the unit right side up
and lift off the cover plate.

With the cover plate off you will see a
green circuit board underneath the keys. To the
right of the SPACE BAR and below the SHIFT and
BACK SPACE keys are three chips; two small ones
and a large 40-pin (20 pins per side) chip. The
large chip is the PROM that needs to be changed.

Remove the PROM with a chip-puller, pulling
it straight out. Take care not to damage the
adjacent circuits or chips.

Insert the new PROM into the socket. MAKE
SURE THE NOTCH ON THE PROM IS **POINTED TO THE
LEFT** (TOWARDS THE SPACE BAR). Position the PROM
so that all of the little pins are lined up over
the socket holes. Make sure none of the pins are

bent. With the pins aligned over the holes, and
the chip notch pointed left, firmly push the
PROM into the socket.

When the new PROM is plugged in, replace
the cover plate and tighten the screws. Plug the
coil cord back into the workstation (it is not
necessary to squeeze the tab which will make a
click noise when it is properly plugged in).

Turn on your workstation and log in. If you
have trouble logging in, or the keyboard does not
seem to function properly, check that the coil
cord is correctly plugged into the workstation.
Remove the cover plate and make sure that the
PROM has been inserted with the notch to the
left and that none of the pins are bent. If all
appears to be in order and the keyboard still
malfunctions call DMS (415) 532-3686, Service
Department.

Once you have logged in and you see the
CP/M A prompt type ESC V RETURN (A>ESC V <CR>)
(Note---Capitol V, not lowercase). Your screen
will display the CRT version number and the
keyboard version number which should look like
this:

KYBD 2.X
KYBD?