



MSTM – DOS
Version 2.11
Documentation

digital

First Printing, October 1984

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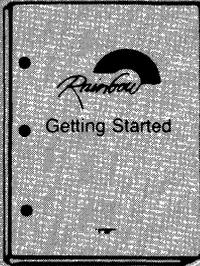
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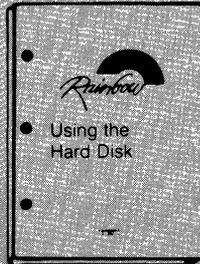
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To get you started . . .



Getting Started

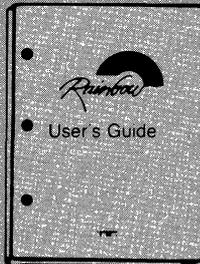
Tells you how to start your operating system and copy the operating system diskette.



Using the Hard Disk

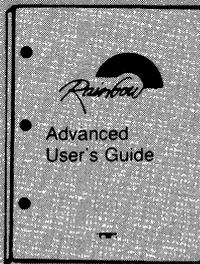
Tells you how to set up your hard disk to use with the operating system.

For more information . . .



User's Guide

Contains detailed information about your operating system and how to use its commands.



Advanced User's Guide

Contains detailed information about the operating system's more advanced commands; for example, those commands that a programmer would use.

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MS™ – DOS
Version 2.11
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MS™-DOS Version 2.11 Update Instructions

AV-EA04A-XV

October 1984

Use these instructions if you have been using the MS™-DOS Version 2.05 or Version 2.01 operating system. If you are a first-time user of the MS™-DOS operating system, you can ignore these instructions and go to the *Rainbow MS™-DOS Version 2.11 Getting Started* in this kit.

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Updating the MS-DOS Operating System

These update instructions are for users of the MS-DOS operating system that have been using the MS-DOS Version 2.05 or Version 2.01 operating system. If you are a first-time user of the MS-DOS operating system, you can ignore these instructions and go to the *Rainbow MS-DOS Version 2.11 Getting Started* in this kit.

You have to update the MS-DOS operating system if you have one of the following combinations:

Table 1. Update Instructions

If you...	Go to...
Are a new user of the MS-DOS operating system with the Rainbow Computer	<i>Rainbow MS-DOS Version 2.11 Getting Started</i> in this kit
Use the MS-DOS Version 2.01 operating system with diskettes that contain application files	Page 2
Use the MS-DOS Version 2.05 operating system with diskettes that contain application files	Page 4
Use the MS-DOS Version 2.01 or Version 2.05 operating system with copy-protected diskettes	Page 6
Use the MS-DOS Version 2.05 or Version 2.01 operating system with a hard disk	Page 9

IMPORTANT

You should make a copy of the master MS-DOS Version 2.11 operating system diskette before you use it. Store the original, master diskette in a safe place.

Updating Diskettes that Contain The MS-DOS Version 2.01 Operating System

To update a diskette that contains the MS-DOS Version 2.01 operating system AND application files or other programs for the MS-DOS Version 2.11 operating system, you will:

- Copy MS-DOS system files from the MS-DOS Version 2.11 operating system diskette to a blank diskette.
- Copy application files or other programs from the MS-DOS Version 2.01 diskette to the diskette that contains the MS-DOS Version 2.11 operating system files.

Follow the instructions below:

1. Turn on the Rainbow computer and insert the MS-DOS Version 2.11 operating system diskette into drive A.
2. Insert a blank diskette into drive B.
3. Press the A key to start the MS-DOS operating system.
4. Type the date and the time.

The computer displays the operating system prompt, A>.

5. Use the FORMAT program to prepare the blank diskette in drive B.
Type:

```
A>FORMAT B: /I/S Return
```

NOTE

To properly update the operating system, you must use the FORMAT program to copy the system files. DO NOT use the SYS program.

When the `FORMAT` program is finished, MS-DOS displays the operating system prompt. The diskette in drive B now contains two hidden MS-DOS Version 2.11 system files and the file named “`COMMAND.COM`”.

6. Use the `COPY` command to copy any MS-DOS Version 2.11 programs, (`DISKCOPY`, `FORMAT`, and `PRINT`, for example) to the diskette in drive B. Most of these programs are new versions and should be used with the new version of the operating system files.

For example, to copy the `PRINT` program to the diskette in drive B, type:

```
A>COPY PRINT.COM B: 
```

7. Use the `COPY` command to copy application files or other programs to the diskette in drive B.
 - Remove the MS-DOS Version 2.11 operating system diskette from drive A.
 - Insert the diskette that contains the MS-DOS Version 2.01 operating system diskette and the application files or other programs into drive A.
 - Type:

```
A>COPY filename.typ B: 
```

Where `filename.typ` is the name of the file you want to copy from the MS-DOS Version 2.01 diskette in drive A to the updated diskette in drive B.

IMPORTANT

Be sure that you **DO NOT** copy an old version of “`COMMAND.COM`” or an old version of any other MS-DOS operating system file to the diskette in drive B.

Updating The MS-DOS Operating System

Your diskette in drive B is now ready to use with the MS-DOS Version 2.11 operating system. With this diskette, you can:

- Start and use the MS-DOS Version 2.11 operating system
- Run programs or applications

NOTE

When you format diskettes, the default drive must be the drive that contains the MS-DOS Version 2.11 operating system diskette. This insures that your diskettes are properly updated to the MS-DOS Version 2.11 operating system.

Updating Diskettes that Contain The MS-DOS Version 2.05 Operating System

To update the operating system on a diskette that contains the MS-DOS Version 2.05 operating system AND other programs or files, you will:

- Use the LDCOPY program to place the MS-DOS Version 2.11 operating system loader on the MS-DOS Version 2.05 diskette.
- Use the SYS program to copy the MS-DOS Version 2.11 system files to the MS-DOS Version 2.05 diskette.
- Use the COPY command to copy the file COMMAND.COM to the MS-DOS Version 2.05 diskette.
- Use the COPY command to copy the MS-DOS Version 2.11 programs, (BACKUP, FORMAT, and DISKCOPY, for example) to the MS-DOS Version 2.05 diskette.

Follow the instructions below:

1. Turn on the Rainbow computer and insert the MS-DOS Version 2.11 operating system diskette into drive A.
2. Insert the diskette that contains the MS-DOS Version 2.05 operating system into drive B.
3. Press the A key to start the MS-DOS operating system.
4. Type the date and the time.

The computer displays the operating system prompt, A>.

5. Use the LDCOPY program to place the MS-DOS Version 2.11 loader on the diskette that contains the MS-DOS Version 2.05 operating system in drive B. Type:

```
A>LDCOPY B: 
```

When the LDCOPY program is finished, the computer displays the A> prompt.

6. Use the SYS program to copy the MS-DOS Version 2.11 system files from your new diskette to the MS-DOS Version 2.05 operating system diskette in drive B. Type:

```
A>SYS B: 
```

When the SYS program is finished, the computer displays the A> prompt.

7. Use the COPY command to copy the file named "COMMAND.COM" from your new diskette to the diskette that contains the MS-DOS Version 2.05 operating system in drive B. Type:

```
A>COPY COMMAND.COM B: 
```

When the COPY command is complete, the computer displays the A> prompt.

Updating The MS-DOS Operating System

8. Use the COPY command to copy any MS-DOS Version 2.11 programs, (DISKCOPY, FORMAT, and BACKUP, for example) to the diskette in drive B. Most of these programs are new versions and should be used with the new version of the operating system.

For example, to copy the BACKUP program to the diskette in drive B, type:

```
A>COPY BACKUP.EXE B: 
```

Your diskette in drive B is now ready to use with the MS-DOS Version 2.11 operating system. With this diskette, you can:

- Start and use the MS-DOS Version 2.11 operating system
- Run programs or applications

Updating Diskettes that Contain MS-DOS Version 2.05 or Version 2.01 Operating System and Are Copy-Protected

To update the operating system on a copy-protected diskette that contains the MS-DOS Version 2.05 or MS-DOS Version 2.01 operating system, you will:

- Copy the files on the copy-protected diskette to a blank, MS-DOS formatted diskette
- Reformat the copy-protected diskette
- Copy the files back to the copy-protected diskette

NOTE

If you want to put MS-DOS Version 2.11 on a copy-protected diskette that does not contain MS-DOS Version 2.05 or Version 2.01, you can follow the instructions below. However, the copy-protected diskette **MUST** have 50,000 bytes of free space.

Follow the instructions below:

1. Turn on the Rainbow computer and insert the MS-DOS Version 2.11 operating system diskette into drive A.
2. Insert a blank diskette into drive B. This diskette is referred to as the "temporary holding diskette."
3. Press the A key to start the MS-DOS operating system.
4. Type the date and the time.

The computer displays the operating system prompt, A>.

5. Use the FORMAT program to prepare the blank diskette in drive B. Type:

```
A>FORMAT B: / I 
```

When the FORMAT program is finished, MS-DOS displays the operating system prompt.

6. Remove the MS-DOS Version 2.11 operating system diskette from drive A and insert the copy-protected diskette into drive A.
7. Use the COPY command to copy the files on the copy-protected diskette in drive A to the blank, formatted diskette in drive B. Type:

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

MS-DOS copies the files from the copy-protected diskette in drive A to the temporary holding diskette in drive B.

Updating The MS-DOS Operating System

8. Use the DEL command to remove the file named "COMMAND.COM" from the temporary holding diskette. Type:

```
A>DEL B:COMMAND.COM 
```

9. Change the current default drive to drive B by typing:

```
A>B: 
```

10. Remove the temporary holding diskette from drive B and insert the MS-DOS Version 2.11 operating system diskette into the same drive.
11. Use the FORMAT program to copy the MS-DOS Version 2.11 system files on the diskette in drive B to the diskette in drive A. Type:

```
B>FORMAT A:/S 
```

IMPORTANT

DO NOT use the /I switch with the above FORMAT program.

When the FORMAT program is finished, the MS-DOS operating system displays the operating system prompt. The diskette in drive A now contains two hidden MS-DOS Version 2.11 operating system files and the file named "COMMAND.COM".

12. Remove the MS-DOS Version 2.11 operating system diskette from drive B and insert the temporary holding diskette in the same drive.
13. Use the COPY command to copy the files from the temporary holding diskette in drive B to the copy-protected diskette in drive A. Type:

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

NOTE

If you have any MS-DOS Version 2.05 or Version 2.01 programs (DISKCOPY and FORMAT, for example) on the copy-protected diskette, you should copy the new version of the program from the MS-DOS Version 2.11 operating system diskette to the copy-protected diskette.

You can now use your original copy-protected diskette to start the MS-DOS Version 2.11 operating system.

Updating to MS-DOS Version 2.11 on a Hard Disk

The update instructions for a hard disk depend on whether you have a 10-megabyte partition on your hard disk. To determine whether you have a 10-megabyte partition, follow the steps below:

1. Turn on the Rainbow computer and insert the MS-DOS Version 2.11 operating system diskette into drive A.
2. Press the A key to start the MS-DOS operating system.

If your screen looks like Screen 1, follow the instructions in the section “Updating to MS-DOS Version 2.11 on a Hard Disk without a 10-Megabyte Partition”.

If your screen looks like Screen 2, then follow the instructions in the section “Updating to MS-DOS Version 2.11 on a Hard Disk with a 10- Megabyte Partition”.

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**Microsoft MS-DOS version 2.11
Copyright 1981,82,83 Microsoft Corp.**

**Command v. 2.11
Current date is Sat 9-01-1984
Enter new date:**

**Screen 1. MS-DOS Version 2.11 Start-Up Screen
without a 10-Megabyte Partition**

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Microsoft MS-DOS version 2.11
Copyright 1981,82,83 Microsoft Corp.

WARNING: Only 8 MBytes of the hard disk is usable.
Refer to the MS-DOS installation instructions.

Command v. 2.11
Current date is Sat 9-01-1984
Enter new date:

Screen 2. MS-DOS Version 2.11 Start-Up Screen
with a 10-Megabyte Partition

Updating to MS-DOS Version 2.11 on a Hard Disk without a 10-Megabyte Partition. If your computer displays Screen 1 when you start the MS-DOS Version 2.11 operating system, you do not have a 10-megabyte partition on your hard disk. Follow the steps below to copy the MS-DOS Version 2.11 operating system on your hard disk.

You will:

- Use the LDCOPY program to place the MS-DOS Version 2.11 operating system loader on the hard disk partition(s).
- Use the SYS program to copy the MS-DOS Version 2.11 system files to the hard disk partition(s).
- Use the COPY command to copy the file COMMAND.COM to the hard disk partition(s).
- Use the COPY command to copy the MS-DOS Version 2.11 programs, (BACKUP, FORMAT, and DISKCOPY, for example) to the MS-DOS Version 2.05 hard disk partition(s).

Follow the instructions below:

NOTE

You must follow these steps for **all** MS-DOS partitions to properly update the operating system on your hard disk.

1. Type the date and the time.

The computer displays the operating system prompt, A>.

2. Use the LDCOPY program to place the MS-DOS Version 2.11 loader on your hard disk partition that contains the MS-DOS Version 2.05 operating system. Type:

```
A>LDCOPY E: 
```

When the LDCOPY program is finished, the computer displays the A> prompt.

3. Use the SYS program to copy the MS-DOS Version 2.11 system files from your new diskette to the hard disk partition. Type:

A>SYS E:

When the SYS program is finished, the computer displays the A> prompt.

IMPORTANT

If the SYS program displays the message, “No room for system on destination diskette,” you do not start the operating system from the hard disk partition. You should ignore the message and continue with step 4.

4. Use the COPY command to copy the file named “COMMAND.COM” from your new diskette to the hard disk partition, (drive E:). Type:

A>COPY COMMAND.COM E:

When the COPY command is complete, the computer displays the the A> prompt.

5. Use the COPY command to copy any MS-DOS Version 2.11 programs, (DISKCOPY, FORMAT, and BACKUP, for example) to the hard disk partition. Most of these programs are new versions and should be used with the new version of the operating system.

For example, to copy the BACKUP program to the hard disk drive E, type:

A>COPY BACKUP.EXE E:

Your hard disk partition is now ready to use with the MS-DOS Version 2.11 operating system.

Updating to MS-DOS Version 2.11 on a Hard Disk with a 10-Megabyte Partition. If your computer displays Screen 2 when you start the MS-DOS Version 2.11 operating system, you have a 10-megabyte partition. Follow the instructions below to update the operating system on the hard disk. You will:

- Copy all the files from the hard disk to back-up diskettes.
- Re-initialize and re-partition the hard disk with the Winchester Utility Program Version 2.0 diskette that is contained in this kit.
- Format the MS-DOS hard disk partition(s) and copy the MS-DOS Version 2.11 operating system files to the hard disk partition(s).
- Copy the files from the back-up diskettes back to the hard disk. You will copy only those files that do not already exist on the hard disk partition(s).
- Copy any MS-DOS programs (DISKCOPY and FORMAT, for example) that you need from the MS-DOS Version 2.11 operating system diskette to the hard disk partition(s).

Follow the instructions below:

1. Type the date and the time.

The computer displays the operating system prompt, A>.

2. Insert a blank, formatted diskette into drive B.
3. Use the BACKUP program on the MS-DOS Version 2.11 operating system diskette to copy the contents of the MS-DOS hard disk partition to other diskettes. Type:

```
A>BACKUP E:\*.* /A TO B: 
```

Where:

- E: Is the MS-DOS hard disk partition that you want to copy files from
- B: Is the diskette drive that contains the diskette that you will copy the files to

Then follow the instructions at the bottom of the screen.

4. After you copy the files from the hard disk, find the Winchester Utility Program Version 2.0 diskette contained in this kit. Use this diskette to re-initialize and re-partition your hard disk.

NOTE

You should use this Winchester Utility Program Version 2.0 diskette, instead of the Winchester Utility Program Version 1.0 diskette whenever you use this program in the future.

- a. Remove the MS-DOS Version 2.11 diskette from drive A and insert the Winchester Utility Program Version 2.0 diskette in the drive A.
- b. Reset the Rainbow computer by pressing:

Set-Up **Ctrl/Set-Up**

- c. When the computer displays the Main System Menu, press the A key.

The computer displays the Winchester Disk Utility Program Main Screen.

- d. Press the down arrow key once so the arrow points to the "Test and initialize the hard disk" option. Then press:

Do

Follow the instructions on the screen to test and initialize the hard disk. When the testing is complete, the computer displays the Winchester Disk Utility Program Main Screen again.

- e. Press the down arrow key twice so the arrow points to the “Re-partition the hard disk” option. Then press:

Do

The computer displays the operating system menu. Follow the instructions on the screen to choose your partition arrangement.

IMPORTANT

We recommend that you divide the hard disk into the 8-megabyte and the 2-megabyte partitions. You can no longer choose a 10-megabyte partition. The contents of your 10-megabyte partition can be contained in the 8-megabyte partition of the new arrangement. Even though you can re-partition with any of the available combinations, choosing the above combination insures that the files can be easily restored.

After you select the new partition arrangement, the computer returns to the Winchester Disk Utility Program Main Screen.

- f. Remove the Winchester Utility Program Version 2.0 diskette from drive A. Store it in a safe place in case you ever need to use it again.
- g. To leave the Winchester Utility Program, press:

Set-Up **Ctrl/Set-Up**

5. Insert the MS-DOS Version 2.11 operating system diskette into drive A.
6. Press the A key to start the MS-DOS operating system.
7. Type the date and the time.

The computer displays the operating system prompt, A>.

8. Use the FORMAT program on the MS-DOS Version 2.11 operating system diskette to reformat the MS-DOS hard disk partition(s). Type:

```
A>FORMAT E:/S 
```

When the FORMAT program is complete, the computer displays the operating system prompt.

9. Use the BACKUP program on the MS-DOS Version 2.11 operating system diskette to restore the files that you copied to the other diskettes. Type:

```
A>BACKUP 
```

The computer displays the Winchester Utility Program Main Screen.

- a. Press the down arrow key twice so the arrow points to the “Restore hard disk files from the backup diskettes.” Then, press:

The computer displays the restore options.

- b. Press the Next Screen key to select the advanced restore options.

The computer displays the Advanced User Restore Options.

- c. Choose:

- Source diskette drive
- Destination hard disk drive

- d. Press the down arrow key to move to the “Restore file specifier” option.

- e. Press the delete character key until the default entry is no longer displayed.

- f. Type:

```
\*.* /A
```

Updating The MS-DOS Operating System

- g. Press the down arrow key to move the arrow to the "Restore over existing files" option.
- h. Press the left arrow key to select "No".

This tells the computer to copy (restore) all the files from your back-up diskettes to the hard disk except files with the same name as files that already exist on the hard disk drive. The files that already exist on your hard disk are the MS-DOS system files that the /S switch of the FORMAT program copied there. You DO NOT want to copy over these files.

- i. Press:

Do

Then follow the instructions at the bottom of the screen to copy (restore) the files to the specified hard disk partition.

- 10. To update the remaining MS-DOS programs that are on the MS-DOS Version 2.11 operating system diskette, use the COPY command to copy the new versions of the programs from the MS-DOS Version 2.11 operating system diskette to the hard disk partition(s). Most of these programs are new versions and should be used with the new version of the operating system files.

For example, to copy the BACKUP program to the hard disk drive E, type:

A>COPY BACKUP.EXE E: **Return**

Your hard disk partition is now ready to use with the MS-DOS Version 2.11 operating system.

AA-EA05A-XV

*Rainbow*TM

MSTM - DOS
Version 2.11
Getting Started

digital equipment corporation

First Printing, October 1984

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Preface

Welcome to the Rainbow Computer

We congratulate you on the purchase of the Rainbow personal computing system. The Rainbow computer is today's most versatile system. It is the only industry-standard computer built to DIGITAL's quality specifications and backed by DIGITAL's commitment to service and support. The Rainbow computer is a sound investment in personal productivity that you'll enjoy using every day.

To get you started, we have prepared a set of easy-to-use documentation. We welcome your comments, which you can record on the card in the back of each manual. Please let us hear from you.

Remember that purchasing your first Rainbow computer is just the beginning of your relationship with Digital Equipment Corporation, the world's leading manufacturer of minicomputers. Our dedication to quality manufacturing, our extensive availability of spare parts and accessories, and our service organization of 16,000 representatives worldwide are your further assurance of total DIGITAL quality. With the Rainbow computer and the MS-DOS operating system, you have an investment that will grow in value as you use it now and in the future.

1

Starting and Stopping the Computer

This guide assumes you are a first-time user of Digital Equipment Corporation's Rainbow computer. The guide presents each procedure in a step-by-step manner. Therefore, it is important for you to follow each step in the given sequence. If you attempt to follow steps out of sequence, some procedures may be confusing to you. Enjoy using the computer.

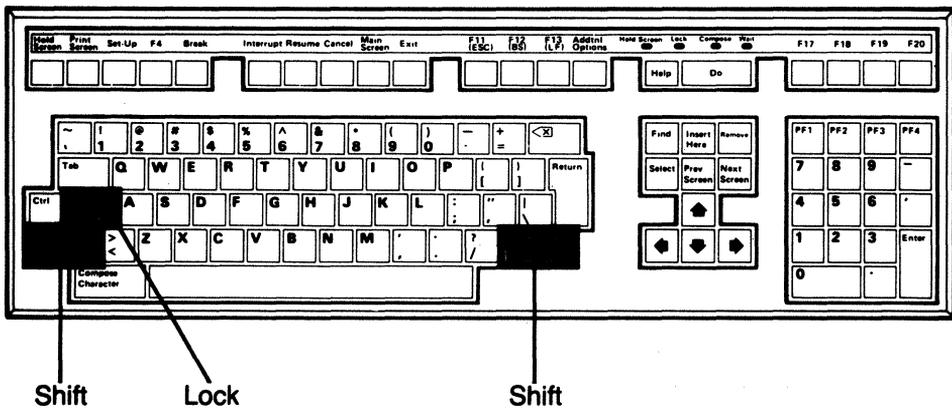
This guide is organized as follows:

- Chapter 1: Starting and stopping the Rainbow computer and the MS-DOS operating system
- Chapter 2: Copying a diskette

Starting and Stopping the Computer

The following information is helpful for you to know in order to use the computer:

- In examples of dialog between you and the computer, characters the computer displays on the screen are printed in black. Characters you type from the keyboard are printed in color.
- You can type these characters in either lowercase or uppercase. Use the Shift or Lock key on the keyboard to produce uppercase characters. The illustration below shows these keys.



NOTE

You cannot use the Lock key to type characters shown above numbers or other special characters on the keyboard. For example, if you want to type \$, %, *, (, :, “, ”, ?, you must use the Shift key. The Lock key only affects the alphabetic characters. When the Lock key is pressed down, you can return to lowercase by pressing the Lock key again.

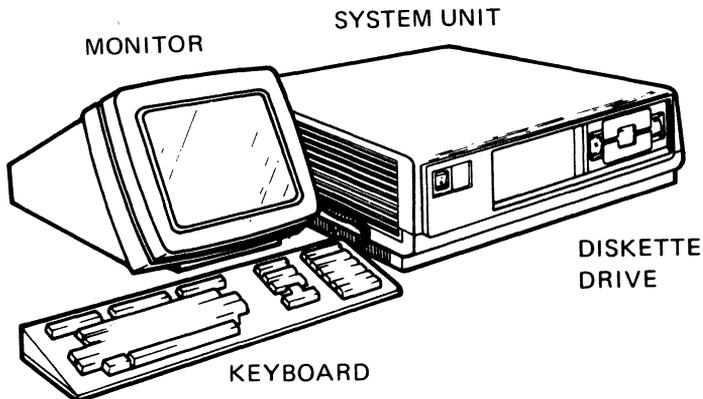
- Be sure to type all spaces and punctuation marks exactly as they are printed in this guide. In many cases, if you mistype a word or character, a message is displayed and you must retype the line.

Starting and Stopping the Computer

- **Return** means to press the Return key.
- **Ctrl/C** means to hold down the control key (labeled Ctrl on the keyboard). While you are still holding the Ctrl key, press the C key and then release both keys.

You cannot hurt the computer. Nothing that you type on the keyboard will do any damage to the Rainbow computer.

The illustration below shows a Rainbow computer including a monitor (video screen), keyboard, and system unit with two diskette drives.



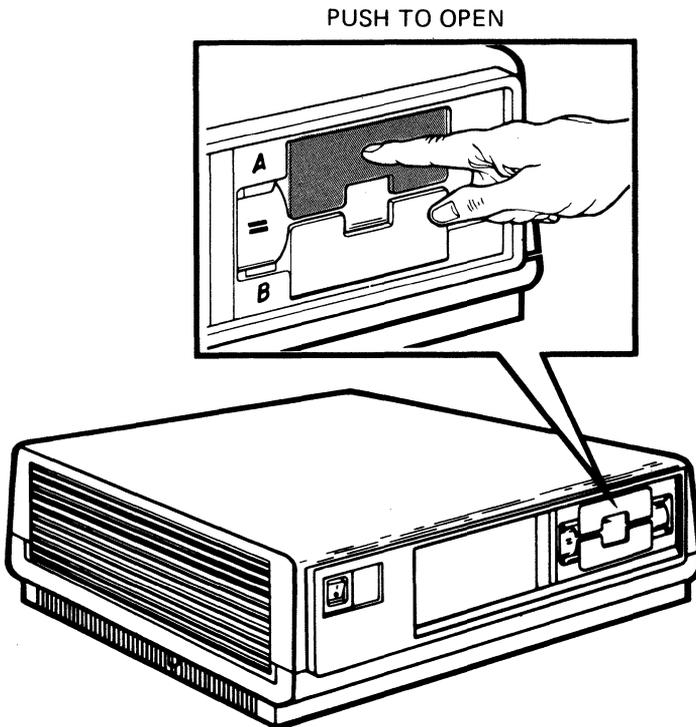
Setting up the Rainbow Computer

If you need help at any time, call the appropriate DIGITAL Customer Help Line number listed at the end of this guide.

The instructions in this section assume that the computer has been installed according to the *Rainbow Installation Guide*.

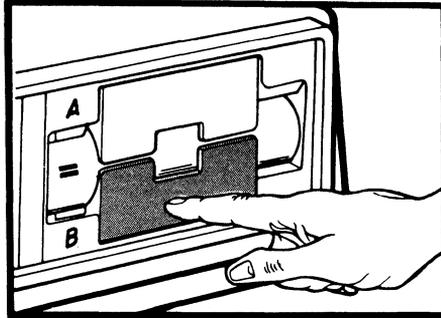
Opening the drive doors on a horizontal unit

1. Open drive A by pushing on the **top** of the drive door.



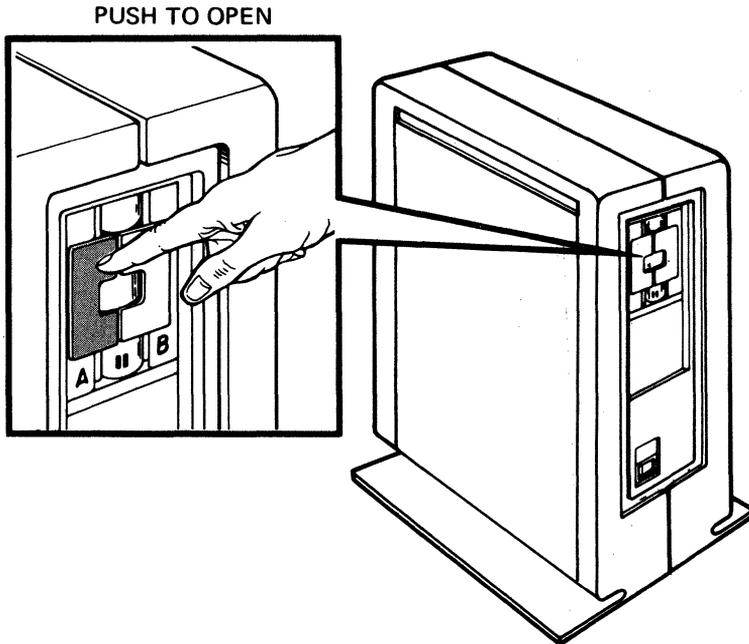
2. Open drive B by pushing on the **bottom** of the drive door.

PUSH TO OPEN

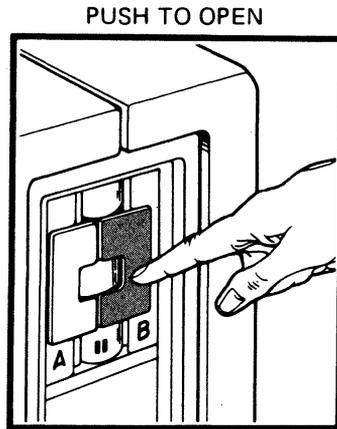


Opening the drive doors on a vertical unit

1. Open drive A by pushing on the **left** edge of the drive door.

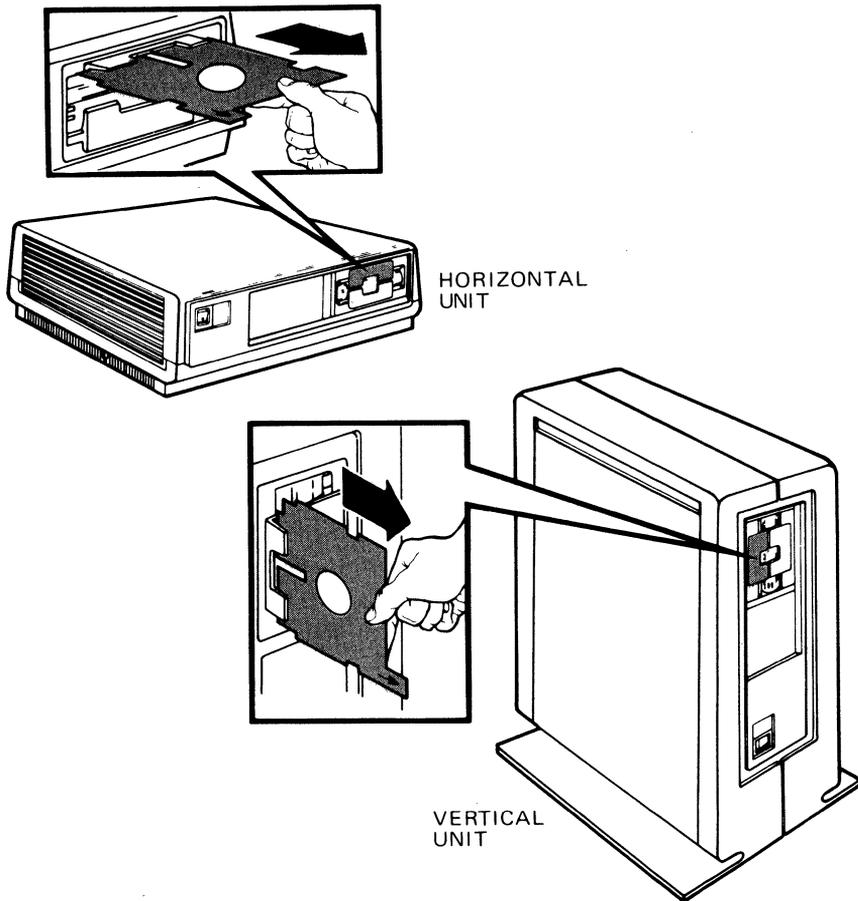


2. Open drive B by pushing on the **right** edge of the drive door.



Removing the protective card or diskette

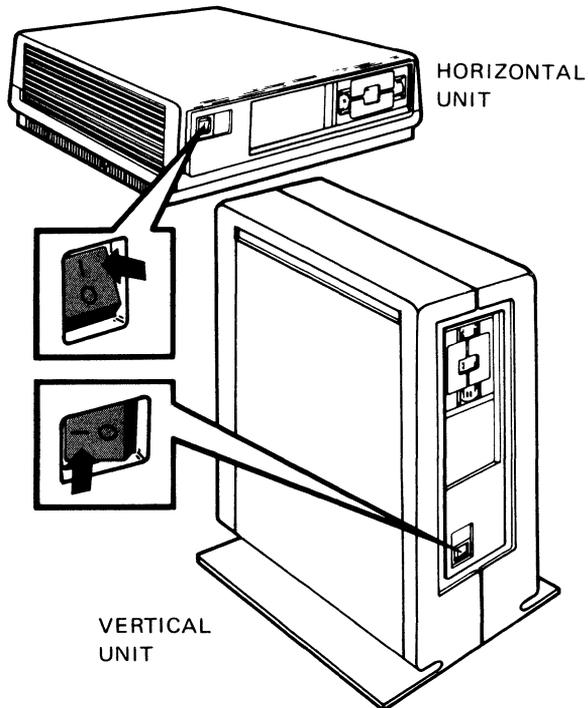
1. Be sure the diskette drives are empty.
2. If the protective card was not removed as part of the installation procedure, remove it now from drive A (and drive C if you have four drives.) Also remove any diskettes that you find in the drives. Remove these by grasping their outer edge and pulling *gently*.



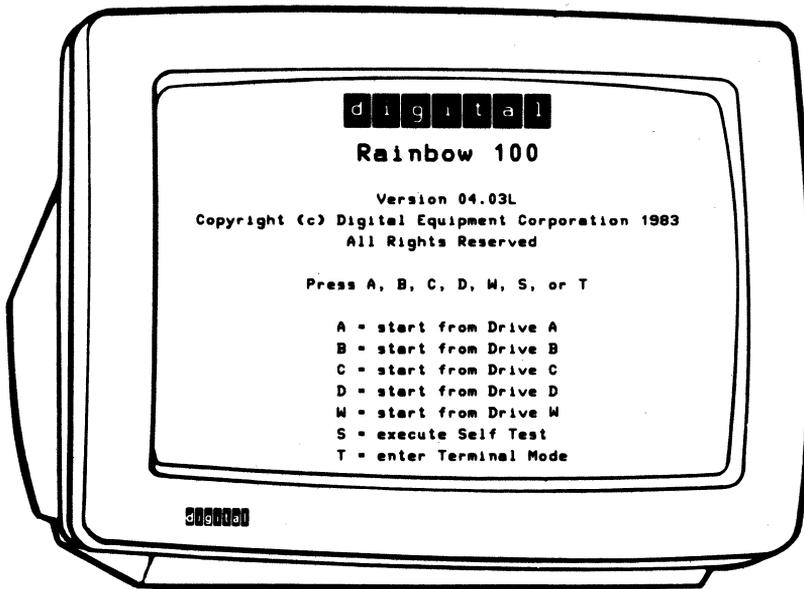
The protective card prevents the drive components from moving during shipment. Be sure to save it to use later if you move the computer.

Turning on the Rainbow Computer

Turn on the computer by pressing the power switch to the 1 (on) position.



After about 25 seconds, you will hear whirring sounds and a beep. Then the Main System Menu is displayed as shown on the next page.

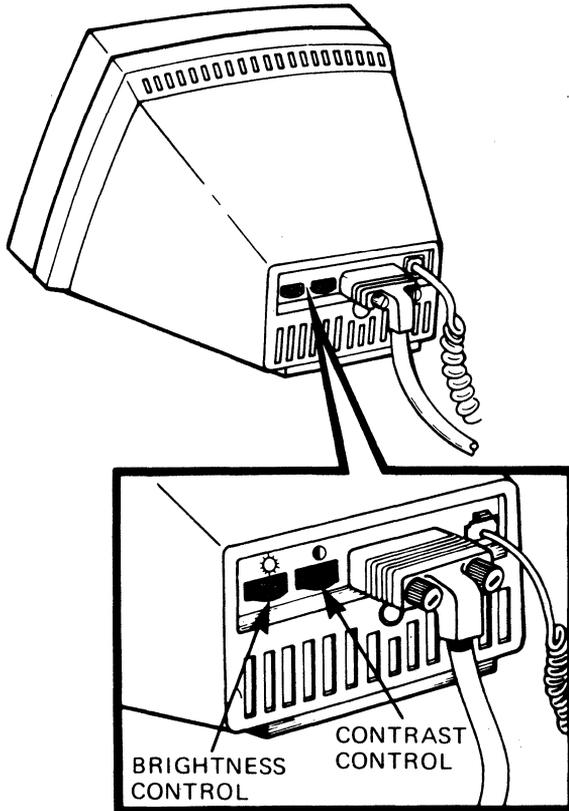


Helpful Information

When you turn the computer on:

- It automatically runs a short self-test to check its components.
- The drive doors can be opened or closed.
- The version number of the computer is displayed above the copyright notice in the Main System Menu. The number on your screen may be different from the number shown in the sample above. If you ever need to report a problem, your vendor may ask for your version number.

- If you find a list of countries displayed on your screen, you have not selected a language in which to communicate with the computer. To make this selection, refer to the *Rainbow Installation Guide*.
- If the Main System Menu is too dim or too bright, or is not displayed at all, adjust the brightness and contrast controls on the back of the monitor as shown below.



Starting and Stopping the Computer

Contrary to the instructions in the Main System Menu, **do not** press any keys at this time. Wait until you have followed the instructions for inserting a diskette. If you accidentally press A, B, C, or D, the computer displays:

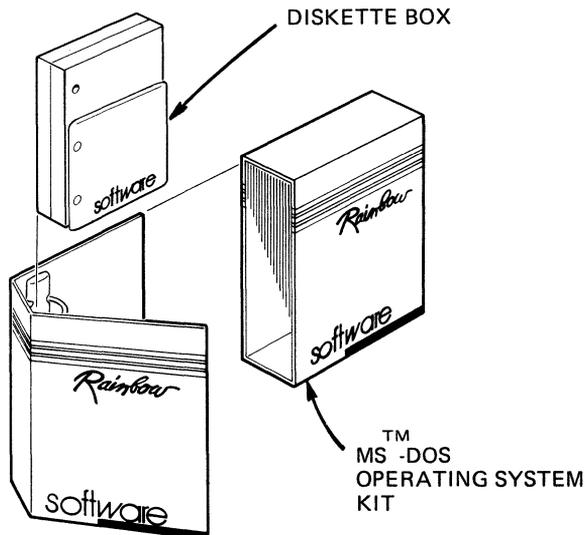
See Owner's Manual - MESSAGE 21 - Drive Not Ready

If you see this message, turn the computer off by pressing the power switch to position 0. Then turn it on again and start over.

If you see any other message, follow the instructions given in the message.

Finding the MS-DOS Master System Diskette

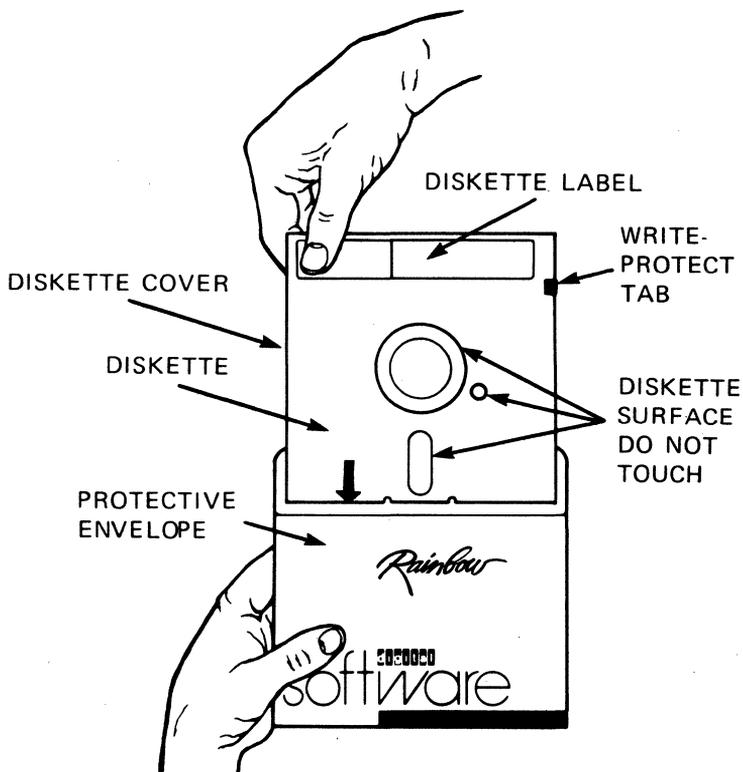
1. Open the MS-DOS Operating System Kit and remove the diskette box.



2. Remove the MS-DOS master system diskette from the diskette box.



3. Remove the MS-DOS master system diskette from its protective paper envelope.



Helpful Information

- Handle a diskette by its edges. Do not touch diskette surfaces that show through in the center of the diskette cover.
- If you want more information about diskettes, refer, at your leisure, to Appendix B in the *Rainbow MS-DOS Version 2.11 User's Guide*.

Starting the Operating System

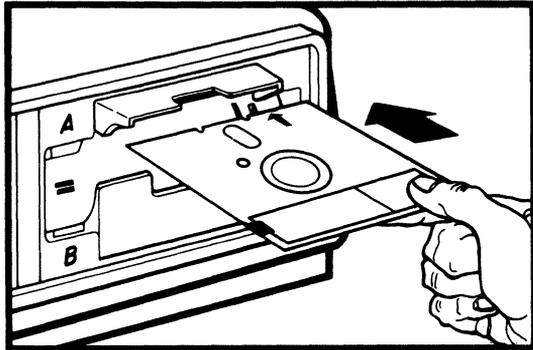
The Rainbow computer operates with a group of instructions called an operating system that controls the overall functioning of the computer. You are using an operating system known as MS-DOS.

When the Main System Menu, shown in the section called “Turning on the Rainbow Computer,” is displayed on the screen, you can start the operating system. Proceed with the following instructions.

Inserting the master system diskette into a horizontal unit

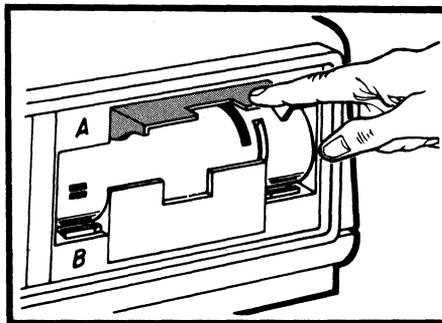
1. If the drive A door is closed, open it.
2. With the diskette label facing **up** and the write-protect tab on the **left**, insert the diskette into drive A.

ALIGN ORANGE ARROW
ON DISKETTE WITH
THE ORANGE STRIPE
ON THE DISKETTE DRIVE



3. With the diskette securely in drive A, close the drive door by pushing on the outside of the open door. If the door does not close easily, make sure the diskette is fully inserted.

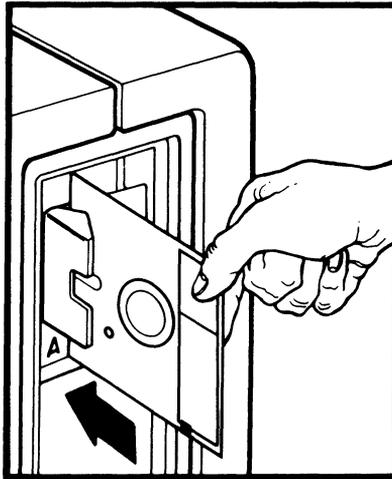
PUSH TO CLOSE



Inserting the master system diskette into a vertical unit

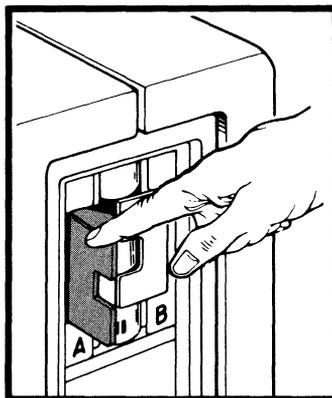
1. If the drive A door is closed, open it.
2. With the diskette label on the **left** and the write-protect tab facing **down**, insert a diskette into drive A.

ALIGN ORANGE ARROW
ON DISKETTE WITH
THE ORANGE STRIPE
ON THE DISKETTE DRIVE



3. With the diskette securely in the drive, close the door by pushing on the outside of the open door. If the door does not close easily, make sure the diskette is fully inserted.

PUSH TO CLOSE



Starting and Stopping the Computer

On the keyboard, press:

A

in response to the Main System Menu.

Helpful Information

- Pressing A tells the computer which drive contains the system diskette.
- You will hear clicking and whirring sounds from the drive.
- A small light beside the drives turns on briefly.
- You will see the following message:

Loading MS-DOS ...

- After the clicking and whirring sounds stop, the operating system displays the start-up message as shown below.

```
Copyright 1984 Digital Equipment Corporation
```

```
Microsoft MS-DOS version 2.11  
Copyright 1981,82,83 Microsoft Corp.
```

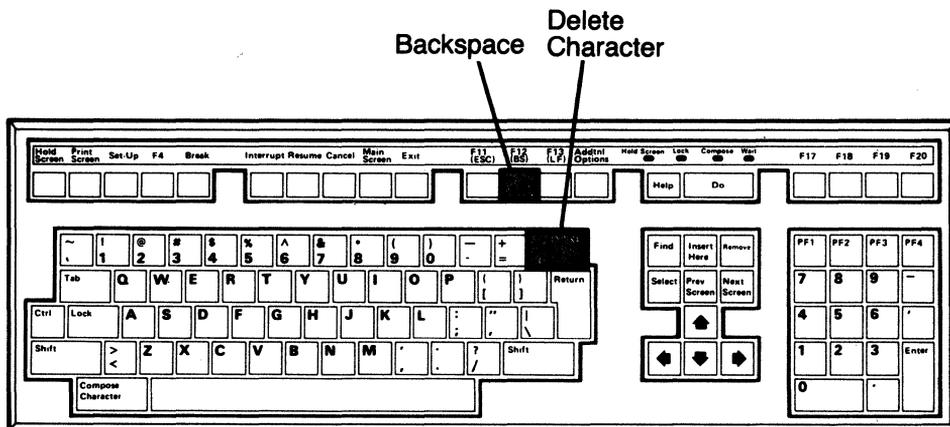
```
Command v. 2.11  
Current date is Sat 9-01-1984  
Enter new date:
```

- The version number of the operating system is displayed along with the copyright date. The numbers on your screen may be different from the numbers shown in the previous illustration.
- If the entire start-up message is not displayed as shown, follow the instructions in the message at the top of the screen.

Setting the Date and Time

Notice that the last symbol displayed on your screen is a blinking rectangle. This symbol is called a cursor. The cursor shows you where the next character you type will be displayed on the screen. The cursor is showing you where to enter today's date.

After you enter the date and the time, press the Return key to send those instructions to the computer. If you discover a typing error before you press the Return key, use the delete character key or the backspace key to erase one letter at a time. The delete character key is located above the Return key and is marked with an X. The backspace key is labeled BS on the keyboard label strip. These keys are shown in the illustration below.



1. Enter today's date using the following format:

mm-dd-yy

For example, you would enter November 24, 1983 as:

11-24-83

Type in the current date and press the Return key.

The MS-DOS operating system displays the current time and asks you:

Enter new time:

2. Enter the current time using the following format:

hh:mm

Note that the operating system uses a twenty-four hour clock. For example, 7:30 a.m. is typed as:

7:30

and 7:30 p.m. is typed as:

19:30

3. When you have entered the correct time, press the Return key. You will see:

A>

Congratulations! You have now successfully started the MS-DOS operating system.

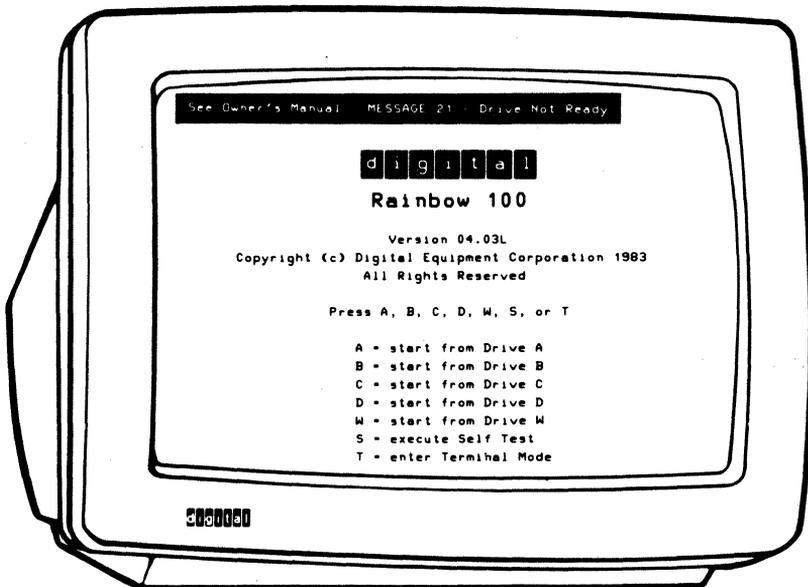
The last symbol displayed on the left side of the screen, A>, is called the operating system prompt or prompt. The computer displays this prompt to indicate that it is waiting (or prompting) for instructions from you. The prompt consists of the name of the drive the operating system is currently accessing (A, B, C, or D) and a right angle bracket. The drive that is currently being accessed is also known as the active or the default drive.

Messages

While you are using the computer, unexpected messages could display on the screen. There are many possible reasons for these messages. For example, the computer could find a problem while you are running a program. (A program is a collection of instructions to the computer.) If you see a message that begins with

See Owner's Manual -

refer to the messages section of the *Rainbow Owner's Manual*. For all other messages, refer to the *Rainbow MS-DOS Version 2.11 User's Guide*. The illustration below shows an example of a message. You see this message if you have inserted a diskette incorrectly.



The *Rainbow MS-DOS Version 2.11 User's Guide* lists all operating system messages in alphabetical order and explains how to solve the problem that causes each message.

Resetting the Rainbow Computer

Resetting the computer is like turning it off and then on again without pressing the power switch. It allows you to start over without having to remove the diskettes. When you reset the computer, it acts as though it were just turned on, and displays the Main System Menu.

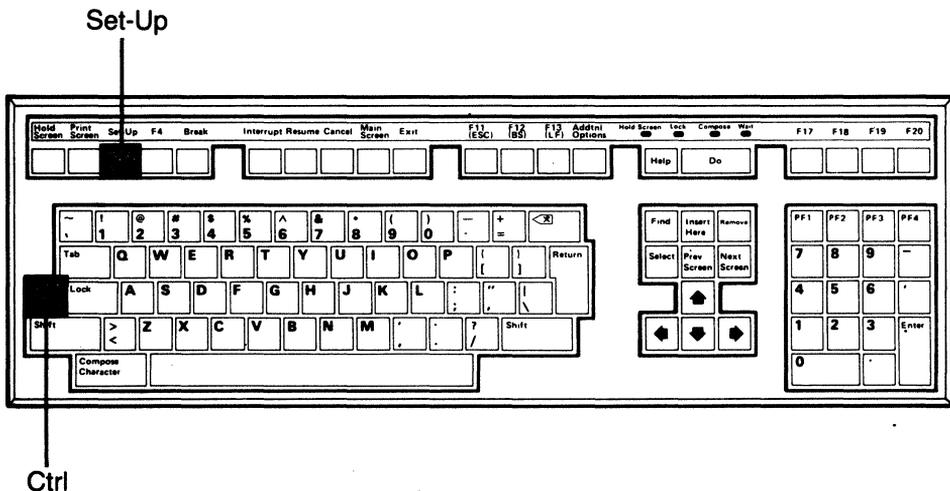
Helpful Information

- You may need to begin again if the computer does not respond as expected. For example, if the Main System Menu is not displayed after you turn the power on, simply reset the computer.
- Resetting works only when the computer is already turned on.

How to Reset the Computer

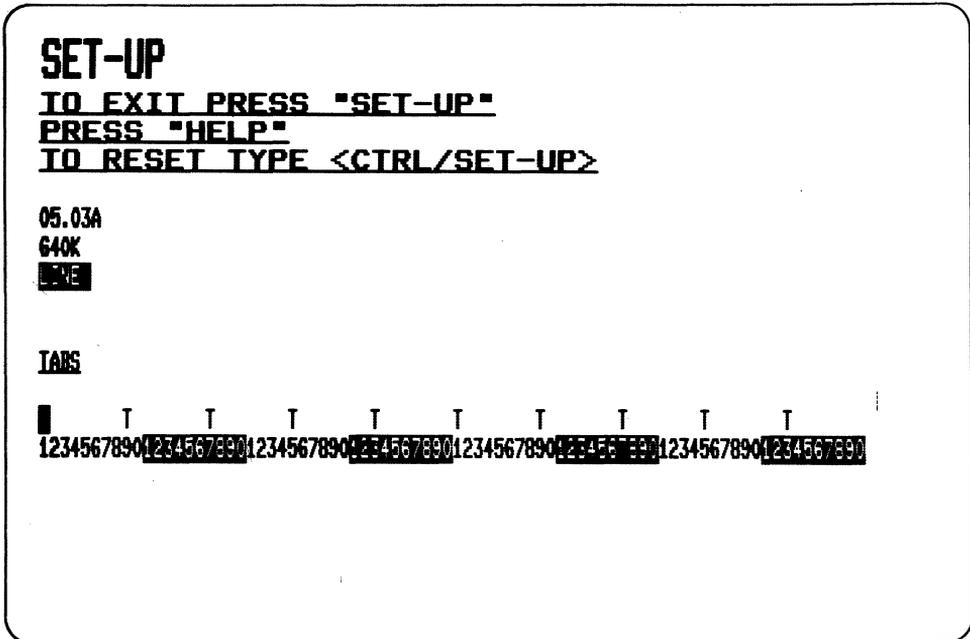
Practice resetting the computer now by following the instructions below:

1. Press the Set-Up key shown in the illustration below.



Starting and Stopping the Computer

Then the text on your screen should look like the screen below.



2. Hold down the Ctrl key. While you are still holding the Ctrl key, press the Set-Up key again. Then release both keys gently.

The illustration on the previous page shows you the location of these keys.

You can reset the computer with or without diskettes inserted in the drives.

The computer displays:

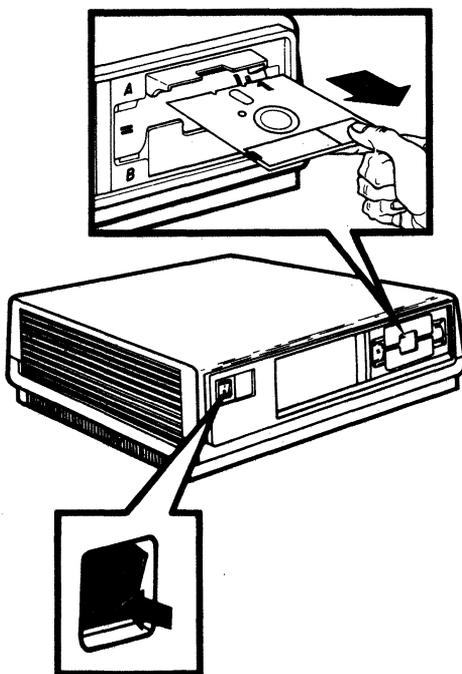
TESTING...

In about eight seconds, the computer again displays the Main System Menu.

Turning off the Computer

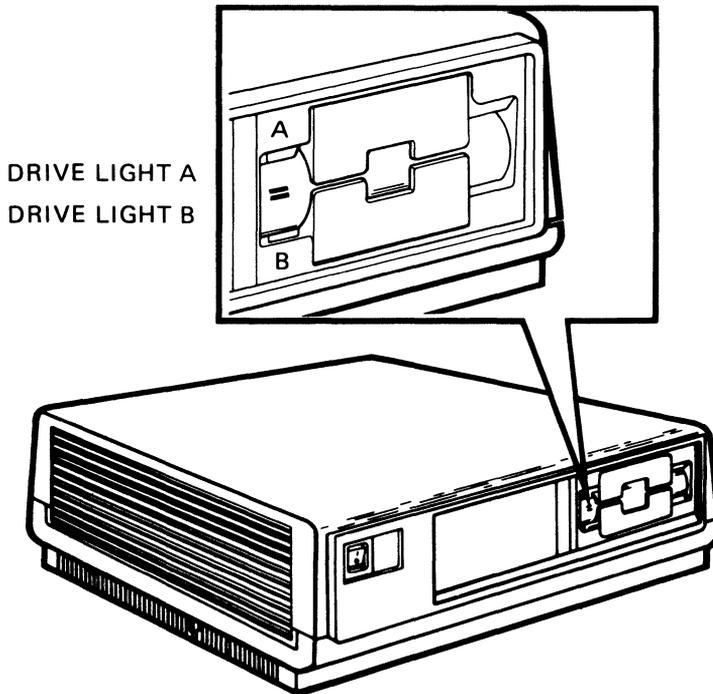
This section describes how to turn the computer off. However, if you are using the computer for the first time, leave it on with the master system diskette in drive A, and proceed to the section called "What To Do Next" on page 28.

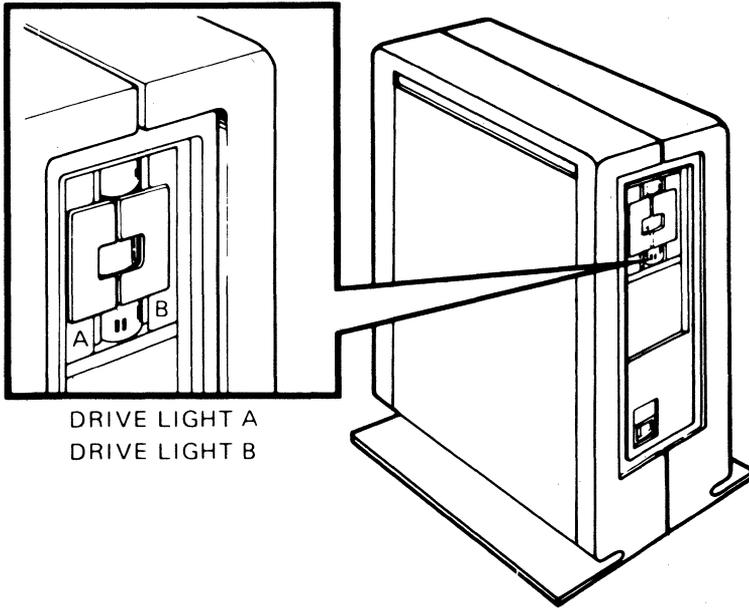
To end an operating session, **remove all diskettes before turning the computer off.** Then turn the computer off by pressing the power switch to 0.



IMPORTANT

Do not remove a diskette from its drive while the operating system is accessing information on it. This activity is easy to detect because the small lights beside each drive are lit when the operating system writes to or reads from a diskette. The illustrations below and on the following page show the location of these lights.





IMPORTANT

Always place diskettes in their protective paper envelopes and store them in a safe place. Keep diskettes in close-fitting, dust-tight boxes. Store these boxes in rooms with consistent temperature, humidity, and cleanliness. For a full description of the handling and care of diskettes, refer to Appendix B of the *Rainbow MS-DOS Version 2.11 User's Guide*.

What To Do Next

Press A to start the MS-DOS operating system. Then read Chapter 2 and follow the instructions to make a copy of the MS-DOS master system diskette that is currently inserted in drive A.

2

Copying a Diskette

This chapter explains how to format and copy a diskette. As an example, the chapter describes how to make a copy of the MS-DOS master system diskette that is currently inserted in drive A.

Why Copy a Diskette?

It is important to copy or back up all diskettes because a diskette can be accidentally damaged or lost. By making copies of your diskettes, you generate working copies and can store the original, master diskettes. The stored diskettes can then be used to make copies, if necessary.

You should back up all your diskettes regularly. To do this use the **FORMAT** and **DISKCOPY** programs. The **FORMAT** program gives a diskette a format or organization that the MS-DOS operating system understands. The **DISKCOPY** program copies the entire contents of one diskette onto another diskette.

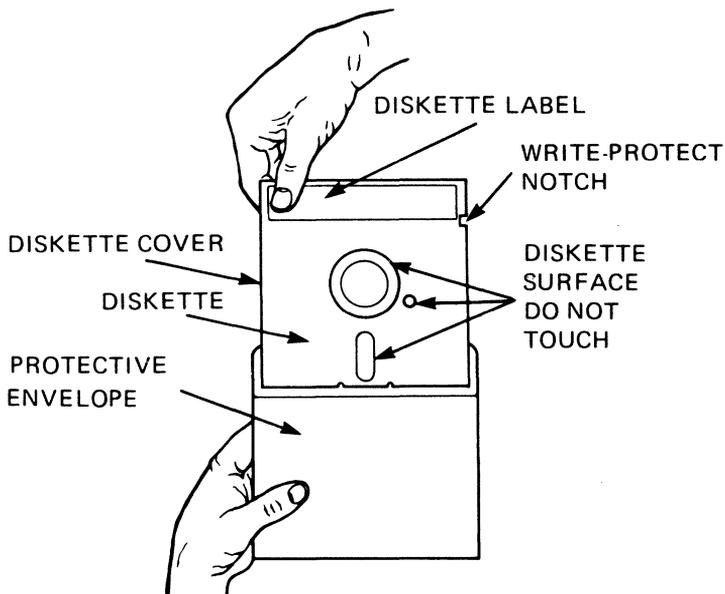
Making a Working Copy of the Master System Diskette

To copy the files from the MS-DOS master system diskette in drive A, you must first insert a blank diskette into drive B and format that diskette for MS-DOS. You copy the MS-DOS master system diskette onto this new diskette.

Preparing the Blank Diskette

Before you use a blank diskette, you must use the FORMAT program to prepare it. This ensures that the diskette is compatible with the MS-DOS operating system on the Rainbow computer. To format the blank diskette, follow the steps below:

1. Remove the diskette from its protective paper envelope.



2. Open drive B and insert the diskette. Be sure there is no tab protecting the write-protect notch. If there is, remove it. Otherwise, you will not be able to copy the diskette.

- **Horizontal unit**

With the label facing **down** and the write-protect notch on the **right**, insert the diskette into drive B.

NOTE

Your blank diskette might not have a label.

INSERT DISKETTE
"UPSIDE DOWN"
IN DRIVE B



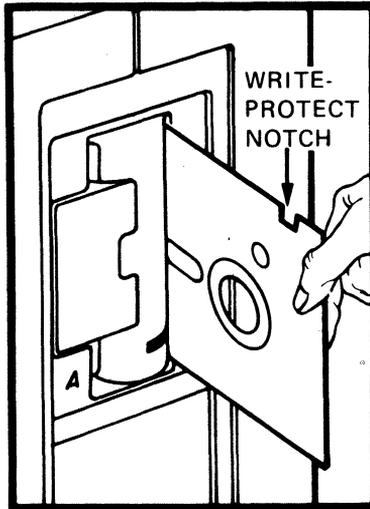
Copying a Diskette

- **Vertical unit**

With the label on the **right** and the write-protect notch facing **up**, insert the diskette into drive B.

NOTE

Your blank diskette might not have a label.



3. Close drive B by pushing on the outside of the open door.
4. In response to the A> prompt, type:

```
A>FORMAT B:/I Return
```

Remember that **Return** means to press the Return key.

IMPORTANT

When using the FORMAT program, you must include the name of the drive that contains the blank diskette. If you do not include the name of the drive, the MS-DOS operating system displays a message. If this happens, see the messages section in the *Rainbow MS-DOS Version 2.11 User's Guide*.

The MS-DOS operating system displays a message similar to the following:

```
Rainbow Disk Formatter Version 2.7
```

```
WARNING!!! This program will destroy any data  
currently on your disk. Type <Ctrl/C> to stop.
```

```
Insert new diskette in drive B:  
and strike any key when ready
```

5. Since your blank diskette is already in drive B, press any key on the keyboard to tell the MS-DOS operating system you are ready.

After you press a key, the operating system displays:

```
Volume label (11 characters, <Return> for none)?
```

Volume labels are used to identify diskettes; they are like name tags for each diskette.

Copying a Diskette

6. If you want to use a volume label to name the diskette, after the question mark, type:

```
Volume label (11 characters, <Return> for none)?MYDISKETTE 
```

This gives your diskette the volume label, MYDISKETTE.

If you do not want to assign a label, press the Return key. You will see a message on your screen similar to:

```
393216 bytes total disk space  
393216 bytes available on disk
```

```
Format another (Y/N)?
```

7. To end the FORMAT program, type:

```
Format another (Y/N)?N
```

The MS-DOS operating system then displays the system prompt:

```
A>
```

Copying the Master System Diskette

The DISKCOPY program copies the contents of one diskette to a different diskette. In the example below, you will copy the contents of the MS-DOS master system diskette in drive A to the new diskette in drive B.

The DISKCOPY program takes a few minutes to complete.

1. After the A>, type:

```
A>DISKCOPY A: B: 
```

Remember that means to press the Return key.

The screen displays the text shown below:

```
A>DISKCOPY A: B:
```

```
Insert source diskette in drive A:
```

```
Insert formatted target diskette in drive B:
```

```
Strike any key when ready █
```

Copying a Diskette

2. Because you already have the correct diskettes in drive A and drive B, press any key as indicated on the screen. The MS-DOS operating system begins copying the master diskette and displays the message:

Copying....

After the operating system has copied the diskette, DISKCOPY asks you:

Copy another (Y/N)?

IMPORTANT

If you see any messages while you are copying, refer to the discussion of the DISKCOPY command in the *Rainbow MS-DOS Version 2.11 User's Guide*.

3. To end the DISKCOPY program, after the question mark type:

Copy another (Y/N)? N

The system prompt, A>, is then displayed.

Congratulations! You have now successfully created a copy of the MS-DOS master system diskette.

Removing and Storing the Master System Diskette

To end this copying session:

1. Open the drive A door and **remove the MS-DOS master system diskette.**
2. Return this diskette to its protective envelope and store it in a safe place. By storing this master diskette, you are preserving a reliable diskette from which to make future copies of the operating system if the diskette you use daily is damaged or lost.
3. Open the drive B door and remove the newly copied diskette.
4. On a spare label, write "MS-DOS Working" with a felt-tip pen.

IMPORTANT

If the label is attached to the diskette, do not use a ball-point pen or a pencil as these can damage the diskette.

5. Attach the label to the front of the diskette. Use this "working" copy for your everyday operations.

Looking at the Diskette Directory

Each diskette contains files, which are collections of information. Each diskette also contains a list of all files called a directory, which is similar to a book's table of contents. The directory lists the files stored on the diskette.

To display the names of files that are stored in the MS-DOS diskette:

1. Insert your diskette with the working copy of the MS-DOS operating system into drive A.

Copying a Diskette

2. After the A>, type:

A>DIR

The operating system displays the following message:

```
Volume in drive A is MS-DOS V2.11
Directory of A:\
```

After this message, a list of file names similar to those on the screen below appears.

```
COMMAND COM 15973 8-10-84 1:05p
CONFIG SYS 17 8-29-84 12:27a
MDRIVE SYS 953 9-27-83 11:46p
MDRIVE COM 873 9-27-83 10:38p
CHKDSK COM 6468 10-19-83 7:51p
FORMAT COM 19414 8-09-84 1:44p
DISKCOPY COM 1409 10-19-83 7:51p
PRINT COM 3808 8-03-84 9:35a
EDLIN COM 8080 10-19-83 7:51p
FIND EXE 6331 10-19-83 7:51p
FC EXE 2585 10-19-83 7:51p
SYS COM 922 10-19-83 7:51p
RECOVER COM 2295 10-19-83 7:51p
MORE COM 4364 10-19-83 7:51p
LINK EXE 42368 1-06-83 4:36p
DEBUG COM 12223 10-19-83 7:52p
MEDIACHK EXE 1396 10-10-83 9:25a
RDCPM EXE 9194 10-14-83 9:45a
BACKUP EXE 71146 8-13-84 4:56p
CREF EXE 13824 10-19-83 7:52p
HASH EXE 81266 9-01-84 12:05a
SETPORT EXE 34804 2-17-84 4:03p
EXE2BIN EXE 1649 10-19-83 7:51p
SORT EXE 1632 8-08-84 12:21a
MODE COM 1056 9-26-84 1:42p
XATTACH COM 1388 9-26-84 1:27p
XDETCH COM 1302 9-26-84 1:59p
LDCOPY COM 5888 10-01-84 8:40p
28 File(s) 11264 bytes free
```

A>|

Helpful Information

- The names on your screen may not be the same, but they should be similar to the examples on this screen.
- Remember that nothing you type on the keyboard will damage the computer.
- You can type instructions to the operating system in lowercase or uppercase characters. To produce uppercase characters, use the Shift or Lock keys.
- If you make a typing mistake, but have not yet pressed the Return key, you can correct it by using the delete character or the backspace keys. The delete character key is located above the Return key, marked with an X. The backspace key is labeled BS on the labelstrip.

If you made a mistake but already pressed the Return key, the operating system displays the message:

```
Bad command or file name
```

followed by the system prompt, A>. For example, if you type:

```
A>DIRR 
```

the operating system responds with:

```
Bad command or file name
```

```
A>
```

When the MS-DOS operating system displays the prompt, A>, you can type the correct instruction to the operating system.

What to Do Next

At this point, you are ready to begin working with the computer. You may wish to do any of the following:

- Make a copy of an application diskette.
- Create and edit a document using a word processing program.
- Run an application program.
- Make a single diskette with both the system programs and the application programs on it.
- Read the *Rainbow MS-DOS Version 2.11 User's Guide* for information about:
 - Using MS-DOS commands
 - Creating and editing a document using the MS-DOS text editor, EDLIN and the special editing keys
 - End the session by removing all diskettes and turning the power switch to position 0.
- Read the *Rainbow Using the Hard Disk* to install and use the hard disk with the MS-DOS operating system.

A

Getting Help

Help Line Phone Numbers

Country	Phone Number
U.S.A.	(800) DEC-8000
Canada	(800) 267-5251
United Kingdom	(0256) 59 200
Belgium	(02)-24 26 790
West Germany	(089) 95 91 66 44
Italy	(02)-617 53 81 or 617 53 82
Japan	(0424) 64-3302
Denmark	(04)-30 10 05
Spain	(1)-73 34 307
Finland	(90)-42 33 32
Holland	(1820)-31 100
Switzerland	(01)-810 51 21
Sweden	(08)-98 88 35
Norway	(02)-25 64 22
France	(1)-687 31 52
Austria	(222)-67 76 41 extension 444
Australia	
Sydney	(02) 412-5555
All other areas	(008) 226377

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READER'S COMMENTS

Did you find this manual understandable, usable, and well-organized? Please make suggestions for improvement.

Did you find errors in this manual? If so, specify the error and the page number.

Please indicate the type of reader that you most nearly represent.

- First-time computer user
- Experienced computer user
- Application package user
- Programmer
- Other (please specify) _____

Name _____

Date _____

Organization _____

Street _____

City _____

State _____

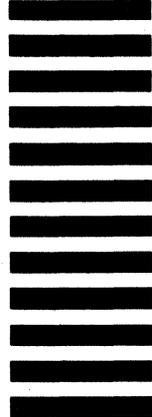
Zip Code
or Country _____

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AA-EA06A-XV

*Rainbow*TM

MSTM - DOS
Version 2.11
Using the Hard Disk

digital equipment corporation

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The postage-prepaid READER'S COMMENTS form on the last page of this document requests the user's critical evaluation to assist us in preparing future documentation.

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Preface

Welcome to the Rainbow Winchester Disk Option

We congratulate you on the purchase of the Rainbow personal computer and the Rainbow Winchester disk option. The Rainbow Winchester disk is a hard disk that you install in your personal computer.

The hard disk provides space for 10 million characters (about 3,750 pages). You can store data from 25 or more diskettes on the hard disk.

Intended Reader

This guide is intended for Rainbow computer users who have purchased the Rainbow Winchester disk option and plan to use it with the MS-DOS operating system. The purpose of this guide is to provide you with detailed information about how to use the hard disk.

This guide assumes that you have:

1. Installed the Rainbow computer according to the instructions in the *Rainbow Installation Guide*.
2. Installed and tested the Rainbow Winchester disk according to the instructions in the *Rainbow Winchester Disk Option Installation Guide*.
3. Read the *Rainbow MS-DOS Version 2.11 Getting Started*.

Guide Organization

The *Rainbow MS-DOS Version 2.11 Using the Hard Disk* manual is organized as follows:

Chapter 1	Introduces the hard disk and describes its uses.
Chapter 2	Discusses how to add an MS-DOS part (called “partition”) to the hard disk.
Chapter 3	Discusses the four ways of starting the MS-DOS operating system from the hard disk.
Chapter 4	Tells you how you can correct hard disk problems.
Chapter 5	Discusses how you can change the arrangement of the internal storage areas on the hard disk.
Appendix A	Lists the international DIGITAL Help Line telephone numbers.

Conventions Used

Follow the conventions listed below while using this guide.

- In examples of dialog between you and the computer, what the computer displays on the screen is shown in black. The characters you type from the keyboard are shown in color.
- You can type these characters in either lower- or uppercase characters. Use the Shift or Lock key on the keyboard to enable uppercase characters.

IMPORTANT

The Lock key does not enable you to type the numeric and special symbol keys. For example, if you want to type \$, %, *, (, :, ? you must use the Shift key. The Lock key only affects the alphabetic characters.

- Make sure to type all spaces and punctuation marks exactly as they are printed.
- When you see `Return`, press the Return key on the keyboard.
- When you see `Ctrl/C`, hold down the control key. While you are still holding the Ctrl key, press the C key and then release both keys.
- The optional portions of a command syntax are enclosed in a pair of square brackets ([]).
- Braces ({ }) indicate that you have a choice between two or more entries. You must select at least one unless the entries are optional.

Hard Disk Uses

What is the Hard Disk

The hard disk (called a Winchester disk) can be added onto the Rainbow computer. This disk enables you to store large files or many small files, and access the files very rapidly.

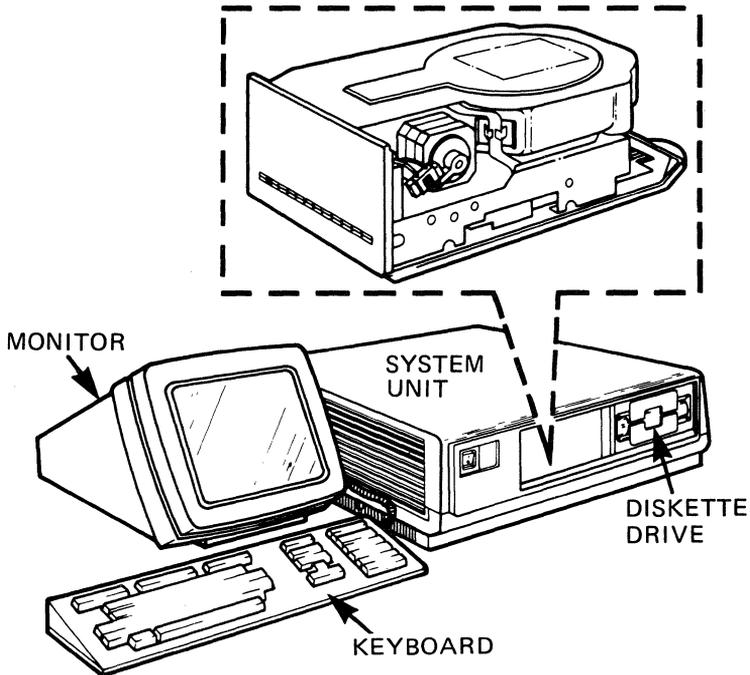
The hard disk's storage capacity is defined in megabytes. A byte is equal to one character, and a megabyte is equal to a million characters. The hard disk contains ten megabytes of storage space, which is equivalent to 25 times the storage capacity of a single diskette.

In terms of type-written pages, a diskette stores about 150 pages of text; the 10-megabyte hard disk stores about 3750 pages; the 5-megabyte hard disk stores about 1875 pages.

The disk can simulate up to four diskette drives, each with a much larger capacity than a single diskette.

Because of its speed and large working capacity, you may want to use the hard disk to store the programs and files you use daily, and use diskettes for storing less-used files. If you are using an application program, we recommend that you store it on the hard disk and store data files on diskettes.

Figure 1-1 shows where the hard disk fits into the Rainbow computer.



MR-11156

Figure 1-1. The Hard Disk and the Rainbow Computer

For a description of installation procedures, refer to the *Rainbow Winchester Disk Option Installation Guide*.

What You Can Do with the Hard Disk

You can use the hard disk to:

- Store application programs or data files.
- Automatically start your operating system from the hard disk by simply turning on the power switch if you have a Rainbow 100B or Rainbow 100+ computer.

For detailed instructions on how to accomplish the above tasks and for more information on the hard disk, read the remaining chapters in this manual.

2

Setting Up the Hard Disk

Before you can use the hard disk with the MS-DOS operating system, you must have:

1. Installed the Rainbow computer according to the instructions in the *Rainbow Installation Guide*.
2. Installed and tested the hard disk according to the directions in the *Rainbow Winchester Disk Option Installation Guide*.

To set up the hard disk to use it with the MS-DOS operating system, read the rest of this chapter.

Using the Hard Disk with the MS-DOS Operating System

When you used the Winchester Utility Program to test and initialize (prepare) the hard disk, it was automatically divided into two CP/M-86/80 parts of equal size. That is, it was set up for use with the CP/M-86/80 operating system.

You must now set it up to use with the MS-DOS operating system by:

1. Setting aside an MS-DOS part on the hard disk

This step sets aside an area of the hard disk for the MS-DOS operating system so you can read and write MS-DOS files to the hard disk. This is called “partitioning” the hard disk.

2. Preparing and copying the MS-DOS operating system files to the MS-DOS part

This step prepares the MS-DOS part of the hard disk that you set aside and then copies the operating system files to that part.

A Hard Disk Partition

This section tells you about the internal storage areas that the hard disk is divided into. Each of these areas or “parts” are called **partitions**.

A hard disk can be divided into two, three or four internal storage areas, each with a much larger capacity than a single diskette. Each of these internal storage areas is called a hard disk partition. You can divide (or partition) the internal storage areas to use the space in a way that best fits your needs. For example, if you are using more than one operating system, you may need to have one five-megabyte partition for one operating system, and two 2.5 megabyte partitions for the other operating system.

NOTE

If you have a disk with a five megabyte storage capacity, the partition sizes are different.

The Winchester Utility Program Version 2.0 allows you to divide (or partition) your hard disk in any one of the following arrangements:

1. Two or four partitions of the CP/M-86/80 operating system only.
2. Two or four partitions of the MS-DOS operating system only.
3. One or two partitions for the CP/M-86/80 operating system, plus one or two partitions for the MS-DOS operating system.

To use the hard disk with the MS-DOS operating system, you must set aside at least one MS-DOS partition.

Setting Aside an MS-DOS Partition

This section tells you how to set aside a partition(s) for the MS-DOS operating system. To do this you will:

- Start the Winchester Utility Program Version 2.0
- Choose option 2 to re-partition the hard disk
- Choose which partition arrangement you want to divide your hard disk into
- Choose the size of the partitions depending on which arrangement you choose

NOTE

Changing the partitions destroys **ALL** existing data on **ALL** hard disk partitions. Therefore, if you are currently storing files on the hard disk, be sure to copy all files on all partitions that you want to save before changing the partition arrangement. The *Rainbow MS-DOS Version 2.11 User's Guide* explains how to copy files from the hard disk.

Starting the Winchester Utility Program. To start the Winchester Utility Program Version 2.0:

1. Turn on the Rainbow computer, if you haven't done so already.
2. Find the Winchester Utility Program Version 2.0 diskette contained in this kit. Insert the diskette into drive A.

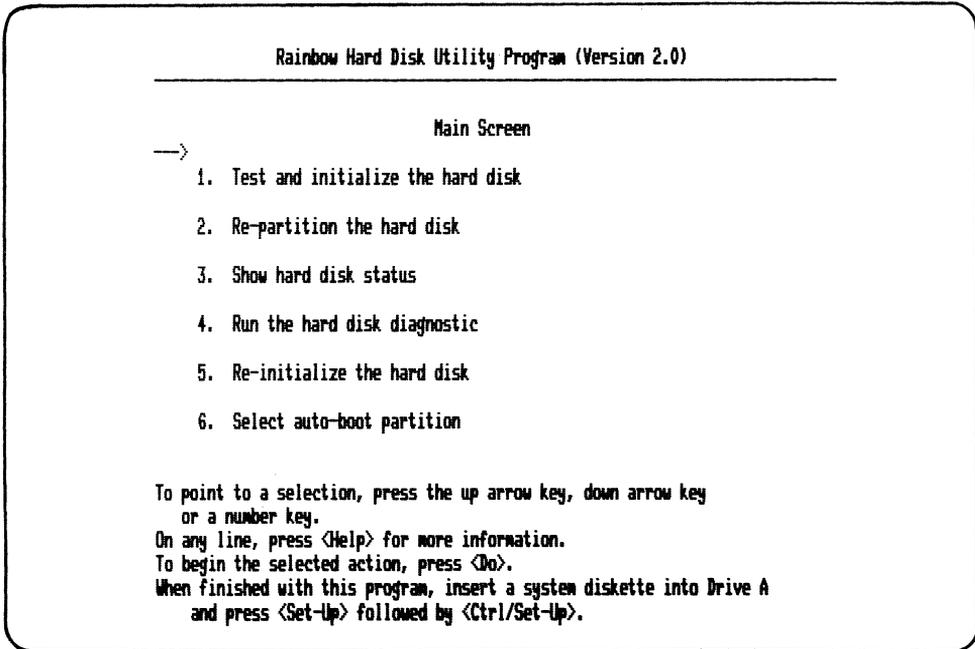
IMPORTANT

You should use the Winchester Utility Program diskette contained in this kit, rather than any other Winchester Utility Program diskette that you may already have.

3. In response to the Rainbow computer's Main System Menu, type:

A

The computer displays the Winchester Utility Program's Main Screen.



Screen 2-1. Winchester Utility Program's Main Screen

Choosing the "Re-Partition" Option.

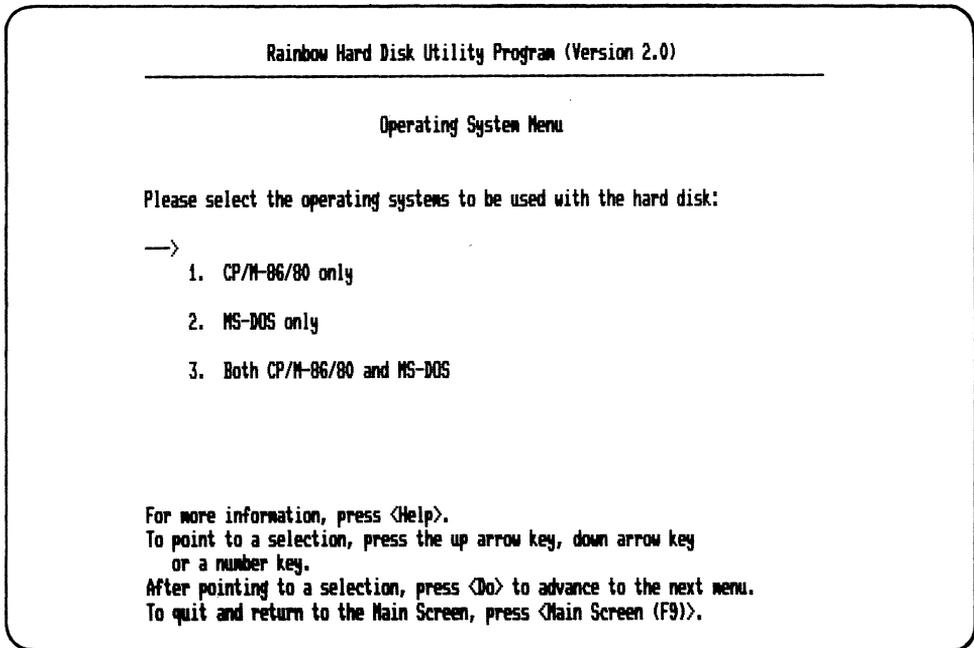
1. Press one of the following to select option 2:

- The up or down arrow keys until the arrow points to option 2
- The 2 key

2. Press:

Do

The computer displays the Operating System Menu shown in Screen 2-2.



Screen 2-2. Winchester Disk Utility Program Operating System Menu

Choosing Your Partition Arrangement.

1. To set aside an MS-DOS partition(s) you must select either option 2 or option 3 shown in Screen 2-2. Choose option 2 or option 3 depending on your plans for the hard disk as described below:

Option 2 Select this option if you plan to use ONLY the MS-DOS operating system with the hard disk. If you select this option, the computer displays the MS-DOS Partition Menu, which asks you to select the partition arrangement.

- Option 3 Select this option if you plan to use BOTH the MS-DOS and CP/M-86/80 operating systems with the hard disk. The available space is divided equally between the two operating systems. If you select this option, the computer displays two menus, which ask you to select the number of partitions for each operating system.

2. To select an option, press one of the following:

- The 2 key
- The 3 key

3. Press:

Do

The computer displays the screen for the option you selected.

Choosing the Size Arrangement.

1. After you have chosen the partition arrangement, you must now select the number of partitions from the menu.
2. To begin the re-partitioning process, press:

Do

The computer displays the following warning twice:

WARNING: ALL DATA ON THE HARD DISK WILL BE DESTROYED

3. To continue, press:

Resume

The program displays:

Re-partitioning is in progress.

4. When the program is finished, it displays:
 - A message that the partitioning is complete
 - The new partition arrangement
5. To leave the Winchester Utility Program and return to the Rainbow computer's Main System Menu, press:

Set-Up **Ctrl/Set-Up**

Preparing the MS-DOS Partition and Copying the Operating System

Before you can use the partition with the operating system, you must first prepare the partition and copy the operating system files onto the hard disk. To do this, use the **FORMAT** command. This command:

- Sets up the partition for the MS-DOS files that allow you to start the operating system from the hard disk.
- Copies some files so you can start the operating system from the new partition.

To prepare the MS-DOS partition and copy the operating system to it, follow the steps below:

1. Insert the MS-DOS operating system diskette into drive A.
2. In response to the Rainbow computer's Main System Menu, press:

A
3. Enter the date and the time.

4. When MS-DOS displays the A> prompt, type:

A>FORMAT E: /S

When the FORMAT program is complete, the computer displays the operating system prompt, A>.

5. To return to the Rainbow computer's Main System Menu, press:

What to Do Next

Now the partition is ready to use with the MS-DOS operating system. You can now:

- Use the COPY command to copy the remainder of the MS-DOS programs to the hard disk partition. See the *Rainbow MS-DOS Version 2.11 User's Guide* for instructions on how to use the COPY command.
- Copy or install application files on the hard disk partition. To copy files, see the COPY command in the *Rainbow MS-DOS Version 2.11 User's Guide*. To install an application on the hard disk partition, see the appropriate manual for the application.
- Start the operating system from the hard disk by pressing a series of keys, (manual start), if you have a Rainbow 100B or Rainbow 100+ computer. See Chapter 3 of this book.
- Set up the hard disk partition so you can automatically start the operating system from it, if you have a Rainbow 100B or Rainbow 100+ computer. See Chapter 3 of this book.

3

Starting MS-DOS From the Hard Disk

You can start the MS-DOS operating system from the hard disk in several ways. This chapter describes these ways and helps you decide which method is best for you.

Before you can choose a method to start the operating system, you must have:

1. Installed the hard disk according to the instructions in the *Rainbow Winchester Disk Option Installation Guide*.
2. Tested the hard disk according to the instructions in the *Rainbow Winchester Disk Option Installation Guide*.
3. Set aside at least one MS-DOS partition and copied the MS-DOS operating system to it according to the instructions in Chapter 2 of this book.

Manual Start Versus Automatic Start

You can start the MS-DOS operating system from the hard disk either:

- Manually
- Automatically

Manually means that you have to select the drive and the partition every time you start the operating system; that is, you must press a key to select a drive and a hard disk partition.

Automatically means that you can set the computer to select the drive and/or partition; that is, you **do not** have to press any keys.

NOTE

If the W option is not displayed on your Rainbow computer's Main System Menu, you cannot start the operating system from the hard disk. You can, however, use the hard disk to store and work with files.

Manually Starting MS-DOS from the Hard Disk

You must first set up the computer to manually start the MS-DOS operating system from the hard disk. To do this:

1. With the Rainbow computer's Main System Menu displayed, enter the Set-Up program by pressing:

Set-Up

The computer displays the main Set-Up screen.

2. Press:

Prev Screen

The computer displays Set-Up's "AUTO-BOOT" screen shown in Screen 3-1.

NOTE

"AUTO-BOOT" is the name of the option that allows you to choose a specific drive to start the operating system from. If you choose a letter (A, B, C, D, W), the computer goes to that drive every time you turn on the computer. If you choose ? (question mark), the computer displays the Rainbow Main System Menu when you turn on the computer.

SET-UP

TO EXIT PRESS "SET-UP"

PRESS "HELP"

TO RESET TYPE <CTRL/SET-UP>

05.03A

640K

LINE

AUTO-BOOT

?-DRIVE

Screen 3-1. AUTO-BOOT Set-Up Screen

Starting MS-DOS From the Hard Disk

3. Press the up arrow key until the computer displays:

?=DRIVE

NOTE

If the computer already displays the ?, you can skip step 4.

4. To save the change you have made to the Set-Up program, press:

Shift/S

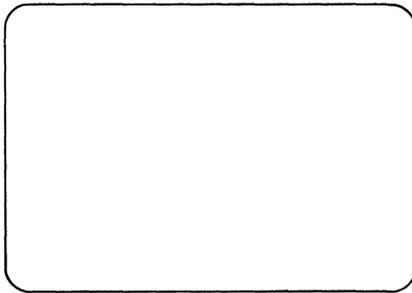
5. To leave the Set-Up program, press:

Set-Up

The computer displays the Rainbow computer's Main System Menu.

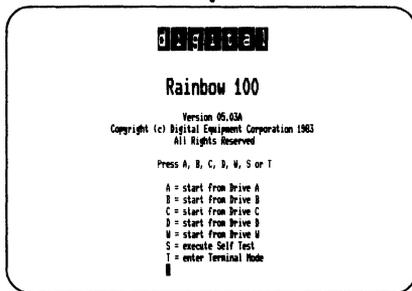
The next time you use the Rainbow computer, you can start the MS-DOS operating system manually from the hard disk. (That is, you must type keys on the keyboard to indicate the drive and partition.)

Starting MS-DOS From the Hard Disk



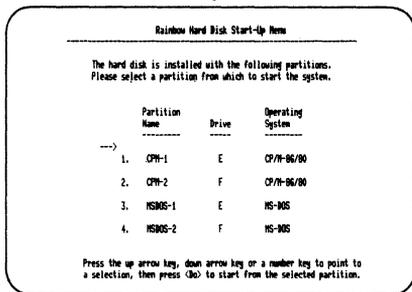
Turn on the Rainbow computer.

+



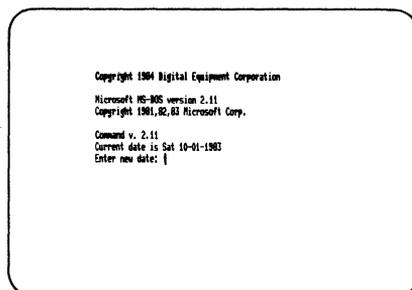
Press the W key to select the Winchester drive.

+



Press the number of the partition that you want to start the operating system from.

=



The MS-DOS operating system is ready to use.

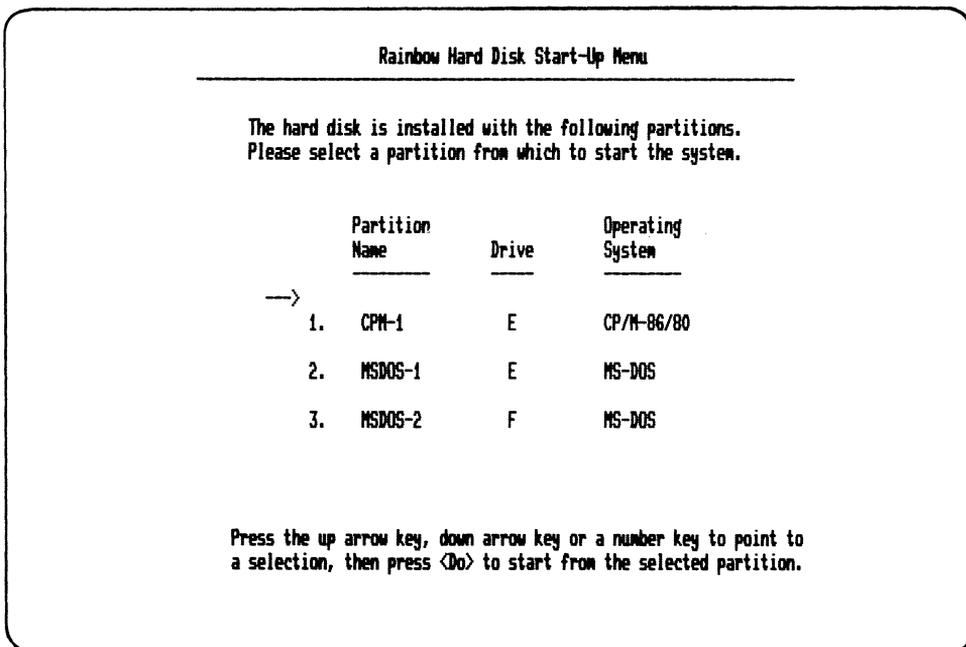
Figure 3-1. Manually Starting the Operating System from the Hard Disk

Starting MS-DOS From the Hard Disk

To do this:

1. Turn on the computer, and press **W** when you see the Rainbow computer's Main System Menu.

The computer displays a screen with choices of partitions. The choices depend on the partition arrangement you have selected. Screen 3-2 displays an example of a screen with choices of partitions.



Screen 3-2. A Partition Arrangement

2. Select the MS-DOS partition that you prepared in the previous section by pressing the up or down arrow keys until the arrow points to the partition. Then press:

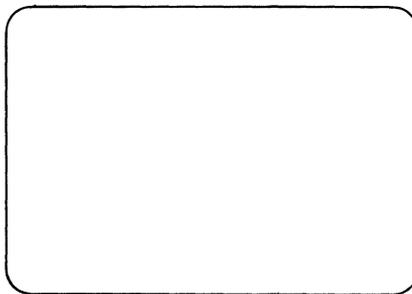
Do

The computer then starts the MS-DOS operating system.

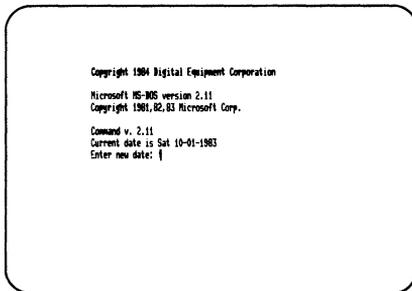
Automatically Starting MS-DOS from the Hard Disk

When you automatically start the operating system from the hard disk, you can choose the drive, the partition, or neither. There are three different ways to automatically start the operating system from the hard disk. You can:

1. Turn on the computer and the computer automatically starts the operating system. This means that you do not have to press any keys.



Turn on the Rainbow computer.



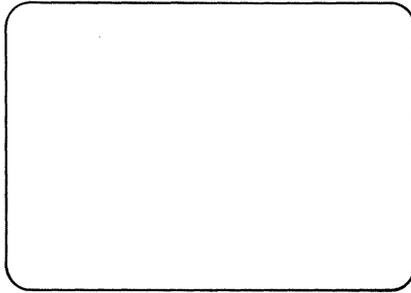
The MS-DOS operating system is ready to use.

Figure 3-2. The Computer Chooses the Drive and the Partition

Select this way if you always want to start one operating system from one partition on the hard disk. With this way, every time you turn on the computer, the operating system starts from a specific partition on the hard disk.

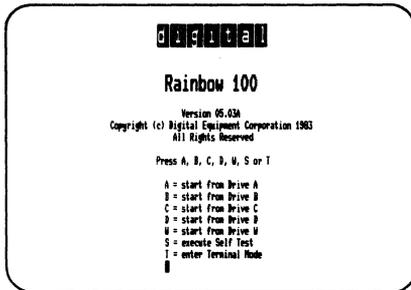
Starting MS-DOS From the Hard Disk

2. Turn on the computer, select **W** for the hard disk and then the computer automatically starts the operating system. This means that you only have to press the **W** key when you see the Rainbow computer's Main System Menu. You do not have to press a key to select a partition.



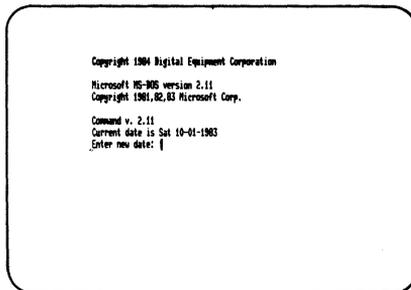
Turn on
the Rainbow computer.

+



Press the **W**
key to select
the Winchester drive.

=

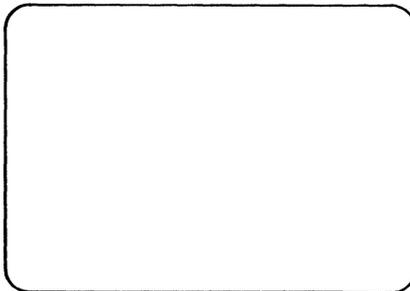


The MS-DOS
operating system
is ready to use.

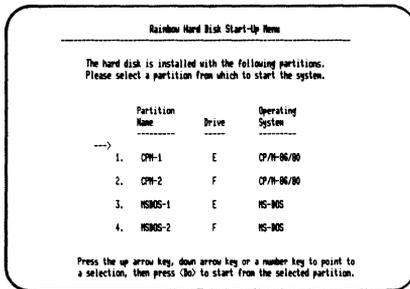
Figure 3-3. You Only Choose the Drive

Select this way if you always want to start the operating system from a specific partition when you start from the hard disk. This way allows you to choose a drive to start the operating system from. Every time you choose drive **W**, the operating system starts from a specified partition.

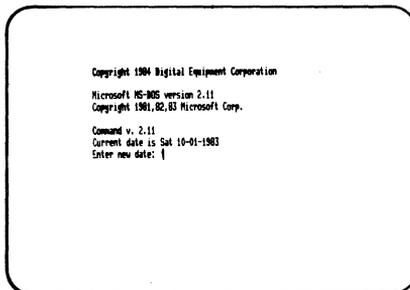
3. Turn on the computer and the computer automatically selects **W** for the hard disk. You select a hard disk partition and then the operating system starts. This means that you only have to press the key to specify the partition and the Do key.



Turn on the Rainbow computer.



Press the number of the partition that you want to start the operating system from.



The MS-DOS operating system is ready to use.

Figure 3-4. You Only Choose the Partition

Select this way if you always want to start the operating system from the hard disk, but not from one specific partition. With this way, the computer automatically chooses drive W. You can then choose which partition to start the operating system from.

The Computer Chooses the Drive and the Partition

To set up the computer so you only have to turn on the Rainbow computer and your operating system automatically starts without pressing any keys:

1. Locate the Rainbow Winchester Utility Program Version 2.0 diskette that comes in this kit. Insert this diskette into drive A.
2. From the Rainbow computer's Main System Menu that is displayed, press:

A

Screen 3-3 shows the Winchester Utility Program's Main Screen.

Rainbow Hard Disk Utility Program (Version 2.0)

Main Screen

—>

1. Test and initialize the hard disk
2. Re-partition the hard disk
3. Show hard disk status
4. Run the hard disk diagnostic
5. Re-initialize the hard disk
6. Select auto-boot partition

To point to a selection, press the up arrow key, down arrow key
or a number key.

On any line, press <help> for more information.

To begin the selected action, press <Do>.

When finished with this program, insert a system diskette into Drive A
and press <Set-Up> followed by <Ctrl/Set-Up>.

Screen 3-3. Winchester Utility Program's Main Screen

3. From the Winchester Utility Program's Main Screen, choose *Option 6: Select auto-boot partition* by pressing one of the following:

- The down arrow key
- The 6 key

4. Press:

Do

5. You must then choose the partition from which you want the operating system to start the next time you turn on the computer. The choices depend on the partition arrangement you have selected.

Choose the partition by:

- Pointing to it with the up or down arrow key
- Pressing the Do key

After you make a selection, the asterisk (*) moves to that selection.

6. Press:

Set-Up **Ctrl/Set-Up**

The computer displays the Rainbow computer's Main System Menu.

7. When you see the Main System Menu, press:

Set-Up

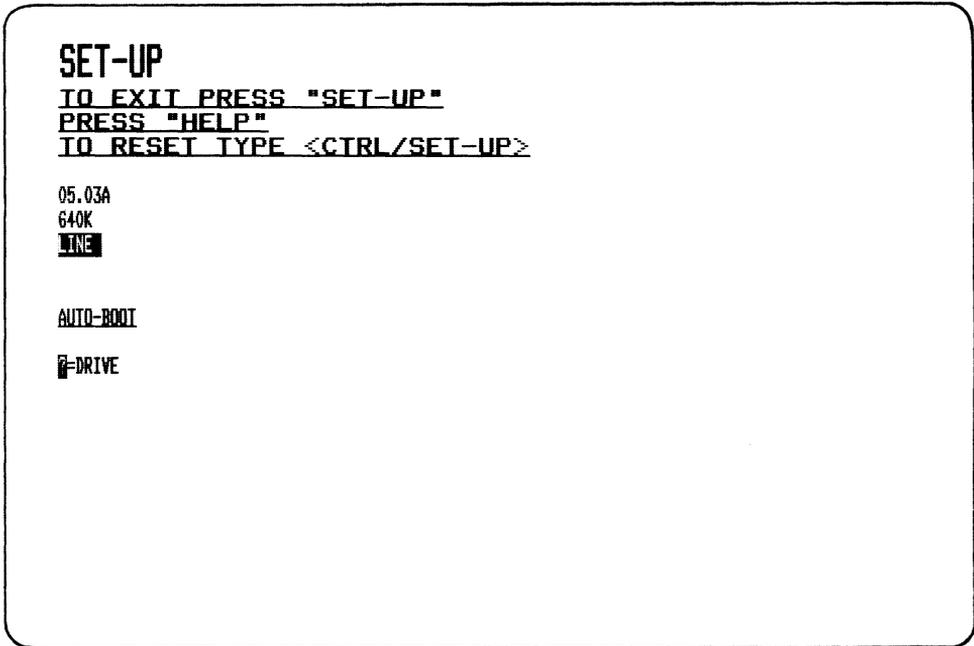
8. Press:

Prev Screen

The computer displays Set-Up's "AUTO-BOOT" screen shown in Screen 3-4.

NOTE

"AUTO-BOOT" is the name of the option that allows you to choose a specific drive to start the operating system from. If you choose a letter (A, B, C, D, W), the computer goes to that drive every time you turn on the computer. If you choose ? (question mark), the computer displays the Rainbow Main System Menu when you turn on the computer.



Screen 3-4. AUTO-BOOT Set-Up Screen

9. Press the up arrow key until the computer displays:

W=DRIVE

NOTE

If the computer already displays the W, you can skip Step 10.

10. To save the change you have made to the Set-Up program, press:

Shift/S

11. To leave the Set-Up program, press:

Set-Up

The computer displays the Rainbow computer's Main System Menu.

The next time you turn on the computer, the operating system automatically starts from the specified partition on the hard disk. You do not have to press any keys.

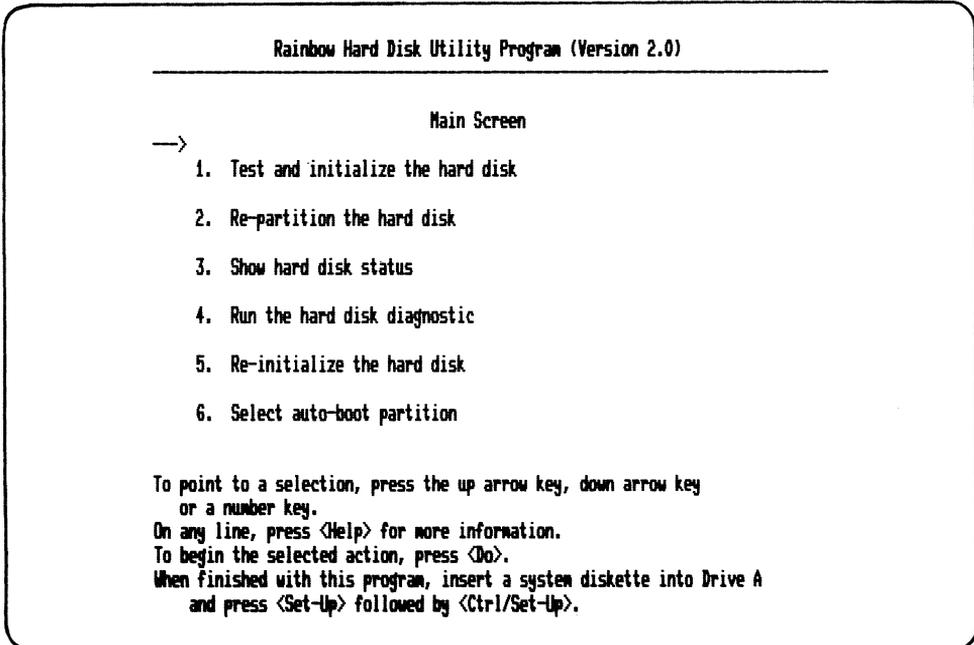
You Only Choose the Drive

To set up the computer so you only have to turn on the computer and choose the drive to automatically start the operating system:

1. Locate the Rainbow Winchester Utility Program Version 2.0 diskette that comes in this kit. Insert this diskette into drive A.
2. From the Rainbow computer's Main System Menu that is displayed, press:

A

Screen 3-5 shows the Winchester Utility Program's Main Screen.



Screen 3-5. Winchester Utility Program's Main Screen

3. From the Winchester Utility Program's Main Screen, choose *Option 6: Select auto-boot partition* by pressing one of the following:

- The down arrow key six times until the arrow points to option 6
- The 6 key

4. Press:

Do

5. You must then choose the partition from which you want the operating system to start the next time you turn on the computer. The choices depend on the partition arrangement you have selected.

Choose the partition by:

- Pointing to it with the up or down arrow key
- Pressing the Do key

After you make a selection, the asterisk (*) moves to that selection.

6. Press:

Set-Up **Ctrl/Set-Up**

The computer displays the Rainbow computer's Main System Menu.

The next time you turn on the computer you need only select drive W when you see the Rainbow computer's Main System Menu. The computer then automatically starts the operating system from the partition you selected in the above instructions.

You Only Choose the Partition

To set up the computer so you only have to turn on the computer and choose the hard disk partition to automatically start the operating system:

1. With the Rainbow computer's Main System Menu displayed on the screen, press:

Set-Up

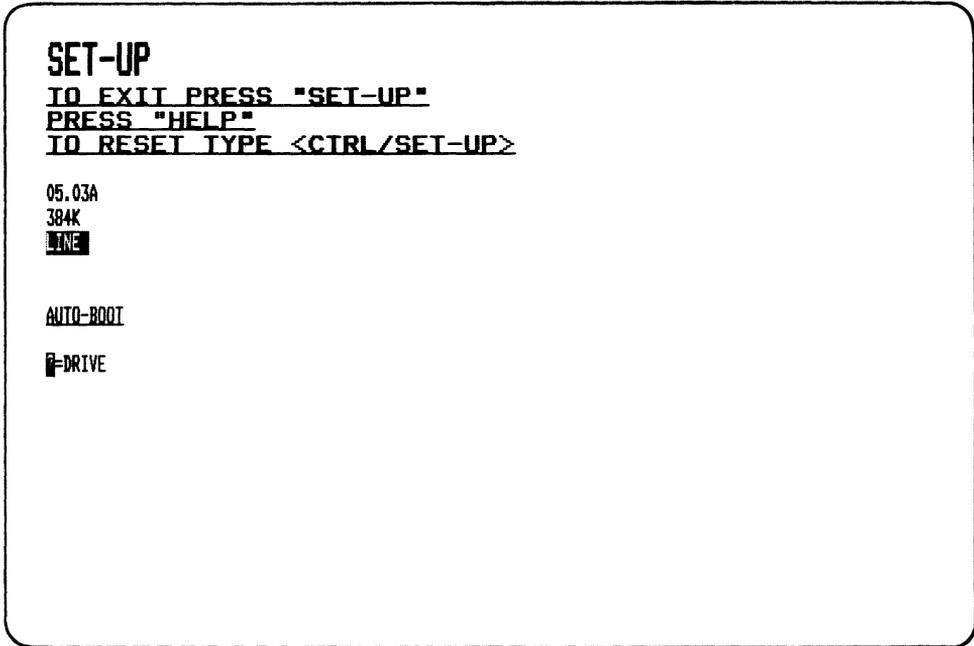
2. Press:

Prev Screen

The computer displays Set-Up's "AUTO-BOOT" screen shown in screen 3-6.

NOTE

"AUTO-BOOT" is the name of the option that allows you to choose a specific drive to start the operating system from. If you choose a letter (A, B, C, D, W), the computer goes to that drive every time you turn on the computer. If you choose ? (question mark), the computer displays the Rainbow Main System Menu when you turn on the computer.



Screen 3-6. AUTO-BOOT Set-Up Screen

3. Press the up arrow key until the computer displays:

W=DRIVE

NOTE

If the computer already displays the W, you can skip Step 4.

4. To save the change you have made to the Set-Up program, press:

Shift/S



5. To leave the Set-up program and return to the Rainbow computer's Main System Menu, press:

Set-Up

Starting MS-DOS From the Hard Disk

The next time you turn on the computer, it automatically displays the hard disk partitions. You can then select a hard disk partition from which to start the operating system.

4

Correcting Winchester Disk Problems

This chapter describes problems you might encounter while using the Winchester Disk Utility Program. The first part of the chapter lists the Winchester Disk messages in alphabetic order. The second part of the chapter discusses option 4 and option 5 of the Winchester Utility Program. You can use these options to correct some Winchester Disk problems.

Winchester Disk Messages

When you are using the Winchester Utility Program, problems can arise while you are initializing, testing, or setting the auto-boot partition.

If a problem arises, the Winchester Utility Program can display any of the following messages:

**ERROR IN PARTITION drv:
Initialization data could not be written.**

The operating system requires certain data to be written to the first two sectors of the partition. This message can occur if some of that data could not be written for any reason. The specified partition is unusable.

Correcting Winchester Disk Problems

Press the Resume key to advance to other partitions; others are still usable.

To make the partition usable again, you must return to the Winchester Utility Program's Main Screen and select option 4 to run the hard disk diagnostic. The diagnostic is a test that checks for problems. If a bad sector (portion of the hard disk) is found, the program displays the following message when the test is complete:

```
n NEW BAD SECTORS DETECTED
SELECT THE RE-INITIALIZE OPTION
```

You should copy the files on ALL hard disk partitions to back-up diskettes, if you haven't already. Then use the Winchester Utility Program option 5 to re-initialize the hard disk. After the hard disk is re-initialized, you can re-partition and restore the files to the hard disk. You should then be able to use the partition that contained the bad sector again.

ERROR IN PARTITION drv: Insufficient number of alternate sectors.

This message can occur while running the Winchester Utility Program if there were not enough alternate sectors available to assign to the bad sectors within the partition. The specified partition is unusable.

Press the Resume key to advance to other partitions; others are still usable.

If you have three or less partitions on the hard disk, you can re-partition to try to make the bad sectors of the hard disk occupy a smaller partition. For example, if you have two MS-DOS partitions, one of which displays this message, you can try to re-partition the hard disk into four MS-DOS partitions. The bad sector may only ruin one of the four partitions and you can use the three remaining partitions.

**ERROR IN PARTITION drv:
Directory area could not be initialized.**

The directory area on the partition could not be initialized with the data required by the MS-DOS operating system. The specified partition is unusable.

Press the Resume key to advance to other partitions; others are still usable.

To make the partition usable again, you must return to the Winchester Utility Program's Main Screen and select option 4 to run the hard disk diagnostic. The diagnostic is a test that checks for problems. If a bad sector (portion of the hard disk) is found, the program displays the following message when the test is complete:

```
n NEW BAD SECTORS DETECTED  
SELECT THE RE-INITIALIZE OPTION
```

You should copy the files on ALL hard disk partitions to back-up diskettes, if you haven't already. Then use the Winchester Utility Program option 5 to re-initialize the hard disk. After the hard disk is re-initialized, you can re-partition and restore the files to the hard disk. You should then be able to use the partition that contained the bad sector again.

**FATAL ERROR
Hard disk does not respond.**

This message can occur if the hard disk did not indicate that it had completed a procedure.

Return to the Winchester Utility Program's Main Screen and run option 4, the diagnostic test to obtain more information about the failure.

**FATAL ERROR
Hardware failure detected during testing.**

This message can occur during the initialization procedure of your hard disk when either the disk controller board or the drive is faulty.

Refer to the *Rainbow Winchester Disk Option Installation Guide* for more information about installing the hard disk.

Return to the Winchester Utility Program's Main Screen and run option 4, the hard disk diagnostic to obtain more information about the failure.

FATAL ERROR

Initialization data could not be read back from hard disk.

This message can occur while using the hard disk if the utility program cannot read back some of the data that it previously wrote onto the hard disk.

Return to the Winchester Utility Program's Main Screen and run option 4, the hard disk diagnostic to obtain more information about the failure.

FATAL ERROR

Initialization data could not be written on hard disk.

This message can occur while using the hard disk if the utility program was not able to write some of the data that the operating system needs to read at a later time.

Return to the Winchester Utility Program's Main Screen and run option 4, the hard disk diagnostic to obtain more information about the failure.

FATAL ERROR

No hard disk diagnostic program.

This message can occur when the file DEX16UTL.CMD is not found on the Winchester Utility Program diskette provided with the hard disk.

Make a new copy of the Winchester Utility Program diskette from the master copy.

FATAL ERROR

No pre-boot program.

This message is rare, but can occur if the file containing the pre-boot program could not be found on the utility diskette.

Make a new copy of the Winchester Utility Program diskette from the master copy.

FATAL ERROR
No secondary boot program.

This message is rare, but can occur if the file containing the secondary boot program could not be found on the utility diskette.

Make a new copy of the Winchester Utility Program diskette from the master copy.

FATAL ERROR
Programming error occurred.

This message is very rare but can occur if the Winchester Utility Program detects a problem with the program code.

If this message is displayed, report the problem to the DIGITAL Help Line. For the phone number of the office nearest you, look on the bottom of your keyboard or refer to Appendix A of this guide.

FATAL ERROR
Secondary boot program is too big.

This message is rare, but can occur if the secondary boot program does not fit into the allocated space on the hard disk. This can only occur if the file was somehow overwritten or changed.

Make a new copy of the Winchester Utility Program diskette from the master copy.

Hard disk option is not connected.

This message can occur if the Winchester Utility Program did not find the hard disk controller board.

Refer to the *Rainbow Winchester Disk Option Installation Guide* for more information about the hard disk controller board.

Recheck the connections of the controller board and try the procedure again.

Solving Winchester Disk Problems

The Winchester Utility Program has two options that you can use when you encounter some of the messages described earlier in this chapter. The options are:

- Option 4. Run the hard disk diagnostic
- Option 5. Re-initialize the hard disk

NOTE

See the description of the message in the preceding section to determine if you can use these options with the message displayed on your screen.

These options are explained in the following sections.

Option 4: Run the hard disk diagnostic

The hard disk diagnostic is a program that “tests” your hard disk to see if it has any problems.

You should use the hard disk diagnostic (option 4) if you encounter problems while:

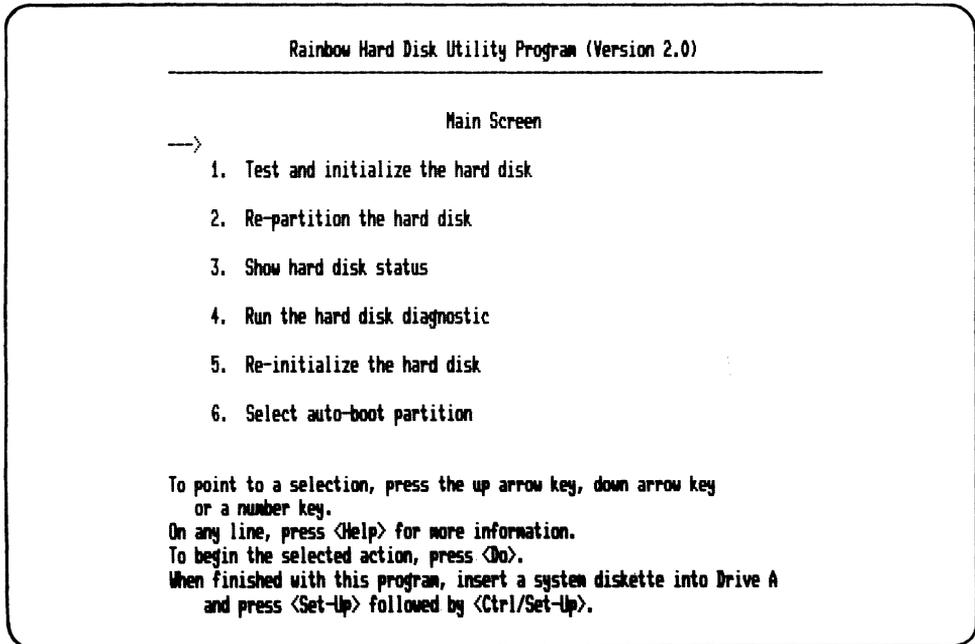
- Initializing the hard disk
- Partitioning the hard disk
- Setting the auto-boot partition

To use the hard disk diagnostics:

1. Find the Winchester Utility Program Version 2.0 diskette in this kit. Insert this diskette into drive A.
2. Turn on the Rainbow computer. From the Main System Menu, type:

A

Screen 4-1 displays the Winchester Utility Program’s Main Screen.



Screen 4-1. Winchester Utility Program's Main Screen

3. Choose option 4, run the hard disk diagnostic by pressing one of the following:
 - The down arrow key four times until the arrow points to option 4
 - The 4 key
4. Then press:

Do

Option 4 displays detailed messages as it runs eight subtests. As each subtest runs, the program displays either:

PASSED

or

FAILED

5. If the hard disk diagnostic finishes, Screen 4-2 displays:

```

                                Rainbow Hard Disk Utility Program (Version 2.0)
                                -----
                                HARD DISK OPTION DIAGNOSTIC          REV 2.1
                                =====
                                PASS 0000
SUBTEST #7:  READ ALL SECTORS          PASSED
              WRITE SECTORS TEST
              IMPLIED SEEK(WRITE)     PASSED
              BASIC WRITE TEST 1      PASSED
              BASIC WRITE TEST 2      PASSED
              BASIC WRITE TEST 3      PASSED
SUBTEST #8:  WRITE FORMAT TESTS      PASSED

***  DIAGNOSTIC COMPLETE  ***

PRESS <RETURN> TO RETURN TO MAIN MENU
=====
```

Screen 4-2. End of a Successful Diagnostic Test

The bottom of the screen could also display:

```
n NEW BAD SECTORS DETECTED
SELECT THE RE-INITIALIZE OPTION
```

If the bottom of the screen displays this message, you should press the Return key to return to the Winchester Utility Program's Main Screen. You should copy the files on ALL hard disk partitions to back-up diskettes, if you haven't already. Then, use the Winchester Utility Program option 5 to re-initialize the hard disk.

If the bottom of the screen does not display this message, you can use your hard disk. To leave the hard disk diagnostics, press the Return key. Then press:

Set-Up **Ctrl/Set-Up**

6. If the hard disk diagnostic does not finish, the hard disk has failed a subtest. If the hard disk fails a subtest, you should report the problem to the DIGITAL Help Line. For the phone number of the office nearest you, look at the bottom of your keyboard or refer to Appendix A of this guide.

Option 5: Re-initialize the hard disk

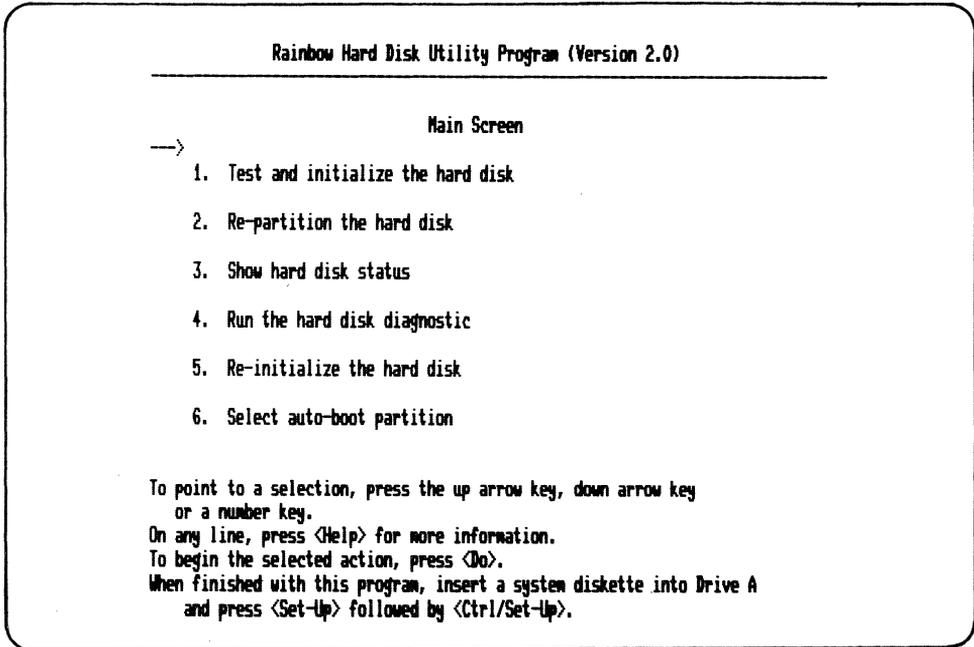
You should re-initialize the hard disk (option 5) if the hard disk diagnostic found new bad sectors. Re-initializing the hard disk is like starting again with a new disk. If any information is currently stored on the disk, it will be erased.

To re-initialize the hard disk, follow the steps below to start the Winchester Utility Program, if you haven't already.

1. Find the Winchester Utility Program Version 2.0 diskette in this kit. Insert this diskette into drive A.
2. Turn on the Rainbow computer. From the Rainbow computer's Main System Menu, press:

A

Screen 4-3 displays the Winchester Utility Program's Main Screen.



Screen 4-3. Winchester Utility Program's Main Screen

3. Choose option 5, re-initialize the hard disk, by pressing one of the following:

- The up or down arrow key until the arrow points to option 5
- The 5 key

4. Then, press:

Do

The program displays two messages to warn you that all data on the hard disk will be destroyed.

5. To start the re-initialize procedure, press:

Resume

Screen 4-4 is displayed when the re-initialization is complete.

```

Rainbow Hard Disk Utility Program (Version 2.0)
-----

Re-initialization is completed.

The hard disk is re-initialized with the following partitions:

Partition      Drive      Operating      Size
Name           System
-----
CPM-1          E          CP/M-86/80    4.898MB
CPM-2          F          CP/M-86/80    4.898MB

To perform additional actions, press <Main Screen (F9)> to
return to the Main Screen.
If finished with this program, insert a system diskette into Drive A
and press <Set-Up> followed by <Ctrl/Set-Up>.

```

Screen 4-4. Complete Initialization Procedure

The hard disk is now set up with two CP/M-86/80 partitions. If you want to change the partition arrangement, see Chapter 5 of this guide. Otherwise, you can start using the hard disk.

5

The Hard Disk Arrangement

This chapter tells you how to change the arrangement of your hard disk, (called re-partitioning). You may want to do this at a later time, when another partition arrangement may better fit your needs. For example, if you have only one operating system on your hard disk and you want to add another, you must re-partition the hard disk.

Changing the Partition Arrangement on the Hard Disk

To change the arrangement (or re-partition) the hard disk:

1. Turn on the Rainbow computer.

CAUTION

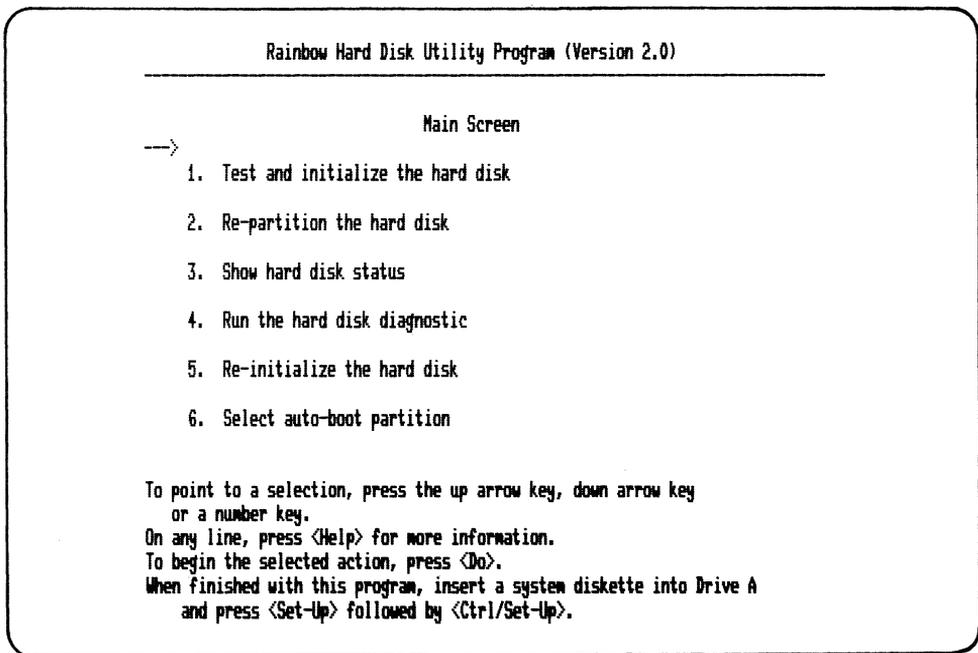
Changing the partition arrangement destroys any existing data on the hard disk. Therefore, if you have files stored on the disk, be sure to copy all files on all partitions that you want to save to a back-up diskette save before making a change.

The Hard Disk Arrangement

2. Find the Winchester Utility Program Version 2.0 diskette in this kit. Insert the diskette into drive A.
3. When you see the Rainbow computer's Main System Menu, type:

A

The Winchester Utility Program's Main Screen is then displayed. (See Screen 5-1.)



Screen 5-1. Winchester Utility Program's Main Screen

NOTE

If you are not sure what your current hard disk partition arrangement is, you can select Option 3: Show hard disk status. Then return to the Winchester Utility Program's Main Screen.

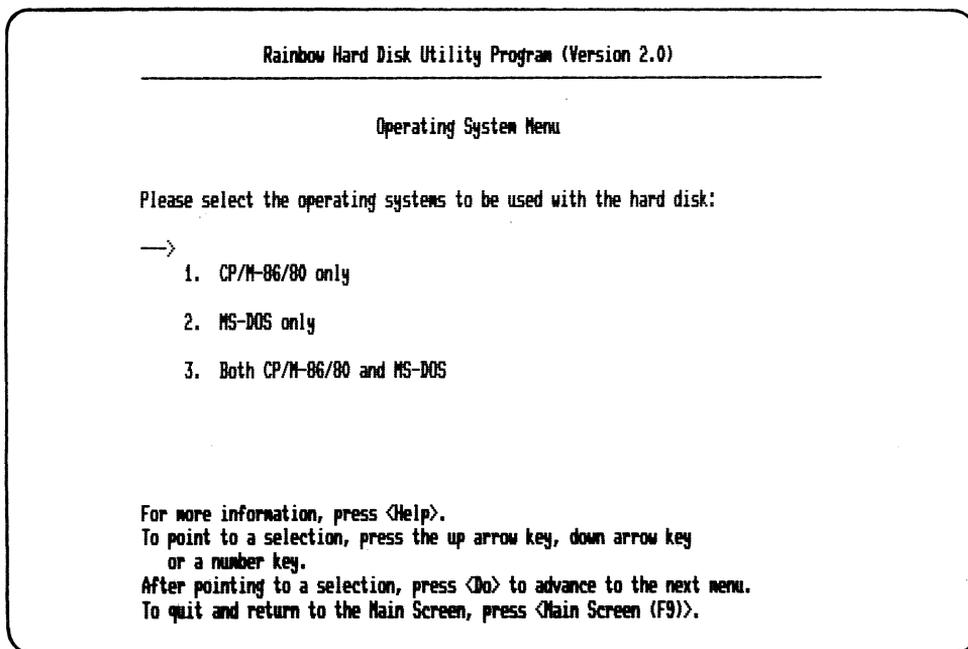
4. Choose Option 2: Re-partition the hard disk, by pressing one of the following:
 - The up or down arrow key until the arrow points to option 2
 - The number 2
5. Press:

Do

After you choose option 2, you are given a choice of which operating system(s) you want to use. (See Screen 5-2.)

NOTE

This example will divide the space on the hard disk equally between the MS-DOS operating system and the CP/M-86/80 operating system.

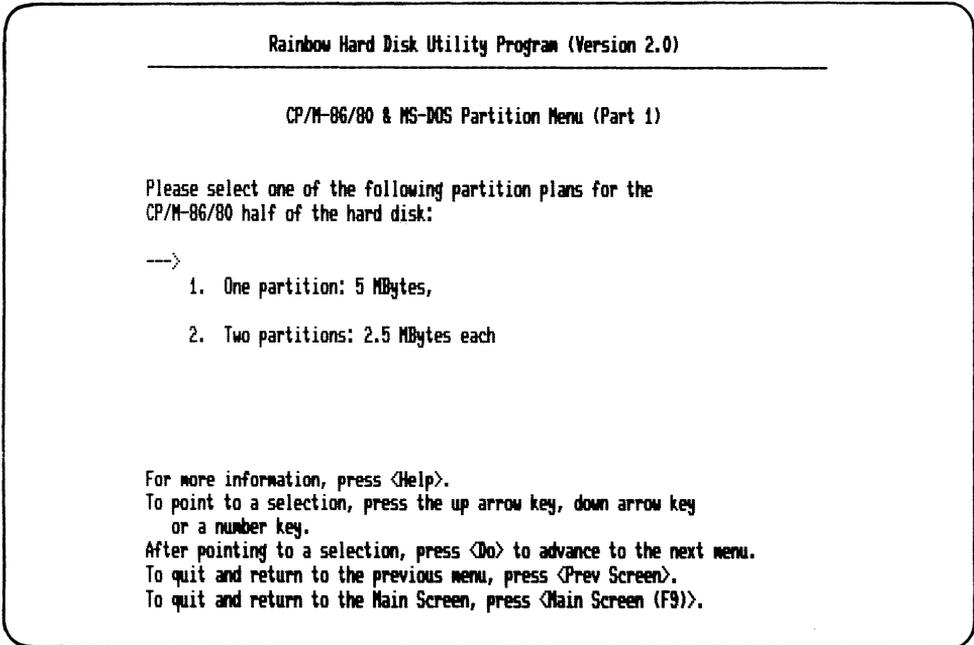


Screen 5-2. Operating System Menu

6. To choose the CP/M-86/80 operating system and the MS-DOS operating system, press one of the following:
 - The down arrow key three times until the arrow points to option 3
 - The 3 key
7. Then, press:

Do

The computer displays the CP/M-86/80 and MS-DOS Partition Menu. (See Screen 5-3.)



Screen 5-3. CP/M-86/80 & MS-DOS Partition Menu (Part 1)

NOTE

If you have a disk with five megabytes instead of ten, the partition sizes shown on the screen are different.

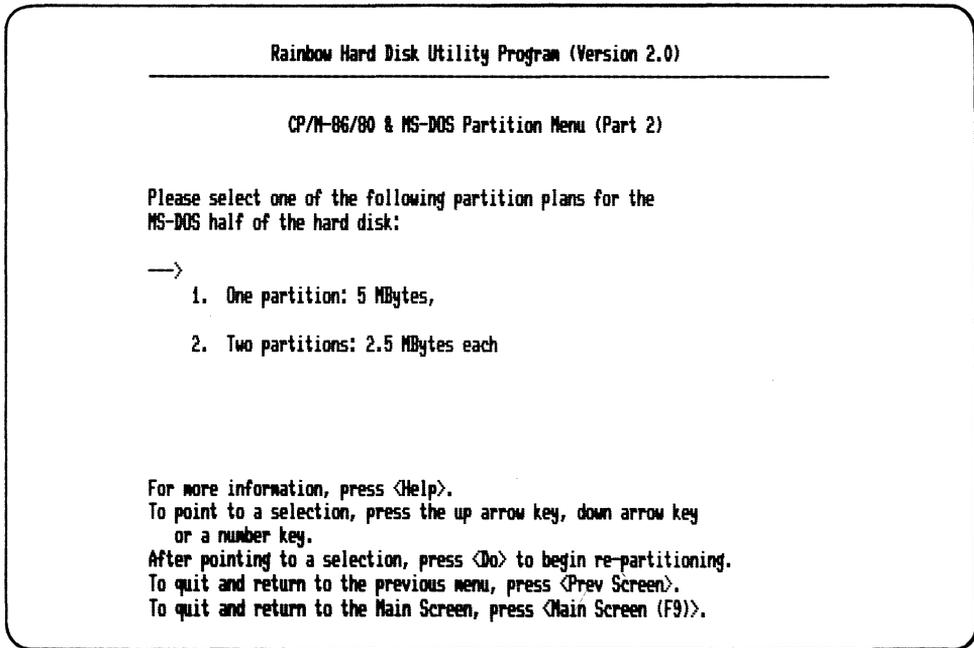
To choose the arrangement for the CP/M-86/80 operating system, press one of the following:

- The down arrow key
- The 1 or 2 key

8. Then press:

Do

The second partition menu is then displayed. (See Screen 5-4.)



Screen 5-4. CP/M-86/80 & MS-DOS Partition Menu (Part 2)

To choose the arrangement for the MS-DOS operating system, press one of the following:

- The down arrow key
- The 1 or 2 key

9. Then, press:

Do

10. After you press the Do key, two messages are displayed:

WARNING: ALL DATA ON THE HARD DISK WILL BE DESTROYED

11. To begin the re-partitioning procedure, press:

Resume

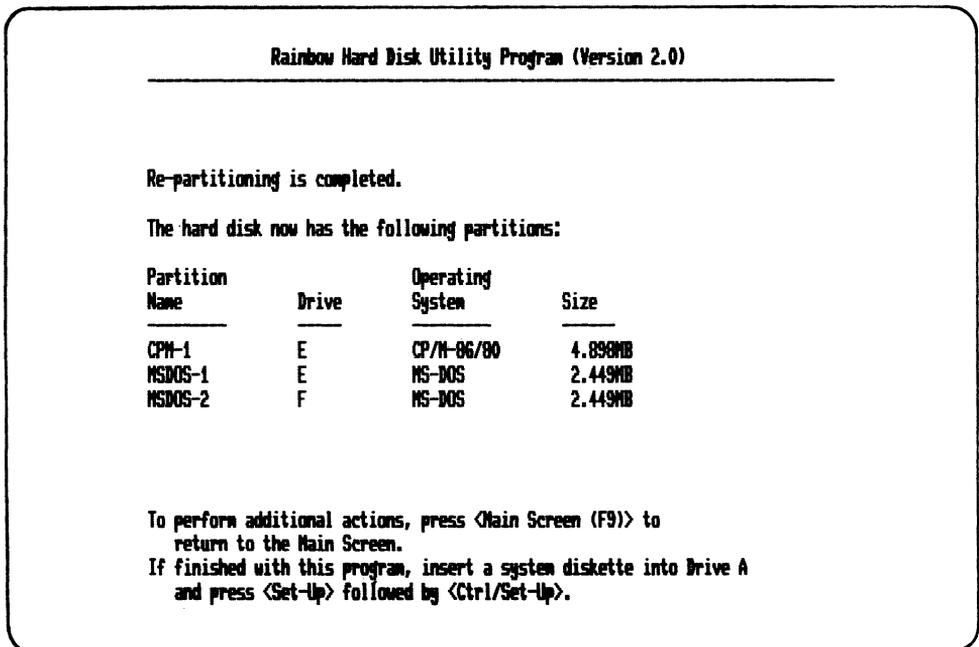
The program displays:

Re-partitioning is in progress

12. When the program is finished, it displays:

- A message that the partitioning is complete
- The new partition arrangement

See screen 5-5.



Screen 5-5. Re-partitioned Disk Status

The Hard Disk Arrangement

NOTE

If you have a disk with five megabytes instead of ten, the partition sizes shown on the screen are different.

13. To leave the Winchester Utility Program, press:

Set-Up **Ctrl/Set-Up**

The computer displays the Rainbow computer's Main System Menu.

Appendix



A

Getting Help

Help Line Phone Numbers

Country	Phone Number
U.S.A.	(800) DEC-8000
Canada	(800) 267-5251
United Kingdom	(0256) 59 200
Belgium	(02)-24 26 790
West Germany	(089) 95 91 66 44
Italy	(02)-617 53 81 or 617 53 82
Japan	(0424) 64-3302
Denmark	(04)-30 10 05
Spain	(1)-73 34 307
Finland	(90)-42 33 32
Holland	(1820)-31 100
Switzerland	(01)-810 51 21
Sweden	(08)-98 88 35
Norway	(02)-25 64 22
France	(1)-687 31 52
Austria	(222)-67 76 41 extension 444
Australia	
Sydney	(02) 412-5555
All other areas	(008) 226377

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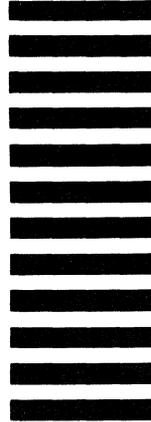
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*Rainbow*TM

MSTM - DOS
Version 2.11
User's Guide

digital equipment corporation

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Printed in U.S.A.

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Preface

Welcome to MS-DOS

We congratulate you on the purchase of the Rainbow personal computing system and the MS-DOS Version 2.11 operating system. The Rainbow computer is the only industry standard computer built to DIGITAL's quality specifications and backed by DIGITAL'S commitment to service and support. The Rainbow computer is a sound investment in personal productivity that you'll enjoy using every day.

To get started, we have prepared a set of easy-to-use documentation. In the back of these manuals is a card that welcomes your comments. Please let us hear from you.

Remember that purchasing your first Rainbow computer is just the beginning of your relationship with Digital Equipment Corporation, the world's leading manufacturer of minicomputers. Our dedication to quality manufacturing, our extensive availability of spares and accessories, and our service organization of 16,000 representatives worldwide are your further assurance of total DIGITAL quality. With the Rainbow computer and the MS-DOS Version 2.11 operating system you have an investment that will grow in value as you use it now and in the future.

Intended Reader

This guide is intended for first-time users of Digital Equipment Corporation's Rainbow computer. The purpose of this guide is to provide you with detailed information about the MS-DOS operating system.

This guide assumes that you have:

- Installed the Rainbow computer according to the instructions in the *Rainbow Installation Guide*.
- Read the *Rainbow MS-DOS Version 2.11 Getting Started*.
- Made a copy of the MS-DOS master system diskette.

Guide Organization

Chapter 1	Introduces the MS-DOS operating system by having you try a few simple tasks and gives an example of how to create and print a short memo.
Chapter 2	Discusses the MS-DOS operating system commands in alphabetical order.
Chapter 3	Describes how to use the MS-DOS editing and control character keys.
Chapter 4	Discusses how to create and edit memos.
Chapter 5	Alphabetically lists the MS-DOS messages.
Appendix A	Lists DIGITAL's International Help Line numbers.
Appendix B	Describes how to store, handle, and use diskettes.
Appendix C	Discusses how to read IBM diskettes.
Appendix D	Discusses the international features of the MS-DOS Version 2.11 operating system.

Conventions Used

Follow the conventions listed below while using this guide.

- In examples of dialog between you and the computer, what the computer displays on the screen is shown in black. The characters you type from the keyboard are shown in color.
- You can type these characters in either lower or upper case characters. Use the Shift or Lock key (see Figure I) on the keyboard to enable uppercase characters.

IMPORTANT

The Lock key does not enable you to type the numeric and special symbol keys. For example, if you want to type \$, %, *, (, :, ? you must use the Shift key. The Lock key only affects the alphabetic characters.

- Make sure to type all spaces and punctuation marks exactly as they are printed.
- When you see `Return`, press the Return key on the keyboard (see Figure I).
- When you see `Ctrl/C`, hold down the control key (Ctrl key on the keyboard as shown in Figure I). While you are still holding the Ctrl key, press the C key and then release both keys.
- The optional portions of a command syntax are enclosed in a pair of square brackets (`[]`).
- Braces (`{ }`) indicate that you have a choice between two or more entries. You must select at least one unless the entries are optional.

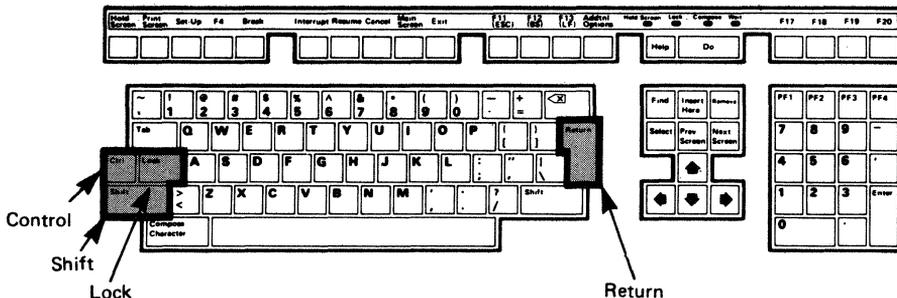


Figure I. Control, Shift, Lock, and Return Keys

Additional Information

You can find additional information on the Rainbow computer and the MS-DOS operating system in:

- *Rainbow Owner's Manual*
 - Using the keyboard
 - Using Set-Up features
 - Using the Rainbow computer as a terminal
 - Using escape sequences
- *Rainbow MS-DOS Version 2.11 Advanced User's Guide*
 - Batch processing
 - Directories and paths
 - Additional MS-DOS commands
 - The File Comparison utility
 - The Link utility
- *Rainbow MS-DOS Version 2.05 Technical Documentation Kit*

You can order this technical documentation kit by calling DECdirect at 1-800-258-1710.

Introducing the MS-DOS Operating System

An operating system is a group of instructions that controls the overall operation of the computer. This guide discusses MS-DOS, an operating system for the Rainbow computer. With this operating system, you can run a variety of application programs.

To use this guide, you should have:

1. Installed the Rainbow computer according to the instructions in the *Rainbow Installation Guide*.
2. Read the *Rainbow MS-DOS Version 2.11 Getting Started*, which describes:
 - Starting and stopping the computer from a diskette drive
 - Making a copy of the MS-DOS operating system master diskette

Hands-On Experience

This chapter explains introductory operating system concepts and operations that enable you to:

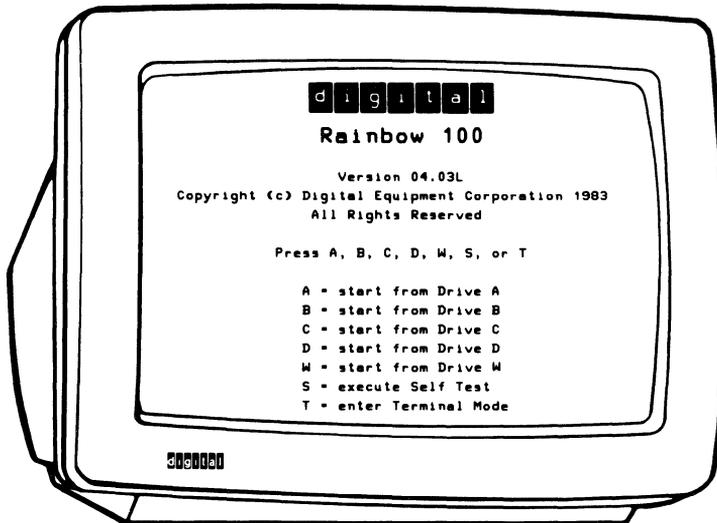
1. Start the operating system from a diskette.
2. Use a few common commands (instructions to the operating system).
3. Create a short memo.
4. Print the memo on a printer.
5. Copy the memo to another diskette.

The end of this chapter includes information on correcting problems.

Starting the Operating System from a Diskette Drive

Start the MS-DOS operating system by completing the following instructions:

1. Be sure there is no protective card or diskette in any of the drives.
2. Turn on the computer by pressing the power switch to the 1 (on) position on the front of the system unit. The drive doors can be open or closed.
3. Be sure the Main System Menu is displayed on the screen, as shown in Screen 1-1.



Screen 1-1. Rainbow Main System Menu

4. Remove the MS-DOS working diskette from its protective paper envelope. (You created this diskette following the instructions in Chapter 2 of the *Rainbow MS-DOS Version 2.11 Getting Started*.)
5. Open the door of drive A and insert the working diskette. Be sure to align the orange arrow on the diskette with the orange stripe on the diskette drive.
6. Close the drive door.
7. Start the MS-DOS operating system by pressing:

A

in response to the Main System Menu. Pressing A tells the computer which drive contains the MS-DOS operating system diskette. This is the drive from which you want to work.

After you hear clicking and whirring sounds, the MS-DOS operating system displays the start-up message in Screen 1-2.

NOTE

The screens in this guide might not be identical to those displayed on your computer. The general form of the information should be the same, but specific information such as dates and times can differ. If, at anytime, a screen is not displayed, refer to the end of this chapter for help. For explanations of messages, refer to Chapter 5.

```
Copyright 1984 Digital Equipment Corporation
```

```
Microsoft MS-DOS version 2.11  
Copyright 1981,82,83 Microsoft Corp.
```

```
Command v. 2.11  
Current date is Sat 10-01-1983  
Enter new date: █
```

Screen 1-2. MS-DOS Operating System Start-Up Message

8. The MS-DOS operating system displays a date and then prompts (asks) you to enter the correct date. You enter the current date using the following format:

mm-dd-yy

For example, you would enter September 23, 1984 as:

9-23-84

Now, enter **today's date** and press the **Return** key.

9. The MS-DOS operating system displays a time and prompts you to enter the correct time. You enter the time using the following format of a twenty-four hour clock:

hh:mm

For example, you would enter 9:15 a.m. as:

9:15

and 9:15 p.m. as:

21:15

Now, enter the **current time** and press the **Return** key.

Screen 1-3 shows a sample date and time entry.

```
Copyright 1984 Digital Equipment Corporation

Microsoft MS-DOS version 2.11
Copyright 1981,82,83 Microsoft Corp.

Command v. 2.11
Current date is Sat 9-01-1984
Enter new date: 9-23-84
Current time is 0:00:15.27
Enter new time: 9:15

A>|
```

Screen 1-3. Date and Time Input

Notice the last two symbols displayed on the left side of the screen, A>. This is called the operating system prompt, or prompt. It indicates that the operating system is waiting for instructions. The prompt consists of the name of the drive the operating system is currently working from (for example A or B) and a right angle bracket. The drive identified in the prompt is known as the active drive, or default drive.

Entering Instructions

Whenever the MS-DOS operating system displays its prompt, you can type an instruction. Instructions are commands that you type on the keyboard. These commands tell the operating system what to do.

Most of the operating system commands are designed to act on a file, which is a collection of information stored on the diskette. The MS-DOS operating system works with two types of files:

- Program files, which contain a collection of instructions telling the computer how to perform a specific task.
- Text files, which contain a collection information, which you have entered such as a list of numbers or a memo.

The operating system accepts commands from you to:

- List the names of files on a diskette.
- Copy the entire contents of a diskette.
- Copy individual files.
- Create text files.
- Display a text file on the screen.
- Print files on a printer.
- Delete files.
- Run programs.

You type a command directly after the A> prompt. As you type a command, the computer displays the command characters on the screen as you enter them.

The cursor is a blinking rectangle or blinking underline that indicates where you enter the next character. The cursor moves to the right each time you type a character.

NOTE

The computer displays the characters you type as lower-case characters unless you use the Shift or Lock keys to obtain upper-case characters. A light above the Help and Do keys indicates when the Lock key is on. To release the Lock key press the Lock key again.

You can type commands in either upper- or lower-case characters. After typing most commands, press the Return key.

Pressing the Return key tells the operating system that you have finished typing the command and want the command executed. Some programs display messages such as <CR> (for carriage return) or "RETURN" to indicate that you should press the Return key.

Displaying a Directory

A commonly-used command is the DIR command, which displays the diskette file directory. Each diskette that contains files also contains a file directory. A file directory—or directory—is like a book's table of contents. It tells the operating system what files are stored on the diskette.

To list the names of files stored on the working diskette in drive A, after the prompt, type:

```
A>DIR Return
```

Remember to type only what is printed in color. The symbol **Return** means "press the Return key. "

The operating system displays a list of file names. Screen 1-4 shows the list of files stored on the MS-DOS operating system diskette.

```
COMMAND COM 15973 8-10-84 1:05p
CONFIG SYS 17 8-29-84 12:27a
MDRIVE SYS 953 9-27-83 11:46p
MDRIVE COM 873 9-27-83 10:38p
CHKDSK COM 6468 10-19-83 7:51p
FORMAT COM 19414 8-09-84 1:44p
DISKCOPY COM 1409 10-19-83 7:51p
PRINT COM 3808 8-03-84 9:35a
EDLIN COM 8080 10-19-83 7:51p
FIND EXE 6331 10-19-83 7:51p
FC EXE 2585 10-19-83 7:51p
SYS COM 922 10-19-83 7:51p
RECOVER COM 2295 10-19-83 7:51p
MORE COM 4364 10-19-83 7:51p
LINK EXE 42368 1-06-83 4:36p
DEBUG COM 12223 10-19-83 7:52p
MEDIACHK EXE 1396 10-10-83 9:25a
RDCPM EXE 9194 10-14-83 9:45a
BACKUP EXE 71146 8-13-84 4:56p
CREF EXE 13824 10-19-83 7:52p
MASH EXE 81266 9-01-84 12:05a
SETPORT EXE 34804 2-17-84 4:03p
EXE2BIN EXE 1649 10-19-83 7:51p
SORT EXE 1632 8-08-84 12:21a
XMODE COM 1309 10-10-84 4:54p
XATTACH COM 3197 10-08-84 12:15a
XDETACH COM 2886 10-08-84 12:23a
LDCOPY COM 6144 10-05-84 4:01p
28 File(s) 7680 bytes free
```

A>|

Screen 1-4. Directory of Drive A

NOTE

Files are identified by two parts: file name and file type. In the directory, the file name and file type are separated by a space(s). The file type indicates the type of file. For example, the file type TXT indicates a document or text file. Refer to Chapter 2 for more information on file names.

Correcting Spelling and Typing Mistakes

The operating system executes a command after you press the Return key. If you misspell a command or make a typographical error and then press the Return key, the operating system indicates that it does not understand the command by displaying a message. Try the following example. Type:

```
A>DIRR 
```

The operating system displays:

```
Bad command or file name
```

```
A>
```

The message “Bad command or file name” indicates the MS-DOS operating system did not recognize DIRR as a valid command. The A> prompt indicates that the operating system is waiting for you to retype the command correctly. See Screen 1-5.

```
A>DIRR
Bad command or file name
A>|
```

Screen 1-5. Example of Typing Error

As long as you see the A> prompt, you can retype the command.

If you mistype a command and realize your mistake before you press the Return key, you can correct it using the delete character key, (see Figure 1-1).

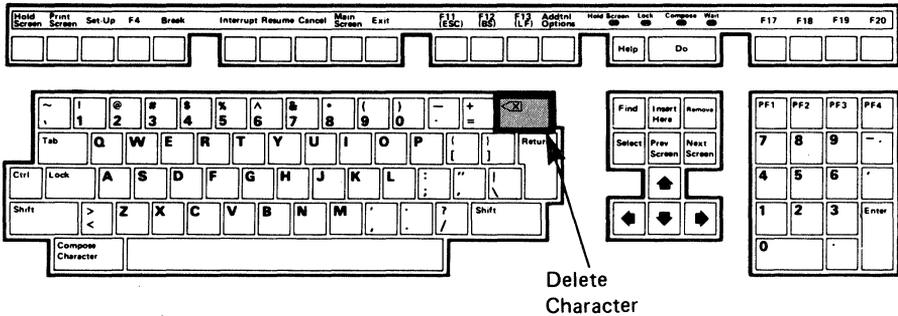


Figure 1-1. Delete Character Key

Delete Character Key

Each time you press the delete character key, the last character you typed is erased from the screen and the cursor moves back one space. You cannot erase the prompt.

To see how the delete character key works, when you see the A> prompt, complete the following instructions.

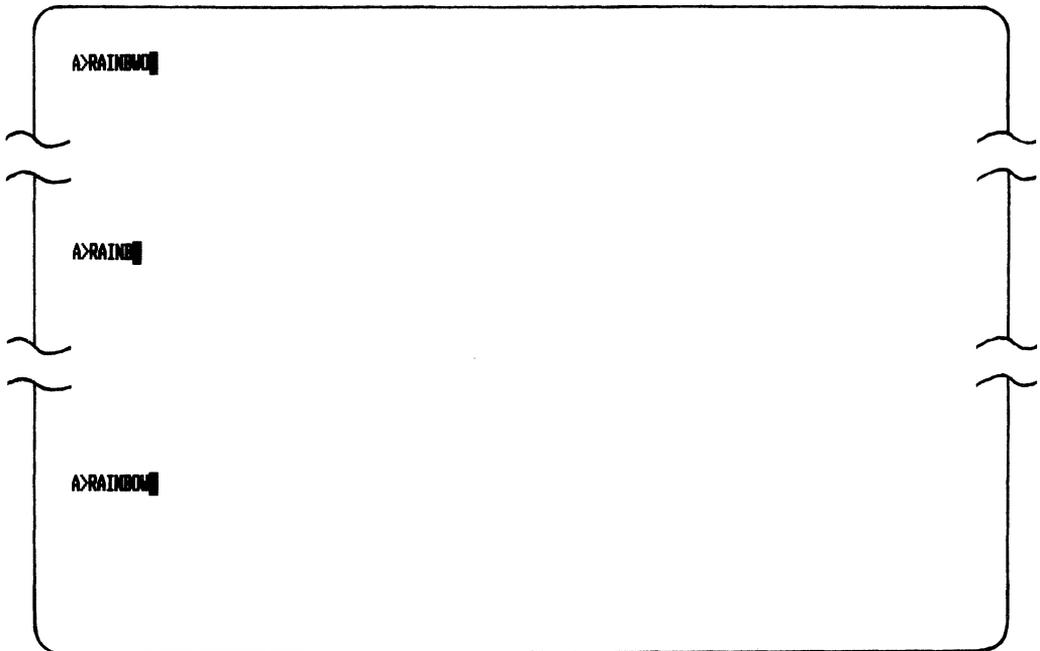
1. Type:

A>RAINBWO
2. Press the **delete character** key twice. The characters “O” and “W ” are erased, leaving the characters “RAINB” displayed on the screen.

3. Now type **OW** to complete the word Rainbow.

Screen 1-6 shows this sequence.

4. Press the delete character key seven times to erase the entire word.



Screen 1-6. Using the Delete Character Key

Checking the Diskette in Drive A

You should periodically use the CHKDSK command to check for errors on your diskette or hard disk. If CHKDSK displays any messages, refer to the complete discussion of CHKDSK in Chapter 2.

Use CHKDSK by typing:

A>CHKDSK

Screen 1-7 shows the CHKDSK display.

```
A>CHKDSK
Volume MS-DOS V211 created Aug 19, 1984 5:26p

 393216 bytes total disk space
 29696 bytes in 3 hidden files
 349184 bytes in 28 user files
 14336 bytes available on disk

655360 bytes total memory
622928 bytes free
```

```
A>|
```

Screen 1-7. Using CHKDSK

Creating and Printing a Memo

The following example shows you how to use EDLIN, an editor, to enter a memo and store it on the diskette. The example also shows you how to print the memo on a printer.

Starting the Editor and Inserting Text

The first step in creating a file is to assign a file name and file type. Because the example is a memo containing text, call the file MEMO.TXT.

1. To start EDLIN, type:

```
A>EDLIN MEMO.TXT 
```

EDLIN responds with:

```
New file  
*
```

The * is the EDLIN prompt. It indicates EDLIN is waiting for you to type an instruction.

2. To type text in the memo, enter insert mode by typing:

```
* I 
```

EDLIN displays:

```
1:*
```

to indicate you can type the first line of the memo.

Introducing the MS-DOS Operating System

3. Type the following text and press the Return key:

```
1:*To: Fred 
```

EDLIN displays:

```
2:*
```

4. Type the second line of text and press the Return key:

```
2:*From: Alyce 
```

EDLIN displays:

```
3:*
```

5. Type the third line of text and press the Return key:

```
3:*I'm writing this memo using the Rainbow computer. 
```

EDLIN displays:

```
4:*
```

6. Type the last line and press the Return key:

```
4:*It's very easy to do. 
```

EDLIN displays:

```
5:*
```

7. To leave insert mode hold down the Ctrl key and press the C key. This action is indicated by . Try it now.

```
5:* 
```

EDLIN displays:

^c

and then

*

The * indicates you are no longer in insert mode.

Screen 1-8 shows the Insert procedure.

```
A>EDLIN MEMO.TXT
New file
*I
  1:*To: Fred
  2:*From: Alyce
  3:*I'm writing this memo using the Rainbow computer.
  4:*It's very easy to do.
  5:*^C
*I
```

Screen 1-8. Inserting the Memo

Displaying the Memo

Display the memo again by typing:

*L **Return**

next to the *. See Screen 1-9.

```
*L
  1:*To: Fred
  2: From: Alyce
  3: I'm writing this memo using the Rainbow computer.
  4: It's very easy to do.
*█
```

Screen 1-9. Displaying the Memo

Leaving the Editor

After displaying the memo, EDLIN displays:

*

To leave the editor and save MEMO.TXT on the diskette, type:

*E

next to the *.

The MS-DOS operating system displays its A> prompt.

Printing the Memo

Before you print the memo, check to see that the printer is connected to the Rainbow computer and that the printer is turned on. The *Rainbow Owner's Manual* shows you how to connect a printer to the Rainbow computer.

To print the memo, type:

A>PRINT MEMO.TXT

If this is the first time you have used the PRINT command since you started the computer, the operating system displays the following message:

Name of list device [PRN]:

In response, press:

The operating system displays:

Resident part of PRINT installed

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As the memo starts to print, the MS-DOS operating system displays:

```
A:MEMO .TXT is currently being printed
```

Screen 1-10 shows the PRINT dialog. The “A:” confirms that you are printing a file from the diskette in drive A.

```
A>PRINT MEMO.TXT
Name of list device [PRN]:
Resident part of PRINT installed

      A:MEMO .TXT is currently being printed

A>
```

Screen 1-10. PRINT Dialog

Copying a Memo to Another Diskette

You can use the COPY command to copy files from one diskette to another diskette. This is useful if you want to make a reserve copy of a file. This example shows you how to copy the memo you just created, MEMO.TXT, from the diskette in drive A to a diskette in drive B.

Preparing a Diskette

Before you can copy the memo, you must prepare a new diskette to receive information. The process of preparing the diskette is called formatting. Find a new diskette and do the following:

1. After the prompt, type:

```
A>FORMAT B: /I 
```

The FORMAT program displays the introductory message shown in Screen 1-11.

```
A>FORMAT B:/I
```

```
Rainbow Disk Formatter Version 2.7.
```

```
WARNING!!! This program will destroy any data  
currently on your disk. Type <Ctrl/C> to stop.
```

```
Insert new diskette in drive B:  
and strike any key when ready
```

Screen 1-11. FORMAT Introductory Message

2. Open the drive B door and insert the blank diskette in drive B.
3. Close the drive B door.
4. Press:

Return

The drive B light comes on and you will hear whirring and clicking sounds. The formatting process takes about 60 seconds. The FORMAT program then displays:

```
Volume label (11 characters, Return for none)?
```

5. Type:

```
MYDISKETTE Return
```

The FORMAT program displays:

```
393216 bytes total disk space
393216 bytes available on disk
```

followed by the prompt:

```
Format another (Y/N)?
```

6. Press:

```
N
```

The MS-DOS operating system displays the A> prompt.

Screen 1-12 shows the complete FORMAT dialog.

```
A>FORMAT B:/I
Rainbow Disk Formatter Version 2.7.
WARNING!!! This program will destroy any data
currently on your disk. Type <Ctrl/C> to stop.
Insert new diskette in drive B:
and strike any key when ready
Volume label (11 characters, <Return> for none)? MYDISKETTE
393216 bytes total disk space
393216 bytes available on disk
Format another (Y/N)?N
A>|
```

Screen 1-12. FORMAT Dialog

Copying the Memo

To copy the memo from the diskette in drive A to the diskette in drive B, use the COPY command. Next to the prompt, type:

```
A>COPY MEMO.TXT B:MEMO.TXT 
```

The operating system displays:

```
1 File(s) copied
```

```
A>
```

This message indicates the copy procedure was successful.

Working with the Diskette in Drive B

This section shows you how to:

1. Change the active drive from A to B.
2. Display the drive B directory.
3. Display MEMO.TXT on the screen.
4. Delete MEMO.TXT from the diskette.
5. Change the active drive from B to A.

Changing the Active Diskette Drive to B

To check that the file, "MEMO.TXT," copied to drive B, display a directory of drive B. To tell the operating system to go to the diskette in drive B, type:

```
A>B: 
```

The MS-DOS operating system displays:

B>

indicating that drive B is now active.

Displaying the Directory of Drive B

To display the directory of the diskette in drive B, type:

B>DIR

Screen 1-13 shows that MEMO.TXT is on the diskette in drive B.

```
A>B:
B>DIR

Volume in drive B is MYDISKETTE
Directory of B:\

MEMO   TXT       97  9-23-84  9:23a
1 File(s)  392704 bytes free

B>|
```

Screen 1-13. Directory of Drive B

Displaying a File on the Screen

Use the **TYPE** command to look at the contents of a file on the screen. To display **MEMO.TXT** from the diskette in drive **B**, type:

```
B>TYPE MEMO.TXT 
```

The operating system displays the memo as shown in Screen 1-14.

```
B>TYPE MEMO.TXT
To: Fred
From: Alyce
I'm writing this memo using the Rainbow computer.
It's very easy to do.

B>
```

Screen 1-14. The **TYPE** Command

Deleting a File

If you no longer need to keep a file, delete it from the diskette directory with the DEL command. Once you delete the file you can never access its contents, so think carefully before you delete it.

To delete MEMO.TXT from the diskette in drive B, type:

```
B>DEL MEMO.TXT 
```

To check that MEMO.TXT is no longer in the drive B directory, type:

```
B>DIR 
```

Screen 1-15 shows the directory. Notice MEMO.TXT is not included.

```
B>DIR
Volume in drive B is MYDISKETTE
Directory of B:\

File not found

B>|
```

Screen 1-15. Directory of Drive B After Deleting MEMO.TXT

Changing the Active Diskette Drive to A

Because you do not have any files on the diskette in drive B, make drive A the active drive again by typing:

B>A:

The MS-DOS operating system displays the prompt:

A>

What To Do in Case of Trouble

If you have any trouble while using the computer, there are several things to try.

1. Refer to the list of operating system messages in Chapter 5.
2. Reset the Rainbow computer.

Operating System Messages

Messages can be displayed for a variety of reasons. For example, messages can be displayed if you:

- Type a command incorrectly.
- Type an invalid command.
- Omit some information the operating system needs to complete the command.
- Choose a nonexistent drive.

You cannot anticipate all the conditions that can cause a message. However, if you get a message:

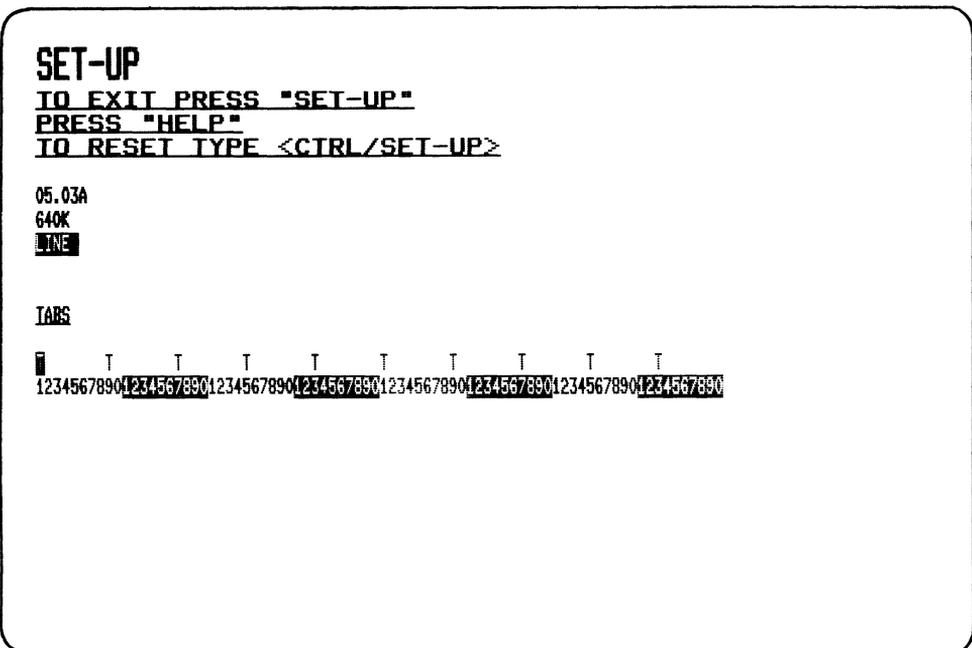
- Check for spelling errors. If you find any, retype the command.
- Check the list of commands in Chapter 2 to determine if the command you typed is a valid MS-DOS operating system command.

- Refer to Chapter 2 for further discussion of the commands or to Chapter 5 for a list of operating system messages, what they mean, and what to do about them.

Resetting the Rainbow Computer

If the operating system encounters a condition it cannot deal with, it can fail to display a message or fail to respond to any key you type. If this happens, or if you want to start over for some reason, reset the computer. You reset while the computer is turned on. Diskettes can be in or out of the drives. To reset the computer:

1. Press the Set-Up key. The text on your screen should look like that in Screen 1-16.



Screen 1-16. Set-Up Display

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2. Then hold down the Ctrl key while pressing the Set-Up key.

After you press these keys, the computer displays:

TESTING...

About four seconds later, the test is completed. If the computer detects no problems, the computer displays the Main System Menu.

Then, you can restart the MS-DOS operating system by pressing:

A

2

Using MS-DOS Files and Commands

This chapter is divided into two sections:

- Section 1 explains concepts about files, directories, and commands.
- Section 2 discusses the most frequently used commands. The commands are listed alphabetically.

Section 1 Using Commands, Files, and Directories

Commands

A command has three parts:

- The command or keyword
- The optional command tail
- Carriage return, shown as Return

Any combination of these parts is a command line. For example, the following is a command line:

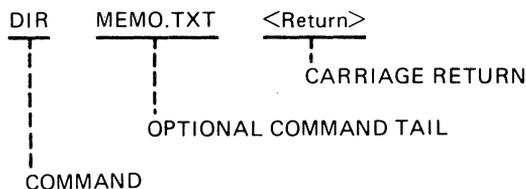


Figure 2-1. Command Line Example

Commands are instructions that tell the MS-DOS operating system to perform a single operation.

An optional command tail supplies the command with additional information, often a file name.

To have the MS-DOS operating system execute the command, press the Return key.

When you type commands, exact spacing and punctuation are important. In most cases, you must type at least one space after a command to separate the command from the optional command tail. Additional spacing and punctuation requirements are noted in Section 2, where each command is described.

Files

Most commands are designed to act on files. A file is a collection of related information. A file on your diskette can be compared to a file folder in a file cabinet. For example, one file folder could contain the names and addresses of the employees who work in your office. You could name this file the Employee Master File in your file cabinet (see Figure 2-2). A file on your diskette could also contain the names and addresses of the employees in your office and could be named EMPLOYEE.TXT (see Figure 2-3).

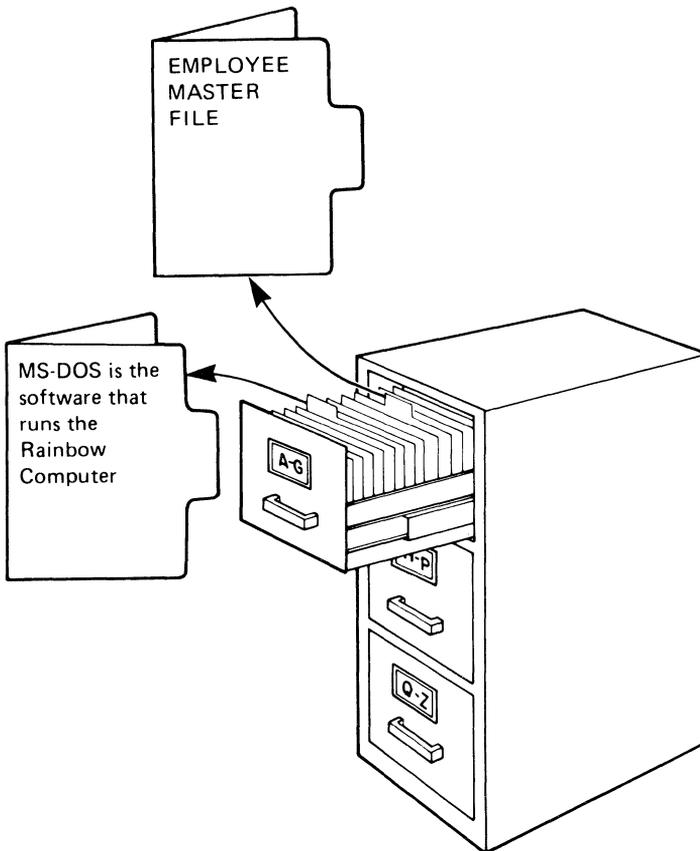


Figure 2-2. Storing Information in a File Cabinet

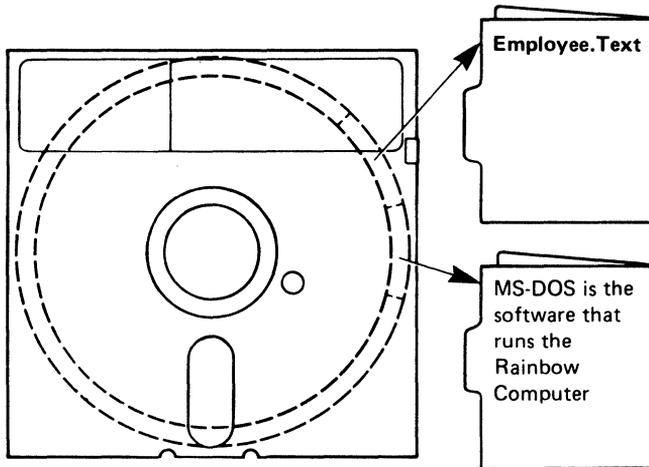


Figure 2-3. Storing Information on a Diskette

All programs, text, and data on your diskette reside in files, and each file has a unique name. You refer to a file by its name.

Each time you input and save data or text, you create a file. You also create a file when you write and name programs and save them on your diskette.

Naming Files

The name of a file has two parts:

- The file name
- The file type

In the example below, MYFILE is the **file name** and .EXE is the **file type**.

MYFILE.EXE

A file name consist of from one to eight characters. The file type can be three or fewer characters. You can type the characters in lowercase or uppercase letters.

File names and file types usually consist of letters and numbers, but other characters are allowed. You can use the characters A through Z and the numbers 0 through 9 in file names and file types. You can also use the following characters:

		°	À	Ñ	à	ñ
\$	i	±	Á	Ò	á	ó
&	e	²	Â	Ó	â	ô
#	£	³	Ã	Ô	ã	õ
%	¥	µ	Ä	Õ	ä	ö
'	§	¶	Å	Ö	å	ø
()	×	·	Æ	Ø	æ	œ
-	©	¹	Ç	Ð	ç	ø
@	®	º	È	Ù	è	ù
^	<<	>>	É	Ú	é	ú
{ }		¼	Ê	Û	ê	û
~		½	Ë	Ü	ë	ü
`		¿	Ì	Ý	ì	ý
!			Í	ß	í	
			Î		î	
			Ï		ï	

Figure 2-4. File Name Characters

Illegal File Names

The MS-DOS operating system reserves certain words for special purposes. The following words **cannot** be used as file names:

- AUX
- CON
- PRN
- NUL
- CLOCK

Wildcards

You can use two special characters, called wildcards, in file names or file types to take the place of any character. They are:

- The question mark (?)
- The asterisk (*)

The Question Mark

A question mark in a file name or file type indicates that any character can occupy that position. For example, the command:

```
A>DIR TEST?RUN.EXE 
```

lists all directory filenames on the default (active) drive that:

- Have eight characters
- Begin with TEST
- Have a character after TEST
- End with the letters RUN
- Have a file type of EXE

The following are some examples of files that might be listed by the above DIR command:

```
TEST1RUN.EXE  
TEST2RUN.EXE  
TEST6RUN.EXE  
TESTSRUN.EXE
```

The Asterisk

An asterisk in a file name or file type indicates that any character can occupy that position or any of the remaining positions in the file name or file type. For example:

```
A>DIR TEST*.EXE Return
```

lists all directory entries on the default (active) drive with file names that begin with the character TEST and have a file type of EXE. Some examples of files that might be listed by the above DIR command are:

```
TEST1.EXE  
TEST2RUN.EXE  
TEST6RUN.EXE  
TESTALL.EXE
```

The wildcard designation *.* refers to **all** files on the diskette. Note that the asterisk wildcard can be very powerful when used in MS-DOS commands.

Directories

The names of your files are kept in a directory on each diskette. The directory also contains information on the size of your files, the locations of the files on the diskette, and the dates the files were created and updated. The directory you are working on is called your current or **working directory**.

You can create and maintain private areas or “sub-directories” on the same diskette. These areas are known as “directory paths”. For complete information on sub-directories and paths, refer to the *Rainbow MS-DOS Version 2.11 Advanced User’s Guide*, in this kit.

Section 2

MS-DOS Operating System Commands

The MS-DOS operating system has two types of commands:

- Internal
- External

Table 2-1 lists the characteristics of internal and external commands.

Table 2-1. Internal and External Command Characteristics

Internal Commands	External Commands
Not shown in directory	Shown in directory
Always stored in the computer; automatically read into the computer memory at start up	Stored as files on a diskette; read into the computer only when requested
Can be used at any time regardless of which diskette or drive is being used	Can only be used if the requested file exists on diskette; specify the diskette that the file is on
Are executed immediately when you type the command name and press the Return key.	End with a file type of .COM, .EXE, or .BAT. For example, DISKCOPY.COM and FORMAT.COM are external files. Note that you do not have to include the file type when you type a file name.

Table 2-2 lists and briefly describes the MS-DOS internal and external commands that are listed in this manual.

Table 2-2. MS-DOS Operating System Commands

Command	Type	Use
BACKUP	External	Copies the indicated files from the hard disk to a set of diskettes or from a set of diskettes to the hard disk
CHKDSK	External	Scans the diskette of the default or designated drive and checks for errors
CLS	Internal	Clears the screen
COPY	Internal	Copies file(s) you specify
DATE	Internal	Displays and sets the date
DEL	Internal	Deletes file(s) you specify
DIR	Internal	Lists requested directory entries
DISKCOPY	External	Copies diskettes
ERASE	Internal	Deletes file(s) you specify
FORMAT	External	Prepares a diskette to receive MS-DOS files
MDRIVE	External	Specifies the size of the memory drive (MDRIVE.SYS)
PRINT	External	Prints files you specify
RDCPM	External	Reads CP/M-86/80 files from a diskette
REN	Internal	Renames a file
SET	Internal	Sets one string value to another string value
SETPORT	External	Changes the serial port parameters for the computer and sets up your LA50, LA100, or LQP02 printer.
SYS	External	Transfers the MS-DOS operating system files from one diskette to another diskette
TIME	Internal	Displays and sets the time
TYPE	Internal	Displays the contents of the file you specify
VER	Internal	Displays the MS-DOS operating system version number
VERIFY	Internal	Checks a diskette to make sure that information has been correctly written on it
VOL	Internal	Displays the volume identification number

Advanced Commands

The commands listed in Table 2-3 are mainly for programmers. They are stored on the MS-DOS master system diskette. For more information on these commands refer to the *Rainbow MS-DOS Version 2.11 Advanced User's Guide* in this kit.

Table 2-3. Advanced Commands

Command	Type	Usage
BREAK	Internal	Sets Ctrl/C check
CHDIR	Internal	Changes directories
CTTY	Internal	Changes console TTY
ECHO	Internal	Turns on or off the echoing of batch file command lines to the terminal and turns on or off the MS-DOS operating system prompt
EXE2BIN	External	Converts executable files to binary format
EXIT	Internal	Exit command, returns to lower level
FIND	Internal	Searches for a specific string of text
FOR	Internal	Provides a logical looping capability for command lines
GOTO	Internal	Provides logic flow control for batch file command lines
IF	Internal	Provides logic control for command lines
LDCOPY	External	Copies reserved system tracks from one diskette to another
MEDIACHK	External	Improves diskette performance
MKDIR	Internal	Makes a directory
MORE	Internal	Displays output one screen at a time
PATH	Internal	Sets a command search path
PAUSE	Internal	Temporarily suspends execution of a batch file command lines

Table 2-3. Advanced Commands (Cont.)

Command	Type	Usage
PROMPT	Internal	Designates the command prompt
RECOVER	External	Recovers a file(s) containing bad sectors.
REM	Internal	Displays a comment in a batch file
RMDIR	Internal	Removes a directory
SHIFT	Internal	Increases the number of replaceable parameters in the batch process
SORT	Internal	Sorts data alphabetically, forward or backward

Mini-Exchange Commands

Table 2-4 lists the commands you can use with the Mini-Exchange. See the *Rainbow Using the Mini-Exchange MS-DOS Version 2.11 Operating System* contained in this kit.

Table 2-4. Mini-Exchange Commands

Command	Type	Usage
XMODE	External	Reassigns logical devices to physical devices
XATTACH	External	Attaches a Rainbow computer port to a Mini-Exchange port
XDETACH	External	Detaches a Rainbow computer port from a Mini-Exchange port

Information Common to All Commands

The following information applies to all MS-DOS commands:

- Commands are usually followed by one or more options (command tails). Options are information you can add to the command line if you choose; they are not necessary to use the command.
- You can type commands and options in uppercase or lowercase letters, or a combination of both.
- You must separate commands and options by delimiters. The space or comma is normally used for delimiters.

For example:

```
A>DEL NEWFILE.TXT   
A>RENAME,THISFILE THATFILE 
```

You can also use the semicolon (;), the equal sign (=), or the Tab key as delimiters in MS-DOS commands.

- You must include the file type when referring to a file that already has a file type (except to run external commands and batch files).
- Commands take effect only after you press the Return key.
- Wildcards and reserved words (for example, PRN) are not allowed in the names of any commands.
- The prompt is the default drive designation followed by a greater-than sign (for example, A>).
- Some command explanations refer to diskette drives or files as the *source* and *destination*. The *source* is the one from which you are transferring information. The *destination* is the one to which you are transferring information.

In all cases, type the *source* before the *destination*. The following example of the COPY command illustrates the order:

```
A>COPY source.txt destination 
```

Conventions Used

Table 2-5 lists the conventions used in the discussion of commands.

Table 2-5. Conventions

Convention	Meaning
drv:	Diskette drive name (A:, B:, C:, D:) Hard disk drive name (E:, F:, G:, H:)
filename	Any valid file name. The filename option does not refer to a device or to a diskette drive designation.
.typ	Optional file type consisting of a period and one to three characters. When used, file types immediately follow file names (filename.typ).
switches	Options that control the MS-DOS operating system commands. They are preceded by a forward slash (/).
arguments	Provide more information to MS-DOS commands. You usually choose between arguments; for example ON or OFF.
. . .	Vertical ellipsis indicates a sequential progression to the entry shown.

Command Formats

The following information tells you how to format MS-DOS commands:

- All words shown in capital letters must be entered. These words must be spelled and spaced exactly as shown. You can type these words in any combination of uppercase or lowercase characters.
- You must supply the text for any items shown in lowercase. For example, you enter the name you chose for your file when you see:

`[filename.typ]`

- Items shown in brackets [] are optional. When you include optional information, *do not type* the brackets. Include only the information within the brackets.
- Items shown in braces { } indicate that you can choose between two or more items. *Do not type the braces*. One item must be selected unless the entries are optional.
- You must include all punctuation as shown, except for brackets and braces.

BACKUP

Purpose

BACKUP is a program that allows you to:

- Copy files **from a hard disk to diskettes** (called “backup ” in this guide). Backup is generally used to make copies of the files you have created. If they are accidentally erased from the hard disk, you can copy these files back to the hard disk. Hence, they are called “backup” copies of the files.
- Copy files **from diskettes to a hard disk** (called “restore” in this guide). Restore is generally used to copy back or “restore” files that were accidentally erased from the hard disk.

Figure 2-5 shows the “backup” and “restore” concepts.

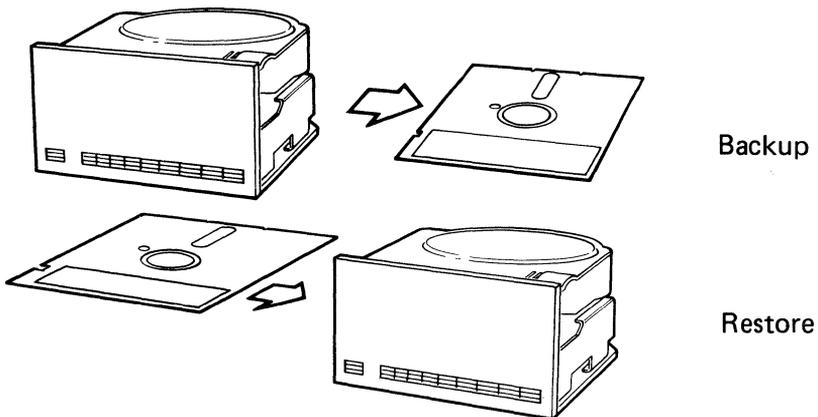


Figure 2-5. Backup and Restore Concepts

BACKUP

It is important to make extra copies of all your files at regular intervals because a hard disk can become too full, damaged, or accidentally erased. By making these copies of the files, you can delete them from the daily working space on the hard disk, and copy them back to the hard disk at a later time.

Forms

BACKUP [Return](#)

BACKUP operation [Return](#)

Menu Form. For the first form, you use a “menu” to copy files back and forth from the hard disk . For instructions, see the section titled “BACKUP Menu Instructions.” Use this form if you are not familiar with the BACKUP program and its options. The BACKUP menus ask you for information to supply to the program.

Command Line Form. For the second form, you simply type commands after the A> prompt. For instructions, see the section titled “BACKUP Command Line Instructions.” Use this form when you are familiar with the BACKUP program and know exactly what options you want to use. You cannot use all the BACKUP program’s options with this form.

BACKUP Menu Instructions

You use the BACKUP program to:

- Copy files from the hard disk to diskettes (called “backup” in this guide).
- Copy files from diskettes to the hard disk (called “restore” in this guide). Restore is generally used to “restore” files that were accidentally erased from the hard disk.

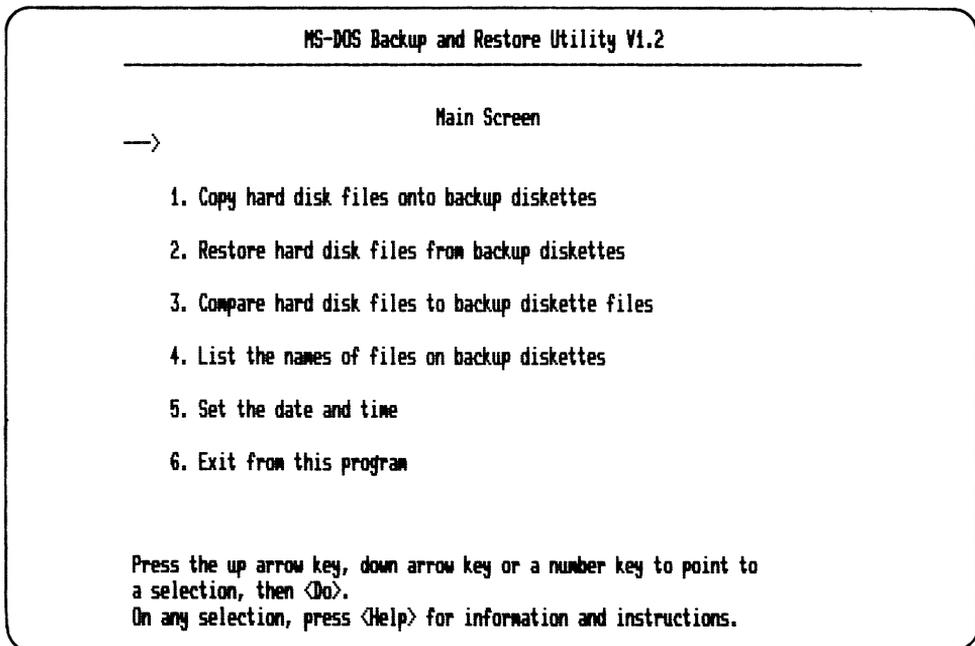
NOTE

The instructions below assume that you are starting the operating system from a diskette in drive A.

Starting BACKUP. To start the BACKUP program, type:

A>BACKUP **Return**

BACKUP displays the menu shown in Screen 2-1.



Screen 2-1. The Backup/Restore Main Screen

BACKUP

To select an option:

1. Move the arrow in the left-hand corner of the screen to the task you want to do by either:
 - Pressing the up or down arrow keys
 - Typing a number (1-6)
2. Press the Do key.

For example, if you type the number 4, the arrow moves to the fourth option—“List the names of files on backup diskettes”. Then press the Do key.

After you press the Do key and the BACKUP program begins, you are asked questions by the BACKUP program.

The options for the BACKUP program are discussed in the following sections of this chapter.

Getting Help. If you want to find out what an option does:

1. Choose the option you want information about by pressing one of the following:
 - The up or down arrow keys to the appropriate line
 - The number of the option (1-6)
2. Press the Help key.

After you have received the information you need, press the Prev Screen key to return to the Backup/Restore Main Screen.

Option 1. Copy Hard Disk Files onto Backup Diskettes

Option 1 of the BACKUP program allows you to copy selected files from the hard disk to a set of diskettes. The diskettes you copy to are called the “backup” diskettes.

IMPORTANT

Before you copy files, be sure that you set the correct time and date. The time and the date can be essential when you copy files back to the hard disk. Set the time and the date with the TIME and DATE commands at the operating system level or with Option 5 on this BACKUP program.

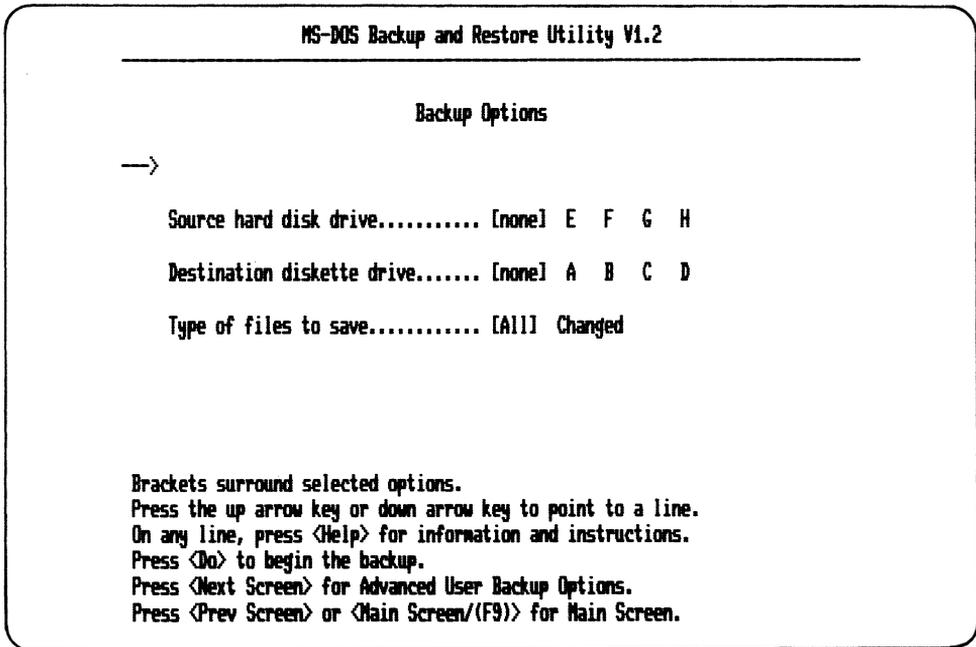
To copy files from a hard disk to a set of diskettes:

1. Start the BACKUP program by typing:

```
A>BACKUP Return
```

2. Insert a blank, MS-DOS formatted diskette in the diskette drive that you want to copy the files to.
3. Press one of the following:
 - The up or down arrow key until the arrow points to option 1
 - The 1 key
4. Press the Do key.

The computer displays the backup options shown in Screen 2-2.



Screen 2-2. Backup Options

5. To choose the hard disk drive to copy files from, press:
 - a. The down arrow key
 - b. The right arrow key to select the source drive (E, F, G, H)

NOTE

If you are not sure what an option means, move the arrow to the option you need help on, and press the Help key.

6. To choose the diskette drive to copy the files to, press:
 - a. The down arrow key
 - b. The right arrow key to select the destination drive (A, B, C, D)

7. Choose to copy:

- **All** files in the hard disk's current directory by making no more selections and pressing the Do key.
- The files in the hard disk's current directory that have **changed** since the last time you copied files:
 - Press the down arrow key.
 - Press the right arrow key to highlight “changed”.
 - Press the Do key.

NOTE

The BACKUP program displays the Date and Time screen after you press the Do key if you did not change the default date and time when you started the MS-DOS operating system. If you see this screen, type the current date and time and press the Do key. Then press the Do key to start copying the files.

As the BACKUP program copies the files to the diskette, each file name is displayed on the screen. When the diskette is full, you are asked to insert another blank, MS-DOS formatted diskette.

When the program is done you see a brief message indicating that the BACKUP program is complete, and the program returns to the Backup/Restore Main Screen.

NOTE

After you have copied these files to diskettes, you cannot use the files on these diskettes for any other purpose than copying them back to the hard disk.

BACKUP

Advanced Backup Procedures. Advanced User Backup options are available for the copying process. For example, you can delete the files from the hard disk after you copy them to the diskettes. See Screen 2-3 for all of the advanced backup options.

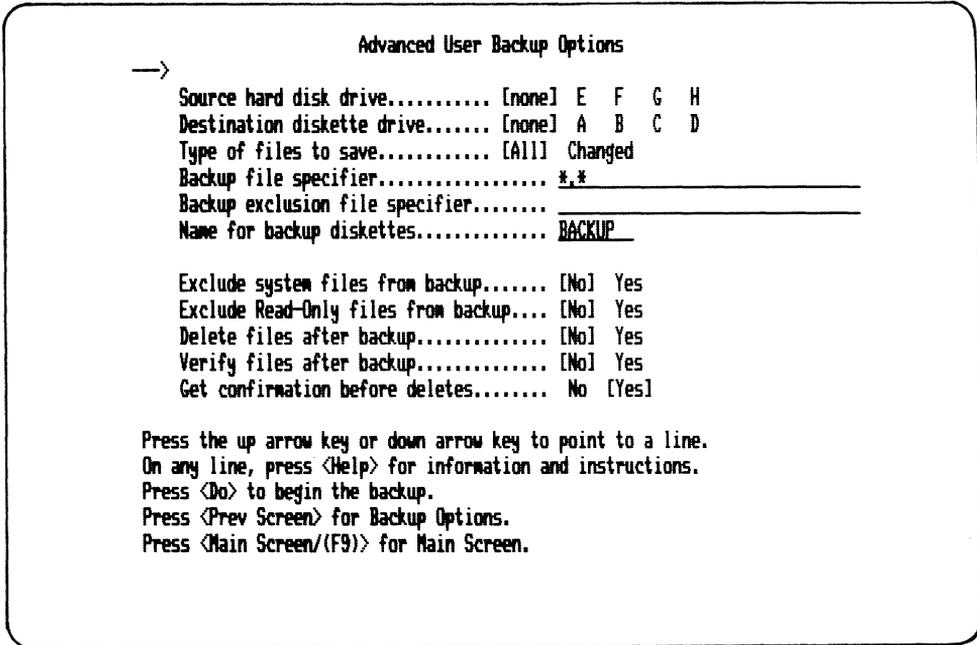
To use the advanced backup options:

1. Start the BACKUP program. Type:

A>BACKUP **Return**

2. Insert a blank, MS-DOS formatted diskette into the diskette drive that you want to copy the files to.
3. Press one of the following:
 - The up or down arrow key until the arrow points to option 1
 - The 1 key
4. Press the Do key.
5. Press the Next Screen key.

Screen 2-3 displays the advanced backup options.



Screen 2-3. Advanced User Backup Options

6. Press the up or down arrow key to select a line.
7. Press the right arrow key to select an option within a line, or type a value on the drawn line
8. When you have specified all the information, press the Do key.

NOTE

The BACKUP program displays the Date and Time screen after you press the Do key if you did not change the default date and time when you started the MS-DOS operating system. If you see this screen, type the current date and time and press the Do key. Then press the Do key to start copying the files.

BACKUP

As the BACKUP program is copying the files, each file name is displayed on the screen. When the diskette is full, you are asked to insert another blank, MS-DOS formatted diskette.

When the program is done, it displays a brief message indicating that the copying process is complete, and the program returns to the Backup/Restore Main Screen.

NOTE

After you have copied these files to diskettes, you cannot use the files on these diskettes for any other purpose than copying them back to the hard disk.

Descriptions of each of the advanced user backup options follow.

Source hard-disk drive

This option allows you to specify the partition on the hard disk from which files will be saved. The partitions recognized by this program range from E to H. If a hard disk has fewer partitions, and you select a nonexistent partition, a message is displayed on the bottom of the screen in reverse video. There is no default value; you must select a partition.

Destination diskette drive

This option allows you to specify which diskette drive contains the diskettes to which to copy the files. The option requests that you insert diskettes as needed to save all the specified files.

The drives recognized by this program range from A to D. There is no default value; you must select a drive.

Type of files to save

This option allows you to specify whether or not to save ALL files in a specified directory or just those that have been changed or created since the last backup procedure. The default is to copy all files. However, saving selected files is faster and requires less space.

Backup file specifier

This option allows you to specify categories of file names to be saved on the diskette. The names of the files to be saved can be written in this entry by using:

- An optional directory and/or path name
- A one to eight-character file name
- An optional period (.)
- An optional file type of up to three characters
- An optional /A specification that causes specified files in the hard disk's current directory and all directories below it to be included in the operation.
- An optional /D specification that causes specified files in directories below but not including the hard disk's current directory to be included in the operation.

NOTE

You cannot specify both /A and /D in the file specification. If you do not specify either /A or /D, then the BACKUP program only performs the operation on the files in the hard disk's current directory.

BACKUP

For example, if you specify drive E as the source hard disk drive, the following file specification backs up the entire hard disk drive E including the main directory and all subdirectories.

`*.* /A`

If desired, you can also use the following wildcard characters:

- ? Matches any single character
- * Matches any number of any characters

You can also specify an indirect file. An indirect file contains a list of files (one per line) to be saved on the diskettes. This is useful if you have a long and frequently used list of files.

To specify an indirect file:

1. Use the symbol @
2. Followed by an optional drive name (A through I) and a colon (:)
3. Followed by a file name and optional file type. The name of the indirect file cannot include wildcard characters. However, the file names listed in the indirect file can contain wildcards.

Example:

`@A:LIST.FIL`

If you type an illegal character, a message is displayed at the bottom of the screen. If you type a character unintentionally, you can use the delete character key to erase the character.

The default file specifier is all files in the hard disk's current directory (*.*).

Backup exclusion file specifier

This option allows you to specify a category of file names *not* to be saved on the diskettes. The names of the files *not* to be saved can be written in this entry by using the wildcard characters described earlier. The default is no files. If you type an illegal character, a message is displayed at the bottom of the screen. If you type a character unintentionally, you can use the delete character key to erase the character. You cannot use the /A or /D switches on this file specifier.

Name for backup diskettes

The name of the backup diskettes is an eight-character name that you choose. This name is stored on each backup diskette in the set. The name is also used by the restore and verify programs as a check that the correct set of diskettes has been inserted when files are being copied back to the hard disk. The default name is BACKUP. To change the name, erase the existing name using the delete character key. Then re-type the name. If you type an illegal character, a message is displayed at the bottom of the screen. If you type a character unintentionally, you can use the delete character key to erase the character.

Exclude system files from backup

This option allows you to specify whether or not to save files with the system attribute that are in the source partition. The system files are not often changed so that once you have saved them, you can choose not to save them again. The default is NO.

Exclude Read Only files from backup

This option allows you to specify whether or not to save files with the Read Only attribute that are in the source partition. The default is NO.

Delete files after backup

This option allows you to specify whether or not to delete each file from the hard disk source partition after the file has been saved onto the diskettes. This selection can save you time if a large number of files are to be permanently saved. In addition, this option eliminates the possibility of deleting the wrong files after a permanent backup procedure. The default is NO.

Verify files after backup

This option allows you to specify whether or not to check that the data has been correctly copied to the diskettes. This feature verifies that the data has been properly copied. On the other hand, it takes more time. Therefore, if you feel confident about the backup procedures, select NO for this option. The default is NO.

CAUTION

If you plan to delete or erase the data from the hard disk before you attempt to restore the data, you should select YES for this option. Then, when you copy the data to the diskettes, you are assured that the data was copied successfully and can be easily restored.

Get confirmation before deletes

This option allows you to specify whether or not the BACKUP program should require you to “give permission ” before any data is deleted from the hard disk or diskettes. You are prompted before each file deletion whether or not to delete that particular file. If you feel confident about the operation of the backup procedure and do not wish to be prompted by these messages, select NO for this option. The default is YES.

Option 2. Restore Hard Disk Files from Backup Diskette

Option 2 from the BACKUP program allows you to copy selected files from the diskettes to a specified partition on the hard disk. You do this generally to copy files back to the hard disk, (restore).

To copy files from the diskettes to the hard disk:

1. Start the BACKUP program by typing:

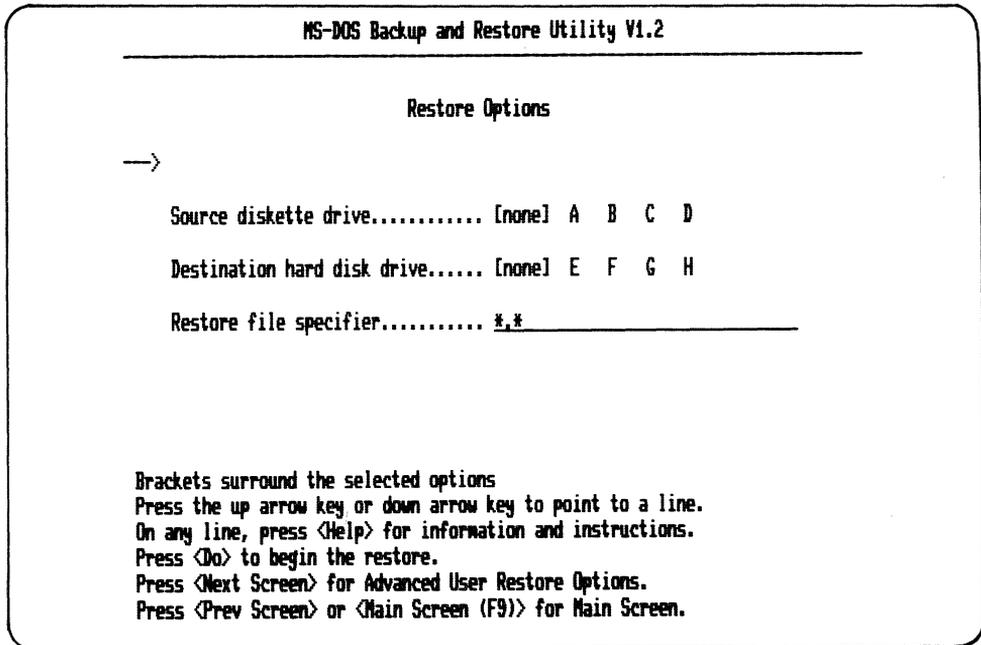
```
A>BACKUP Return
```

2. Press one of the following:

- The up or down arrow key until the arrow points to option 2
- The 2 key

3. Press the Do key.

The computer displays the restore options shown in screen 2-4.



Screen 2-4. Restore Options

NOTE

The *.* indicates all files in the current hard disk directory that are on the back-up diskettes.

4. To choose the diskette drive to copy the files from, press:
 - a. The down arrow key to move the arrow to the first line
 - b. The right arrow key to select the source drive (A, B, C, D)

NOTE

If you are not sure what an option means, select the option by moving the arrow to the option you need help on, and press the Help key.

5. To choose the hard disk drive to copy the files to, press:
 - a. The down arrow key to move the arrow to the second line
 - b. The right arrow key to select the destination drive (E, F, G, H)

6. Choose to restore:
 - All files in the hard disk's current directory by not making any more selections and pressing the Do key
 - Certain files that you specify:
 - Press the down arrow key to move the arrow to the third line.
 - Press the delete character key until the *.* is removed.
 - Type the names of the files you want restored.
 - Press the Do key.

You can specify the /A or the /D switches here. See the section called "Backup file specifier" earlier in this chapter for more information about these switches.

NOTE

If you are not sure of how to specify a group of files, refer to the section called "Backup File Specifier" earlier in this chapter.

After the program starts, you are asked to insert a diskette. When all the files have been copied from that diskette to the hard disk, you are asked to insert another diskette.

As the BACKUP command copies the files to the hard disk, each file name is displayed on the screen. When the program is done you see a brief message indicating that the procedure is complete, and the program returns to the Backup/Restore Main Screen.

BACKUP

Advanced Restore Procedures. Advanced User Restore options are available for the restoring process. For example, you can verify the files after they are restored. See screen 2-5 for all of the advanced restore options.

To use the advanced restore options:

1. Start the BACKUP program by typing:

A>BACKUP **Return**

2. Press one of the following:

- The up or down arrow key until the arrow points to option 2
- The 2 key

3. Press the Do key.
4. Press the Next Screen key.

Screen 2-5 displays the advanced restore options.

```

MS-DOS Backup and Restore Utility V1.2

Advanced User Restore Options

-> Source diskette drive..... [none] A B C D
Destination hard disk drive.... [none] E F G H

Restore file specifier..... *.*
Restore exclusion file specifier...
Name of backup diskettes..... BACKUP

Restore over existing files..... No [Yes]
Restore over Read-Only files..... [No] Yes
Restore over system files..... [No] Yes
Verify files after restore..... [No] Yes
Get confirmation before deletes..... No [Yes]

Press the up arrow key or down arrow key to point to a line.
On any line, press <Help> for information and instructions.
Press <Do> to begin the restore.
Press <Prev Screen> for Restore Options.
Press <Main Screen/(F9)> for Main Screen.

```

Screen 2-5. Advanced User Restore Options

5. Press the up or down arrow key to select a line.
6. Press the right arrow key to select an option within a line, or type a value on the drawn line.
7. When you have specified all the information, press the Do key.

After the program starts, you are asked to insert a diskette. When all the files have been copied from that diskette to the hard disk, you are asked to insert another diskette.

As the BACKUP program is copying the files from the diskettes to the hard disk, each file name is displayed on the screen. When the program is done, it displays a brief message indicating that the copying process is complete, and the program returns to the Backup/Restore Main Screen.

These advanced user options are similar to those for the backup options, except for three, which are described as follows.

Restore over existing files

This option allows you to specify whether or not to restore files from the diskettes even if a file of the same name already exists on the hard disk. If the file already exists on the hard disk, it is deleted and the file from the diskette is written onto the hard disk.

The option is useful if you wish to restore a few files that were inadvertently deleted. The default is YES.

Restore over Read Only files

This option allows you to specify whether or not to restore files that have a Read Only protection attribute from the diskettes even if a file of the same name already exists on the hard disk. If the file already exists on the hard disk, it is deleted and the file from the diskette is written onto the hard disk.

This option, in effect, allows the Restore utility to override the Read Only attribute. The default is YES.

Restore over system files

This option allows you to specify whether or not to restore system files from the diskettes even if a file of the same name already exists on the hard disk. If the file already exists on the hard disk, it is deleted and the file from the diskette is written onto the hard disk.

This option is useful if you wish to restore all application files to a previous state. The default is YES.

Option 3. Compare Hard Disk Files to Backup Diskette Files

Option 3 of the BACKUP program allows you to compare specified files on the diskettes with the corresponding files on the hard disk—called a “verify operation”. Use this option to see any changes that have been made since you last saved a file. The verify option is useful as a check that you have the latest copy of any given file, as well as a check to be sure you have saved the file on diskettes.

IMPORTANT

You should select this option if you plan to delete the files from the hard disk before you restore them. This insures that the files were successfully copied to the diskettes and can be easily restored.

To compare the files on the hard disk to those on the backup diskette:

1. Start the BACKUP program by typing:

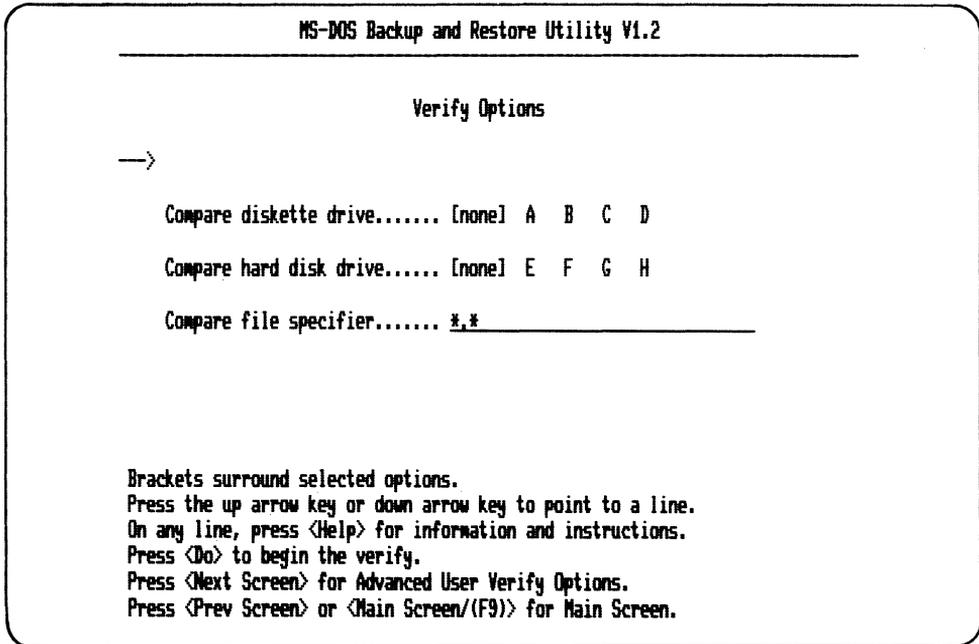
A>BACKUP **Return**

2. Press one of the following:

- The down arrow key until the arrow points to option 3
- The 3 key

3. Press the Do key.

The computer displays the verify options as shown in Screen 2-6.



Screen 2-6. Verify Options

4. To choose the diskette drive to compare file from, press:
 - a. The up or down arrow key
 - b. The right arrow key to select the diskette drive, (A, B, C, D)
5. To choose the hard disk drive to compare the files to, press:
 - a. The down arrow key
 - b. The right arrow key to select the hard disk drive, (E, F, G, H)

6. Choose to compare:

- All files in the hard disk's current directory that are on the back-up diskettes by making no more selections and pressing the Do key
- Certain files that you specify:
 - Press the down arrow key to move the arrow to the third line.
 - Press the delete character key until the *.* is removed.
 - Type the file specification for the files you want to compare.
 - Press the Do key.

You can specify the /A or the /D switches here. See the section called "Backup file specifier" earlier in this chapter for more information about these switches.

When the program starts you are asked to insert the first diskette. After the files are compared between the diskette and the hard disk partition, you are asked to insert another diskette.

As the BACKUP program verifies each file, the file name is displayed on the screen. When the program is done, you see a brief message indicating that the verify procedure is complete, and the program returns to the Backup/Restore Main Screen.

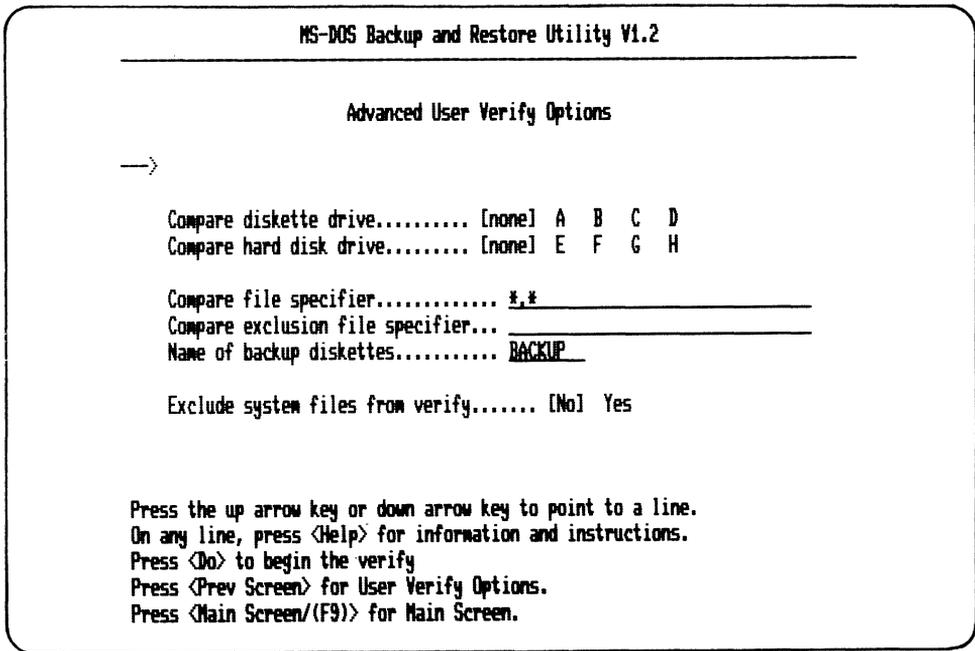
Advanced Verify Procedures. Advanced User Verify Options are available for the verify process. For example, you can choose to exclude system files from the verify procedure. See screen 2-7 for all of the advanced user verify options.

To use the advanced verify options:

1. Start the BACKUP program by typing:

A>BACKUP **Return**

2. Press one of the following:
 - The up or down arrow key until the arrow points to option 3
 - The 3 key
3. Press the Do key.
4. Press the Next Screen key.
Screen 2-7 displays the advanced verify options.



Screen 2-7. Advanced User Verify Options

5. Press the up or down arrow key to select a line.
6. Press the right arrow key to select an option within a line, or type a value on the drawn line.
7. When you have specified all the information, press the Do key.

When the program starts you are asked to insert the first diskette. After the files are compared between the diskette and the hard disk partition, you are asked to insert another diskette.

As the BACKUP program verifies each file, the file name is displayed on the screen. When the program is done, you see a brief message indicating that the verify procedure is complete, and the program returns to the Backup/Restore Main Screen.

The advanced verify options are similar to the advanced backup and restore options as described on preceding pages.

Option 4. List the Names of Files on Backup Diskettes

Option 4 of the BACKUP program allows you to list the names of all files that you copied on a set of diskettes.

To list the files that are stored on the backup diskette:

1. Start the BACKUP program by typing:

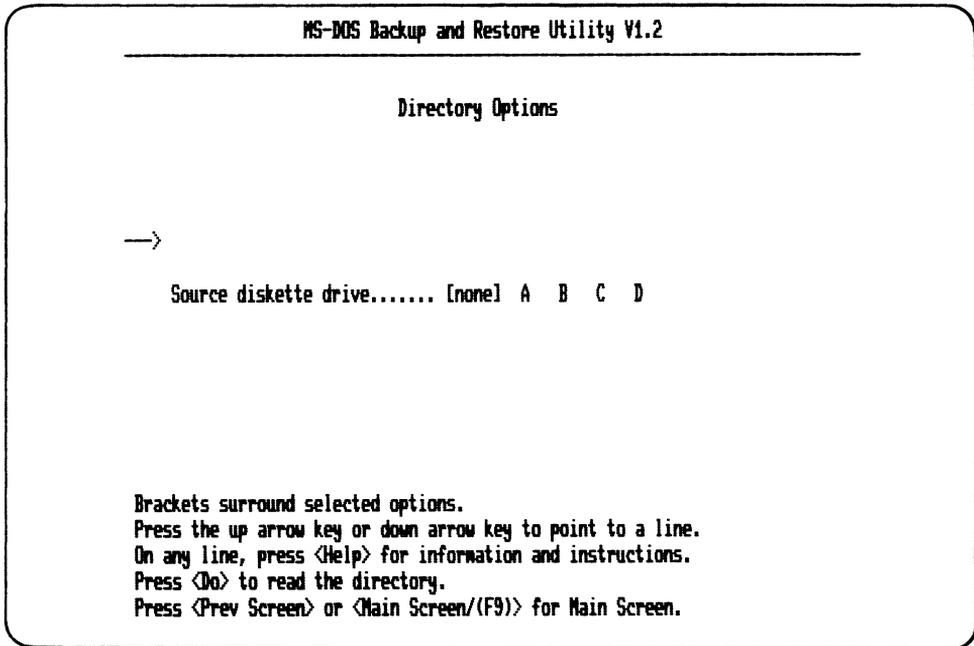
A>BACKUP **Return**

2. Press one of the following:

- The up or down arrow key so the arrow points to option 4
- The 4 key

3. Press the Do key.

The computer displays the directory options shown in Screen 2-8.



Screen 2-8. Directory Options

4. To choose which diskette drive to list the file from, press:
 - a. The down arrow key
 - b. The right arrow key to select the the diskette drive (A, B, C, D)
5. Press the Do key.

The program asks you to insert a backup volume in the selected drive. Then the program displays information about diskettes and the files on these diskettes.

If you have a series of backup diskettes, you only need to insert the first diskette to display a directory of all the files in the series.

Option 5. Set the Date and Time

Option 5 allows to specify the date and time on the computer. This option allows you to reset the date and the time that you specified when you started MS-DOS.

To set the date and the time:

1. Start the BACKUP program by typing:

```
A>BACKUP Return
```

2. Press one of the following:

- The up or down arrow key until the arrow points to option 5
- The 5 key

3. Press the Do key.

The computer displays the date and time options as shown in Screen 2-9.

```
MS-DOS Backup and Restore Utility V1.2
-----
                                Date and Time

Please enter the current date and time.
The format for date is:
    mm-dd-yy      (Example: 2-8-83)

The format for time is:
    hh:mm:ss      (example: 16:30:00)
-->

Today's date..... 09-09-84_____
Current time..... 10:16:13_____

Press the up arrow key or down arrow key to point to a line.
On any line, press <Help> for information and instructions.
Press <Do> to set the date
Press <Main Screen/(F9)> for Main Screen.
```

Screen 2-9. Date and Time

4. To enter the date:
 - a. Press the down arrow key to move to the "Today's date " line.
 - b. Use the delete character key to delete the current date.
 - c. Enter the month and day in two digits; enter the year in two or four digits.
5. To enter the time:
 - a. Press the down arrow key to the "Current Time" line.
 - b. Use the delete character key to delete the current time.
 - c. Enter the hour, minutes, and seconds in one or two digits. (Entering seconds is optional.)
6. To set the date and time, press the Do key.

Option 6. Exit from this Program

Option 6 of the BACKUP program allows you to leave the BACKUP program and return to the operating system.

To leave the BACKUP program from the Backup/Restore Main Screen:

1. Press one of the following:

- The down arrow key until the arrow points to option 6
- The 6 key

2. Press the Do key.

When you leave the BACKUP program you are returned to the operating system prompt.

BACKUP Command Line Instructions

You can use the BACKUP command line instructions to:

- Copy files **from a hard disk to diskettes** (called “backup” in this guide). Backup is generally used to make copies of the files you created. If they are accidentally erased from the hard disk, you can copy these files back to the hard disk. Hence, they are called “backup” copies of the files.
- Copy files **from diskettes to a hard disk** (called “restore ” in this guide). Restore is generally used to copy back or “restore” files that were accidentally erased from the hard disk.

This is the form of the BACKUP program to use if you do not want to use the menu form. You simply type in a command after the A> prompt. You should know exactly what operations you want to perform to use this form.

You **cannot** use all of the operations of the BACKUP program using this form.

The basic operations you can use on the command line are:

- BACKUP
- RESTORE
- VERIFY
- DIRECTORY

To use all of the options of the BACKUP program, you must use the menu form. (See the section titled "BACKUP Menu Instructions".)

Forms. You can use the following forms at the command level for the BACKUP program:

A>BACKUP [BACKUP] p:[filename.typ][/A | /D] TO drv: [/ALL] [/CHANGED]

A>BACKUP RESTORE p: FROM drv:[filename.typ]

A>BACKUP VERIFY p: WITH drv:[filename.typ]

A>BACKUP DIRECTORY drv:

BACKUP

Where:

p:	Is a hard disk partition (E through H).
drv:	Is a diskette drive (A through D).
[filename.typ]	Is an optional file specifier or indirect file. Path names can be included before the file name.
[/A]	Is an optional specification that causes specified files in the current directory and all directories below it to be included in the operation.
[/D]	Is an optional specification that causes specified files in directories below but not including the current directory to be included in the operation.
[/ALL]	Is an optional specification to copy all files in a specified directory.
[/CHANGED]	Is an optional specification to copy only the files that have changed since the last backup operation.

BACKUP Restrictions

The following list describes some restrictions of the BACKUP program.

- The BACKUP program allows you to type only up to 32 characters in file name and path name specifications. If you must specify a file name and path name specification that exceeds 32 characters, you should change your directory (with the CHDIR command) so the directory that contains the file(s) you want to save, restore, or verify is now the current directory. Do this BEFORE you run the BACKUP program.

For example, if the full path name and file name were:

```
\DIGITAL\SYSTEM\MSDOS\UTILITY\*.EXE
```

you would use the MS-DOS CHDIR command to make your current directory “\DIGITAL\SYSTEM\MSDOS\UTILITY” before running the BACKUP program. Then, specify “*.EXE” as the file name to be included in the operation.

- The BACKUP program can only display up to 50 characters in a file name and path name specification. This means that when the BACKUP program displays a file name and path name specification that contains greater than 50 characters, it omits the characters following the fiftieth character. However, the program uses the full file name and path name specification in performing the backup, restore, or verify operation despite the truncated display.
- If you include a very large number of files in a backup operation (250-300 files), then the BACKUP program may not have enough memory available to process all of them at once. The program displays a message to that effect if this situation occurs. You should then process each sub-directory individually in multiple backup operations.
- If an unrecoverable error occurs during a backup, restore or verify operation, the cursor may not be displayed on the screen when you are returned to the operating system’s prompt. To restore the cursor, you must reset the computer.

- **AVOID USING DISKETTES WITH WRITE-PROTECT TABS ON THEM.**

If you use a write-protected diskette on which to copy files during a backup operation, the BACKUP program stops the operation. If the BACKUP program copied files to any previous diskettes before it encountered the write-protected diskette, the previous diskettes are valid backup volumes. You can use them to restore the files they contain. The only misleading information is in the directory of the backup diskettes, which includes the files that the BACKUP program could not copy onto the write-protected volume.

- It is possible, during a restore operation, to NOT have enough space on your hard disk for the BACKUP program to transfer all the files. This can happen if you have:

- Added or created new files on the hard disk
- Reduced the size of the partition

since you backed up the files you are attempting to restore. To restore the file(s) if this situation occurs:

- Delete some files on the hard disk so all the files can be restored
- Repeat the Restore operation

CHKDSK

Purpose

CHKDSK is an external command that scans the diskette in the specified drive and checks it for errors.

Form

CHKDSK [drv:][filename.typ][/F][/V]

Instructions

CHKDSK should be used periodically on each diskette and hard disk to check for errors in the directory. If errors are found, CHKDSK displays a message, and then a status report. (See Chapter 5 for a list of CHKDSK messages.)

Switches

The /F switch corrects errors you find with CHKDSK.

The /V switch displays messages while you are using CHKDSK.

Example

The following is an example of a status report:

```
393216 bytes total disk space
 25600 bytes in 3 hidden files
204288 bytes in 18 user files
163328 bytes available on disk
```

```
65536 bytes total memory
53152 bytes free
```

CLS

CLS

Purpose

CLS is an internal command that clears the screen.

Form

CLS **Return**

Instructions

CLS causes the MS-DOS operating system to send the ANSI escape sequence **ESC**[2J to your screen, which then clears the screen.

COPY

Purpose

COPY is an internal command that copies one or more files from one diskette to another. If you prefer, you can give each copy a different name. This command can also copy files to other locations on the same diskette.

Form

To **copy** files:

```
COPY  
[drv:]filename.typ[/A[/B][drv:][filename.typ[/A[/B[/V] Return
```

To **concatenate** files:

```
COPY [drv:]filename.typ[/A[/B] + [drv:]filename.typ[/A[/B] ...  
      [drv:]filename.typ [/A] [/B[/V]
```

Instructions

Copy files. If you do not specify the second [drv:]filename.typ, the file is placed on the default drive with the original file name.

If you specify the second [drv:]filename.typ, you can type it in one of three ways:

- If you do not specify the second filename.typ, the copy is made to the specified drive and has the same name as the original file name.
- If you specify **only** filename.typ in the second option, the original file is copied to a file on the default drive with the original file name.
- If you specify both the drive and the filename.typ, the original file is copied to that specified drive and filename.

COPY

If the first filename.typ option is on the default drive and you do not specify the second filename.typ, the COPY command is stopped. The MS-DOS operating system displays the following message:

```
File cannot be copied onto itself
0 File(s) copied
```

The /V switch causes the operating system to verify that the sectors written on the destination diskette are recorded properly. Although there are rarely recording errors when you run COPY, you can verify that critical data has been correctly recorded. This option causes the COPY command to run slower because the MS-DOS operating system checks each entry recorded on the diskette.

The /A and the /B switches indicate that the files being processed are ASCII or binary files. Each switch applies to the file name preceding it and to all remaining files on the command line, until another /A or /B switch is found.

When you use /A with a source file, the switch causes the file to be treated as a text file. Data in the file is copied up to, but not including, the first end-of-file mark, (Ctrl/Z). The rest of the file is not copied.

When you use /B with a source file, the switch causes the entire file to be copied, including any end-of-file mark.

When you use /A with a target file, /A causes an end-of-file character to be added as the last character of the file.

When you use /B with a target file, the /B causes no end-of-file character to be added.

Concatenate Files. The COPY command also allows file concatenation (joining) while copying. Concatenation is accomplished by simply listing any number of files as options to COPY, separated by +. For example:

```
A>COPY A.XYZ+B.MEM+B:C.TXT BIGFILE.TXT Return
```

This command concatenates files named A.XYZ, B.MEM, and B:C.TXT and places them in the file called BIGFILE.TXT on the default drive.

To combine several files into one file, you can also use wildcards. For example:

```
A>COPY *.LST COMBIN.PRN Return
```

This command takes all files with a file type of .LST and combines them into a file named COMBIN.PRN.

Avoid concatenating when one of the source file names has the same file name as the destination file name. For example, the following command is incorrect if ALL.LST already exists, unless ALL.LST is the first *.LST file in the diskette directory.

```
A>COPY *.LST ALL.LST Return
```

The problem is not detected until after the original ALL.LST has been copied over by the new ALL.LST. At this point the original ALL.LST is destroyed.

The following command appends all *.LST files, except ALL.LST, to ALL.LST:

```
A>COPY ALL.LST + *.LST
```

COPY

This command is the correct way to concatenate when one of the source file names has the same file name as the destination file name.

The following command copies the file B:ABC.TXT to the default drive and assigns a new date and time.

```
A>COPY B:ABC.TXT +
```

The following command only changes the date and time, leaving the file in place:

```
A>COPY B:ABC.TXT + ,, B:
```

The commas define the end of the source file name. They are necessary because the COPY command expects another file name after the + sign.

When you concatenate files, the default switch is /A.

Examples

1. The following example copies a file named REPORT.TXT on the diskette in drive A to the diskette in drive B. The file name does not change.

```
A>COPY REPORT.TXT B: 
```

2. In the following example, for each file found matching *.LST, that file is combined with the corresponding .REF file. The result is a file with the same file name but with the file type .PRN. Thus, FILE1.LST will be combined with FILE1.REF to form FILE1.PRN; then XYZ.LST is combined with XYZ.REF to form XYZ.PRN; and so on.

```
A>COPY *.LST+*.REF *.PRN 
```

3. The following COPY command combines all files matching *.LST, then all files matching *.REF, into one file named COMBIN.PRN:

```
A>COPY *.LST+*.REF COMBIN.PRN 
```

4. The following command concatenates the file names "A.COM", "B.XYZ", and "B:C.TXT". The MS-DOS operating system copies:
 - The entire file "A.COM" including any end-of-file mark
 - The file "B.XYZ" up to but not including any end-of-file mark
 - The file "B:C.TXT" up to but not including any end-of-file mark

The three files are then placed in the file named "BIGFILE.TXT".

```
A>COPY A.COM/B + B.XYZ/A + B:C.TXT BIGFILE.TXT 
```

DATE

DATE

Purpose

DATE is an internal command that lets you enter or change the date known to the operating system. This date is recorded in the directory for any files you create or alter.

You can change the date from your terminal or from a batch file.

Form

DATE [mm-dd-yy]

NOTE

The date format above is for the United States. The form for the DATE command depends on the country you specify in the CONFIG.SYS file on the MS-DOS Version 2.11 diskette. See Appendix D of this guide for information on how to change the format.

Instructions

If you type DATE, the DATE command displays the following message:

```
Current date is mm-dd-yy
Enter new date:
```

Press the Return key if you do not want to change the date shown. You can also type a particular date after the DATE command, as in:

```
A>DATE 3-9-81
```

In this case, you do not have to answer the “Enter new date: “ question. Enter the new date using numerals only; you cannot use letters.

The options allowed are:

```
mm = 1 - 12
dd = 1 - 31
yy = 80 - 99 or 1980 - 2099
```

You can separate the date, month, and year entries by hyphens (-), periods (.) or slashes (/). The MS-DOS operating system changes months and years correctly, whether the month has 31, 30, 29, or 28 days. The operating system handles leap years.

DEL (DELETE)

DEL (DELETE)

Purpose

DEL is an internal command that deletes all files with the designated filename.typ. You can also use ERASE instead of DEL to delete files. ERASE is discussed in this chapter.

Form

DEL [drv:]filename.typ

Instructions

If you use wildcards for the file name and file type, such as *.* , the prompt “Are you sure?” is displayed.

If you type Y, then all files are deleted as requested. DEL performs the same function as ERASE.

Example

In the following example, the DEL command erases all the files from the diskette in drive B.

A>DEL B: *.*

Press the Y key after the computer displays “Are you sure?”. Then all the files on the diskette in drive B are erased.

DIR (DIRECTORY)

Purpose

DIR is an internal command that lists the files in a directory.

Form

DIR [drv:][filename.typ][[/P][/W]] 

Instructions

If you just type DIR, all directory entries on the default drive are displayed. If only the drive specification is given (DIR drv:), all entries on the diskette in the specified drive are displayed. If you type only a file name with no file type (DIR filename), then *all files* with the designated file name on the diskette in the default drive are displayed.

If you designate a file specification (DIR drv:filename.typ), all files with the file name specified on the diskette in the drive you specified are displayed. In all cases, files are listed with their size and with the time and date of their last modification.

You can use the wildcard characters ? and * (question mark and asterisk) in the file name option. Table 2-6 lists the DIR command equivalents.

Table 2-6. DIR Command Equivalents

Command	Equivalent
DIR	DIR *.*
DIR FILENAME	DIR FILENAME.*
DIR .EXT	DIR *.EXT
DIR .	DIR *.

Switches

You can use two switches with the DIR command. They are:

- The /P switch. The /P switch selects page mode. When you use /P, the directory display pauses after the screen is filled. To resume display of output, press any key.
- The /W switch. The /W switch selects wide display. When you use /W, only file names are displayed. The file size and time and date of last modification are not displayed. Files names are displayed five to a line.

DISKCOPY

Purpose

DISKCOPY is an external command that copies the contents of the diskette in the source drive to the diskette in the destination drive.

Form

DISKCOPY [drv1:][drv2:] **Return**

Instructions

The first drive option (drv1:) is the source drive that contains the diskette you want to copy. The second drive option (drv2:) is the destination drive that contains the empty diskette.

If you omit both options, a single-drive copy operation is performed on the default drive.

If you omit the second option, the default drive is used as the destination drive.

You can specify the same drives or you can specify different drives. Typing the same drive name for drv1 and drv2, tells the MS-DOS operating system to copy the contents of one diskette to another diskette using only one drive. The MS-DOS operating system prompts you to insert each diskette at the appropriate times. DISKCOPY waits for you to press the Return key before continuing.

DISKCOPY

The diskette in the destination drive should have been previously formatted.

After copying, DISKCOPY displays:

```
Copy complete
Copy another (Y/N)?
```

If you do not wish to make another copy, press N.

If you press Y, the MS-DOS operating system prompts you to insert the proper diskettes. The next copy is performed on the same drives that you originally specified.

Because diskette space is not allocated sequentially, diskettes that have had a lot of file creation and deletion activity can have fragmented storage areas. A file can be separated into several parts and located in several places on the diskette. The first free space (sector) found is the next space (sector) allocated, regardless of its location on the diskette.

A fragmented diskette can cause poor performance due to delays involved in finding, reading, or writing a file. If this is the case, first prepare a diskette, using the FORMAT command and then use the COPY command, instead of DISKCOPY, to copy your diskette. This eliminates the fragmentation.

The following example copies all files from the diskette in drive A: to the diskette in drive B:

```
A>COPY A:*.* B:/V 
A>
```

ERASE

Purpose

ERASE is an internal command that deletes all files with the filename.typ you specify.

Form

ERASE [drv:]filename.typ **Return**

Instructions

If you use the wildcards *.* , the prompt, “Are you sure? ” is displayed. If you type Y, all files are deleted as requested. You can also use the DEL command to erase files.

Example

In the following example, the ERASE command removes all the files from the diskette in drive B.

A>ERASE B:*.* **Return**

Press the Y key after the computer displays “Are you sure?”. Then all the files on the diskette in drive B are erased.

FORMAT

Purpose

FORMAT is an external command that prepares (formats) the diskette so you can copy files to it. You need to prepare all new diskettes before you can copy individual files to the diskette.

Form

```
FORMAT drv:[ /S][ /I] 
```

Instructions

This command prepares (formats) the directory on a new, empty diskette. The drive designation is required. You cannot format a diskette in the default drive.

The FORMAT command allows you to assign a volume label to a diskette. A volume label is used to identify diskettes; it is like a name tag for the diskette. A volume label consists of from one to eleven characters. You can use all acceptable files name characters in a volume label.

Switches

The /S switch copies the operating system files from the diskette in the default drive to the newly formatted diskette.

The files are copied in the following order:

1. IO.SYS
2. MSDOS.SYS
3. COMMAND.COM

The /I switch physically formats a non-RX50 diskette.

MDRIVE

Purpose

A memory drive is like adding an extra disk drive to your computer. The MS-DOS operating system uses the memory (that you allocate) as though it were a diskette drive. Any MS-DOS operating system commands that reference or use a diskette drive are valid for the memory drive.

You use the external command, MDRIVE, to set the amount of memory allocated to the memory drive.

Because a memory drive does not depend on the mechanical rotation of a diskette, the reading and writing operations on a memory drive are faster than on a diskette drive.

Form

MDRIVE [*n*]

Instructions

MDRIVE allows you to allocate memory in 64K byte pages.

The first 128K bytes of memory are reserved for the MS-DOS operating system and application programs. To use the MDRIVE command successfully, you must have at least 192K bytes of memory.

You **MUST** always configure MDRIVE from the drive that you will subsequently start the operating system from.

MDRIVE

Example

The following example shows how to allocate memory for (or configure) the memory drive when you do not know how much memory you can allocate:

NOTE

The MDRIVE examples assume that a total of 320K bytes of memory are available. The 320K byte total includes the 128K bytes from the system unit and a 192K byte memory option.

A>MDRIVE

Rainbow Mdrive Configurator Vers. 2.0

Your Mdrive is currently disabled.

Enter the number of 64 Kbyte pages (0-3): 2

Memory drive configured. Reboot system to activate.

A>

You can optionally specify the number of 64K byte pages as *n* on the same line that invokes MDRIVE. The following example allocates the same amount of memory as the previous example:

A>MDRIVE 2

Rainbow Mdrive Configurator Vers. 2.0

Memory drive configured. Reboot system to activate.

A>

The name of the memory drive depends on whether you have the hard disk option. If you do not have the hard disk option, the memory drive name is E. If you do have the hard disk option, the name of the memory drive depends on the number of hard disk partitions that you allocated to the MS-DOS operating system. For each partition allocated to the MS-DOS operating system, the memory drive name is advanced along the alphabet by one character. Thus, a hard disk with two partitions advances the memory drive name to G.

The following example assumes that you do not have a hard disk option. To make the memory drive the default drive type:

```
A>E: 
E>
```

After the memory drive is configured, you must restart the MS-DOS operating system. This allows the MS-DOS operating system to recognize the new memory allocation size for the memory drive.

Each time you restart the MS-DOS operating system, the memory drive is blank. It does not contain any files. If you want to run an application program from the memory drive, you must use the COPY command to copy the file(s) to the memory drive.

You can retrieve memory allocated to the memory drive by specifying zero 64K byte pages as in the following example:

```
E>A: 
A>MDRIVE 0 
```

The Mdrive will be disabled at next system boot.

A>

NOTE

If you have saved any new or modified data on the memory drive, you must use the COPY command to save the data on a another drive. If you turn the Rainbow computer off, the data in the memory drive is lost.

CAUTION

Some application programs require more than 128K bytes of memory. If you intend to run an application that requires more than 128K bytes of memory, then you must allow more memory for the application by allocating less memory for the memory drive.

PRINT

PRINT

Purpose

PRINT is an external command that prints a text file on a printer. You can use other MS-DOS commands while the file is printing.

Form

```
PRINT [[drv:]filename.typ[ /T[ filename.typ /C][ filename.typ  
/P]]] 
```

Instructions

Use the PRINT command only if you have a printer attached to your computer.

The first time you use the PRINT command after starting the MS-DOS operating system, it asks you for the name of the list device, the default being "PRN", which is the normal printer port. Press the Return key to continue.

Switches

Table 2-7 describes the switches you can use with the PRINT command.

Table 2-7. PRINT Command Switches

Switch	Usage
/T	Removes all files waiting to be printed. A message to this effect is displayed on the screen.
/C	Turns on cancel mode. The filename.typ preceding the /C switch and all filename.typ entries following it in the print queue are removed from the print queue until you issue a /P switch.
/P	Turns on print mode. The preceding filename.typ and all following filename.typ entries are added to the print queue until you issue a /C switch.

The PRINT command with no switches displays the contents of the print queue on your screen without affecting the queue.

Examples

The following example removes the files waiting to be printed.

```
A>PRINT /T 
```

The following example removes the files waiting to be printed and prepares for printing all files on the default drive with the file type ASM.

```
A>PRINT /T *.ASM 
```

The following example removes all files with the extension .ASM from the print queue and adds the files REPORT.TXT and MONTH.LST to the print queue.

```
A>PRINT *.ASM/C REPORT.TXT/P MONTH.LST
```

RDCPM

Purpose

RDCPM is an external command that allows you to read CP/M-86/80 files on RX50 diskettes while using the MS-DOS operating system. RDCPM cannot read CP/M-86/80 files from the hard disk.

NOTE

The RDCPM command can also read DECMATE II CP/M-80 diskettes and PROFESSIONAL 325/350 CP/M-80 diskettes.

Form

RDCPM operation b:[filename.typ] [a:][path] **Return**

Where:

- | | |
|--------------|--|
| operation | Is the name of the RDCPM function that you want to do. RDCPM has three operations:

DIR
READ
TYPE |
| b: | Is the drive where you insert the CP/M-86/80 diskette. |
| filename.typ | Is the optional CP/M-86/80 file specification. The default file specification is *.*. |
| a: | Is the drive where you insert the MS-DOS diskette. If you omit the MS-DOS drive specifier, the MS-DOS file is created on the current default drive. You can only this option when you use the READ function. |

path Is the optional MS-DOS directory specification, not including a file specification. The MS-DOS file you create will always have the same file name and file type as the CP/M-86/80 file. You can only use this option when you use the READ function.

Instructions

DIR Option. If you specify the DIR function with the RDCPM command, the MS-DOS operating system displays a directory of the files on the CP/M-86/80 diskette in the specified drive.

READ Option. If you specify the READ function with the RDCPM command, the MS-DOS operating system copies all files from the CP/M-86/80 diskette (that match the file specification) to the directory described by “path” on the MS-DOS diskette.

TYPE Option. If you specify the TYPE function with the RDCPM command, the MS-DOS operating system displays the contents of files on the CP/M-86/80 diskette that match the file specification on the screen.

Examples

1. The following command displays the directory of files on the CP/M-86/80 diskette in drive B that match the file specification, TESTFILE.*.

```
A>RDCPM DIR B:TESTFILE.* 
```

2. The following command copies the file(s) named TESTFILE.* from drive B to the directory REPORT\JAN in drive A.

```
A>RDCPM READ B:TESTFILE.* A:REPORT\JAN 
```

3. The following command types the file(s) named TESTFILE.* (from drive B) on your screen.

```
A>RDCPM TYPE B:TESTFILE.* 
```

REN (RENAME)

Purpose

REN is an internal command that changes the name of a file to the new file name.

Form

```
REN [drv:]oldfilename.typ newfilename.typ Return
```

Instructions

The first option (oldfilename.typ) must be given a drive designation if the diskette resides in a drive other than the default drive. Any drive designation for the second option (newfilename.typ) is ignored. The file remains on the diskette where it currently resides.

You can use the wildcard characters in either option. All files matching the old name are renamed. If wildcard characters appear in the new name, corresponding character positions will not be changed.

Examples

1. The following command changes the names of all files with the .LST file type to similar names with the .PRN file type:

```
REN *.LST *.PRN Return
```

2. In the next example, REN renames the file ABODE on drive B: to ADOBE:

```
REN B:ABODE ?D?B? Return
```

The file remains on drive B:.

SET

SET

Purpose

SET is an internal command that sets one string value equivalent to another string value for use in later programs.

Form

SET [*string1*=[*string2*]] **Return**

Instructions

Use this command only if you want to set values that are used by programs you have written. An application program can check all values that are set with the SET command by issuing SET with no options.

If you type the SET command with no string specified, then the current environment strings are displayed.

If you specify *string1*= and do not specify *string2*, then the entire entry *string1=string2* is removed from the environment.

Examples

1. The following example sets the variable TTY to the value VT52 until you change it with another SET command.

```
A>SET TTY=VT52 
```

2. You can also use the SET command in batch processing. In this way, you can define your replaceable parameters with names instead of numbers. If your batch file contains the statement "LINK %FILE%," you can set the name that the operating system uses for that variable with the SET command. The command:

```
A>SET FILE=DOMORE 
```

replaces the batch file parameter %FILE% with the file name DOMORE. Therefore, you do not need to edit each batch file to change the replaceable parameter names. Note that when you use text (instead of numbers) as replaceable parameters in batch files, the name must end with a percent sign.

SETPORT

SETPORT is an external command that allows you to view or change the current settings for:

- The printer connector (printer parameters)
- The communication connector (modem parameters)
- The extended communication connector A (auxiliary parameters)
- The LA50 printer
- The LA100 printer
- The LQP02 printer

For the connectors, the SETPORT command allows you to access features that are not available in the Rainbow's Set-Up. For the DIGITAL printers, the SETPORT command enables you to set features that are not directly accessible through the controls on the printer.

Form

SETPORT

Instructions

After you type the SETPORT command, the computer displays the SETPORT Main Menu. From this menu you can select a group of parameters for a connector or a printer to view or change. See the following sections for information on how to view and change the SETPORT parameters.

Viewing the SETPORT Parameters. To select a group of parameters, press the up arrow key or the down arrow key so the arrow points to your choice. Then press the Do key.

The computer displays a set of parameters specific to the group you selected.

NOTE

The parameters displayed on the printer menu, the modem menu and auxiliary port menu reflect the current default settings of Rainbow's Set-Up. If you changed a Set-Up parameter and did not save it by pressing **Shift/S**, the change is not reflected in the SETPORT program.

Changing the SETPORT Parameters. To change a parameter:

1. Press the up arrow key or the down arrow key so the reverse video bar highlights your choice.
2. Press the left arrow key or the right arrow key until the computer displays the setting you choose.

When you press the left arrow key or the right arrow key for the printer, modem and auxiliary port parameters, the computer displays:

Press <Do> to set

For the new settings to take effect, you **must** press the Do key after you select any new settings and before you move to another SETPORT menu or leave the command. The changes are not reflected in Rainbow's Set-Up.

NOTE

The computer remembers the changes you made to any printer, modem, or auxiliary port parameters until you reset or turn off the computer. If you change a parameter for a printer, the printer remembers the change until it is turned off or the parameter is reset. The SETPORT menus for the LA50, LA100, LQP02 printers always display the same set of parameters when you start the SETPORT command.

3. To view another group of parameters, press the Next Screen key or the Prev Screen key. You can then change any of these parameters by following the previous instructions.

Leaving SETPORT. After you select (and set, if necessary) any new parameters, press the Exit key to leave the SETPORT command.

Table 2-8 describes each group of SETPORT parameters that you can change.

Table 2-8. SETPORT Parameters

Parameters	Purpose
Communications Connector	To select the data settings for the printer connector on the back of the system unit. These settings must match the settings of your printer. You may need to change these settings if you use a non-DIGITAL printer.
Modem Connector	To select the data settings for the communications connector on the back of the system unit. These settings must match the settings of your modem or other computer.
Extended Communication Option Connector	To select the data settings for the extended communication connector A. To use these parameters your computer must have an extended communications option. You can only select settings for extended communication connector A with the SETPORT command.
LA50 Remote Setup LA100 Remote Setup LQP02 Remote Setup	To select the printer's settings. The list of parameters differs for each printer based on the printer's characteristics. The SETPORT command allows you to specify these parameters on its menus rather than sending escape sequences to the printer.

For more information on the parameters for the printer connector, the modem connector and the auxiliary port connector, see the *Rainbow Owner's Manual*. For more information on the parameters for the LA50, the LA100, and the LQP02 printers, see the appropriate printer manual.

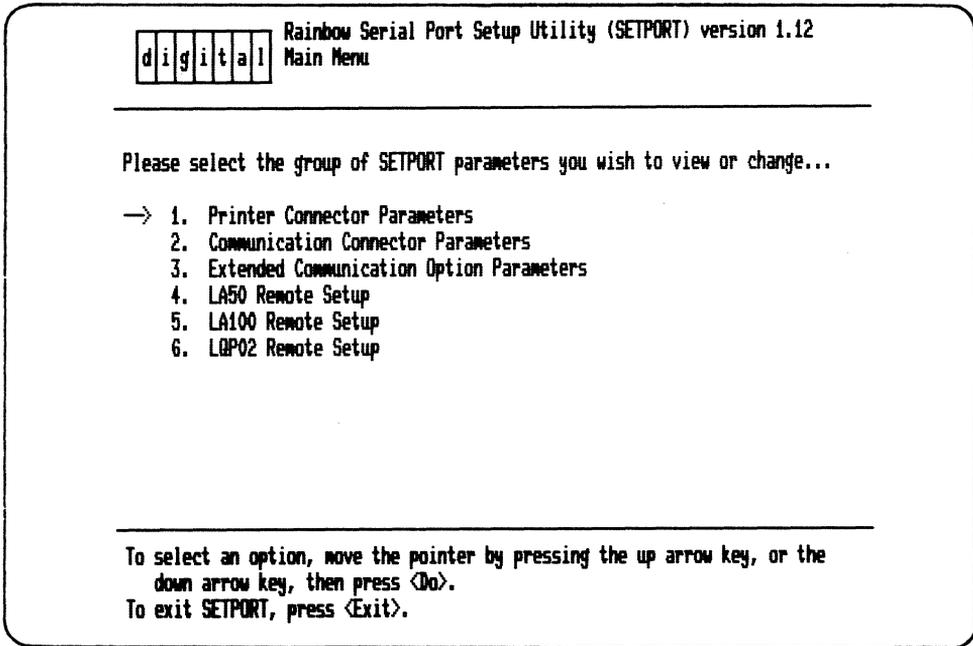
Example

The following example shows you how to change the character quality from normal to enhanced for an LA50 printer.

1. Type:

```
A>SETPORT Return
```

The computer displays the Setport Main Menu (Screen 2-10).



Screen 2-10. SETPORT Main Menu

2. Press the down arrow key three times until the arrow points to "LA50 Remote Setup". Then press the Do key.

The computer displays the LA50 Remote Setup menu. This menu lists the current default settings for the LA50 printer.

3. Press the down arrow key four times until the reverse video bar highlights the "Print Density" parameter.
4. Press the left arrow key so that the print density changes to "enhanced".
5. Press the Do key.
6. Press the Exit key to return to the SETPORT Main Menu.

The next time you print a document, it will be printed in enhanced quality characters rather than in normal quality characters.

SYS (SYSTEM)

Purpose

SYS is an external command that transfers the MS-DOS hidden system files from the diskette in the default drive to the diskette in the drive you specify by drv:.

Form

SYS drv:

Instructions

SYS is normally used to update the operating system or to place the operating system on a formatted diskette that contains no files. You must supply an entry for drv:

If IO.SYS and MSDOS.SYS are on the destination diskette, they must take up the same amount of space on the diskette as the new system will need. For example, you cannot transfer system files from an MS-DOS Version 2.11 diskette to an MS-DOS Version 2.01 diskette. You must reformat the MS-DOS Version 2.01 diskette with the MS-DOS Version 2.11 FORMAT command before using the SYS command.

NOTE

You can transfer system files from an MS-DOS Version 2.11 diskette to an MS-DOS Version 2.05 diskette. But we recommend that you reformat the MS-DOS Version 2.05 diskette with the MS-DOS Version 2.11 FORMAT command so that you update the diskette completely.

SYS (SYSTEM)

The transferred files are copied in the following order:

1. IO.SYS
2. MSDOS.SYS

IO.SYS and MSDOS.SYS are both hidden files that are not displayed when the DIR command is executed. COMMAND.COM (the command processor) is *not* transferred. You must use the COPY command to transfer COMMAND.COM.

TIME

Purpose

TIME is an internal command that displays and sets the time.

Form

TIME [hh:mm]

NOTE

The time format above is for the United States. The format for the TIME command depends on the country you specify in the CONFIG.SYS file on the MS-DOS Version 2.11 diskette. See Appendix D of this guide for information on how to change the format.

Instructions

If you type the TIME command only, the following message is displayed:

```
Current time is hh:mm:ss.cc  
Enter new time:
```

Press the Return key if you do not want to change the time shown. You can type a new time to the TIME command as:

TIME 8:20

Type the new time using numerals only; letters are not allowed. The allowed options are:

- hh = 00 – 23
- mm = 00 – 59

Separate the hour and minute entries by colons (:) or periods (.). You do not have to type the ss (seconds) or cc (hundredths of seconds) options.

TYPE

Purpose

TYPE is an internal command that displays the contents of the file on the screen.

Form

TYPE [drv:]filename.typ

Instructions

Use the TYPE command to look at a file without modifying it. (Use DIR to find the name of a file and EDLIN to alter the contents of a file.) TYPE expands tabs to spaces that are consistent with tab stops at every eighth column. Do not display binary files with a TYPE command because a display of binary files causes control characters (such as Ctrl/Z) to be sent to your computer, including bells, form feeds, and escape sequences.

VER

Purpose

VER is an internal command that prints the MS-DOS operating system version number.

Form

VER

Instructions

If you want to know what version of the MS-DOS operating system you are using, type VER. The version number is displayed on your screen.

VERIFY

Purpose

VERIFY is an internal command that turns the verify switch on or off when writing to a diskette. When you turn on the verify switch, the MS-DOS operating system tells you that a file was written correctly and has no bad sectors.

Form

VERIFY [ON|OFF]

Instructions

This command is identical with the COPY command's /V switch. If you want to verify that all files are written correctly to a diskette, you can use the VERIFY command to tell the MS-DOS operating system to verify that your files are intact (no bad sectors, for example). The MS-DOS operating system performs a VERIFY each time you write data to a diskette. You receive a message only if the MS-DOS operating system was unable to successfully write your data to diskette.

VERIFY ON remains in effect until you change it in a program by using the SET VERIFY command, or until you issue a VERIFY OFF command to the MS-DOS operating system.

If you want to know what the current setting of VERIFY is, type VERIFY with no options.

VOL (VOLUME)

Purpose

VOL is an internal command that displays a diskette volume label, if a label exists.

Form

VOL [drv:] **Return**

Instructions

This command displays the volume label of the diskette in drive you specify. If no drive is specified, the MS-DOS operating system prints the volume label of the diskette in the default drive.

If the diskette does not have a volume label, VOL displays:

Volume in drive x has no label

3

Editing Keys

This chapter discusses:

- Special editing keys
- Control characters

You can use special editing keys and control keys to perform some operations on the command line and to create documents with an MS-DOS program called an editor. This chapter describes how to use the special editing keys and the control characters for use on the command line. Chapter 4 discusses how to use the editing keys and the control characters with the editor.

Special Editing Keys

The special editing keys deserve particular emphasis because they differ from the way in which most operating systems handle the way commands are entered. You do not have to type the same sequence of keys repeatedly, because the last command line is placed in a special storage area called a template.

The special editing keys allow you to:

- Repeat a command line by pressing two keys simultaneously
- Edit and retry the command when you make an error, without retying the entire command line
- Edit and execute a command line that is similar to a preceding command with a minimum of typing

When you type a command to the MS-DOS operating system and press the the Return key, the command is automatically sent to the command processor. At the same time, a copy of this command is sent to the template, which allows you to recall the command or modify it using the special editing keys.

Table 3-1 lists the special editing keys. Each of these keys is more fully described in Chapter 4, *Creating and Changing Documents*.

Table 3-1. Special Editing Keys

Key	Editing Function
	Copies one character from the template to the command line
Select	Copies characters up to the character specified in the template and puts these characters on the command line
Do	Copies all remaining characters in the template to the command line
Remove	Skips over (does not copy) a character in the template
Find	Skips over (does not copy) the characters in the template up to the character specified
Cancel	Cancel the current input; leaves the template unchanged
Insert Here	Enters/exits insert mode
Resume	Makes the new line the new template
Exit	Inserts an end-of-file character (Ctrl/Z) in the new template

Figure 3-1 shows the location of these keys on the keyboard.

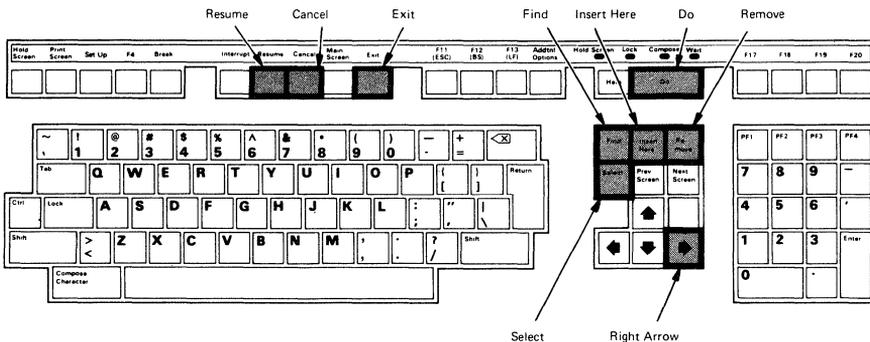


Figure 3-1. Editing Keys

Examples

These examples show you how to use the editing keys at the command line. Chapter 4 shows you how to use the editing keys with the MS-DOS text editor.

If you type the following command:

```
DIR PRDG.COM
```

the MS-DOS operating system displays information about the file PRDG.COM on your screen. The command line is also saved in the template. To repeat the command, just press two keys:

Do

Return

The repeated command is displayed on the screen as shown below:

```
DIR PRDG.COM
```

Notice that pressing the Do key causes the contents of the template to be sent to the command line; pressing the Return key causes the command line to be executed.

If you want to display information about a file named PRDG.ASM, you can use the contents of the template and type:

Select C

Pressing the Select key followed by the letter C copies all characters from the template to the command line, up to but not including the character "C". The operating system displays:

```
DIR PRDG.
```

Now type:

```
ASM
```

The result is:

```
DIR PROG.ASM
```

The command line DIR PROG.ASM is now in the template and ready to be sent to the command processor for execution. To do this, press the Return key.

Now assume that you want to execute the following command:

```
TYPE PROG.ASM
```

To do this, type:

```
TYPE    
```

Notice that when you are typing, the characters are entered directly into the command line and overwrite corresponding characters in the command line and template. This automatic replacement feature is turned off when you press the Insert Here key. Thus, the characters “TYPE” replace the characters “DIR ” in the template. To insert a space between “TYPE” and “PROG.ASM”, press the Insert Here key and then the space bar. Finally, to copy the rest of the template to the command line, press the Do key and then the Return key. The command TYPE PROG.ASM has been processed by the operating system, and the template becomes TYPE PROG.ASM.

If you had misspelled TYPE as BYTE, an error would have occurred. Instead of aborting the whole command, you can save the misspelled line, before you press the Return key, by creating a new template with the Resume key:

```
BYTE PROG.ASM 
```

You could then edit this command by typing:

```
T  P 
```

Editing Keys

The right arrow key copies a single character from the template to the command line. The resulting command line is then the command that you want:

TYPE PROG.ASM

As an alternative, you can use the same template containing BYTE PROG.ASM and then use the Remove and Insert Here keys to achieve the same result:

Remove **Remove** **→** **Insert Here** YP **Do**

Table 3-2 shows how the command line is affected as you type.

Table 3-2. Effect of Commands on Command Line

Keys	Screen	Effect On Command Line
Remove	—	Skips over 1st template character
Remove	—	Skips over 2nd template character
→	T	Copies 3rd template character
Insert Here	YP TYP	Inserts characters
Do	TYPE PROG.ASM	Copies rest of template

Notice that the Remove key does not affect the command line. It affects the template by deleting the first character. Similarly, the Find key deletes characters in the template, up to but not including a given character.

Control Character Functions

A control character function is a function that affects the command line. The Ctrl key (control key) is a special key that is used in conjunction with certain other keys (see Figure 3-1 for the location of the Ctrl key). When you press the Ctrl key simultaneously with another key, a simple command is sent to the operating system that affects the command line.

Table 3-3 lists the control character keys and their functions.

Remember that when you type a control character, such as Ctrl/C, you must hold down the control key, (labeled Ctrl on the keyboard), and then press the C key at the same time.

Table 3-3. Control Character Keys and Their Functions

Control Character	Function
Ctrl/N	Turns on and off echoing of output to line printer.
Ctrl/C	Stops current command.
Ctrl/H	Removes the last character from command line, and erases character from screen.
Ctrl/J	Inserts physical end-of-line, but does not empty command line. Use the LF key (line feed) to extend the current logical line beyond the physical limits of one screen.
Ctrl/P	Turns on and off terminal output to line printer.
Ctrl/S	Stops output display on the screen. Press any key to resume.
Ctrl/X	Cancels the current line; empties the command line; and then outputs a back slash (\), carriage return, and line feed. The template used by the special editing commands is not affected.

4

Creating and Changing Documents

This chapter describes how to use an editor. An editor is a type of program that lets you create, change and display memos, reports, and other documents. The MS-DOS operating system's editor is called EDLIN.

This chapter is divided into four sections:

- Section 1 tells you how to start EDLIN.
- Section 2 describes how to use the special editing keys introduced in Chapter 3.
- Section 3 describes how to use EDLIN commands and options.
- Section 4 lists the EDLIN commands.

What You Can Do with EDLIN

You can use EDLIN to:

- Create new files and save them
- Update existing files and save both the updated and original files
- Delete, edit, insert, and display lines
- Search for, delete, or replace text within one or more lines

What Is a Line Editor?

EDLIN is a line editor. A line editor lets you create and edit files line by line. EDLIN is divided into lines; each line holds up to 253 characters. EDLIN generates line numbers and displays them during the editing process for your convenience. Line numbers are not actually stored in the saved file.

Lines are always numbered consecutively. When you insert lines, all line numbers advance automatically by the number of lines inserted. When you delete lines, all line numbers decrease automatically by the number of lines you deleted.

Section 1 Starting EDLIN

To start EDLIN, type:

```
EDLIN filename.typ Return
```

Creating a New File

If you are creating a new file, filename.typ should be the name of the file you wish to create. If EDLIN does not find this file on the diskette, EDLIN creates a new file with the name you specify. The following message and prompt are displayed:

```
New file  
*
```

Notice that the prompt for EDLIN is an asterisk (*).

When you see the prompt, EDLIN is ready to accept commands.

To begin entering text, you must enter the Insert command to insert lines. The Insert command is discussed in Section 4 of this chapter.

Using an Existing File

If you want to change (or edit) an existing file, filename.typ should be the name of the file you want to change. When EDLIN finds the file on the designated or default drive, the file is loaded into memory.

- If the entire file can be loaded into memory, EDLIN displays the following message on your screen:

```
End of input file
*
```

You can then edit the file using EDLIN editing commands.

- If the file is too large to be loaded into memory, EDLIN continues to load lines until memory is 3/4 full and then displays the * prompt. You can now edit the portion of the file that is in memory.

To edit the remainder of the file, you must save some of the edited lines on the diskette to free memory using the Write command. Then use the Append command to load the unedited lines from the diskette into memory.

When you complete the editing session, save the original (old) and the revised (new) files by using the End command. The End command is discussed later in this chapter. The original file is renamed with a file type of .BAK, and the revised file has the file name and file type you specify in the EDLIN command. The original .BAK file is not erased until the end of the editing session, or until diskette space is needed by the editor, EDLIN.

Do not try to edit a file with a file type of .BAK because EDLIN assumes that any .BAK file is a backup file. If you find it necessary to edit such a file, rename the file with another file type (using the RENAME command discussed in Chapter 2), then start EDLIN and specify the new filename.typ.

Section 2

Using Special Editing Keys

The special editing keys and template discussed in Chapter 3 can be used to edit your text files. These keys are discussed in detail in this section.

Table 4-1 summarizes the commands, codes, and functions. Descriptions of the special editing keys follow the table.

Table 4-1. Special Editing Keys

Key	Function	Description
	Copies one character	Copies one character from the template to the new line.
Select	Copies up to character	Copies all characters from the template to the new line, up to the character specified
Do	Copies template	Copies all remaining characters in the template to the screen
Remove	Skips one character	Does not copy (skips over) a character
Find	Skips up to character	Does not copy (skips over) the characters in the template, up to the character specified
Cancel	Quits input	voids the current input; leaves the template unchanged
Insert Here	Insert mode	Enters/exits insert mode
Insert Here	Replace mode	Turns insert mode off; this is the default
Resume	New template	Makes the new line the new template
Exit	Exits template	Inserts an end-of-file character in the new template



(Right Arrow Key)

Purpose

The right arrow key copies one character from the template to the command line.

Instructions

Pressing the right arrow key copies one character from the template to the command line. When you press the right arrow key, one character is inserted in the command line.

Example

If you begin an editing session and your screen displays:

```
1:*This is a sample file.  
1:*
```

with the cursor positioned at the beginning of the line, after the asterisk, pressing the right arrow key copies the first character (T) to the second of the two lines displayed:

```
1:*This is a sample file.  
1:* 
```

becomes

```
1:*This is a sample file.  
1:*T
```

Each time you press the right arrow key, one more character is displayed on the same line:

1:* 

1:*T 

1:*Th 

1:*Thi 

1:*This

Select Key

Purpose

The Select key copies multiple characters up to a character you specify.

Instructions

The Select key allows you to copy all characters, up to a character you specify, from the template to the command line. The character you specify is the character you type after you press the Select key; the character is not copied or displayed on the screen. Pressing the Select key causes the cursor to move to the single character that is specified in the command. If the template does not contain the specified character, nothing is copied.

Example

Assume that the screen shows:

```
1:*This is a sample file.  
1:*
```

At the beginning of the editing session, the cursor is positioned at the beginning of the line, after the asterisk. Pressing the Select key copies all characters up to the character specified immediately after you press the Select key.

```
1:*This is a sample file.  
1:*  e
```

becomes

```
1:*This is a sample file.  
1:*This is a sample
```

with the cursor positioned after the l in the second line.

Do Key

Purpose

The Do key allows you to copy the template to the command line.

Instructions

The Do key lets you copy all remaining characters from the template to the command line. Regardless of the cursor position at the time the Do key is pressed, the rest of the line is displayed, and the cursor is positioned after the last character on the line.

Example

Assume that the screen shows:

```
1:*This is a sample file.  
1:*
```

At the beginning of the editing session, the cursor is positioned at the beginning of the line, after the asterisk. Pressing the Do key copies all characters from the template to the line with the cursor.

```
1:*This is a sample file.  
1:*(Do)  
1:*This is a sample file.
```

Remove Key

Purpose

The Remove key allows you to skip over one character in the template.

Instructions

Each time you press the Remove key, one character is not copied from the template. The action of the Remove key is similar to the right arrow key, except that the Remove key skips a character in the template rather than copy it to the command line.

Example

Assume that the screen shows:

```
1:*This is a sample file.  
1:*
```

At the beginning of the editing session, the cursor is positioned at the beginning of the line, after the asterisk. Pressing the Remove key skips over the first character (T).

```
1:*This is a sample file.  
1:* Remove
```

The cursor position does not change, and only the template is affected. To see how much of the line has been skipped over, press the Do key, which moves the cursor beyond the last character of the line.

```
1:*This is a sample file.  
1:* Remove Do his is a sample file.
```

Find Key

Purpose

The Find key allows you to skip multiple characters in the template, up to the specified character.

Instructions

The Find key lets you skip over all characters up to a character that you specify in the template. This character is not copied and is not shown on the screen. If the template does not contain the specified character, no character is skipped over. The action of the Find key is similar to the Do key, except that the Find key allows you to skip over characters in the template rather than copying them to the command line.

Example

Assume that the screen shows:

```
1:*This is a sample file.  
1:*
```

At the beginning of the editing session, the cursor is positioned at the beginning of the line, after the asterisk. The Find key lets you skip over all the characters in the template up to the character specified after you press the Find key:

```
1:*This is a sample file.  
1:* Find p
```

The cursor position does not change. To see how much of the line has been skipped over, press the Do key to copy the template. This moves the cursor beyond the last character of the line:

```
1:*This is a sample file.  
1:* Find p Do  
1:*ple file.
```

Cancel Key

Purpose

The Cancel key allows you to stop inputting and empties the command line.

Instructions

The Cancel key lets you empty the command line, but leaves the template unchanged. The Cancel key also prints a backslash (\), carriage return, and line feed, and turns insert mode off. The cursor is positioned at the beginning of the line, after the asterisk. Pressing the Do key copies the template to the command line and the command line is displayed as it was before the Cancel key was pressed.

Example

Assume that the screen shows:

```
1:*This is a sample file.  
1:*
```

At the beginning of the editing session, the cursor is positioned at the beginning of the line, after the asterisk. Next, assume that you want to replace the line with "Sample File":

```
1:*This is a sample file.  
1:*Sample File
```

To cancel the line you just entered (Sample File), and to keep "This is a sample file.", press the Cancel key. Notice that a backslash is displayed on the Sample File line to tell you it has been canceled.

```
1:*This is a sample file.  
1:*Sample File (Cancel) \
```

Press the Return key to keep the original line, or to perform any other editing functions. If you press the Do key, the original template is copied to the command line:

* This a sample file.

Insert Here Key

Purpose

The Insert Here Key is used to insert or replace text in a file. The Insert Here key lets you turn insert and replace modes on and off.

Instructions

Pressing the Insert Here key causes EDLIN to enter and exit insert mode. The current cursor position in the template is not changed. The cursor does move as each character is inserted. However, when you have finished inserting characters, the cursor is positioned at the same character as it was before the insertion began. Thus, characters are inserted **in front of** the character to which the cursor points.

Example

Assume that the screen shows:

```
1:*This is a sample file.  
1:*
```

At the beginning of the editing session, the cursor is positioned at the beginning of the line, after the asterisk. Assume that you press the Select and f keys:

```
1:*This is a sample file.  
1:* Select fThis is a sample
```

Now press the Insert Here key and insert the characters “edit” and a space:

```
1:* Select fThis is a sample Insert Here edit Space  
1:*This is a sample edit
```

If you now press the Do key, the rest of the template is copied to the line:

```
1:*This is a sample edit Do file.
```

To exit insert mode, simply press the Return key again.

If you pressed the Return key, the remainder of the template would be truncated, and the command line ends:

```
1:*This is a sample Insert Here edit Return
1:*This is a sample edit
```

Instructions

Pressing the Return key causes EDLIN to exit insert mode and to enter replace mode. All the characters you type overwrite and replace characters in the template. When you start to edit a line, replace mode is in effect. If the Return key is pressed, the remainder of the template is deleted.

Example

Assume that the screen shows:

```
1:*This is a sample file.
1:*
```

At the beginning of the editing session, the cursor is positioned at the beginning of the line, after the asterisk. Assume that you then type:

```
1:*This is a sample file.
1:* Select mThis is a sa Insert Here lary tax
1:*This is a salary tax Remove Remove Remove Remove Do
1:*This is a salary tax file.
```

Notice that you **replaced** “mple” with “lary tax”. If you type characters that extend beyond the length of the template, the remaining characters in the template are automatically added when you press the Do key.

Resume Key

Purpose

The Resume key allows you to create a new template.

Instructions

Pressing the Resume key copies the current command line to the template. The contents of the old template are deleted. Pressing the Resume key outputs an @ (“at” sign) character, a carriage return, and a line feed. The command line is also emptied and insert mode is turned off.

IMPORTANT

The Resume key performs the same function as the Cancel key, except that the template is changed and an @ (“at” sign) character is printed instead of a \ (backslash).

Example

Assume that the screen shows:

```
1:*This is a sample file.  
1:*
```

At the beginning of the editing session the cursor is positioned at the beginning of the line, following the asterisk. Assume that you type:

```
1:*This is a sample file.  
1:*  m  
1:*This is a sa  lary tax  
1:*This is a salary tax       
1:*This is a salary tax file.
```

At this point, assume that you want this line to be the new template, so you press the the Resume key:

1:*This is a salary tax file. **Resume** @

The @ indicates that this new line is now the new template. Additional editing can be done using the new template.

Section 3

Using EDLIN Commands

EDLIN commands perform editing functions on lines of text. You should read the following information before you use EDLIN commands.

Locating Lines

You can reference line numbers relative to the current line (the line with the asterisk). Use a minus sign (hyphen key) with a number to indicate lines before the current line. Use a plus sign with a number to indicate lines after the current line.

Example

```
*-10,+10L 
```

This command lists 10 lines before the current line, the current line, and 10 lines after the current line.

Using Multiple Commands

You can use multiple commands on one command line. When you issue a command to edit a single line, a line number and a semicolon must separate commands on the line. Otherwise, one command can follow another without any special separators. In the case of a Search and Replace command, the string can be ended by a Ctrl/Z instead of pressing the Return Key.

Examples

The following command line edits line 15 and then displays lines 10 through 20 on the screen.

```
*15;-5,+5L Return
```

The command line in the next example searches for “This string” and then displays five lines before and five lines after the line containing the matched string. If the search fails, then the displayed lines are those line numbers relative to the current line. (The Search command is described later in this chapter.)

```
*SThis string Ctrl/V -5,+5L Return
```

Spacing in Commands

You can type EDLIN commands **with** or **without** a space between the line number and command. For example, to delete line 6, the command 6D is the same as 6 D.

Inserting Control Characters

It is possible to insert a control character (such as Ctrl/C) into text by using the Ctrl/V characters before it, while you are in insert mode. Ctrl/V tells the MS-DOS operating system to recognize the next **capital** letter typed as a control character. It is also possible to use a control character in any of the string arguments of Search or Replace by using the special quote character. (The Replace command is described later in this chapter.)

Example

The following list describes the function of control characters.

- S **Ctrl/V** Z Finds the first occurrence of Ctrl/Z in a file
- R **Ctrl/V** Z **Ctrl/Z** foo Replaces all occurrences of Ctrl/Z in a file by "foo "
- R **Ctrl/V** C **Ctrl/Z** bar Replaces all occurrences of Ctrl/C by "bar "

It is possible to insert Ctrl/V into the text by typing:

Ctrl/V **Ctrl/V**

Inserting the Ctrl/Z Character

The Ctrl/Z character ordinarily tells EDLIN, "This is the end of the file." If you have Ctrl/Z characters elsewhere in your file, you must tell EDLIN that these other control characters do not mean end-of-file. Use the /B switch to tell EDLIN to ignore any Ctrl/Z characters in the file and to show you the entire file.

EDLIN Command Options

Several EDLIN commands accept one or more options. The effect of a command option varies, depending on which command you use. The following list describes each option.

1. **line**—The line option indicates a line number that you type. Line numbers must be separated by a comma or a space from other line numbers, other options, and from the command.

You can specify the line option in one of three ways:

- **Number**—Any number less than 65529. If a number larger than the largest existing line number is specified, then line means the line after the last line number.
- **Period (.)**—If you specify a period for line, then line means the current line number. The current line is the last line edited, and is not necessarily the last line displayed. The current line is marked on your screen by an asterisk (*) between the line number and the first character.
- **Pound (#)**—The pound sign indicates the line after the last line number. If you specify # for line, this has the same effect as specifying a number larger than the last line number.

Pressing the Return key without any of the line specifiers listed above directs EDLIN to use a default value appropriate to the command.

2. **?**—The question mark option directs EDLIN to ask you if the correct string has been found. The question mark is used only with the Replace and Search commands. Before continuing, EDLIN waits for you to type either a Y or press the Return key for a yes response, or for any other key for a no response.
3. **string**—The string option represents text to be found, to be replaced, or to replace other text. The string option is used only with the Search and Replace commands. Each string must be ended by typing a Ctrl/Z or by pressing the Return key (see the Replace command for details). No spaces should be typed between strings or between a string and its command letter, unless you want those spaces to be part of the string.

Section 4

EDLIN Commands

This section describes EDLIN editing commands. The commands are listed alphabetically. Refer to Table 2-5 in Chapter 2 for a list of conventions used in this manual.

Table 4-2 summarizes the EDLIN commands discussed in this chapter.

Table 4-2. EDLIN Commands

Command	Purpose
Line	Edits line number
A	Appends lines
C	Copies lines
D	Deletes lines
E	Ends editing
I	Inserts lines
L	Lists text
M	Moves lines
P	Pages text
Q	Quits editing
R	Replaces lines
S	Searches text
T	Transfers text
W	Writes lines

(A)ppend

Purpose

Append lets you add the specified number of lines from the diskette to the file being edited in memory. The lines are added at the end of lines that are currently in memory.

Form

[n] A

where n = number of lines

Instructions

This command is meaningful only if the file being edited is too large to fit into memory. As many lines as possible are read into memory for editing when you start EDLIN.

To edit the remainder of the file that does not fit into memory, lines that have already been edited must be written to the diskette. Then you can load unedited lines from the diskette into memory with the Append command. Refer to the Write command in this chapter for information on how to write edited lines to the diskette.

IMPORTANT

If you do not specify the number of lines to append, lines are appended to memory until available memory is 3/4 full. No action is taken if available memory is already 3/4 full.

The message "End of input file" is displayed when the Append command has read the last line of the file into memory.

(C)opy

Purpose

Copy lets you copy a range of lines to a specified line number. The lines can be copied as many times as you want by using the count option.

Form

```
[line],[line],line,[count]C Return
```

Instructions

If you do not specify a number in count, EDLIN copies the lines one time. If the first or the second line are omitted, the default is the current line. The file is renumbered automatically after the copy.

The line numbers must not overlap or you will get an “Entry error ” message. For example, 3,20,15C would result in a message.

Examples

Assume that the following file exists and is ready to edit:

```
1: This is a sample file
2: used to show copying lines.
3: See what happens when you use
4: the Copy command
5: (the C command)
6: to copy text in your file.
```

You can copy this entire block of text by issuing the following command:

```
*1,6,7C Return
*
```

When you display your file (using the List command), the result is:

```
*L Return
1: This is a sample file
2: used to show copying lines.
3: See what happens when you use
4: the Copy command
5: (the C command)
6: to copy text in your file.
7:*This is a sample file
8: used to show copying lines.
9: See what happens when you use
10: the Copy command
11: (the C command)
12: to copy text in your file.
*
```

If you want to place the text within other text, the third line option should specify the line **before** which you want the copied text to appear. For example, assume that you want to copy lines and insert them **within** the following file:

```
1: This is a sample file
2: used to show copying lines.
3: See what happens when you use
4: the Copy command
5: (the C command)
6: to copy text in your file.
7: You can also use COPY
8: to copy lines of text
9: to the middle of your file.
10: End of sample file.
```

(C)opy

The command 3,6,10C results in the following file (which you display using the List command):

```
1: This is a sample file
2: used to show copying lines.
3: See what happens when you use
4: the Copy command
5: (the C command)
6: to copy text in your file.
7: You can also use COPY
8: to copy lines of text
9: to the middle of your file.
10:*See what happens when you use
11: the Copy command
12: (the C command)
13: to copy text in your file.
14: End of sample file.
```

(D)delete

Purpose

Delete allows you to erase a specified range of lines in a file.

Form

[line], [line]D **Return**

Instructions

If the first line is omitted, that option defaults to the current line (the line with the asterisk next to the line number). If the second line is omitted, then just the first line is deleted. When lines are deleted, the line immediately after the deleted section becomes the current line and has the same line number as the first deleted line had before the deletion occurred.

Examples

Deleting Multiple Lines. Assume that the following file exists and is ready to edit:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: This line will be
6: deleted
.
.
.
25: (the D and I commands)
26: to edit the text
27:*in your file.
```

To delete multiple lines (lines 5 through 24), type:

```
*5,24D 
```

result is:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6: to edit the text
7:*in your file.
```

Deleting a Single Line. To delete a single line, type:

*6D

The result is:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6:*in your file.
```

Deleting a Range of Lines. Assume you have the following file:

```
1: This is a sample file
2: used to show dynamic line numbers.
3:*See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6: to edit text
7: which you
8: have put
9: in your file.
```

To delete a range of lines, beginning with the current line, type:

*,6D

The result is:

```
1: This is a sample file
2: used to show dynamic line numbers.
3:*which you
4: have put
5: in your file.
```

Notice that the lines are automatically renumbered.

Edit

Purpose

Edit allows you to change a line of text.

Form

[line] **Return**

Instructions

When a line number is typed, EDLIN displays the line number and text; then, on the next line, EDLIN reprints the line number. The line is now ready for editing. You can use any of the EDLIN editing commands to edit the line. The existing text of the line serves as the template until the Return key is pressed. If no line number is typed (that is, if only the Return key is pressed), the line after the current line (marked with an asterisk (*)) is edited. If no changes to the current line are needed and the cursor is at the beginning or end of the line, press the Return key to accept the line as is.

CAUTION

If the Return key is pressed while the cursor is in the middle of the line, the remainder of the line is deleted.

Example

Assume that the following file exists and is ready to edit:

```
1: This is a sample file.  
2: used to show  
3: the editing of line  
4:*four.
```

To edit line 4, type:

```
*4 
```

The contents of the line are displayed with a cursor below the line following the asterisk:

```
4:* four.  
4:*
```

Now, using the Do and Insert Here special editing keys, type:

```
4:  number  four   
5:*
```

(E)nd

(E)nd

Purpose

End lets you stop the editing session.

Form

E

Instructions

This command:

- Saves the edited file on diskette
- Renames the original input file by giving it a file type of .BAK
- Exits EDLIN

If the file was created during the editing session, no .BAK file is created.

The E command takes no options. Therefore, you cannot tell EDLIN on which drive to save the file. The drive on which you want to save the file must be specified when you start the editing session.

If no drive is specified as the active drive when EDLIN is started, the file is saved on the diskette in the default drive. (It is still possible to copy the file to a different drive using the MS-DOS COPY command.)

You must be sure that the diskette contains enough free space for the entire file. If the diskette does not contain enough free space, the write is ended and the edited file lost, although part of the file might be written out to the diskette.

Example

*E

A>

After you type the E command and press the Return key, the operating system default drive prompt (for example, A>) is displayed.

(I)nsert

(I)nsert

Purpose

Insert allows you to add text immediately before the specified line.

Form

[line]I **Return**

Instructions

If you are creating a new file, the I command must be given before text can be inserted. Text begins with line number 1. Successive line numbers display automatically each time you press the Return key.

EDLIN remains in insert mode until you press Ctrl/C. When you exit insert mode, the line immediately following the inserted lines becomes the current line. All line numbers following the inserted section are incremented by the number of lines inserted.

If line is not specified, the default is the current line number and the lines are inserted immediately before the current line. If line is any number larger than the last line number, or if a pound sign (#) is specified as line, the inserted lines are appended to the end of the file. In this case, the last line inserted becomes the current line.

NOTE

Use the Interrupt key to insert an escape character when required.

Examples

Assume that the following file exists and is ready to edit:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6: to edit text
7:*in your file.
```

To insert text before a specific line that is **not** the current line, type:

```
*7I 
```

The result is:

```
7:*
```

Now, type the new text for line 7:

```
7:* and renumber lines 
```

Then to end the insertion, press Ctrl/C on the **next** line:

```
8:* 
```

To see your file type L and press the Return key.

```
*L 
```

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6: to edit text
7. and renumber lines
8:*in your file.
```

(I)nsert

To insert lines immediately before the current line, type:

*I

The result is:

8:*

Now, insert the following text and end by typing Ctrl/C on the next line:

8: so they are consecutive

9:*

To list the file, type L and press the Return key.

*L

The result is:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6: to edit text
7: and renumber lines
8: so they are consecutive
9:*in your file.
```

To append new lines to the end of the file, type:

```
*10I Return
```

This produces the following:

```
10:*
```

Now, type the following new lines:

```
10: The insert command can place new lines  
11: in the file; there's no problem  
12: because the line numbers are dynamic;  
13: they'll go all the way to 65529.  
14:*
```

End the insertion by typing Ctrl/C on line 14. The new lines displays at the end of all previous lines in the file. Now type the List command (L) and press the Return key. The result is:

```
1: This is a sample file  
2: used to show dynamic line numbers.  
3: See what happens when you use  
4: Delete and Insert  
5: (the D and I commands)  
6: to edit text  
7: and renumber lines  
8: so they are consecutive  
9: in your file.  
10: The insert command can place new lines  
11: in the file; there's no problem  
12: because the line numbers are dynamic;  
13: they'll go all the way to 65529.
```

(L)ist

(L)ist

Purpose

List lets you display a range of lines, including the two lines specified.

Form

```
[line] [, line]L Return
```

Instructions

Default values are provided if either or both of the options are omitted. If you omit the first option, as in:

```
*, lineL Return
```

the display starts 11 lines before the current line and ends with the specified line. The beginning comma is required to indicate the omitted first option.

NOTE

If the specified line is more than 11 lines before the current line, the display is the same as if you omitted both options.

If you omit the second option, as in:

```
*lineL Return
```

23 lines are displayed, starting with the specified line.

If you omit both parameters, as in:

```
*L Return
```

23 lines are displayed (the 11 lines before the current line, the current line, and the 11 lines after the current line). If there are fewer than 11 lines before the current line, more than 11 lines after the current line is displayed to make a total of 23 lines.

Examples

1. Assume that the following file exists and is ready to edit:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
.
.
.
15:*The current line contains an asterisk.
.
.
.
26: to edit text
27: in your file.
```

2. To list a range of lines without reference to the current line, type `line,lineL` and press the Return key:

```
*2,5L 
```

The result is:

```
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
```

3. To list a range of lines beginning with the current line, type:

```
*.,26L 
```

(L)ist

The result is:

```
15:*The current line contains an asterisk.  
.  
.  
.  
26: to edit text
```

4. To list a range of 23 lines centered around the current line, type only L:

*L

The result is:

```
4: Delete and Insert  
5: (the D and I commands)  
.  
.  
.  
13: The current line is listed in the middle of the range.  
14: The current line remains unchanged by the L command.  
15:*The current line contains an asterisk.  
.  
.  
.  
26: to edit text.
```

(M)ove

Purpose

Move allows you to move a range of text to the line specified.

Form

```
[line],[line],lineM Return
```

Instructions

Use the Move command to move a block of text (ranging from the first line to the second line) to another location in the file. The lines are renumbered according to the direction of the move.

Example

```
* ,+25 ,100M Return
```

moves the text from the current line plus 25 lines to line 100. If the line numbers overlap, EDLIN displays an “Entry error” message.

To move lines 20–30 to line 100, type:

```
*20 ,30 ,100M Return
```

(P)age

(P)age

Purpose

Page lets you move through a file 23 lines at a time.

Form

```
[line][,line]P
```

Instructions

If the first line is omitted, that number defaults to the current line plus one. If the second line is omitted, 23 lines are listed. The line at the bottom of the screen becomes the new current line and is marked with an asterisk.

(Q)uit

Purpose

Quit lets you end the editing session and returns to the MS-DOS operating system.

Quit does not save any changes made to the file.

Form

Q

Instructions

EDLIN asks you to be sure you do not want to save your changes.

Type Y if you want to quit the editing session. No editing changes are saved and no .BAK file is created. Refer to the End command in this chapter for information about the .BAK file.

Type N or any other character except Y if you want to continue the editing session.

NOTE

When started, EDLIN erases any previous copy of the file with a file type of .BAK to make room to save the new copy. If you reply Y to the "Abort edit (Y/N)?" message, your previous backup copy no longer exists.

Example

```
*Q   
Abort edit (Y/N)?Y  
A>
```

(R)eplace

Purpose

Replace lets you substitute all occurrences of a string of text in the specified range with a different string of text or blanks.

Form

```
[line][,line][?]Rstring1 Ctrl/Z string2 Return
```

NOTE

Ctrl/Z displays as **^Z** on your screen.

Instructions

As each occurrence of string1 is found, it is replaced by string2. Each line in which a replacement occurs is displayed. If a line contains two or more replacements of string1 with string2, then the line is displayed once for each occurrence. When all occurrences of string1 in the specified range are replaced by string2, the R command terminates and the asterisk prompt reappears.

If a second string is to be given as a replacement, then string1 must be separated from string2 with a Ctrl/Z. String2 **must** also end with a Ctrl/Z and a carriage return combination or simply by pressing the Return key.

If string1 is omitted, then Replace takes the old string1 as its value. If there is no old string1, for example, the first time this is performed, then the replacement process terminates immediately.

If string2 is omitted, end the command line by pressing the Return key.

If the first line is omitted in the range (as in ,line) then the first line defaults to the line **after** the current line.

If the second line is omitted (as in line or line,), the second line defaults to #. Therefore, this is the same as line,#. Remember that # indicates the line after the last line of the file.

If string1 is ended with a Ctrl/Z and there is no string2, string2 is taken as an empty string and becomes the new replace string.

Examples

*Rstring2

deletes occurrences of old string1.

If the question mark (?) option is given, the Replace command stops at each line with a string that matches string1, displays the line with string2 in place, and then displays the prompt "O.K.?".

If you press Y or the Return key, then string2 replaces string1, and the next occurrence of string1 is found. Again, the "O.K.?" prompt displays. This process continues until the end of the range or until the end of the file.

After the last occurrence of string1 is found, EDLIN displays the asterisk prompt.

If you press any key besides Y or Return after the "O.K.?" prompt, the string1 is left as it was in the line, and Replace goes to the next occurrence of string1.

If string1 occurs more than once in a line, each occurrence of string1 is replaced individually, and the "O.K.?" prompt is displayed after each replacement. In this way, only the desired string1 is replaced, and you can prevent unwanted substitutions.

(R)eplace

Assume that the following file exists and is ready for editing:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6: to edit text
7: in your file.
8: The insert command can place new lines
9: in the file; there's no problem
10: because the line numbers are dynamic;
11: they'll go all the way to 65529.
```

To replace all occurrences of string1 with string2 in a specified range, type:

```
*2,12R and Ctrl/Z or Return
```

The result is:

```
4: Delete or Insert
5: (the D or I commands)
8: The insert command can place new lines
```

NOTE

In the above replacement, some unwanted substitutions have occurred. To avoid these and to confirm each replacement, the same original file can be used with a slightly different command.

In the next example, to replace only certain occurrences of the first string with the second string, type:

*2?Rand or

The result is:

```
5: (The D or I commands)
0.K.? Y 
5: (The D or I commors)
8: The insert command can place new lines
0.K.? N 
8: The insert commor can place new lines
*
```

Now, type the List command (L) to see the result of all these changes:

```
.
.
.
4: Delete or Insert
5: (The D or I commands)
.
.
.
8: The insert command can place new lines
.
.
.
```

(S)earch

Purpose

Search allows you to search the specified range of lines for a specified string of text.

Form

[line][,line][?]Sstring Return

Instructions

You end the command line by pressing the Return key. The first line that matches the string is displayed and becomes the current line. If no line contains a match for the string, the message “Not found” is displayed.

If the question mark option is not specified, the Search command ends when a match is found. If the question mark option (?) is included in the command, EDLIN displays the first line with a matching string; it then prompt you with the message “O.K.?”.

If you press either the Y or the Return key, the line becomes the current line and the search ends.

If you press any other key, the search continues until another match is found, or until all lines have been searched (and the “Not found” message is displayed).

If the first line is omitted (as in ,line S string), the first line defaults to the line **after** the current line.

If the second line is omitted (as in line S string or line, S string), the second line defaults to # (line after last line of file), which is the same as line,# S string.

If string is omitted, Search takes the old string if there is one. (Note that “old” here refers to a string specified in a previous Search or Replace command.)

If there is not an old string (for example, no previous search or replace has been done), the command terminates immediately.

Examples

Assume that the following file exists and is ready for editing:

```
1: This is a sample file
2: used to show dynamic line numbers.
3: See what happens when you use
4: Delete and Insert
5: (the D and I commands)
6: to edit text
7: in your file.
8: The insert command can place new lines
9: in the file; there's no problem
10: because the line numbers are dynamic;
11:*they'll go all the way to 65529.
```

To search for the first occurrence of the string “and”, type:

```
2,12 Sand 
```

The following line is displayed:

```
4: Delete and Insert
```

To get the “and” in line 5, modify the search command by typing:

```
  , 12 Sand 
```

(S)earch

The search then continues from the line after the current line (line 4), since no first line was given. The result is:

5: (the D and I commands)

To search through several occurrences of a string until the correct string is found, type:

1, ? Sand

The result is:

4: Delete and Insert

O.K.?

If you press any key (except Y or the Return key), the search continues, therefore type:

O.K.? N

Continue:

5: (the D and I commands)

O.K.?

Now press Y to terminate the search:

O.K.? Y

*

To search for string XYZ without the verification (O.K.), type:

*Sxyz

EDLIN reports a match and continues to search for the same string when you issue the S command:

*S

EDLIN reports another match if there is one. If there are no more matches, EDLIN reports the string is “Not found”.

NOTE

String defaults to any string specified by a previous Replace or Search command.

(T)ransfer

(T)ransfer

Purpose

Transfer lets you insert (merge) the contents of filename.typ into the file currently being edited at line. If line is omitted, then the current line is used.

Form

```
[line]T filename.typ Return
```

Instructions

This command is useful if you want to put the contents of a file into another file or into the text you are typing. The transferred text is inserted at the line number specified by line and the lines are renumbered.

(W)rite

Purpose

Write allows you to write a specified number of lines to the diskette from the lines that are being edited in memory. Lines are written to diskette beginning with line number 1.

Form

[n]W

Instructions

This command is meaningful only if the file you are editing is too large to fit into memory. When you start EDLIN, EDLIN reads lines into memory until memory is 3/4 full.

To edit the remainder of your file, you must write edited lines in memory to diskette. Then you can load additional unedited lines from diskette into memory by using the Append command.

NOTE

If you do not specify the number of lines, lines are written until memory is 3/4 full. No action is taken if available memory is already more than 3/4 full. All lines are renumbered, so that the first remaining line becomes line number 1.

5

Messages

This chapter lists the messages that can be displayed while using the MS-DOS Version 2.11 operating system. They are listed in alphabetical order for easy reference. The message is printed first, followed by what it means, and what to do about it.

Remember, if you are asked to reset the Rainbow computer:

- Press the Set-Up key.
- Then hold down the control key (Ctrl on the keyboard) while you press the Set-Up key.

Other Messages

If you see a message that starts with

`See Owner's Manual - MESSAGE nn -`

Consult the *Rainbow Owner's Manual*.

If any messages are displayed while you are using an application program, refer to the application program documentation for instructions.

Allocation error, size adjusted

The CHKDSK program found an invalid cluster number in the FAT (File Allocation Table). The CHKDSK program truncated the file at the end of the last valid cluster.

Bad call format reading/writing device

The MS-DOS Version 2.11 operating system found an incorrect length request header for the specified device. Press the A key to abort the command. Review the source code of the program that produced the message.

Bad command error reading/writing device

The MS-DOS Version 2.11 operating system found an invalid command in the command code field of the request header for the specified device. Press the A key to abort the command. Review the source code of the program that produced the message.

Bad command or file name

The MS-DOS Version 2.11 operating system did not recognize the command or file name. Check for typing errors. Reenter the command correctly.

Bad or missing Command Interpreter

The MS-DOS Version 2.11 operating system could not find the COMMAND.COM file on the disk. The COMMAND.COM file is invalid or is missing from the root directory, or the COMSPEC= parameter in the CONFIG.SYS file did not point to a COMMAND.COM file. Reset the Rainbow computer and copy the COMMAND.COM file from your MS-DOS back-up system diskette onto the disk you use to start the MS-DOS Version 2.11 operating system.

Bad or missing filename

You specified an invalid device in the CONFIG.SYS file. Check the accuracy of the DEVICE statement in the CONFIG.SYS file.

Bad unit error reading/writing device

The MS-DOS Version 2.11 operating system found an invalid subunit code in the request header for the specified device. Press the A key to abort the command. Review the source code of the program that produced the message.

Batch file missing

The MS-DOS Version 2.11 operating system could not find the batch file (.BAT) you tried to process.

Cannot CHDIR to filename – tree past this point not processed

The CHKDSK program was unable to proceed to the specified directory while traveling the tree structure of the directory. All sub-directories underneath this directory will not be verified. Copy the files on your disk to another disk. If you have trouble copying the files, run the RECOVER program.

**Cannot CHDIR to root
Processing cannot continue**

The CHKDSK program was unable to return to the root directory while traveling the tree structure of the directory. The CHKDSK program cannot continue checking the remaining sub-directories to the root. Copy the files on your disk to another disk. If you have trouble copying the files, run the RECOVER program.

Cannot do binary reads from a device

You used the /B option while copying from a device other than a disk. Try again without the /B option.

Cannot edit .BAK file—rename file

You specified a file with a .BAK file type for the EDLIN program to edit. The EDLIN program cannot edit a file with a .BAK file type. Rename or copy the file with a different file type.

Cannot format disk on default drive.

You either specified the default drive or did not specify a drive when using the FORMAT program. Specify a drive other than the default drive.

Cannot format this disk.

The MS-DOS Version 2.11 operating system could not format this disk because of physical errors on the disk. Run the FORMAT program again with the /I switch or try another disk.

Cannot load COMMAND, system halted

The MS-DOS Version 2.11 operating system was unable to reload the non-resident portion of the COMMAND.COM file into memory. Reset your Rainbow computer and reload the MS-DOS Version 2.11 operating system.

Cannot open filename

The PRINT program failed to find the specified file to print, or the file does not exist. Check the command for a valid file name.

Cannot recover . entry, processing continued.

The CHKDSK program found the . (current directory) entry defective. Copy the files on your disk to another disk. If you have trouble copying the files, run the RECOVER program.

Cannot recover .. entry,

The CHKDSK program found the .. (parent directory) entry defective. Copy the files on your disk to another disk. If you have trouble copying the files, run the RECOVER program.

Cannot start COMMAND, exiting

The MS-DOS Version 2.11 operating system could not load another copy of the COMMAND.COM file into memory. Either you do not have enough memory, or the FILES= parameter in the CONFIG.SYS file is set too low.

Cannot use Mdrive for formatting.

You specified MDRIVE for formatting. MDRIVE is already formatted.

Can't find MDRIVE.SYS

The MS-DOS Version 2.11 operating system could not find the MDRIVE.SYS file. Your MS-DOS start-up disk must contain both the MDRIVE.COM and MDRIVE.SYS files in the root directory. Copy the MDRIVE.SYS file from your MS-DOS back-up diskette.

Can't read setup.

The SETPORT program could not read the extended communications data. You are probably using the MS-DOS Version 2.01 operating system. Check to make sure you are using the MS-DOS Version 2.11 operating system.

CHDIR .. failed, trying alternate method

The CHKDSK program could not return to a parent directory while traveling the tree structure. The CHKDSK program tries to return to that directory by starting over at the root and traveling down. Copy the files on your disk to another disk. If you have trouble copying the files, run the RECOVER program.

Content of destination lost before copy

A source file in your COPY command was also the destination file. The COPY program overwrote the source file prior to completion of the copy. You can no longer use that file.

Copy not completed

The DISKCOPY program could not copy the entire disk because of physical errors on the disk. Use another diskette.

CP/M drive must be 'A' through 'D' No Wini Support

The RDCPM program tried to read a CP/M-86/80 hard disk partition. The RDCPM program cannot read CP/M-86/80 hard disk partitions. If you want to read a CP/M-86/80 file from a hard disk:

1. Start the CP/M-86/80 operating system.
2. Copy the file to a diskette.
3. Restart the MS-DOS Version 2.11 operating system.
4. Use the RDCPM program to read the file from the diskette.

CP/M source cannot be the current default drive

The current default drive contains an MS-DOS disk. Reenter the command specifying the drive that contains the CP/M-86/80 file.

**Data error reading/writing drive drv
Abort, Retry, Ignore?**

The MS-DOS Version 2.11 operating system could not read from or write to the disk. The disk is probably unusable. Press the R key to retry the command.

If the problem persists and you are performing a back-up, restore, or verify operation, press the I key to ignore the problem and continue the operation. A file is most probably corrupted.

If you are not performing a back-up, restore, or verify operation and the problem persists, press the A key to abort the command. Copy all files to a new diskette or back up and reformat your hard disk.

**Directory is totally empty,
no . or ..**

The specified directory did not contain references to current and parent directories. Delete the specified directory and recreate it.

**Disk error reading/writing drive drv
Abort, Retry, Ignore?**

The MS-DOS Version 2.11 operating system could not read from or write to the disk. The disk is probably unusable. Press the R key to retry the command.

If the problem persists, press the A key to abort the command. Copy all files to a new diskette or back up and reformat your hard disk.

Disk error reading FAT

The CHKDSK program found a defective sector while trying to read the FAT (File Allocation Table). The MS-DOS Version 2.11 operating system automatically uses the other FAT (File Allocation Table). Copy all files to a new diskette or back up and reformat your hard disk.

Disk error writing FAT

The CHKDSK program found a defective sector while trying to write the FAT (File Allocation Table). The MS-DOS Version 2.11 operating system automatically uses the other FAT (File Allocation Table). Copy all files to a new diskette or back up and reformat your hard disk.

Disk full— write not completed

You entered the EDLIN END command, but the disk did not contain enough free space for the file. The EDLIN program stops the END command and returns you to the operating system. Delete some files to free some space on your disk. Restart the editing session.

Disk is not properly initialized.
Possible blank disk? Try "FORMAT drv:/I".

You used an improperly initialized diskette on your Rainbow computer. Use the FORMAT command with the /I switch to prepare your diskette.

Disk unsuitable for system disk

The FORMAT program found a bad sector on the disk where some system data resides. You can use this disk for general data storage, but you cannot use it as a system disk.

Disks must be the same size

You tried to copy a diskette to another diskette with a different format using the DISKCOPY program. Use the COPY program to copy files onto the diskette.

Divide overflow

The Intel 8088 processor set the divide overflow flag, which is usually caused by division by zero. Review the source code or contact the vendor of the program that produced the message.

Drive Error.

Your disk drive may be malfunctioning. Reset your Rainbow computer and run the Rainbow self-test diagnostics by pressing S from the Rainbow Main System Menu.

Duplicate file name or File not found

You tried to rename a file to a file name that already exists, or the name you specified could not be found. Use a different file name for the destination file or check to make sure the source file exists.

Entry error

You entered an EDLIN command incorrectly. Reenter the command correctly and press the Return key.

Entry has a bad attribute (or size or link)

If one period displayed before the message, the CHKDSK program found an error in an entry in the current directory. If two periods displayed before the message, the CHKDSK program found an error in an entry in the subdirectory. The CHKDSK program with the /F switch attempts to correct this error.

Messages

Error creating output file.

The RDCPM program tried to copy a file to a disk that is full or has too many directory entries. Delete some files from the disk.

Error in command line

You entered the command line incorrectly. Reenter the command line correctly. Refer to the documentation on the MS-DOS command you are using.

Error in .EXE file

The MS-DOS Version 2.11 operating system tried to load an .EXE file containing an invalid internal format. Copy the .EXE file from your MS-DOS Version 2.11 operating system back-up diskette.

Error modifying MDRIVE.SYS

The MS-DOS Version 2.11 operating system found a faulty copy of MDRIVE.SYS. Copy the file from your MS-DOS back-up system diskette.

Error reading CP/M file

The RDCPM program found an error while reading the CP/M-86/80 file. Check the integrity of the file by loading the CP/M-86/80 operating system and typing the file. If your file is correct, copy the file to a new diskette and use the RDCPM program again.

Error reading floppy disk file

The BACKUP program found an error while verifying your diskette produced by the BACKUP program. Run the BACKUP program again using a new diskette.

Error reading hard disk file

The VERIFY program found an error in the files on your hard disk while verifying your back-up diskettes. Restore the file causing the error on your hard disk from your back-up diskette.

Error reading MDRIVE.SYS

The MS-DOS Version 2.11 operating system found a faulty copy of MDRIVE.SYS. Copy the file from your MS-DOS back-up system diskette.

Error reading the disk

Type any key to try again

The MS-DOS Version 2.11 operating system found a problem while loading. Start the MS-DOS Version 2.11 operating system from your back-up diskette. Copy all files to a new diskette or back up and reformat your hard disk.

Error transferring system area.

The FORMAT program could not transfer the loader to the new disk. Use the FORMAT program with the /I switch.

Error writing Allocation Table.

The FORMAT program could not write the Disk Allocation Table. Use the FORMAT command with the /I switch.

Error writing MSDOS file

The RDCPM program found a problem while writing the MS-DOS file. Use a different destination disk.

Error writing to device

You sent too much data to a device. The MS-DOS Version 2.11 operating system could not write the data to the specified device. Check the amount of data in the file that requested the input/output function and try again.

Errors found, F parameter not specified. Corrections will not be written to disk.

The CHKDSK program found problems on the disk. You must use the /F switch if you want the CHKDSK program to correct the problems.

Errors on list device indicate that it may be off-line. Please check it.

Your printer is offline. Turn it online.

EXEC failure

The MS-DOS Version 2.11 operating system either found a problem when reading a command, or you set the FILES statement in the CONFIG.SYS file too low. Increase the value of the FILES statement and restart the MS-DOS Version 2.11 operating system.

Extended Communication Option (PC1XX-BB) is not installed.

The extended communications option board is missing or not working correctly.

File allocation table bad for drive drv

The disk may be faulty. Use the CHKDSK program with the /F switch to check the disk. Then retry the operation. If the message persists, format the disk using the FORMAT program.

File cannot be copied onto itself

You used the same file name for the source and destination file names. Specify a different destination file name.

File creation error

You tried to add a new file name or replace a file that already exists in the directory. If the file already exists, it is a read-only file and cannot be replaced. Use the CHKDSK program on the disk to determine the cause of the problem.

File name must be specified

You did not specify a file name when you started the EDLIN program. Specify a file name.

File not found

The MS-DOS Version 2.11 operating system could not find the file that you specified. Check to see that the path name is accurate and the file exists in the directory you specified.

File on floppy disk is missing

The BACKUP program verify option could not find the files on the diskette. Check to make sure you are using the correct back-up diskettes.

File on hard disk is missing

The BACKUP program verify option could not find the files on the hard disk. You are trying to verify files you deleted. Set the verify file specifier option and the verify exclusion file specifier option in the advanced verify menu so you do not try to verify files you have deleted.

Filename.typ contains x non-contiguous blocks.

The CHKDSK program found non-contiguous blocks in the file you specified. This means that the MS-DOS Version 2.11 operating system stored the file in fragments on the disk rather than sequentially. Copy the fragmented file to another disk to improve reading performance.

Filename.typ has invalid cluster, file truncated.

The CHKDSK program found a file that contains an invalid pointer. If you specified the /F switch, the CHKDSK program truncates the file at the last valid data block. The file may be missing data.

Filename.typ is cross linked on cluster

The CHKDSK program found an area of the disk that belongs to two files. Make a copy of the file that has the problem. Then, delete both files that are cross linked.

FIND: File not found filename

The FIND program could not find the file you specified. Check to see that the path name is accurate and the file exists in the directory you specified.

FIND: Invalid number of parameters

You did not specify a string in the FIND command. Reenter the command with a string.

FIND: Invalid parameter param

You tried to use an invalid parameter in the command line. The valid parameters are /V, /C, and /N. Reenter the command with a valid parameter.

FIND: Read error in filename

The FIND program could not read the file. Reenter the command. If the problem persists, use the CHKDSK program.

FIND: Syntax error

You typed an illegal string in the FIND command. You must enclose the string in quotes ("string"). Reenter the command enclosing the string in quotes.

**First cluster number is invalid,
entry truncated.**

The CHKDSK program found an invalid pointer to the data area in the file directory entry. Use the CHKDSK program with the /F switch to truncate the file to a zero-length file, which you should delete.

FOR cannot be nested

You tried to nest FOR statements in a batch file. You cannot nest FOR statements in a batch file. Remove the FOR statements from the batch file.

Format failure

The MS-DOS Version 2.11 operating system could not format the disk. This message is displayed with an explanation as to why the MS-DOS Version 2.11 operating system could not format the disk.

Incompatible system size

The SYS program could not copy the system files (IO.SYS and MSDOS.SYS). These files occupy more space on the source diskette than is available on the destination diskette. Format a blank diskette with the /S switch and copy all files except the COMMAND.COM file from the source diskette.

Incorrect DOS version

You tried to use a program that will not run on the MS-DOS Version 2.11 operating system. Use the MS-DOS Version 2.11 operating system version of the same program.

Insert COMMAND.COM disk in drive drv and strike any key when ready

The MS-DOS Version 2.11 operating system tried to reload the COMMAND.COM file but could not find the file in the specified drive. Insert your MS-DOS Version 2.11 operating system diskette into the specified drive and press any key. If the specified drive is not A:, B:, C:, or D:, reset the Rainbow computer and restart the MS-DOS Version 2.11 operating system.

Insufficient disk space

You tried to perform an operation on a disk which is full. Try again using a disk that contains sufficient room to perform the operation.

Insufficient memory

You tried to perform an operation without enough memory. If you have a BUFFERS= statement in your CONFIG.SYS file, specify a smaller value in the BUFFERS= statement. Restart the MS-DOS Version 2.11 operating system and try the command again. If this message displays again, you need to purchase additional memory for your Rainbow computer.

Insufficient memory for requested size

You specified too many blocks of memory for your MDRIVE. Specify a lower value for the number of blocks to install for your MDRIVE.

Insufficient memory for system transfer

You did not have enough memory to transfer the MS-DOS Version 2.11 system files (IO.SYS and MSDOS.SYS) using the FORMAT command with the /S switch. Use the SYS program to copy the system files.

**Insufficient room in root directory.
Erase files in root and repeat CHKDSK.**

The CHKDSK program tried to recover lost files into a full root directory. Delete some files in your root directory to make room for the lost files.

Intermediate file error during pipe

The pipe operation uses temporary files on the disk, which are automatically deleted after completion of the piping process. An error occurred in one of these files. Delete some files from your root directory and reenter the piping operation.

Invalid character

You typed an invalid character in the file name of the BACKUP program's backup, restore, or verify file specifier option or the backup, restore, or verify exclusion file specifier option. Reenter the file name using a valid character.

Invalid characters in volume label

You tried to name a volume label with an invalid alphanumeric character. Reenter the volume label with valid alphanumeric characters.

Invalid COMMAND.COM in drive drv

The application program you used has taken most of your memory. The MS-DOS Version 2.11 operating system must reload the COMMAND.COM file from disk. However, the COMMAND.COM file found is a different version from the COMMAND.COM file you started the MS-DOS Version 2.11 operating system with. Insert the diskette you used to start the MS-DOS Version 2.11 operating system into the specified drive.

Invalid country code

You specified an invalid country number in your CONFIG.SYS file. The country number you entered is not supported by the MS-DOS Version 2.11 operating system. Use a valid country code.

Invalid current directory. Processing cannot continue

The CHKDSK program could not read the current directory. Your disk is faulty. Copy all files and reformat your disk.

Invalid date Enter new date:

You used an invalid DATE value or separator. Enter a valid date and press the Return key. If you do not want to enter a date, press the Return key.

Invalid device

You used an invalid device. Valid devices are CON, NUL, AUX, or PRN. Reenter the device.

Invalid directory

You specified an invalid or nonexistent directory. Reenter the directory name correctly.

Invalid drive in search path

You specified an invalid drive to the PATH command. Reenter the command with a valid drive.

Invalid drive or file name

You specified an invalid drive or invalid file name when starting the EDLIN program. Restart the EDLIN program specifying a valid drive or file name.

Invalid drive specification

You specified an invalid drive specification. Reenter the command with a correct drive specification.

Invalid number of parameters

You used an incorrect number of options in the command line. See the documentation on the specified command you are using to determine how many options you can use. Then, reenter the command using the correct number of options.

Invalid parameter

You used an incorrect switch. See the documentation on the specified command you are using to determine what switches you can use. Then, reenter the command using the correct switches.

**Invalid path, not directory,
or directory not empty**

You could not remove the directory requested because you specified an invalid path, an invalid directory, or a directory that is not empty. Specify the correct path name and directory, or delete all the files in the directory you are trying to remove. Reenter the RMDIR command.

Messages

Invalid path or file name

You used an invalid path or file name with the COPY command. Reenter the COPY command line with a valid path or file name.

Invalid path specified

You used an invalid path in the RDCPM program. Run the RDCPM program again using a valid path.

Invalid sub-directory entry

You used an invalid or nonexistent sub-directory. Check to see that you entered the sub-directory name correctly. Run the CHKDSK program using a valid sub-directory.

Invalid time

Enter new time:

You used an invalid TIME value or separator. Reenter a valid time and press the Return key. If you do not want to enter a time, press the Return key.

Label not found

Your batch file contained a GOTO command to a nonexistent label. You must begin a label with a colon. Edit your batch file or use an existent label, and run the batch file again.

Line too long

The EDLIN program stopped the REPLACE command when a replacement string caused the line to expand beyond the 253 character limit. Divide the long line into two lines, then use the REPLACE command twice.

List output is not assigned to a device

You specified a nonexistent device the first time you used the PRINT program. Run the PRINT program and specify a valid device (pressing the Return key specifies the PRN device).

**X lost clusters found in y chains.
Convert lost chains to files (Y/N)?**

The CHKDSK program found files for which the directory entry has been lost. This is usually caused by a program exiting without closing the files.

If you did not specify the /F switch, the CHKDSK program displays the number of bytes that are lost but does not recover the lost space.

If you did specify the /F switch and answer N(o) to the question, the CHKDSK program makes this otherwise unusable space available for use.

If you did specify the /F switch and answer Y(es) to the question, the CHKDSK program creates a file in the root directory for each lost chain. Files created by the CHKDSK program are named FILEnnnn.CHK. Look at the files to see if they contain valuable information. Delete the files that contain information you do not need.

***** Mdrive disabled. *****

Not enough system memory for requested size.

You configured MDRIVE on a Rainbow computer with more memory than the Rainbow computer you are currently using. Reconfigure MDRIVE for the Rainbow computer you are using.

Memory allocation error Cannot load COMMAND, system halted

The MS-DOS Version 2.11 operating system had a problem managing memory. Reset the Rainbow computer and restart the MS-DOS Version 2.11 operating system. If this message persists, copy your MS-DOS Version 2.11 operating system from your back-up MS-DOS Version 2.11 operating system diskette.

Minimum 192K bytes of RAM needed to activate Mdrive

You tried to configure MDRIVE with less than the 192K bytes of required memory. To use MDRIVE, you need to purchase additional memory for your Rainbow computer.

Must specify destination line number

You omitted a destination line number when you tried to copy or move lines with the EDLIN program. Reenter the EDLIN program and specify a destination line number with the COPY or MOVE command.

No files found

The RDCPM program could not find any of the CP/M-86/80 files you specified. Run the RDCPM program and use the DIR option to make sure the file exists.

No files match d:XXXXXXXX.XXX

You specified an invalid file specification to be added to the PRINT queue. Run the PRINT program and specify a valid file specification.

**No free file handles
Cannot start COMMAND.COM, exiting**

The CONFIG.SYS file contains a FILES= parameter that is too small. Restart the MS-DOS Version 2.11 operating system from your back-up MS-DOS Version 2.11 operation system diskette. Edit the CONFIG.SYS file on your working diskette to increase the value of the FILES= parameter.

No room for system on destination disk

You tried to copy the system files to a full disk using the SYS program. Delete some files to make room for the system files or use another disk. You may need to reformat the disk to copy the system files.

No room in directory for file

You tried to save a file in the root directory, but the directory is full while using the EDLIN program. Unlike the root directory, sub-directories are not limited in size. Delete some files from your root directory and reenter the command.

**Non-DOS disk error reading/writing drive drv
Abort, Retry, Ignore?**

The MS-DOS Version 2.11 operating system did not recognize the disk format. Press the A key to abort the command. You cannot use this disk with the MS-DOS Version 2.11 operating system. Reformat the disk.

**Not an MS-DOS system disk
Type any key to try again**

You tried to start the MS-DOS Version 2.11 operating system from a non-system MS-DOS disk. Restart the MS-DOS Version 2.11 operating system using a valid system disk.

Messages

Not enough memory to transfer files

The RDCPM program did not have enough memory to transfer all the files you specified. Transfer the files one at a time.

Not enough room to merge the entire file

You used the EDLIN TRANSFER command to transfer a file to memory, but there was not enough room in memory to hold the file. Free some memory by writing some files to disk and then transfer the file.

Not ready error reading/writing drive drv

Abort, Retry, Ignore?

The MS-DOS Version 2.11 operating system could not access the drive you specified.

1. Check the door of the drive specified in the message. If it is open, close the door and press the R key to retry the command.
2. Check the diskette in the drive specified in the message. If it is upside-down, insert it in the drive correctly and press the R key to retry the command.

Out of environment space

You used a SET command but there is not enough room in the program environment to accept more data. Reduce the size of the data in the program environment by entering smaller SET parameters.

Please set the system date and time first.

You used the BACKUP program without setting the date and time. You must set the date and time before you can back up, restore, or verify files.

PRINT queue is full

You tried to place more than 10 files in the PRINT queue. Wait until some files are printed before adding more files to the queue.

Printer isn't on.

The SETPORT program tried to use the printer but either the printer is turned off, the printer cable is not connected, or the printer is not supported. Turn the printer on or connect the printer cable.

Probable non-DOS disk.

Continue (Y/N)?

You created a disk that the MS-DOS Version 2.11 operating system did not recognize. Either you created the disk on another system with a format not supported on the MS-DOS Version 2.11 operating system, or the disk is not an MS-DOS disk.

If the CHKDSK program displays this message for a diskette, stop processing. If the CHKDSK program displays this message for a hard disk, the information describing the characteristics of the disk to the MS-DOS Version 2.11 operating system has been destroyed. In this case, you can continue the CHKDSK program processing.

Program too big to fit in memory

You used an application program that needs more memory than you have in your Rainbow computer. If you configured MDRIVE, either configure a smaller MDRIVE or remove MDRIVE. If you did not have MDRIVE configured, you must acquire more memory to run your application program.

It is also possible that you just used an application program that is still in memory. Restart the MS-DOS Version 2.11 operating system and try to use the application program again. If this message is displayed again, you must acquire more memory.

Read error occurred

The RDCPM program found an error while reading a CP/M-86/80 file. Check the integrity of the file by loading the CP/M-86/80 operating system and typing the file. If your file is correct, copy the file to a new diskette and use the RDCPM program again.

Read fault error reading/writing drive drv Abort, Retry, Ignore?

The MS-DOS Version 2.11 operating system could not read from or write to the disk drive. Press the R key to retry the command.

If the problem persists, press the A key to abort the command. Your disk drive may be malfunctioning. Reset your Rainbow computer and run the Rainbow self-test diagnostics by pressing S from the Rainbow Main System Menu.

Save volume is bad

The BACKUP program found an error on the back-up diskettes while verifying the files. Your back-up diskettes are unusable. Reformat the faulty back-up diskette and use the BACKUP program again.

Sector not found error reading/writing drive drv Abort, Retry, Ignore?

The MS-DOS Version 2.11 operating system could not read from or write to the disk. The disk may be unusable. Press the R key to retry the command.

If the problem persists, press the A key to abort the command. Then, copy all files to a new diskette or back up and reformat your hard disk.

Sector size too large in file filename

The CONFIG.SYS file loaded the specified device driver that used a sector size larger than that of any other device driver on the system. You cannot run this device driver. Edit the CONFIG.SYS file to delete the DEVICE= entry.

**Seek error reading/writing drive drv
Abort, Retry, Ignore?**

The MS-DOS Version 2.11 operating system could not read from or write to the disk. The disk may be unusable. Press the R key to retry the command.

If the problem persists, press the A key to abort the command. Copy all files to a new diskette or back up and reformat your hard disk.

SETPORT uses no command line arguments

You used an argument on the SETPORT command line. You cannot use arguments on the SETPORT command line.

Sorry, a disk erase error occurred

The BACKUP program found an unrecoverable error on the diskette being erased. Use the FORMAT program with the /I switch and then start the BACKUP program again.

Sorry, a drive specifier is allowed only for indirect files

You specified a drive specification in the BACKUP program's backup, restore, or verify file specifier option. You cannot specify a drive specification in the backup, restore, or verify file specifier option unless it is for an indirect file.

If you are specifying an indirect file, you must precede the file specification with an @ sign. Otherwise, enter the drive specification by the displayed menu items above the file specification by pressing the arrow keys.

Messages

Sorry, a file specifier can't contain a drive name.

The BACKUP program found one or more file names with a drive specification in the file specified in the backup, restore, or verify file specifier option. Edit the file and remove the drive specifications.

Sorry, an indirect file cannot be specified here

You specified an indirect file in the BACKUP program's backup, restore, or verify exclusion file specifier option. Remove the indirect file reference in the backup, restore, or verify exclusion file specifier option.

Sorry, an unidentified error has occurred

The BACKUP program found an unidentified error. Run the BACKUP program again. If the problem persists, copy the BACKUP.EXE file from your back-up MS-DOS Version 2.11 operating system diskette and try again. If the problem still persists, call the DIGITAL Help Line for help.

Sorry, can't open the directory file

The BACKUP program found an error with the data on your back-up diskettes while restoring your files. Run the BACKUP program again. If the problem persists, copy the BACKUP.EXE file from your back-up MS-DOS Version 2.11 operating system diskette and try again. If this does not work, restore your hard disk from an older back-up volume.

Sorry, can't open the specified indirect (<) file.

The BACKUP program could not find the indirect file you specified. Reenter a valid indirect file name.

Sorry, legal switches are: /D and /A.

You used an invalid switch in the BACKUP program's backup, restore, or verify file specifier option. You can only use the /D and /A switches in the backup, restore, or verify file specifier options. Reenter a valid switch.

Sorry, no files have been matched.

You specified file names in the BACKUP program's backup, restore, or verify file specifier option and the backup, restore, or verify exclusion file specifier option that did not match any of the files on either the hard disk or back-up diskettes. Reenter a backup, restore, or verify file specifier option and a backup, restore, or verify exclusion file specifier option that include valid file names.

Sorry, not enough memory for the file buffer.

You tried to copy too many files to back-up diskettes using the BACKUP program. Instead of copying all your files at once, use the BACKUP program several times.

Sorry, not enough memory for the file list.

You tried to copy too many files to back-up diskettes using the BACKUP program. Instead of copying all your files at once, use the BACKUP program several times.

Sorry, not enough memory for the indirect file.

You tried to copy too many files to back-up diskettes using the BACKUP program. Instead of copying all your files at once, use the BACKUP program several times.

Sorry, not enough room in the hard disk root for another sub-directory

The BACKUP program tried to create a sub-directory but there are too many directory entries on the root directory of the hard disk. Delete some files from your root directory on the hard disk and copy them back into sub-directories on the hard disk.

Sorry, not enough room on the hard disk for another sub-directory

The BACKUP program tried to create a sub-directory but there is not enough room on your hard disk. Delete some files from your hard disk and run the BACKUP program again.

Sorry, not enough room on the hard disk for this file

The BACKUP program tried to restore a file to your hard disk. There are either too many directory entries on the root directory of the hard disk, or the hard disk is full. Delete some files from your root directory on the hard disk, and run the BACKUP program again.

Sorry, pathnames are limited to 64 characters.

The BACKUP program tried to backup a file with a file specification larger than 64 characters. Use the CHDIR program to change your current path, and use the BACKUP program several times.

Sorry, the destination drive must be specified

You did not specify a destination drive to the BACKUP program. Run the BACKUP program again and specify a valid destination drive.

Sorry, the disk is not a backup volume

You used a diskette that was not written by the BACKUP program. Insert the correct back-up diskette.

Sorry, the indirect file is is incorrectly formatted.

The BACKUP program found an invalid list of file names in the indirect file. Edit and enter a valid list of file names in your indirect file.

Sorry, the source drive must be specified

You did not identify either the drive on a RESTORE command, or the hard disk drive on a BACKUP command in the command line. Reenter the RESTORE or BACKUP command specifying the source drive.

Sorry, this entry cannot contain a file extension.

You specified a period in the BACKUP program volume name. Reenter another volume name without a period.

Sorry, this entry cannot contain a path specification.

You specified a backslash (\) in the BACKUP program volume name. Reenter another volume name without a backslash.

Sorry, this entry may contain a single file specifier only

You specified a comma in the BACKUP program volume name. Reenter another volume name without a comma.

Sorry, this entry may not contain any 'switches'

You specified a slash (/) in the BACKUP program volume name. Reenter another volume name without a slash.

Sorry, valid flags are: /ALL and /CHANGED

You specified an invalid switch on the BACKUP command line. You can only use the /ALL and /CHANGED switches. Reenter the command line with the correct switch.

Sorry, valid floppy drives are: A, B, C, and D

You specified a nonexistent drive on the BACKUP command line. Reenter the command line with the correct drive (A:, B:, C:, or D:).

Sorry, valid winchester drives are: E, F, G, and H

You specified a nonexistent hard disk drive on the BACKUP command line. Reenter the command line with the correct drive (E:, F:, G:, or H:).

Messages

Sorry, volume name is improper.

You specified an incorrect back-up diskette name while using the BACKUP program advanced menu option. The name does not match those on the actual back-up diskettes. Use the DIRECTORY command to obtain the name of the back-up diskettes and enter that name into the advanced menu option.

Sorry, volume sequence is out of order

The BACKUP program found an internal programming error. Save your diskettes. Call the DIGITAL Help Line for help.

Sorry, wildcards (* or ?) are not allowed in this entry.

You specified an asterisk (*) or question mark (?) in the BACKUP program volume name. Reenter another volume name without an asterisk or question mark.

Sorry, you have not selected a valid winchester drive

You specified a nonexistent hard disk drive on the BACKUP command line. Reenter the command line with a valid hard disk drive.

Sort: Incorrect DOS version

You tried to use a version of the SORT program that cannot be used with the MS-DOS Version 2.11 operating system. Use the SORT program on the MS-DOS Version 2.11 operating system diskette.

Sort: Insufficient disk space

You tried to create a file with the SORT program by redirecting the file to a disk that is full. Specify a different disk or delete some files.

SORT: Insufficient memory

You tried to use the SORT program on a Rainbow computer with insufficient memory. If you configured MDRIVE, either configure a smaller MDRIVE or remove MDRIVE. If you did not have MDRIVE configured, you must acquire more memory to sort this list.

Source and target disks are not the same format. Cannot do the copy.

The diskettes you used for the DISKCOPY program are not the same format. Reformat the target diskette so it is the same format as the source diskette.

Specified COMMAND search directory bad

The COMSPEC= statement in the SET environment is invalid. Either the place that you told the MS-DOS Version 2.11 operating system to look for the COMMAND.COM file does not exist, or the COMMAND.COM file is not in that place. Enter the SET COMSPEC= statement with a valid COMMAND.COM file location.

Syntax error

The MS-DOS Version 2.11 operating system did not recognize the command you typed. Check to make sure that you typed the command correctly.

The command is incorrectly formatted

You typed the BACKUP command line using a wrong format. Reenter the command using the correct format.

Too many resident drivers or programs to permit formatting.

Device drivers or resident programs (such as the PRINT program) are using too much memory to allow the FORMAT program to run. Edit the CONFIG.SYS file, remove one of the drivers to provide more system memory for the operation, and restart the MS-DOS Version 2.11 operating system.

Track 0 bad – disk unusable

The FORMAT program found a defective sector. The FORMAT program can compensate for defective sectors on the disk except for those near the beginning. Use another disk.

Unable to create directory

The MS-DOS Version 2.11 operating system could not create the directory you specified. Check for a name conflict (that is, you may already have a directory with the same name) or the disk may be full.

Unrecognized command in CONFIG.SYS

You used an invalid statement in your CONFIG.SYS file. Edit the CONFIG.SYS file and correct the statement.

Unrecoverable error in directory Convert directory to file (Y/N)?

The CHKDSK program found an error in the directory. If you specified the /F switch and respond Y(es) to the question, the CHKDSK program converts the bad directory to a file. You can then fix the directory yourself or delete it.

If you respond N(o) to the question, you may not be able to write to or read from the bad directory.

Use LA50 Remote Setup.

You used the LA100 or LQP02 setup menu with your LA50 printer. Use the LA50 setup menu.

Use LA100 Remote Setup.

You used the LA50 or LQP02 setup menu with your LA100 printer. Use the LA100 setup menu.

Use LQP02 Remote Setup.

You used the LA50 or LA100 setup menu with your LQP02 printer. Use the LQP02 setup menu.

**WARNING: Cannot read bad block information from hard disk.
Errors in files may occur on this drive.**

The FORMAT program could not read the information telling it where bad blocks (if any) are located. Back up the hard disk and use the Winchester Utility Program to test the hard disk and reinitialize if necessary.

Warning – directory full

The root directory was too full for RECOVER processing. Delete some files in the root directory to free space.

WARNING: Files may not be intact on drive drv

If you have a hard disk, this message can display when you start the operating system. It indicates that there may be a problem with the files on the hard disk.

Make a back-up copy of the files on the hard disk. Then, run the Winchester Utility Program to initialize the hard disk, or reformat the partitions on the hard disk.

**WARNING: Only 8 MBytes of the hard disk is usable.
Refer to the MS-DOS installation instructions.**

You created a 10M byte MS-DOS partition using the Winchester Utility Program Version 1.0. However, you can only use 8M bytes of this partition on your hard disk. Do not exceed 8M bytes of storage on this partition. Back up all files currently on your hard disk. Using the Winchester Utility Program Version 2.0, test and initialize your hard disk. Then, repartition and create a configuration that meets your needs. Finally, restore your files.

WARNING: The hard disk is not formatted or not partitioned

This message occurs if:

- The hard disk has not been installed properly for the MS-DOS Version 2.11 operating system.
- The hard disk has been tested and installed successfully for the MS-DOS Version 2.11 operating system, but the MS-DOS Version 2.11 operating system does not recognize the hard disk.

Use the Winchester Utility Program Version 2.0 to run the diagnostic test and the initialization procedure.

If the problem persists:

- Call your vendor.
- Call the DIGITAL Help Line.

**Write fault error reading/writing drive drv
Abort, Retry, Ignore?**

The MS-DOS Version 2.11 operating system could not read from or write to the disk drive. Press the R key to retry the command.

If the problem persists, press the A key to abort the command. Your disk drive may be malfunctioning. Reset your Rainbow computer and run the Rainbow self-test diagnostics by pressing S from the Rainbow Main System Menu.

**Write protect error reading/writing drive drv
Abort, Retry, Ignore?**

The MS-DOS Version 2.11 operating system could not write to the diskette displayed in the message. Check to see if the diskette has a write-protect tab. If it does, remove the write-protect tab. Press the R key to proceed.

If the error persists, press the A key to abort the command. Your disk drive may be malfunctioning. Reset your Rainbow computer and run the Rainbow self-test diagnostics by pressing S from the Rainbow Main System Menu.

Appendixes

A

Getting Help

Help Line Phone Numbers

Country	Phone Number
U.S.A.	(800) DEC-8000
Canada	(800) 267-5251
United Kingdom	(0256) 59 200
Belgium	(02)-24 26 790
West Germany	(089) 95 91 66 44
Italy	(02)-617 53 81 or 617 53 82
Japan	(0424) 64-3302
Denmark	(04)-30 10 05
Spain	(1)-73 34 307
Finland	(90)-42 33 32
Holland	(1820)-31 100
Switzerland	(01)-810 51 21
Sweden	(08)-98 88 35
Norway	(02)-25 64 22
France	(1)-687 31 52
Austria	(222)-67 76 41 extension 444
Australia	
Sydney	(02) 412-5555
All other areas	(008) 226377

B

Diskettes

Flexible diskettes, when used with care, are remarkably durable and reliable storage devices. Any given portion of a diskette's surface can be read and written upon millions of times before the oxide film that holds the data begins to wear too thin to consistently hold data. Moreover, flexible diskettes routinely pass, without a single error, diagnostic tests that fill the diskette tracks with data which is checked, changed, and rewritten in worst-case format, over and over and over.

In spite of their ruggedness and reliability, flexible diskettes (the pros call them "floppies") have acquired a somewhat poor reputation in data processing circles. Why?

A glance in any computer room or office where flexible diskettes are used shows them sitting on top of video terminals exposed to heat and magnetic fields, sitting beneath coffee cups and cold drink cans, and even lying on the floor without their protective envelopes.

Although many of these diskettes forget what they were told, a surprising number of them continue working through the coffee and cola rings, through the grit and grime and magnetic influences, for months or years at a time.

Don't push your luck. If you wish to avoid joining the ranks of frustrated flexible diskette users, carefully observe the following precautions.

Storing Diskettes

- Keep flexible diskettes in close-fitting, dust-tight boxes (like those they are packaged in when you buy them ten at a time).
- Store these boxes in rooms with consistent temperature, humidity, and cleanliness.

Handling Diskettes

Follow the tips below when handling diskettes.

- Avoid bending the diskettes. The “flexibility” of flexible diskettes is an accident of their design, not a goal. They will bend, but when bent their covers tend to crease or warp in ways that cause wear and binding when the drives rotate the diskette inside. Insert diskettes **gently** into their drives.
- Never allow your fingers to touch the diskette data surface (that is, the shiny, usually brown or black surface inside the black cover). Body oils cause the drive read/write heads (small electromagnets used to read or write information) to behave erratically—usually at the cost of data.
- Always return diskettes to their protective envelopes—even if you expect to use them again in a few seconds. One piece of grit on a diskette picked up from a desk top can wipe out a week's work.
- Keep diskettes far away from magnets. Magnets are often used to hold notes and pictures to metal surfaces. These handy items can damage diskettes.
- The best place to store diskettes, even temporarily, is in their storage boxes. However, if you **must** lay your diskettes (in their protective envelopes, of course) on your desk top rather than replace them in their storage boxes, never lay **anything** on top of them. Once you cover a diskette with a memo, the next thing you lay down will inevitably be a magnetized paperweight, stapler, or a key ring.

Using Diskettes

- Always identify your diskettes with the self-sticking labels. You can always ask the computer to tell you what is on the diskette, but this slows you down unnecessarily. If you fill out these labels after they are applied to the diskette cover, use only felt-tip pens because they require minimum pressure. **Never** use a ball-point pen or pencil. They can seriously deform both the diskette cover and the diskette inside. If you place a new label on a diskette, be sure to gently peel off the old label first. Placing labels on top of labels can cause the diskette to be seated improperly in a drive.
- Never allow diskettes to become so full that you risk running out of space while trying to write data to them. Leave some free space on your data diskettes.
- When running application programs that write data to diskettes, do not exchange one diskette for another except when the program tells you to do so or has finished executing. Some programs open files and leave them open until all the required data has been entered and acted upon. You almost certainly will have trouble if you exchange diskettes in the middle of such an operation.
- Do not turn the computer's power on or off when a diskette is inserted into any drive.

Diskette Backup Procedures

These procedures involve making copies of any edited diskettes.

Why? A diskette is not immortal. Sliding a diskette in and out of its jacket or a poor drive will wear it out. Accidents mentioned above and under "Handling Diskettes" may also occur.

Diskettes

Follow these tips and protect your work.

- Make copies of original diskettes. Label the original “master” and store it. You might want to make two copies of the original.
- Set up a diskette rotation method. Use five diskettes. At the close of day one, copy diskette work onto day two’s diskette. At the close of day two copy work onto day three’s diskette. Label diskettes with the numbers, actual dates, or days of the week.
- Take diskettes out of use after six months of rotation.

Above all “better safe than sorry”. Months of work can be lost due to worn-out or damaged diskettes.

Diskettes and Files

The MS-DOS operating system deals with a wide range of information including programs, text, and data. Information is organized in the form of files, and the files are stored on diskettes. File names distinguish electronic files much the same way as labels on file folders distinguish paper files in a cabinet.

Storing Information on Diskettes

The computer stores and retrieves files by referring to tracks and sectors on a diskette (see Figure B-1). Rainbow diskettes have 80 tracks, (numbered 0–79); each track is composed of ten sectors. Sectors store blocks of “bytes, ” each byte represents one character such as a letter, a digit, or a symbol. Because each sector has a unique location on a diskette, the computer can find a particular sector on a particular track and store information in it or retrieve information from it.

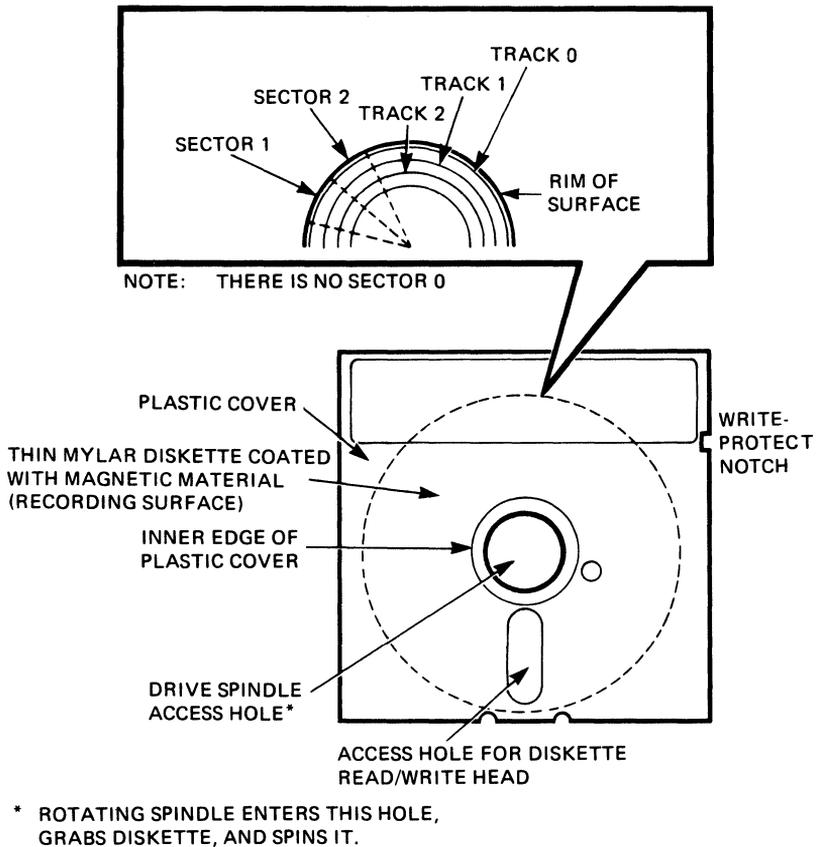


Figure B-1. Tracks and Sectors on a Diskette

The amount of information you can store on a diskette depends on the diskette's "density." The Rainbow computer's double density diskettes can hold twice as much information as single density diskettes. You can store about 115 pages of typewritten text on one diskette assuming 54 lines per page and 65 characters per line.

Protecting Data on Diskettes

You can protect the data on a diskette from being accidentally deleted by applying a self-sticking write-protect tab onto the diskette's write-protect notch (Figure B-2). This tab prevents the computer from writing on the diskette. You can remove the write-protect tab by peeling it off the diskette when you want the computer to write on it.

You can purchase write-protect tabs at any computer store.

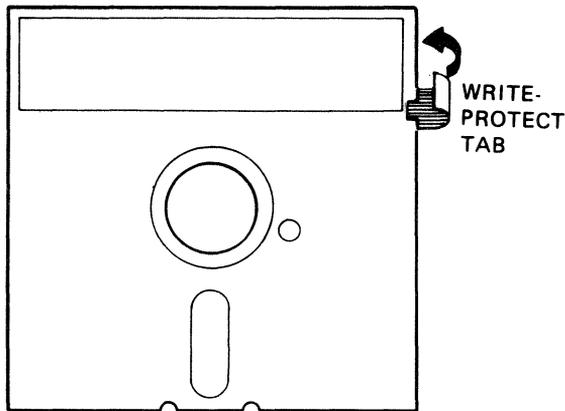


Figure B-2. Applying a Write-Protect Tab



Reading IBM Diskettes

Copying Data or Programs from IBM Diskettes

The Rainbow MS-DOS operating system can copy an 8-sector or 9-sector, single-sided IBM diskette.

If you want to copy data files or programs from an IBM diskette to a Rainbow diskette, follow the steps below.

1. Display the Rainbow Main System Menu according to one of the following procedures:
 - Turn on the Rainbow computer if it is turned off
 - Reset the Rainbow computer if it is turned on
2. Remove the MS-DOS working diskette from its protective envelope.
3. Open the drive A door and insert the MS-DOS working diskette.
4. Start the MS-DOS operating system by pressing the A key in response to the Main System Menu. After entering the correct time and date, the operating system prompt, "A>", should be the last characters displayed on the screen.
5. Remove the IBM diskette from its protective envelope.

6. Open the drive B door and insert the IBM diskette.
7. Use COPY to copy all or some of the data files or programs from the IBM diskette to the MS-DOS working diskette.

To copy **ALL** files, type:

```
A>COPY B:*. * A:/V Return
```

To copy **SOME** files, type:

```
A>COPY B:filename.typ A:/V Return
```

NOTE

We do not recommend writing onto non-RX50K diskettes or diskettes that have not been formatted with the /I switch. The MS-DOS operating system allows you to do this, but you could see unexpected results if you try to read the diskettes on a computer other than the Rainbow.

D

International Features

This appendix includes information about the international features of the MS-DOS Version 2.11 operating system. These features include:

1. Using international characters in file names
2. Using the international conventions for date, time, currency and more.

International Characters

Figure D-1 lists the international characters you can use in file names.

	°	À	Ñ	à	ñ
í	±	Á	Ò	á	ò
ë	²	Â	Ó	â	ó
£	³	Ã	Ô	ã	ô
¥	μ	Ä	Õ	ä	õ
§	¶	Å	Ö	å	ö
×	·	Æ	Ø	æ	ø
©	¹	Ç	Š	ç	š
®	º	È	Ù	è	ù
<<	>>	É	Ú	é	ú
	¼	Ê	Û	ê	û
	½	Ë	Ü	ë	ü
	¿	Ì	Ý	ì	ý
		Í	ß	í	
		Î		î	
		Ï		ï	

Figure D-1. International Characters

If these keys are not printed on your keycaps and you have a Rainbow 100B or Rainbow 100+ computer, you can create them by using the three key compose sequence. See the *Rainbow Owner's Manual* for more information about compose character sequences.

International Conventions

The MS-DOS Version 2.11 operating system can modify the information it displays with the DIR, DATE and TIME commands and some applications to support the conventions used in your country. These conventions include:

Date
Time
Currency
Thousands Separator
Decimal Point

To tell the MS-DOS operating system which country's convention you want to use, insert the country's code into the CONFIG.SYS file. This file is stored on the operating system diskette.

NOTE

The default country code is 1 (for the United States). When you first display the contents of the file CONFIG.SYS, there is no country code visible. If you want to specify another country, you must add the country code to the file.

An example of changing the conventions follows:

1. Type:

```
A>EDLIN CONFIG.SYS
```

MS-DOS displays:

```
End of input file  
*
```

International Features

2. Type:

`Insert` `Return`

MS-DOS displays:

*2

NOTE

This may be another number depending on how many lines are already in the CONFIG.SYS file on your diskette.

3. Type:

`Country=nn`

Where:

nn Is one of the country codes below:

United States	1
France	33
Spain	34
Portugal	35
Italy	39
United Kingdom	44
Germany	49
Japan	81
Israel	97

For example, to specify France, type:

Country=33

4. Press:

Ctrl/C

5. Type:

*End

The next time you reset or turn on your computer, the conventions for the country you specified will be reflected.

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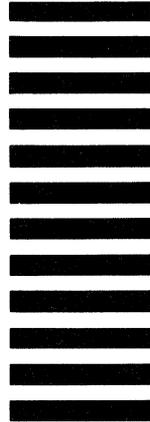
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PREFACE

INTENDED READER

This guide is intended for the advanced user of the MS-DOS operating system. The purpose of this guide is to provide detailed information about advanced MS-DOS concepts and commands.

This guide assumes that you have:

- o Installed the Rainbow computer according to the instructions in the Rainbow Installation Guide.
- o Read the Rainbow MS-DOS Version 2.11 Getting Started contained in this kit.
- o Read the Rainbow MS-DOS Version 2.11 User's Guide contained in this kit.

GUIDE ORGANIZATION

The Rainbow MS-DOS Version 2.11 Advanced User's Guide is organized as follows:

- Chapter 1 Discusses how to use directories and paths with the MS-DOS operating system
- Chapter 2 Discusses batch processing
- Chapter 3 Discusses input and output redirection
- Chapter 4 Explains the advanced MS-DOS commands that are used by programmers
- Chapter 5 Discusses the FILE COMPARISON (FC) utility
- Chapter 6 Discusses the LINK utility
- Appendix A Tells you how to configure the MS-DOS operating system for the Rainbow computer

CHAPTER 1

DIRECTORIES AND PATHS

This chapter discusses the MS-DOS directory structure and how to use file names and path names within this directory structure.

1.1 DIRECTORIES

The names of your files are kept in a directory on each disk. The directory also contains information on the size of the files, their locations on the disk, and the dates that they were created and updated.

When there are multiple users on your computer, or when you are working on several different projects, the number of files in the directory can become large and unwieldy. You may want your own files kept separate from a co-worker's; or, you may want to organize your programs into categories that are convenient for you.

In an office, you can separate files by putting them in different filing cabinets; in effect, creating different directories of information. MS-DOS allows you to organize the files on your disks into directories. Directories are a way of dividing your files into convenient groups of files.

DIRECTORIES AND PATHS

For example, you may want all of your accounting programs in one directory and text files in another. Any one directory can contain any reasonable number of files, and it may also contain other directories (referred to as subdirectories). This method of organizing your files is called a hierarchical directory structure.

A hierarchical directory structure can be thought of as a "tree" structure: directories are branches of the tree and files are the leaves, except that the "tree" grows downward; that is, the "root" is at the top. The root is the first level in the directory structure. It is the directory that is automatically created when you format a disk and start putting files in it. You can create additional directories and subdirectories with some of the commands discussed in Chapter 4, "Advanced MS-DOS Commands."

The tree or file structure grows as you create new directories for groups of files or for other people on the system. Within each new directory, files can be added, or new subdirectories can be created.

It is possible for you to "travel" around this tree. For instance, it is possible to find any file in the system by starting at the root and traveling down any of the branches to the desired file. Conversely, you can start where you are within the file system and travel towards the root.

Unless you take special action when you create a file, new files are created in the directory in which you are now working. Users can have files of the same name that are unrelated because each is in a different directory.

Figure 1-1 illustrates a typical hierarchical directory structure.

DIRECTORIES AND PATHS

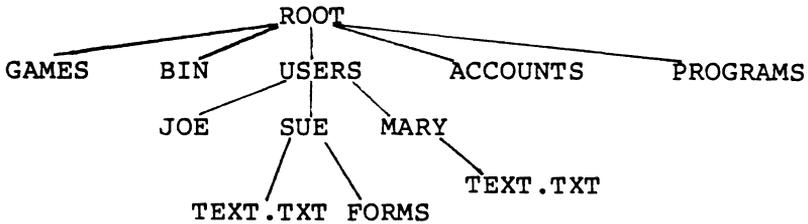


Figure 1-1: A Sample Hierarchical Directory Structure

The ROOT directory is the first level in the directory structure. You can create subdirectories from the ROOT by using the MKDIR command (refer to Chapter 4, "Advanced MS-DOS Commands," for information on MKDIR). In this example, five subdirectories of ROOT have been created. These include:

1. A directory of games, named GAMES
2. A directory of all external commands, named BIN
3. A USER directory containing separate subdirectories for all users of the system
4. A directory containing accounting information, named ACCOUNTS
5. A directory of programs, named PROGRAMS

Joe, Sue, and Mary each have their own directories that are subdirectories of the USER directory. Sue has a subdirectory under the \USER\SUE directory named FORMS. Sue and Mary have files in their directories, each named TEXT.TXT. Notice that Mary's text file is unrelated to Sue's.

DIRECTORIES AND PATHS

This organization of files and directories is not important if you only work with files in your own directory; but if you work with someone else or on several projects at one time, the hierarchical directory structure becomes extremely useful. For example, you could get a list of the files in Sue's FORMS directory by typing:

```
DIR \USER\SUE\FORMS
```

Note that the backward slash mark (\) is used to separate directories from other directories and files.

To find out what files Mary has in her directory, you could type:

```
DIR \USER\MARY
```


DIRECTORIES AND PATHS

`\USER\MARY\FORMS\1A` A typical full pathname. This one happens to be a file named 1A in the directory named FORMS belonging to the USER named MARY.

`USER\SUE` A relative pathname; it names the file or directory SUE in subdirectory USER of the working directory. If the working directory is the root (`\`), (`\`), it names `\USER\SUE`.

`TEXT.TXT` Name of a file or directory in the working directory.

MS-DOS provides special shorthand notations for the working directory and the parent directory (one level up) of the working directory:

. MS-DOS uses this shorthand notation to indicate the name of the working directory in all hierarchical directory listings. MS-DOS automatically creates this entry when a directory is made.

.. The shorthand name of the working directory's parent directory. If you type:

```
DIR ..
```

then MS-DOS will list the files in the parent directory of your working directory.

If you type:

```
DIR ..\..
```

then MS-DOS will list the files in the parent's PARENT directory.

DIRECTORIES AND PATHS

If you use a pathname in front of a command, (for example, E:\DOS\PRINT), the MS-DOS operating system ignores the command and returns to the operating system prompt. To use a command not in the current directory, use the PATH command.

You can use pathnames with the following MS-DOS commands:

BACKUP	FIND
CHDIR	LINK
COPY	MASM
DEBUG	MKDIR
DEL	PATH
DIR	RDCPM
EDLIN	RECOVER
ERASE	RMDIR
FC	TYPE

1.2.2 Pathing and External Commands

External commands reside on disks as program files. They must be read from the disk before they execute. (For more information on external commands, refer to the Rainbow MS-DOS Version 2.11 User's Guide).

When you are working with more than one directory, it is convenient to put all MS-DOS external commands into a separate directory so they do not clutter your other directories. When you issue an external command to MS-DOS,

DIRECTORIES AND PATHS

MS-DOS immediately checks your working directory to find that command. You must tell MS-DOS in which directory these external commands reside. This is done with the PATH command.

For example, if you are in a working directory named \BIN\PROG, and all MS-DOS external commands are in \BIN, you must tell MS-DOS to choose the \BIN path to find the FORMAT command. The command

```
PATH \BIN
```

tells MS-DOS to search in your working directory and the \BIN directory for all commands. You only have to specify this path once to MS-DOS during your terminal session. MS-DOS will now search in \BIN for the external commands. If you want to know what the current path is, type the word PATH and the current value of PATH will be printed.

For more information on the MS-DOS command PATH, refer to Chapter 4, "Advanced MS-DOS Commands."

1.2.3 Pathing and Internal Commands

Internal commands are the simplest, most commonly used commands. They execute immediately because they are incorporated into the command processor. (For more information on internal commands, refer to the Rainbow MS-DOS Version 2.11 User's Guide.)

Some internal commands can use paths. The following four commands, COPY, DIR, DEL, and TYPE have greater flexibility when you specify a pathname after the command.

DIRECTORIES AND PATHS

The syntax of these four commands is shown below.

COPY <pathname pathname>

If the second pathname to COPY is a directory, all files are copied into that directory.

DEL <pathname>

If the pathname is a directory, all the files in that directory are deleted. Note: The prompt "Are you sure (Y/N)?" will be displayed if you try to delete a path. Type Y to complete the command, or type N for the command to abort.

DIR <pathname>

Displays the directory for a specific path.

TYPE <pathname>

You must specify a file in a path for this command. MS-DOS will display the file on your screen in response to the TYPE pathname command.

1.2.4 Displaying Your Working Directory

All commands are executed while you are in your working directory. You can find out the name of the directory you are in by issuing the MS-DOS command CHDIR (Change Directory) with no options. For example, if your current directory is \USER\JOE, when you type:

```
CHDIR<RETURN>
```

you will see:

```
A:\USER\JOE
```

This is your current drive designation plus the working directory (\USER\JOE).

DIRECTORIES AND PATHS

If you now want to see what is in the \USER\JOE directory, you can issue the MS-DOS command DIR. The following is an example of the display you might receive from the DIR command for a subdirectory:

```
Volume in drive A has no ID
Directory of A:\USER\JOE

.                <DIR>           8-06-84    10:09a
..               <DIR>           8-06-84    10:09a
TEXT            <DIR>           8-06-84    10:09a
FILE1.COM      5243           8-06-84    9:30a
4 File(s)      8376320 bytes free
```

A volume ID for this disk was not assigned when the disk was formatted. Note that MS-DOS lists both files and directories in this output. As you can see, Joe has another directory in this tree structure named TEXT. The '.' indicates the working directory \USER\JOE, and the '..' is the shorthand notation for the parent directory \USER. FILE1.COM is a file in the \USER\JOE directory. All of these directories and files reside on the disk in drive A:.

Because files and directories are listed together (see previous display), MS-DOS does not allow you to give a subdirectory the same name as a file in that directory. For example, if you have a path \BIN\USER\JOE where JOE is a subdirectory, you cannot create a file in the USER directory named JOE.

1.2.5 Creating a Directory

To create a subdirectory in your working directory, use the MKDIR (Make Directory) command. For example, to create a new directory named NEWDIR under your working directory, simply type:

```
MKDIR NEWDIR
```

DIRECTORIES AND PATHS

After this command has been executed by MS-DOS, a new directory will exist in your tree structure under your working directory. You can also make directories anywhere in the tree structure by specifying MKDIR and then a pathname. MS-DOS will automatically create the . and .. entries in the new directory.

To put files in the new directory, use the MS-DOS line editor, EDLIN. The Rainbow MS-DOS Version 2.11 User's Guide describes how to use EDLIN to create and save files.

1.2.6 How to Change Your Working Directory

Changing from your working directory to another directory is very easy in MS-DOS. Simply issue the CHDIR (Change Directory) command and supply a pathname. For example:

```
A>CHDIR \USER
```

changes the working directory from \USER\JOE to \USER. You can specify any pathname after the command to "travel" to different branches and leaves of the directory tree. The command "CHDIR .." will always put you in the parent directory of your working directory.

1.2.7 How to Remove a Directory

To delete a directory in the tree structure, use the MS-DOS RMDIR (Remove Directory) command. For example, to remove the directory NEWDIR from the working directory, type:

```
RMDIR NEWDIR
```

DIRECTORIES AND PATHS

Note that the directory NEWDIR must be empty except for the . and .. entries before it can be removed. This will prevent you from accidentally deleting files and directories. You can remove any directory by specifying its pathname. To remove the \BIN\USER\JOE directory, make sure that it has only the . and .. entries, then type:

```
RMDIR \BIN\USER\JOE
```

To remove all the files in a directory (except for the . and .. entries), type DEL and then the pathname of the directory. For example, to delete all files in the \BIN\USER\SUE directory, type:

```
DEL \BIN\USER\SUE
```

You cannot delete the . and .. entries. They are created by MS-DOS as part of the hierarchical directory structure.

CHAPTER 2

BATCH PROCESSING

This chapter tells you how you can put a sequence of commands into a special file called a batch file. You can then execute all the commands by typing the name of the batch file. Batch processing is useful when you must type the same sequence of commands over and over again to perform a commonly used task.

2.1 BATCH PROCESSING

Often you may find yourself typing the same sequence of commands over and over to perform some commonly used task. With MS-DOS, you can put the command sequence into a special file called a batch file, and execute the entire sequence simply by typing the name of the batch file. "Batches" of your commands in such files are processed as if they were typed at a terminal. Each batch file must be named with the .BAT extension, and is executed by typing the filename without its extension.

You can create a batch file by using the Line Editor (EDLIN) or by typing the COPY command. Refer to the "How to Create an AUTOEXEC.BAT File" section later in this chapter for more information on using the COPY command to create a batch file.

BATCH PROCESSING

Two MS-DOS commands are available for use expressly in batch files: REM and PAUSE. REM permits you to include remarks and comments in your batch files without these remarks being executed as commands. PAUSE prompts you with an optional message and permits you to either continue or abort the batch process at a given point. REM and PAUSE are described in detail in Chapter 4.

Batch processing is useful if you want to execute several MS-DOS commands with one batch command, such as when you format and check a new disk. For example, a batch file for this purpose might look like this:

```
1: REM This is a file to check new disks
2: REM It is named NEWDISK.BAT
3: PAUSE Insert new disk in drive B:
4: FORMAT B:
5: DIR B:
6: CHKDSK B:
```

To execute this .BAT file, simply type the filename without the .BAT extension:

```
NEWDISK
```

The result is the same as if each of the lines in the .BAT file was entered at the terminal as individual commands.

Figure 2-1 illustrates the three steps used to write, save, and execute an MS-DOS batch file.

BATCH PROCESSING

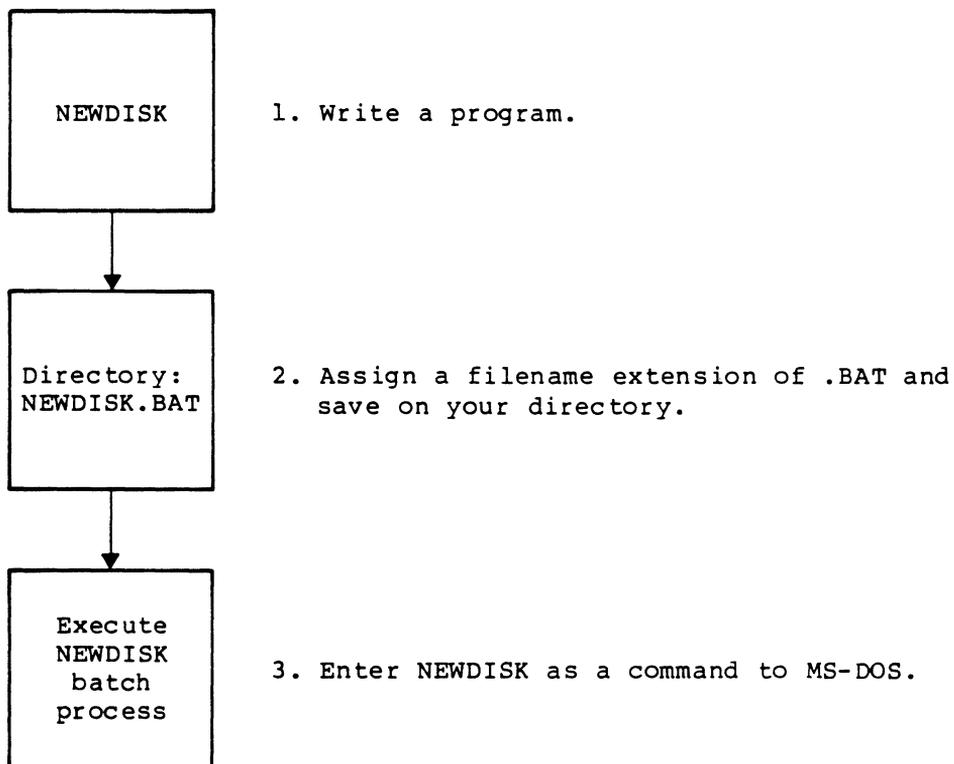


Figure 2-1: MS-DOS Batch File Steps

The following list contains information that you should read before you execute a batch process with MS-DOS:

1. Do not enter the filename BATCH (unless the name of the file you want to execute is BATCH.BAT).
2. Only the filename should be entered to execute the batch file. Do not enter the filename extension.
3. The commands in the file named <filename>.BAT are executed.

BATCH PROCESSING

4. If you press <CTRL/C> while in batch mode, this prompt appears:

Terminal batch job (Y/N)?

If you press Y, the remainder of the commands in the batch file are ignored and the system prompt appears.

If you press N, only the current command ends and batch processing continues with the next command in the file.

5. If you remove the disk containing a batch file being executed, MS-DOS prompts you to insert it again before the next command can be read.
6. The last command in a batch file may be the name of another batch file. This allows you to call one batch file from another when the first is finished.

BATCH PROCESSING

2.2 THE AUTOEXEC.BAT FILE

An AUTOEXEC.BAT file allows you to automatically execute programs when you start MS-DOS. Automatic program execution is useful when you want to run a specific package under MS-DOS, or when you want MS-DOS to execute a batch program automatically each time you start the system. You can avoid loading two separate disks to perform either of these tasks by using an AUTOEXEC.BAT file.

When you start MS-DOS, the command processor searches the MS-DOS disk for a file named AUTOEXEC.BAT. The AUTOEXEC.BAT file is a batch file that is automatically executed each time you start the system.

If MS-DOS finds the AUTOEXEC.BAT file, the file is immediately executed by the command processor and the date and time prompts are bypassed.

If MS-DOS does not find an AUTOEXEC.BAT file when you first load the MS-DOS disk, then the date and time prompts will be issued.

Figure 2-2 illustrates how MS-DOS uses the AUTOEXEC.BAT file.

BATCH PROCESSING

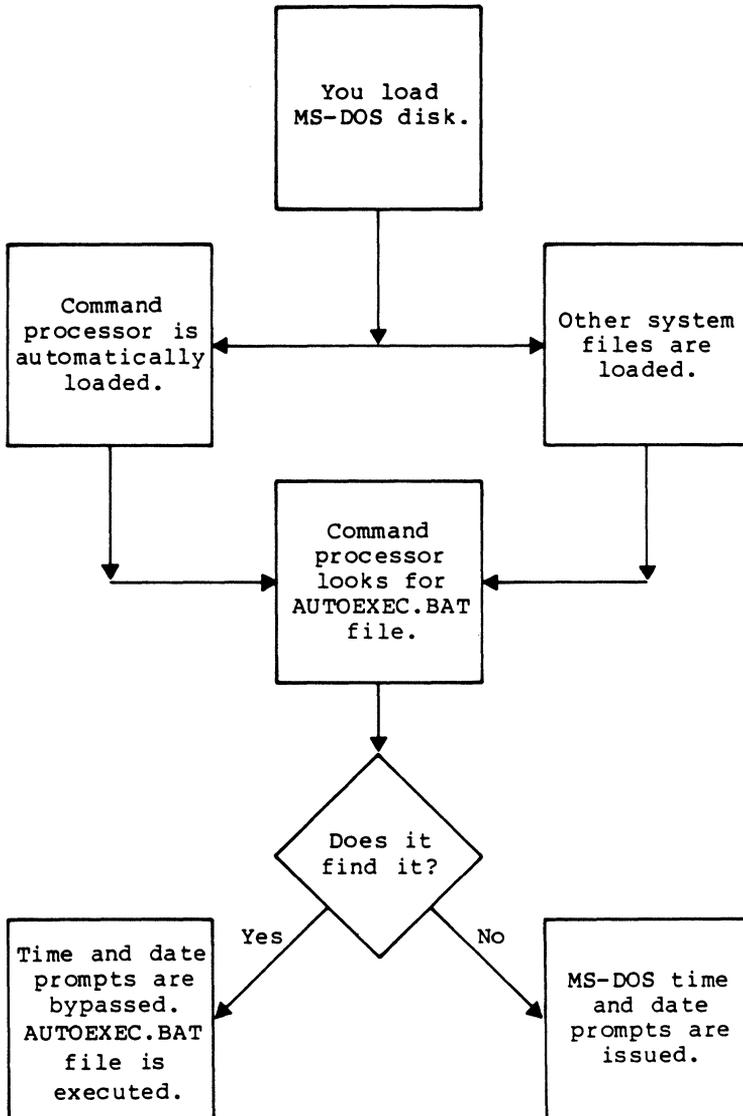


Figure 2-2: How MS-DOS Uses the AUTOEXEC.BAT File

BATCH PROCESSING

2.2.1 How to Create an AUTOEXEC.BAT File

If, for example, you wanted to automatically load BASIC and run a program called MENU each time you started MS-DOS, you could create an AUTOEXEC.BAT file as follows:

1. Type:

```
COPY CON: AUTOEXEC.BAT
```

This statement tells MS-DOS to copy the information from the console (keyboard) into the AUTOEXEC.BAT file. Note that the AUTOEXEC.BAT file must be created in the root directory of your MS-DOS disk.

2. Now type:

```
BASIC MENU
```

This statement goes into the AUTOEXEC.BAT file. It tells MS-DOS to load BASIC and run the MENU program whenever MS-DOS is started.

3. Press the <CTRL/Z> key; then press the <RETURN> key to put the command BASIC MENU in the AUTOEXEC.BAT file.

4. The MENU program will now run automatically whenever you start MS-DOS.

To run your own BASIC program, enter the name of your program in place of MENU in the second line of the example. You can enter any MS-DOS command or series of commands in the AUTOEXEC.BAT file.

BATCH PROCESSING

NOTE

Remember that if you use an AUTOEXEC.BAT file, MS-DOS will not prompt you for a current date and time unless you include the DATE and TIME commands in the AUTOEXEC.BAT file. It is strongly recommended that you include these two commands in your AUTOEXEC.BAT file, since MS-DOS uses this information to keep your directory current.

BATCH PROCESSING

2.3 CREATING A .BAT FILE WITH REPLACEMENT PARAMETERS

There may be times when you want to create an application program and run it with different sets of data. These data may be stored in various MS-DOS files.

When used in MS-DOS commands, a parameter is an option that you define. With MS-DOS, you can create a batch (.BAT) file with dummy (replaceable) parameters. These parameters, named %0-%9, can be replaced by values supplied when the batch file executes.

For example, when you type the command line COPY CON MYFILE.BAT, the next lines you type are copied from the console to a file named MYFILE.BAT on the default drive:

```
A>COPY CON MYFILE.BAT
COPY %1.MAC %2.MAC
TYPE %2.PRN
TYPE %0.BAT
```

Now, press <CTRL/Z> and then press <RETURN>. MS-DOS responds with this message:

```
1 File(s) copied
A>_
```

The file MYFILE.BAT, which consists of three commands, now resides on the disk in the default drive.

The dummy parameters %1 and %2 are replaced sequentially by the parameters you supply when you execute the file. The dummy parameter %0 is always replaced by the drive designator, if specified, and the filename of the batch file (for example, MYFILE).

BATCH PROCESSING

NOTES

1. Up to 10 dummy parameters (%0-%9) can be specified. Refer to the MS-DOS command SHIFT in Chapter 4 if you wish to specify more than 10 parameters.
2. If you use the percent sign as part of a filename within a batch file, you must type it twice. For example, to specify the file ABC%.EXE, you must type it as ABC%%.EXE in the batch file.

2.3.1 Executing a .BAT File

To execute the batch file MYFILE.BAT and to specify the parameters that will replace the dummy parameters, you must enter the batch filename (without its extension) followed by the parameters you want MS-DOS to substitute for %1, %2, etc.

Remember that the file MYFILE.BAT consists of 3 lines:

```
COPY %1.MAC %2.MAC
TYPE %2.PRN
TYPE %0.BAT
```

To execute the MYFILE batch process, type:

```
MYFILE A:PROG1 B:PROG2
```

MYFILE is substituted for %0, A:PROG1 for %1, and B:PROG2 for %2.

BATCH PROCESSING

The result is the same as if you had typed each of the commands in MYFILE with their parameters, as follows:

```
COPY A:PROG1.MAC B:PROG2.MAC
TYPE B:PROG2.PRN
TYPE MYFILE.BAT
```

The following table illustrates how MS-DOS replaces each of the above parameters:

BATCH FILENAME	PARAMETER1 (%0) (MYFILE)	PARAMETER2 (%1) (PROG1)	PARAMETER3 (%2) (PROG2)
MYFILE	MYFILE.BAT	PROG1.MAC	PROG2.MAC PROG2.PRN

Remember that the dummy parameter %0 is always replaced by the drive designator (if specified) and the filename of the batch file.

CHAPTER 3

REDIRECTION OF INPUT AND OUTPUT

This chapter discusses input and output. It tells you how you can redirect your input and output and "filter" data. Command piping is also discussed.

3.1 INPUT AND OUTPUT

MS-DOS always assumes that input comes from the keyboard and output goes to the terminal screen. However, the flow of command input and output can be redirected. Input can come from a file rather than a terminal keyboard, and output can go to a file or to a line printer instead of to the terminal. In addition, "pipes" can be created that allow output from one command to become the input to another. Redirection and pipes are discussed in the next sections.

3.1.1 Redirecting Your Output

Most commands produce output that is sent to your terminal. You can send this information to a file by using a

REDIRECTION OF INPUT AND OUTPUT

greater-than sign (>) in your command. For example, the command

```
DIR
```

displays a directory listing of the disk in the default drive on the terminal screen.

The same command can send this output to a file named MYFILES by designating the output file on the command line:

```
DIR >MYFILES
```

If the file MYFILES does not already exist, MS-DOS creates it and stores your directory listing in it. If MYFILES already exists, MS-DOS overwrites what is in the file with the new data.

If you want to append your directory or a file to another file (instead of replacing the entire file), two greater-than signs (>>) can be used to tell MS-DOS to append the output of the command (such as a directory listing) to the end of a specified file. The command

```
DIR >>MYFILES
```

appends your directory listing to a currently existing file named MYFILES. If MYFILES does not exist, it is created.

It is often useful to have input for a command come from a file rather than from a terminal. This is possible in MS-DOS by using a less-than sign (<) in your command. For example, the command

```
SORT <NAMES >LIST1
```

sorts the file NAMES and sends the sorted output to a file named LIST1.

REDIRECTION OF INPUT AND OUTPUT

3.1.2 Filters

A filter is a command that reads your input, transforms it in some way, and then outputs it, usually to your terminal or to a file. In this way, the data is said to have been "filtered" by the program. Since filters can be put together in many different ways, a few filters can take the place of a large number of specific commands.

MS-DOS filters include FIND, MORE, and SORT. Their functions are described below:

- FIND Searches for a constant string of text in a file
- MORE Takes standard terminal output and displays it, one screen at a time
- SORT Sorts text

You can see how these filters are used in the next section.

3.1.3 Command Piping

If you want to give more than one command to the system at a time, you can "pipe" commands to MS-DOS. For example, you may occasionally need to have the output of one program sent as the input to another program. A typical case would be a program that produces output in columns. It could be desirable to have this columnar output sorted.

REDIRECTION OF INPUT AND OUTPUT

Piping is done by separating commands with the pipe separator, which is the vertical bar symbol (|). For example, the command

```
DIR | SORT
```

will give you an alphabetically sorted listing of your directory. The vertical bar causes all output generated by the left side of the bar to be sent to the right side of the bar for processing.

Piping can also be used when you want to output to a file. If you want your directory sorted and sent to a new file (for example, DIREC.FIL), you could type:

```
DIR | SORT >DIREC.FIL
```

MS-DOS will create a file named DIREC.FIL on your default drive. DIREC.FIL contains a sorted listing of the directory on the default drive, since no other drive was specified in the command. To specify a drive other than the default drive, type:

```
DIR | SORT >B:DIREC.FIL
```

This sends the sorted data to a file named DIREC.FIL on drive B:.

A pipeline may consist of more than two commands. For example,

```
DIR | SORT | MORE
```

will sort your directory, show it to you one screen at a time, and put --MORE-- at the bottom of your screen when there is more output to be seen.

You will find many uses for piping commands and filters.

CHAPTER 4

ADVANCED MS-DOS COMMANDS

This chapter alphabetically lists the advanced MS-DOS commands, which include commands to use with directories and paths, batch processing commands, and others.

4.1 COMMAND FORMATS

The following notation indicates how you should format the advanced MS-DOS commands:

1. You must enter any words shown in capital letters. These words are called keywords and must be entered exactly as shown. You can enter these keywords in any combination of upper/lowercase; MS-DOS will convert all keywords to uppercase.
2. You supply the text for any items enclosed in angle brackets (< >). For example, you should enter the name of your file when <filename> is shown in the format.
3. Items in square brackets ([]) are optional. If you wish to include optional information, do not include the square brackets, only the information within the brackets.

ADVANCED MS-DOS COMMANDS

4. An ellipsis (...) indicates that you may repeat an item as many times as you want.
5. You must include all punctuation where shown (with the exception of square brackets), such as commas, equal signs, question marks, colons, or slashes.

4.2 MS-DOS ADVANCED COMMANDS

Table 4-1 lists the advanced MS-DOS commands:

Table 4-1: MS-DOS Advanced Commands

Command	Usage
BREAK	Sets CTRL/C check
CHDIR	Changes directories; prints working directory (CD)
CTTY	Changes console TTY
ECHO	Turns batch file echo feature on/off
EXE2BIN	Converts executable files to binary format
EXIT	Exits command and returns to lower level
FIND	Searches for a constant string of text
FOR	Provides a logical looping capability for batch files
GOTO	Provides logical flow control for batch files
IF	Provides logical flow control for batch files

ADVANCED MS-DOS COMMANDS

Command	Usage
LDCOPY	Places the reserved system tracks onto a diskette or hard disk partition
MEDIACHK	Improves diskette performance
MKDIR	Makes a directory (MD)
MORE	Displays output one screen at a time
PATH	Sets a command search path
PAUSE	Suspends execution of a batch file
PROMPT	Designates the command prompt
RECOVER	Recovers a bad file or disk
REM	Displays a comment in a batch file
RMDIR	Removes a directory (RD)
SHIFT	Increases number of replaceable parameters in batch process
SORT	Sorts data alphabetically, forward or backward

ADVANCED MS-DOS COMMANDS

NAME	TYPE
BREAK	Internal

PURPOSE

Sets CTRL-C check.

SYNTAX

BREAK [ON|OFF]

COMMENTS

If you are running an application program that uses CTRL/C function keys, you will want to turn off the MS-DOS CTRL/C function so that when you press <CTRL/C> you affect your program and not the operating system. Specify BREAK OFF to turn off CTRL/C and BREAK ON when you have finished running your application program and are using MS-DOS.

If you do not specify the ON or OFF switch, MS-DOS displays the current setting of BREAK.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
CHDIR (CHANGE DIRECTORY)	Internal

SYNONYM

CD

PURPOSE

Changes directory to a different path; displays current (working) directory.

SYNTAX

CHDIR [pathname]

COMMENTS

If your working directory is \BIN\USER\JOE and you want to change your path to another directory (such as \BIN\USER\JOE\FORMS), type:

```
CHDIR \BIN\USER\JOE\FORMS
```

and MS-DOS will put you in the new directory. A shorthand notation is also available with this command:

```
CHDIR ..
```

This command will always put you in the parent directory of your working directory.

ADVANCED MS-DOS COMMANDS

CHDIR used without a pathname displays your working directory. If your working directory is \BIN\USER\JOE on drive B:, and you type CHDIR <Return>, MS-DOS will display:

```
B:\BIN\USER\JOE
```

ADVANCED MS-DOS COMMANDS

NAME	TYPE
CTTY	Internal

PURPOSE

Allows you to change the device from which you issue commands (TTY represents the console).

SYNTAX

CTTY <device>

COMMENTS

The <device> is the device from which you are giving commands to MS-DOS. This command is useful if you want to change the device on which you are working. The command

CTTY AUX

moves all command I/O (input/output) from the current device (the console) to the AUX port, such as a printer. The command

CTTY CON

moves I/O back to the original device (here, the console).

ADVANCED MS-DOS COMMANDS

NAME	TYPE
ECHO	Internal

PURPOSE

Turns batch echo feature on and off.

SYNTAX

ECHO [ON |OFF| message]

COMMENTS

Normally, commands in a batch file are displayed ("echoed") on the console when they are seen by the command processor. ECHO OFF turns off this feature. ECHO ON turns the echo back on.

If ON or OFF are not specified, the current setting is displayed.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
EXE2BIN	External

PURPOSE

Converts .EXE (executable) files to binary format. This results in a saving of disk space and faster program loading.

SYNTAX

```
EXE2BIN <d:><filename><.ext> [d:][<filename>[<.ext>]]
```

COMMENTS

This command is useful only if you want to convert .EXE files to binary format. The file named by filespec is the input file. If no extension is specified, it defaults to .EXE. The input file is converted to .COM file format (memory image of the program) and placed in the output file. If you do not specify a drive, the drive of the input file will be used. If you do not specify an output filename, the input filename will be used. If you do not specify a filename extension in the output filename, the new file will be given an extension of .BIN.

The input file must be in valid .EXE format produced by the linker. The resident, or actual code and data part of the file must be less than 64K. There must be no STACK segment.

ADVANCED MS-DOS COMMANDS

Two kinds of conversions are possible, depending on whether the initial CS:IP (Code Segment:Instruction Pointer) is specified in the .EXE file:

1. If CS:IP is not specified in the .EXE file, a pure binary conversion is assumed. If segment fixups are necessary (i.e., the program contains instructions requiring segment relocation), you will be prompted for the fixup value. This value is the absolute segment at which the program is to be loaded. The resulting program will be usable only when loaded at the absolute memory address specified by a user application. The command processor will not be capable of properly loading the program.
2. If CS:IP is specified as 0000:100H, it is assumed that the file is to be run as a .COM file with the location pointer set at 100H by the assembler statement ORG; the first 100H bytes of the file are deleted. No segment fixups are allowed, as .COM files must be segment relocatable. Once the conversion is complete, you may rename the resulting file with a .COM extension. Then the command processor will be able to load and execute the program in the same way as the .COM programs supplied on your MS-DOS disk.

If EXE2BIN finds an error, one or more of the following error messages will be displayed:

File cannot be converted

CS:IP does not meet either of the criteria specified above, or it meets the .COM file criterion but has segment fixups. This message is also displayed if the file is not a valid executable file.

ADVANCED MS-DOS COMMANDS

' File not found

The file is not on the disk specified.

Insufficient memory

There is not enough memory to run EXE2BIN.

File creation error

EXE2BIN cannot create the output file. Run CHKDSK to determine if the directory is full, or if some other condition caused the error.

Insufficient disk space

There is not enough disk space to create a new file.

Fixups needed - base segment (hex):

The source (.EXE) file contained information indicating that a load segment is required for the file. Specify the absolute segment address at which the finished module is to be located.

File cannot be converted

The input file is not in the correct format.

WARNING - Read error on EXE file.
Amount read less than size in header

This is a warning message only.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
EXIT	Internal

PURPOSE

Exits the program COMMAND.COM (the command processor) and returns to a previous level, if one exists.

SYNTAX

EXIT

COMMENTS

This command can be used when you are running an application program and want to start the MS-DOS command processor, then return to your program. For example, to look at a directory on drive B: while running an application program, you must start the command processor by typing COMMAND in response to the default drive prompt:

A>COMMAND

You can now type the DIR command and MS-DOS will display the directory for the default disk. When you type EXIT, you return to the previous level (your application program).

ADVANCED MS-DOS COMMANDS

NAME

FIND

TYPE

External

PURPOSE

Searches for a specific string of text in a file or files.

SYNTAX

```
FIND [/V /C /N] <string> [<filename...>]
```

COMMENTS

FIND is a filter that takes as options a string and a series of filenames. It will display all lines that contain a specified string from the files specified in the command line.

If no files are specified, FIND will take the input on the screen and display all lines that contain the specified string.

Switches for FIND are:

- /V Causes FIND to display all lines not containing the specified string.
- /C Causes FIND to print only the count of lines that contained a match in each of the files.
- /N Causes each line to be preceded by its relative line number in the file.

ADVANCED MS-DOS COMMANDS

The string should be enclosed in quotes. Example:

```
FIND "Fool's Paradise" BOOK1.TXT BOOK2.TXT
```

displays all lines from BOOK1.TXT and BOOK2.TXT (in that order) that contain the string "Fool's Paradise."

The command

```
DIR B: | FIND /V "DAT"
```

causes MS-DOS to display all names of the files on the disk in drive B: which do not contain the string DAT. Type double quotes around a string that already has quotes in it.

When an error is detected, FIND responds with one of the following error messages:

Incorrect DOS version

FIND will only run on versions of MS-DOS that are 2.0 or higher.

FIND: Invalid number of parameters

You did not specify a string when issuing the FIND command.

FIND: Syntax error

You typed an illegal string when issuing the FIND command.

ADVANCED MS-DOS COMMANDS

FIND: File not found <filename>

The filename you have specified does not exist or FIND cannot find it.

FIND: Read error in <filename>

An error occurred when FIND tried to read the file specified in the command.

FIND: Invalid parameter <option-name>

You specified an option that does not exist.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
FOR	Internal

PURPOSE

Command extension used in batch and interactive file processing.

SYNTAX

FOR %%<c> IN <set> DO <command> - for batch processing
FOR %<c> IN <set> DO <command> - for interactive processing.

COMMENTS

<c> can be any character except 0,1,2,3,...,9 to avoid confusion with the %0-%9 batch parameters.

<set> is (#<item>*#)

The %%<c> variable is set sequentially to each member of <set>, and then <command> is evaluated. If a member of <set> is an expression involving * and/or ?, then the variable is set to each matching pattern from disk. In this case, only one such <item> may be in the set, and any <item> besides the first is ignored.

NOTE

The words IN, FOR, and DO must be in uppercase.

ADVANCED MS-DOS COMMANDS

Examples:

```
FOR %%f IN ( *.ASM ) DO MASM %%f;
```

```
FOR %%f IN (FOO BAR BLECH) DO REM %%f
```

The '%%' is needed so that after batch parameter (%0-%9) processing is done, there is one '%' left. If only '%f' were there, the batch parameter processor would see the '%', look at 'f', decide that '%f' was an error (bad parameter reference) and throw out the '%f', so that the command FOR would never see it. If the FOR is not in a batch file, then only one '%' should be used.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
GOTO	Internal

PURPOSE

Command extension used in batch file processing.

SYNTAX

```
GOTO <label>
```

COMMENTS

GOTO causes commands to be taken from the batch file beginning with the line after the <label> definition. If no label has been defined, the current batch file will terminate.

Example:

```
:foo  
REM looping...  
GOTO foo
```

will produce an infinite sequence of messages: REM looping...

Starting a line in a batch file with ':' causes the line to be ignored by batch processing. The characters following GOTO define a label, but this procedure may also be used to put in comment lines.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
IF	Internal

PURPOSE

Command extension used in batch file processing.

SYNTAX

IF <condition> <command>

COMMENTS

The parameter <condition> is one of the following:

ERRORLEVEL <number>

True if and only if the previous program executed by COMMAND had an exit code of <number> or higher.

<string1> == <string2>

True if and only if <string1> and <string2> are identical after parameter substitution. Strings may not have embedded separators.

EXIST <filename>

True if and only if <filename> exists.

NOT <condition>

True if and only if <condition> is false.

The IF statement allows conditional execution of commands. When the <condition> is true, then the <command> is executed. Otherwise, the <command> is ignored.

ADVANCED MS-DOS COMMANDS

NOTE

The words ERRORLEVEL, EXIST, and NOT must be uppercase.

Examples:

```
IF NOT EXIST FOO ECHO Can't find file
```

```
IF NOT ERRORLEVEL 3 LINK $1,,;
```

ADVANCED MS-DOS COMMANDS

NAME	TYPE
LDCOPY	External

PURPOSE

The LDCOPY program is used to place the MS-DOS Version 2.11 operating system's loader on a diskette or hard disk partition. The loader is a program, which is found on the first tracks of the MS-DOS Version 2.11 operating system diskette, that places the MS-DOS operating system into memory.

SYNTAX

LDCOPY <destination drv:>

COMMENTS

The destination drive is the diskette drive or hard disk drive that you want to place the loader on.

You can place the loader on a diskette or a hard disk partition that contains MS-DOS files. The LDCOPY program copies the loader and leaves the MS-DOS files intact.

The following example places the MS-DOS Version 2.11 loader on the hard disk drive E.

```
A>LDCOPY E:
```

ADVANCED MS-DOS COMMANDS

NAME	TYPE
MEDIACHK	External

PURPOSE

Speeds access to Rainbow, MS-DOS formatted diskettes

SYNTAX

MEDIACHK [<ON|OFF>]

COMMENTS

The Rainbow computer can read a variety of MS-DOS diskette formats. The computer must first read the diskette to determine the type of MS-DOS format. If you use only Rainbow, MS-DOS formatted diskettes, use the MEDIACHK command to tell the Rainbow computer that you always use this type of diskette.

When you type the MEDIACHK command with the OFF switch, the Rainbow computer no longer checks to determine the diskette's type of MS-DOS format. This speeds the access to the diskette.

The default is MEDIACHK ON.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
MKDIR	Internal

SYNONYM

MD

PURPOSE

Makes a new directory.

SYNTAX

MKDIR <pathname>

COMMENTS

This command is used to create a hierarchical directory structure. When you are in your root directory, you can create subdirectories by using the MKDIR command. The command

```
MKDIR \USER
```

will create a subdirectory \USER in your root directory. To create a directory named JOE under \USER, type:

```
MKDIR \USER\JOE
```

ADVANCED MS-DOS COMMANDS

NAME	TYPE
MORE	External

PURPOSE

Sends output to console one screen at a time.

SYNTAX

MORE

COMMENTS

MORE is a filter that reads from standard input (such as a command from your terminal) and displays one screen of information at a time. The MORE command then pauses and displays the --MORE-- message at the bottom of your screen.

Pressing the <RETURN> key will display another screen of information. This process continues until all the input data has been read.

The MORE command is useful for viewing a long file one screen at a time. If you type

```
TYPE MYFILES.COM | MORE
```

MS-DOS will display the file MYFILES.COM (on the default drive) one screen at a time.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
PATH	Internal

PURPOSE

Sets a command path.

SYNTAX

PATH [<pathname>[;<pathname>]...]

COMMENTS

This command allows you to tell MS-DOS which directories should be searched for external commands after MS-DOS searches your working directory. The default value is no path.

To tell MS-DOS to search your \BIN\USER\JOE directory for external commands, type:

```
PATH \BIN\USER\JOE
```

MS-DOS will now search the \BIN\USER\JOE directory for external commands until you set another path or shut down MS-DOS.

ADVANCED MS-DOS COMMANDS

You can tell MS-DOS to search more than one path by specifying several pathnames separated by semicolons. For example,

```
PATH \BIN\USER\JOE;\BIN\USER\SUE;\BIN\DEV
```

tells MS-DOS to search the directories specified by the above pathnames to find external commands. MS-DOS searches the pathnames in the order specified in the PATH command.

The command PATH with no options will print the current path. If you specify PATH ;, MS-DOS will set the NUL path, meaning that only the working directory will be searched for external commands.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
PAUSE	Internal

PURPOSE

Suspends execution of the batch file.

SYNTAX

PAUSE [comment]

COMMENTS

During the execution of a batch file, you may need to change disks or perform some other action. PAUSE suspends execution until you press any key, except <CTRL/C>.

When the command processor encounters PAUSE, it prints:

Strike a key when ready . . .

If you press <CTRL/C>, another prompt will be displayed:

Abort batch job (Y/N)?

If you type Y in response to this prompt, execution of the remainder of the batch command file will be aborted and control will be returned to the operating system command level. Therefore, PAUSE can be used to break a batch file into pieces, allowing you to end the batch command file at an intermediate point.

ADVANCED MS-DOS COMMANDS

The comment is optional and may be entered on the same line as PAUSE. You may also want to prompt the user of the batch file with some meaningful message when the batch file pauses. For example, you may want to change disks in one of the drives. An optional prompt message may be given in such cases. The comment prompt will be displayed before the "Strike a key" message.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
PROMPT	Internal

PURPOSE

Changes the MS-DOS command prompt.

SYNTAX

PROMPT [<prompt-text>]

COMMENTS

This command allows you to change the MS-DOS system prompt (for example, A>). If no text is typed, the prompt will be set to the default prompt, which is the default drive designation. You can set the prompt to a special prompt, such as the current time, by using the characters indicated below.

When you use the PROMPT command with the \$P option, be sure that you specify an existing drive. If you use this option with a non-existent drive, you could see unexpected results.

ADVANCED MS-DOS COMMANDS

The following characters can be used in the prompt command to specify special prompts. They must all be preceded by a dollar sign (\$) in the prompt command:

Specify This Character	To Get This Prompt:
\$	The '\$' character
t	The current time
d	The current date
p	The current directory of the default drive
v	The version number
n	The default drive
g	The '>' character
l	The '<' character
b	The '|' character
_	A CR LF sequence
s	A space (leading only)
h	A backspace
e	ASCII code X'1B' (escape)

Examples:

```
PROMPT $n
      Sets the default drive letter prompt.
```

```
PROMPT Time = $t$ _Date = $d
      Sets a two-line prompt which prints:
      Time = (current time)
      Date = (current date)
```

```
PROMPT $e[7m$n:$e[m
      Sets the prompts in inverse video mode and
      returns to normal video mode for other
      text.
```

ADVANCED MS-DOS COMMANDS

NAME	TYPE
RECOVER	External

PURPOSE

Recovers a file or an entire disk containing bad sectors.

SYNTAX

```
RECOVER <filename | d:>
```

COMMENTS

If a sector on a disk is bad, you can recover either the file containing that sector (without the bad sector) or the entire disk (if the bad sector was in the directory).

To recover a particular file, type:

```
RECOVER <filename>
```

This will cause MS-DOS to read the file sector by sector and to skip the bad sector(s). When MS-DOS finds the bad sector(s), the sector(s) are marked and MS-DOS will no longer allocate your data to that sector.

To recover a disk, type:

```
RECOVER <d:>
```

where d: is the letter of the drive containing the disk to be recovered.

ADVANCED MS-DOS COMMANDS

If there is not enough room on the root directory, RECOVER will print a message and store information about the extra files in the File Allocation Table. You can run RECOVER again to regain these files when there is more room in the root directory.

NOTE

You should use RECOVER only as a last resort. RECOVER could misinterpret data that may not be corrupted. This could lead to unpredictable results.

ADVANCED MS-DOS COMMANDS

NAME

REM (REMARK)

TYPE

Internal

PURPOSE

Displays remarks which are on the same line as the REM command in a batch file during execution of that batch file.

SYNTAX

REM [comment]

COMMENTS

The only separators allowed in the comment are the space, tab, and comma.

Example:

```
1: REM This is a file to check new disks
2: REM It is named NEWDISK.BAT
3: PAUSE Insert new disk in drive B:
4: FORMAT B:
5: DIR B:
6: CHKDSK B:
```

ADVANCED MS-DOS COMMANDS

NAME	TYPE
RMDIR (REMOVE DIRECTORY)	Internal

SYNONYM

RD

PURPOSE

Removes a directory from a hierarchical directory structure.

SYNTAX

RMDIR <pathname>

COMMENTS

This command removes a directory that is empty except for the . and .. shorthand symbols.

To remove the \BIN\USER\JOE directory, first issue a DIR command for that path to ensure that the directory does not contain any important files that you do not want deleted. Then type:

```
RMDIR \BIN\USER\JOE
```

The directory has been deleted from the directory structure.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
SHIFT	Internal

PURPOSE

Allows access to more than 10 replaceable parameters in batch file processing.

SYNTAX

SHIFT

COMMENTS

Usually, command files are limited to handling 10 parameters, %0 through %9. To allow access to more than ten parameters, use SHIFT to change the command line parameters. For example:

```
if %0 = "foo"
    %1 = "bar"
    %2 = "name"
    %3...%9 are empty
```

then a SHIFT will result in the following:

```
%0 = "bar"
%1 = "name"
%2...%9 are empty
```

If there are more than 10 parameters given on a command line, those that appear after the 10th (%9) will be shifted one at a time into %9 by successive shifts.

ADVANCED MS-DOS COMMANDS

NAME	TYPE
SORT	External

PURPOSE

SORT reads input from your terminal, sorts the data, then writes it to your terminal screen or files.

SYNTAX

SORT [/R] [/+n]

COMMENTS

SORT can be used, for example, to alphabetize a file by a certain column. There are two switches which allow you to select options:

/R reverse the sort; that is, sort from Z to A.

/+n sort starting with column n where n is some number. If you do not specify this switch, SORT will begin sorting from column 1.

SORT reads and sorts data in the order described in Table 4-2.

ADVANCED MS-DOS COMMANDS

Table 4-2: SORT Table

Sort Order	ASCII Code	Character									
000	000	NUL	061	061	=	096	210	Ò	193	134	SSA
001	001	SOH	062	062	>	096	242	ó	194	135	ESA
002	002	STX	063	063	?	097	211	Ô	195	136	HTS
003	003	ETX	064	064	@	097	243	ô	196	137	HTJ
004	004	EOT	065	065	À	098	212	Õ	197	138	VTS
005	005	ENQ	065	097	a	098	244	ö	198	139	PLD
006	006	ACK	066	192	Á	099	213	Ö	199	140	PLU
007	007	BEL	066	224	à	099	245	ò	200	141	RI
008	008	BS	067	193	Â	100	214	Ï	201	142	SS2
009	009	HT	067	225	á	100	246	ó	202	143	SS3
010	010	LF	068	194	Ã	101	080	P	203	144	DCS
011	011	VT	068	226	â	101	112	p	204	145	PU1
012	012	FF	069	195	Ä	102	081	Q	205	146	PU2
013	013	CR	069	227	ã	102	113	q	206	147	STS
014	014	SO	070	196	Å	103	082	R	207	148	CCH
015	015	SI	070	228	ä	103	114	r	208	149	MW
016	016	DLE	071	066	B	104	083	S	209	150	SPA
017	017	DC1	071	098	b	104	115	s	210	151	EPA
018	018	DC2	072	067	C	105	223	ß	211	152	
019	019	DC3	072	099	c	106	084	T	212	153	
020	020	DC4	073	199	Ç	106	116	t	213	154	
021	021	NAK	073	231	c	107	085	U	214	155	CSI
022	022	SYN	074	068	D	107	117	u	215	156	ST
023	023	ETB	074	100	d	108	217	Û	216	157	OSC
024	024	CAN	075	069	E	108	249	ü	217	158	PM
025	025	EM	075	101	e	109	218	Ü	218	159	APC
026	026	SUB	076	200	È	109	250	ú	219	160	
027	027	ESC	076	232	è	110	219	Û	220	161	i
028	028	FS	077	201	É	110	251	ù	221	162	ç
029	029	GS	077	233	é	111	220	Ü	222	163	£
030	030	RS	078	202	Ê	111	252	ü	223	164	
031	031	US	078	234	ê	112	086	V	224	165	¥
032	032	SP	079	203	Ë	112	118	v	225	166	
033	033	!	079	235	ë	113	087	W	226	167	§
034	034	"	080	070	F	113	119	w	227	168	¶
035	035	#	080	102	f	114	088	X	228	169	©
036	036	\$	081	071	G	114	120	x	229	170	à
037	037	%	081	103	g	115	089	Y	230	171	«
038	038	&	082	072	H	115	121	y	231	172	
039	039	'	082	104	h	116	221	ÿ	232	173	
040	040	(	083	073	I	116	253	ÿ	233	174	
041	041	)	083	105	i	117	090	Z	234	175	
042	042	*	084	204	Ì	117	122	z	235	176	°
043	043	+	084	236	í	118	198	Æ	236	177	+ 2
044	044	,	085	205	Î	118	230	æ	237	178	
045	045	-	085	237	ì	119	216	Ø	238	179	3
046	046	.	086	206	Í	119	248	ø	239	180	
047	047	/	086	238	î	120	197	À	240	181	μ
048	048	0	087	207	Ï	120	229	á	241	182	¶
049	049	1	087	239	ï	121	091	|	242	183	.
050	050	2	088	074	J	122	092	\	243	184	
051	051	3	088	106	j	123	093	]	244	185	1'
052	052	4	089	075	K	124	094	^	245	186	»
053	053	5	089	107	k	125	095	~	246	187	¼
054	054	6	090	076	L	126	096	¸	247	188	½
055	055	7	090	108	l	182	123	{	248	189	
056	056	8	091	077	M	183	124	|	249	190	
057	057	9	091	109	m	184	125	}	250	191	¿
058	058	:	092	078	N	185	126	~	251	208	
059	059	;	092	110	n	186	127	DEL	252	222	
060	060	<	093	209	Ñ	187	128		253	240	
			093	241	ñ	188	129		254	254	
			094	215	Œ	189	130		255	255	
			094	247	œ	190	131				
			095	079	O	191	132	IND			
			095	111	o	192	133	NEL			

ADVANCED MS-DOS COMMANDS

Examples:

This command will read the file UNSORT.TXT, reverse the sort, and then write the output to a file named SORT.TXT:

```
SORT /R <UNSORT.TXT >SORT.TXT
```

The following command will pipe the output of the directory command to the SORT filter. The SORT filter will sort the directory listing starting with column 14 (this is the column in the directory listing that contains the file size), then send the output to the console. Thus, the result of this command is a directory sorted by file size:

```
DIR | SORT /+14
```

The command

```
DIR | SORT /+14 | MORE
```

will do the same thing as the command in the previous example, except that the MORE filter will give you a chance to read the sorted directory one screen at a time.

CHAPTER 5

FILE COMPARISON UTILITY (FC)

This chapter describes how to use the File Comparison utility.

5.1 INTRODUCTION

It is sometimes useful to compare files on your disk. If you have copied a file and later want to compare copies to see which one is current, you can use the MS-DOS File Comparison Utility (FC).

The File Comparison Utility compares the contents of two files. The differences between the two files can be output to the console or to a third file. The files being compared may be either source files (files containing source statements of a programming language); or binary (files output by the MACRO-86 assembler, the MS-LINK Linker utility, or by a Microsoft high-level language compiler).

The comparisons are made in one of two ways: on a line-by-line or a byte-by-byte basis. The line-by-line comparison isolates blocks of lines that are different between the two files and prints those blocks of lines. The byte-by-byte comparison displays the bytes that are different between the two files.

FILE COMPARISON UTILITY (FC)

5.1.1 Limitations on Source Comparisons

FC uses a large amount of memory as buffer (storage) space to hold the source files. If the source files are larger than available memory, FC will compare what can be loaded into the buffer space.

If no lines match in the portions of the files in the buffer space, FC will display only the message:

*** Files are different ***

For binary files larger than available memory, FC compares both files completely, overlaying the portion in memory with the next portion from disk. All differences are output in the same manner as those files that fit completely in memory.

5.2 FILE SPECIFICATIONS

All file specifications use the following syntax:

[d:]<filename>[<.ext>]

where: d: is the letter designating a disk drive. If the drive designation is omitted, FC defaults to the operating system's (current) default drive.

filename is a one- to eight-character name of the file.

.ext is a one- to three-character extension to the filename.

FILE COMPARISON UTILITY (FC)

5.3 HOW TO USE FC

The syntax of FC is as follows:

```
FC [/# /B /W /C] <filename1> <filename2>
```

FC matches the first file (filename1) against the second (filename2) and reports any differences between them. Both filenames can be pathnames. For example,

```
FC B:\F00\BAR\FILE1.TXT \BAR\FILE2.TXT
```

FC takes FILE1.TXT in the \F00\BAR directory of disk drive B: and compares it with FILE2.TXT in the \BAR directory. Since no drive is specified for filename2, FC assumes that the \BAR directory is on the disk in the default drive.

FILE COMPARISON UTILITY (FC)

5.4 FC SWITCHES

There are four switches that you can use with the File Comparison Utility:

/B Forces a binary comparison of both files. The two files are compared byte-to-byte, with no attempt to re-synchronize after a mismatch. The mismatches are printed as follows:

```
--ADDRS----F1----F2-  
xxxxxxxx yy zz
```

(where xxxxxxxx is the relative address of the pair of bytes from the beginning of the file). Addresses start at 00000000; yy and zz are the mismatched bytes from file1 and file2, respectively. If one of the files contains less data than the other, then a message is printed out. For example, if file1 ends before file2, then FC displays:

```
***Data left in F1***
```

/# # stands for a number from 1 to 9. This switch specifies the number of lines required to match for the files to be considered as matching again after a difference has been found. If this switch is not specified, it defaults to 3. This switch is used only in source comparisons.

/W Causes FC to compress whites (tabs and spaces) during the comparison. Thus, multiple contiguous whites in any line will be considered as a single white space. Note that although FC compresses whites, it does not ignore them. The two exceptions are beginning and ending whites in a line, which are ignored.

FILE COMPARISON UTILITY (FC)

For example (note that an underscore represents a white)

`___More__data_to_be_found___`

will match with

`More_data_to_be_found`

and with

`____More____data_to_be__found____`

but will not match with

`___Moredata_to_be_found`

This switch is used only in source comparisons.

`/C` Causes the matching process to ignore the case of letters. All letters in the files are considered uppercase letters. For example,

`Much_MORE_data_IS_NOT_FOUND`

will match

`much_more_data_is_not_found`

if both the `/W` and `/C` options are specified, then `FC` will compress whites and ignore case. For example,

`___DATA_was_found___`

will match:

`data_was_found`

This switch is used only in source comparisons.

FILE COMPARISON UTILITY (FC)

5.5 DIFFERENCE REPORTING

The File Comparison Utility reports the differences between the two files you specify by displaying the first filename, followed by the lines that differ between the files, followed by the first line to match in both files. FC then displays the name of the second file followed by the lines that are different, followed by the first line that matches. The default for the number of lines to match between the files is 3. (If you want to change this default, specify the number of lines with the /# switch.) For example,

```
...
...

-----<filename1>
<difference>
<1st line to match file2 in file1>

-----<filename2>
<difference>
<1st line to match file1 in file2>

-----

...
...
```

FC will continue to list each difference.

If there are too many differences (involving too many lines), the program will simply report that the files are different and stop.

If no matches are found after the first difference is found, FC will display:

```
*** Files are different ***
```

and will return to the MS-DOS default drive prompt (for example, A>).

FILE COMPARISON UTILITY (FC)

5.6 REDIRECTING FC OUTPUT TO A FILE

The differences and matches between the two files, you specify will be displayed on your screen unless you redirect the output to a file. This is accomplished in the same way as MS-DOS command redirection.

To compare File1 and File2 and then send the FC output to DIFFER.TXT, type:

```
FC File1 File2 >DIFFER.TXT
```

The differences and matches between File1 and File2 will be put into DIFFER.TXT on the default drive.

FILE COMPARISON UTILITY (FC)

5.7 EXAMPLES

Example 1:

Assume these two ASCII files are on disk:

ALPHA.ASM	BETA.ASM
FILE A	FILE B

A	A
B	B
C	C
D	G
E	H
F	I
G	J
H	1
I	2
M	P
N	Q
O	R
P	S
Q	T
R	U
S	V
T	4
U	5
V	W
W	X
X	Y
Y	Z
Z	

To compare the two files and display the differences on the terminal screen, type:

```
FC ALPHA.ASM BETA.ASM
```

FILE COMPARISON UTILITY (FC)

FC compares ALPHA.ASM with BETA.ASM and displays the differences on the terminal screen. All other defaults remain intact. (The defaults are: do not use tabs, spaces, or comments for matches, and do a source comparison on the two files.)

The output will appear as follows on the terminal screen (the Notes do not appear):

-----ALPHA.ASM

D NOTE: ALPHA file
E contains defg,
F BETA contains g.
G

-----BETA.ASM

G

-----ALPHA.ASM

M NOTE: ALPHA file
N contains mno where
O BETA contains j12.
P

-----BETA.ASM

J
1
2
P

-----ALPHA.ASM

W NOTE: ALPHA file
 contains w where
-----BETA.ASM BETA contains 45w.

4
5
W

FILE COMPARISON UTILITY (FC)

Example 2:

You can print the differences on the line printer using the same two source files. In this example, four successive lines must be the same to constitute a match.

Type:

```
FC /4 ALPHA.ASM BETA.ASM >PRN
```

The following output will appear on the line printer:

```
-----ALPHA.ASM
```

```
D  
E  
F  
G  
H  
I  
M  
N  
O  
P
```

```
NOTE: p is the 1st of  
a string of 4 matches.
```

```
-----BETA.ASM
```

```
G  
H  
I  
J  
1  
2  
P
```

```
-----ALPHA.ASM
```

```
W  
-----BETA.ASM  
4  
5  
W
```

```
NOTE: w is the 1st of a  
string of 4 matches.
```

FILE COMPARISON UTILITY (FC)

Example 3:

This example forces a binary comparison and then displays the differences on the terminal screen using the same two source files as were used in the previous examples.

Type:

```
FC /B ALPHA.ASM BETA.ASM
```

The /B switch in this example forces binary comparison. This switch and any others must be typed before the filenames in the FC command line. The following display should appear:

```
--ADDRS----F1---F2--  
00000009  44  47  
0000000C  45  48  
0000000F  46  49  
00000012  47  4A  
00000015  48  31  
00000018  49  32  
0000001B  4D  50  
0000001E  4E  51  
00000021  4F  52  
00000024  50  53  
00000027  51  54  
0000002A  52  55  
0000002D  53  56  
00000030  54  34  
00000033  55  35  
00000036  56  57  
00000039  57  58  
0000003C  58  59  
0000003F  59  5A  
00000042  5A  1A
```

FILE COMPARISON UTILITY (FC)

5.8 ERROR MESSAGES

When the File Comparison Utility detects an error one or more of the following error messages will be displayed:

Invalid parameter:<option>

One of the switches that you have specified is invalid.

File not found:<filename>

FC could not read the filename you specified.

Read error in:<filename>

FC could not read the entire file.

Invalid number of parameters

You have specified the wrong number of options on the FC command line.

Bad file

One of the files you specified is defective.

Data left in <filename>

After reaching the end of one of the files in a file comparison, the other file still has uncomparing data left.

Internal error

This message indicates an internal logic error in the FC program.

CHAPTER 6

THE LINKER PROGRAM (MS-LINK)

6.1 INTRODUCTION

This chapter discusses MS-LINK. It is recommended that you read the entire chapter before you use MS-LINK.

NOTE

If you are not going to compile and link programs, you do not need to read this chapter.

The MS-DOS linker (called MS-LINK) is a program that:

- Combines separately produced object modules into one relocatable load module--a program you can run

- Searches library files for definitions of unresolved external references

- Resolves external cross-references

- Produces a listing that shows both the resolution of external references and error messages

THE LINKER PROGRAM (MS-LINK)

6.2 OVERVIEW OF MS-LINK

When you write a program, you write it in source code. This source code is passed through a compiler which produces object modules. The object modules must be passed through the link process to produce machine language that the computer can understand directly. This machine language is in the form required for running programs.

You may wish to link (combine) several programs and run them together. Each of your programs may refer to a symbol that is defined in another object module. This reference is called an external reference.

MS-LINK combines several object modules into one relocatable load module, or Run file (called an .EXE or Executable file). As it combines modules, MS-LINK makes sure that all external references between object modules are defined. MS-LINK can search several library files for definitions of any external references that are not defined in the object modules.

MS-LINK also produces a List file that shows external references resolved, and it also displays any error messages.

MS-LINK uses available memory as much as possible. When available memory is exhausted, MS-LINK creates a temporary disk file named VM.TMP.

Figure 6-1 illustrates the various parts of the MS-LINK operation.

THE LINKER PROGRAM (MS-LINK)

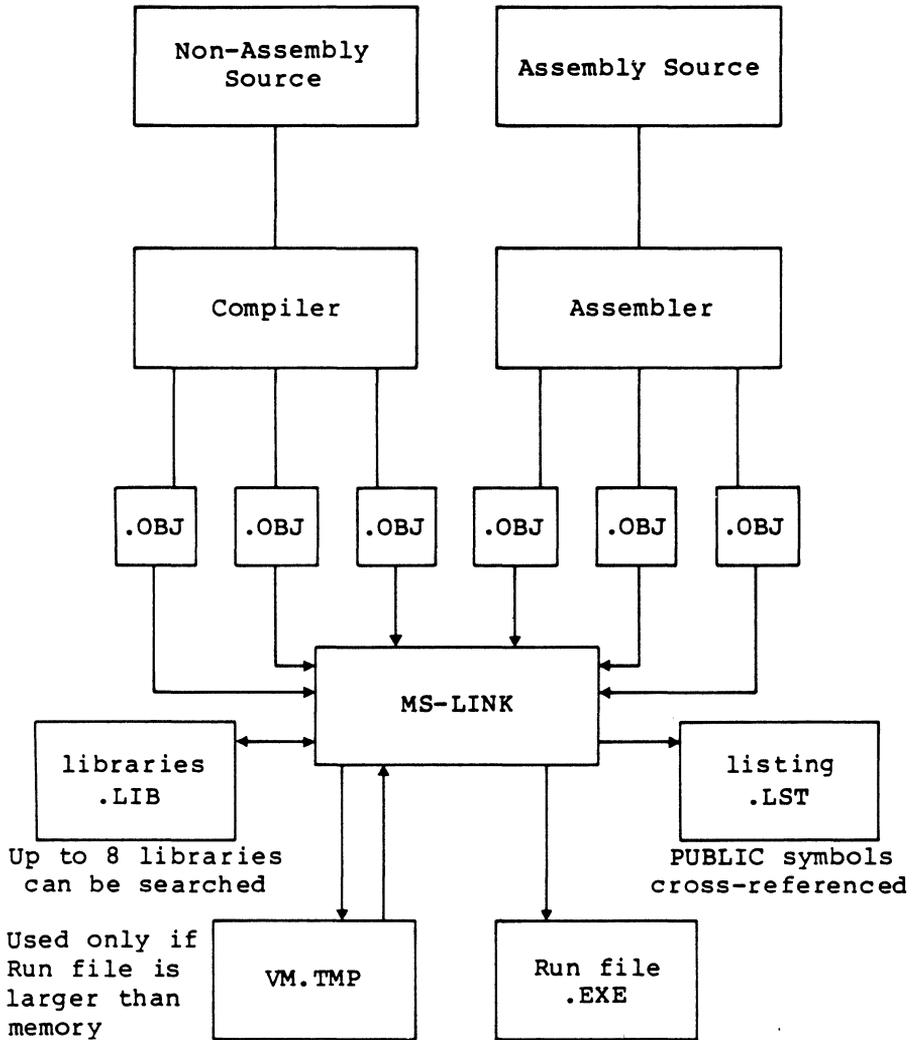


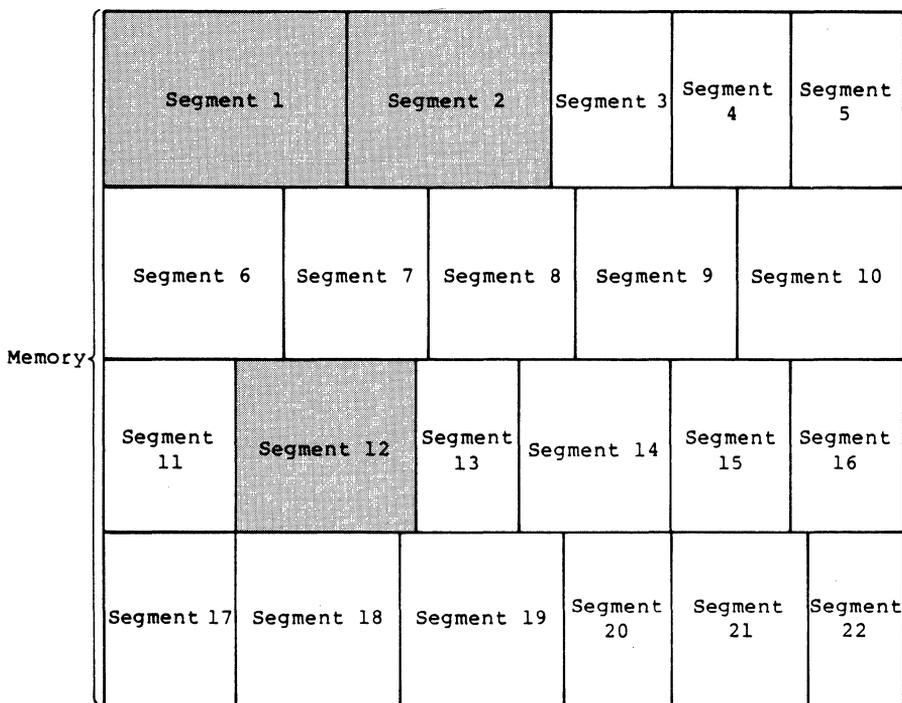
Figure 6-1: The MS-LINK Operation

THE LINKER PROGRAM (MS-LINK)

6.3 DEFINITIONS YOU'LL NEED TO KNOW

Some of the terms used in this chapter are explained below to help you understand how MS-LINK works. Generally, if you are linking object modules compiled from BASIC, Pascal, or a high-level language, you will not need to know these terms. If you are writing and compiling programs in assembly language, however, you will need to understand MS-LINK and the definitions described below.

In MS-DOS memory can be divided into segments, classes, and groups. Figure 6-2 illustrates these concepts.



shaded area = a group (64K bytes addressable)

Figure 6-2: How Memory Is Divided

THE LINKER PROGRAM (MS-LINK)

Example:

	Segment Name	Segment Class Name
Segment 1	PROG.1	CODE
Segment 2	PROG.2	CODE
Segment 12	PROG.3	DATA

Note that segments 1, 2, and 12 have different segment names but may or may not have the same segment class name. Segments 1, 2, and 12 form a group with a group address of the lowest address of segment 1 (i.e., the lowest address in memory).

Each segment has a segment name and a class name. MS-LINK loads all segments into memory by class name from the first segment encountered to the last. All segments assigned to the same class are loaded into memory contiguously.

During processing, MS-LINK references segments by their addresses in memory (where they are located). MS-LINK does this by finding groups of segments.

A group is a collection of segments that fit within a 64K byte area of memory. The segments do not need to be contiguous to form a group (see illustration). The address of any group is the lowest address of the segments in that group. At link time, MS-LINK analyzes the groups, then references the segments by the address in memory of that group. A program may consist of one or more groups.

If you are writing in assembly language, you may assign the group and class names in your program. In high-level languages (BASIC, COBOL, FORTRAN, Pascal), the naming is done automatically by the compiler.

THE LINKER PROGRAM (MS-LINK)

6.4 FILES THAT MS-LINK USES

MS-LINK:

Works with one or more input files

Produces two output files

May be directed to search up to eight library files

For each type of file, the user may give a three-part file specification. The format for MS-LINK file specifications is the same as that of a disk file:

[d:]<filename>[<.ext>]

where: d: is the drive designation. Permissible drive designations for MS-LINK are A: through O:. The colon is always required as part of the drive designation.

filename is any legal filename of one to eight characters.

.ext is one- to three-character extension to the filename. The period is always required as part of the extension.

6.4.1 Input File Extensions

If no filename extensions are given in the input (object) file specifications, MS-LINK will recognize the following extensions by default:

.OBJ Object
.LIB Library

THE LINKER PROGRAM (MS-LINK)

6.4.2 Output File Extensions

MS-LINK appends the following default extensions to the output (Run and List) files:

```
.EXE  Run  (may not be overridden)
.MAP  List (may be overridden)
```

6.4.3 VM.TMP (Temporary) File

MS-LINK uses available memory for the link session. If the files to be linked create an output file that exceeds available memory, MS-LINK will create a temporary file, name it VM.TMP, and put it on the disk in the default drive. If MS-LINK creates VM.TMP, it will display the message:

```
VM.TMP has been created.
Do not change diskette in drive, <d:>
```

Once this message has been displayed, you must not remove the disk from the default drive until the link session ends. If the disk is removed, the operation of MS-LINK will be unpredictable, and MS-LINK might display the error message:

```
Unexpected end of file on VM.TMP
```

The contents of VM.TMP are written to the file named following the Run File: prompt. VM.TMP is a working file only and is deleted at the end of the linking session.

WARNING

Do not use VM.TMP as a filename for any file. If you have a file named VM.TMP on the default drive and MS-LINK requires the VM.TMP file, MS-LINK will delete the VM.TMP already on disk and create a new VM.TMP. Thus, the contents of the previous VM.TMP file will be lost.

THE LINKER PROGRAM (MS-LINK)

6.5 HOW TO START MS-LINK

MS-LINK requires two types of input: a command to start MS-LINK and responses to command prompts. In addition, seven switches control MS-LINK features. Usually, you will type all the commands to MS-LINK on the terminal keyboard. As an option, answers to the command prompts and any switches may be contained in a response file. Command characters can be used to assist you while giving commands to MS-LINK.

MS-LINK may be started in any of three ways. The first method is to type the commands in response to individual prompts. In the second method, you type all commands on the line used to start MS-LINK. To start MS-LINK by the third method, you must create a response file that contains all the necessary commands and tell MS-LINK where that file is when you start MS-LINK.

Summary of Methods to Start MS-LINK

Method 1	LINK
Method 2	LINK <filenames>[/switches]
Method 3	LINK @<filespec>

THE LINKER PROGRAM (MS-LINK)

6.5.1 Method 1: Prompts

To start MS-LINK with Method 1, type:

LINK

MS-LINK will be loaded into memory. MS-LINK will then display four text prompts that appear one at a time. You answer the prompts to command MS-LINK to perform specific tasks.

At the end of each line, you may type one or more switches, preceded by the switch character, a forward slash.

The command prompts are summarized below and described in more detail in the "Command Prompts" section.

PROMPT

RESPONSES

Object Modules [.OBJ]:

List .OBJ files to be linked. They must be separated by blank spaces or plus signs (+). If a plus sign is the last character typed, the prompt will reappear. There is no default; a response is required.

Run File [Object-file.EXE]:

Give filename for executable object code. The default is first-object-filename.EXE. (You cannot change the output extension.)

THE LINKER PROGRAM (MS-LINK)

PROMPT

RESPONSES

List File [Run-file.MAP]:

Give filename for listing.
The default is RUN
filename.

Libraries []:

List filenames to be
searched, separated by
blank spaces or plus signs
(+). If a plus sign is
the last character typed,
the prompt will reappear.
The default is to search
for default libraries in
the object modules.
(Extensions will be change
to .LIB.)

THE LINKER PROGRAM (MS-LINK)

6.5.2 Method 2: Command Line

To start MS-LINK using Method 2, type all commands on one line. The entries following LINK are responses to the command prompts. The entry fields for the different prompts must be separated by commas. Use the following syntax:

```
LINK (object-list>,<runfile>,<listfile>,<lib-list>[/switch...])
```

The entries following LINK are responses to the command prompts. The entry fields for the different prompts must be separated by commas.

where: object-list is a list of object modules, separated by plus signs.

runfile is the name of the file to receive the executable output.

listfile is the name of the file to receive the listing.

lib-list is a list of library modules to be searched.

/switch refers to optional switches, which may be placed following any of the response entries (just before any of the commas or after the <lib-list>, as shown).

To select the default for a field, simply type a second comma with no spaces between the two commas.

Example:

```
LINK  
FUN+TEXT+TABLE+CARE/P/M,,FUNLIST,COBLIB.LIB
```

THE LINKER PROGRAM (MS-LINK)

This command causes MS-LINK to be loaded, then the object modules FUN.OBJ, TEXT.OBJ, TABLE.OBJ, and CARE.OBJ are loaded. MS-LINK then pauses (as a result of using the /P switch). MS-LINK links the object modules when you press any key, and produces a global symbol map (the /M switch); defaults to FUN.EXE Run file; creates a List file named FUNLIST.MAP; and searches the Library file COBLIB.LIB.

THE LINKER PROGRAM (MS-LINK)

6.5.3 Method 3: Response File

To start MS-LINK with Method 3, type:

```
LINK @<filespec>
```

where: filespec is the name of a response file. A response file contains answers to the MS-LINK prompts (shown in Method 1) and may also contain any of the switches. When naming a response file, the use of filename extensions is optional. Method 3 permits the command that starts MS-LINK to be entered from the keyboard or within a batch file without requiring you to take any further action.

To use this option, you must create a response file containing several lines of text, each of which is the response to an MS-LINK prompt. The responses must be in the same order as the MS-LINK prompts discussed in Method 1. If desired, a long response to the Object Modules: or Libraries: prompt may be typed on several lines by using a plus sign (+) to continue the same response onto the next line.

Use switches and command characters in the response file the same way as they are used for responses typed on the terminal keyboard.

When the MS-LINK session begins, each prompt will be displayed in order with the responses from the response file. If the response file does not contain answers for all the prompts, (in the form of filenames, the semicolon command character or carriage returns), MS-LINK will display the prompt which does not have a response, then wait for you to type a legal response. When a legal response has been typed, MS-LINK continues the link session.

THE LINKER PROGRAM (MS-LINK)

Example:

```
FUN TEXT TABLE CARE  
/PAUSE/MAP  
FUNLIST  
COBLIB.LIB
```

This response file tells MS-LINK to load the four object modules name FUN, TEXT, TABLE, and CARE. MS-LINK pauses before producing a public symbol map to permit you to swap disk (see discussion under /PAUSE in the "Switches" section before using this feature). When you press any key, the output files will be named FUN.EXE and FUNLIST.MAP. MS-LINK will search the library file COBLIB.LIB, and will use the default settings for the switches.

THE LINKER PROGRAM (MS-LINK)

6.6 COMMAND CHARACTERS

MS-LINK provides three command characters.

Plus sign

Use the plus sign (+) to separate entries and to extend the current line in response to the Object Modules: and Libraries: prompts. (A blank space may be used to separate object modules.) To type a large number of responses (each may be very long), type a plus sign/<RETURN> at the end of the line to extend it. If the plus sign/<RETURN> is the last entry following these two prompts, MS-LINK will prompt you for more module names. When the Object Modules: or Libraries: prompt appears again, continue to type responses. When all the modules to be linked and libraries to be searched have been listed, be sure the response line ends with a module name and a <RETURN> and not a plus sign/<RETURN>.

Example:

```
Object Module [.OBJ]: FUN TEXT
TABLE CARE+<RETURN>
Object Modules [.OBJ]:
FOO+FLIPFLOP+JUNQUE+<RETURN>
Object Modules [.OBJ]:
CORSAIR<RETURN>
```

Semicolon

To select default responses to the remaining prompts, use a single semicolon (;) followed immediately by a carriage return at any time after the first prompt (Run File:). This feature saves time and overrides the need to press a series of <RETURN> keys.

THE LINKER PROGRAM (MS-LINK)

NOTE

Once the semicolon has been typed and entered (by pressing the <RETURN> key), you can no longer respond to any of the prompts for that link session. Therefore, do not use the semicolon to skip some prompts. To skip prompts, use the <RETURN> key.

Example:

```
Object Modules  
[.OBJ]: FUN TEXT TABLE CARE<RETURN>  
Run Module [FUN.EXE]: ;<RETURN>
```

No other prompts will appear, and MS-LINK will use the default values (including FUN.MAP for the List file).

<CTRL/C>

Use the <CTRL/C> key to abort the link session at any time. If you type an erroneous response, such as the wrong filename or an incorrectly spelled filename, you must press <CTRL/C> to exit MS-LINK then restart MS-LINK. If the error has been typed but you have not pressed the <RETURN> key, you may delete the erroneous characters with the backspace key, but for that line only.

THE LINKER PROGRAM (MS-LINK)

6.7 COMMAND PROMPTS

MS-LINK asks you for responses to four text prompts. When you have typed a response to a prompt and pressed <RETURN>, the next prompt appears. When the last prompt has been answered, MS-LINK begins linking automatically without further command. When the link session is finished, MS-LINK exits to the operating system. When the operating system prompt appears, MS-LINK has finished successfully. If the link session is unsuccessful, MS-LINK will display the appropriate error message.

MS-LINK prompts you for the names of Object, Run, and List files, and for Libraries. The prompts are listed in order of appearance. The default response is shown in square brackets ([]) following the prompt, for prompts which can default to preset responses. The Object Modules: prompt has no preset filename response and requires you to type a filename.

Object Modules [.OBJ]:

Type a list of the object modules to be linked. MS-LINK assumes by default that the filename extension is .OBJ. If an object module has any other filename extension, the extension must be given. Otherwise, the extension may be omitted.

Modules must be separated by plus signs (+).

Remember that MS-LINK loads segments into classes in the order encountered. You can use this information to set the order in which the object modules will be read by MS-LINK.

Run File [First-Object-filename.EXE]:

Typing a filename will create a file for storing the Run (executable) file that results from the link session. All Run files receive the filename extension .EXE, even if you specify an extension other than .EXE.

THE LINKER PROGRAM (MS-LINK)

If no response is typed to the Run File: prompt, MS-LINK uses the first filename typed in response to the Object Modules: prompt as the RUN filename.

Example:

```
Run File [FUN.EXE]: B:PAYROLL/P
```

This response directs MS-LINK to create the Run file PAYROLL.EXE on drive B:. Also, MS-LINK will pause, which allows you to insert a new disk to receive the Run file.

List File [Run-Filename.MAP]:

The List file contains an entry for each segment in the input (object) modules. Each entry also shows the addressing in the Run file.

The default response is the Run filename with the default filename extension .MAP.

Libraries []:

The valid responses are up to eight library filenames or simply a carriage return. (A carriage return means default library search.) Library files must have been created by a library utility.

Library filenames must be separated by blank spaces or plus signs (+).

MS-LINK searches library files in the order listed to resolve external references. When it finds the module that defines the external symbol, MS-LINK processes that module as another object module.

THE LINKER PROGRAM (MS-LINK)

If MS-LINK cannot find a library file on the disks in the disk drives, it will display the message:

```
Cannot find library <library-name>  
Type new drive letter:
```

Press the letter for the drive designation (for example, B).

THE LINKER PROGRAM (MS-LINK)

6.8 MS-LINK SWITCHES

The seven MS-LINK switches control various MS-LINK functions. Switches must be typed at the end of a prompt response, regardless of which method is used to start MS-LINK. Switches may be grouped at the end of any response, or may be scattered at the end of several. If more than one switch is typed at the end of one response, each switch must be preceded by a forward slash (/).

All switches may be abbreviated. The only restriction is that an abbreviation must be sequential from the first letter through the last typed; no gaps or transpositions are allowed. For example:

<u>Legal</u>	<u>Illegal</u>
/D	/DSL
/DS	/DAL
/DSA	/DLC
/DSALLOCA	/DSALLOC

/DSALLOCATE

Using the /DSALLOCATE switch tells MS-LINK to load all data at the high end of the Data Segment. Otherwise, MS-LINK loads all data at the low end of the Data Segment. At runtime, the DS pointer is set to the lowest possible address to allow the entire DS segment to be used. Use of the /DSALLOCATE switch in combination with the default load low (that is, the /HIGH switch is not used) permits the user application to dynamically allocate any available memory below the area specifically allocated within DGroup, yet to remain addressable by the same DS pointer. This dynamic allocation is needed for Pascal and FORTRAN programs.

THE LINKER PROGRAM (MS-LINK)

NOTE

Your application program may dynamically allocate up to 64K bytes (or the actual amount of memory available) less the amount allocated within DGroup.

/HIGH

Use of the /HIGH switch causes MS-LINK to place the Run file as high as possible in memory. Otherwise, MS-LINK places the Run file as low as possible.

IMPORTANT

Do not use the /HIGH switch with Pascal or FORTRAN programs.

/LINENUMBERS

The /LINENUMBERS switch tells MS-LINK to include in the List file the line numbers and addresses of the source statements in the input modules. Otherwise, line numbers are not included in the List file.

NOTE

Not all compilers produce object modules that contain line number information. In these cases, of course, MS-LINK cannot include line numbers.

THE LINKER PROGRAM (MS-LINK)

/MAP

/MAP directs MS-LINK to list all public (global) symbols defined in the input modules. If /MAP is not given, MS-LINK will list only errors (including undefined globals).

The symbols are listed alphabetically. For each symbol, MS-LINK lists its value and its segment:offset location in the Run file. The symbols are listed at the end of the List file.

/PAUSE

The /PAUSE switch causes MS-LINK to pause in the link session when the switch is encountered. Normally, MS-LINK performs the linking session from beginning to end without stopping. This switch allows the user to swap the disks before MS-LINK outputs the Run (.EXE) file.

When MS-LINK encounters the /PAUSE switch, it displays the message:

```
    About to generate .EXE file  
    Change disks <hit any key>
```

MS-LINK resumes processing when the user presses any key.

CAUTION

Do not remove the disk which will receive the List file, or the disk used for the VM.TMP file, if one has been created.

THE LINKER PROGRAM (MS-LINK)

`/STACK:<number>`

number represents any positive numeric value (in hexadecimal radix) up to 65536 bytes. If a value from 1 to 511 is typed, MS-LINK will use 512. If the `/STACK` switch is not used for a link session, MS-LINK will calculate the necessary stack size automatically.

All compilers and assemblers should provide information in the object modules that allow the linker to compute the required stack size.

At least one object (input) module must contain a stack allocation statement. If not, MS-LINK will display the following error message:

WARNING: NO STACK STATEMENT

`/NO`

`/NO` is short for `NODEFAULTLIBRARYSEARCH`. This switch tells MS-LINK to not search the default (product) libraries in the object modules. For example, if you are linking object modules in Pascal, specifying the `/NO` switch tells MS-LINK to not automatically search the library named `PASCAL.LIB` to resolve external references.

THE LINKER PROGRAM (MS-LINK)

6.9 SAMPLE MS-LINK SESSION

This sample shows you the type of information that is displayed during an MS-LINK session.

In response to the MS-DOS prompt, type:

```
LINK
```

The system displays the following messages and prompts (your answers are underlined):

```
Microsoft Object Linker V2.00  
(C) Copyright 1982 by Microsoft Inc.
```

```
Object Modules [.OBJ]: IO SYSINIT  
Run File [IO.EXE]:  
List File [NUL.MAP]: IO /MAP  
Libraries [.LIB]: ;
```

1. By specifying /MAP, you get both an alphabetic listing and a chronological listing of public symbols.
2. By responding PRN to the List File: prompt, you can redirect your output to the printer.
3. By specifying the /LINE switch, MS-LINK gives you a listing of all line numbers for all modules. (Note that the /LINE switch can generate a large volume of output).
4. By pressing <RETURN> in response to the Libraries: prompt, an automatic library search is performed.

THE LINKER PROGRAM (MS-LINK)

Once MS-LINK locates all libraries, the linker map displays a list of segments in the order of their appearance within the load module. The list might look like this:

Start	Stop	Length	Name
00000H	009ECH	09EDH	CODE
009FOH	01166H	0777H	SYSINITSEG

The information in the Start and Stop columns shows the 20-bit hex address of each segment relative to location zero. Location zero is the beginning of the load module.

The addresses displayed are not the absolute addresses where these segments are loaded.

Because the /MAP switch was used, MS-LINK displays the public symbols by name and value. For example:

ADDRESS	PUBLICS BY NAME
009F:0012	BUFFERS
009F:0005	CURRENT_DOS_LOCATION
009F:0011	DEFAULT_DRIVE
009F:000B	DEVICE_LIST
009F:0013	FILES
009F:0009	FINAL_DOS_LOCATION
009F:000F	MEMORY_SIZE
009F:0000	SYSINIT

ADDRESS	PUBLICS BY VALUE
009F:0000	SYSINIT
009F:0005	CURRENT_DOS_LOCATION
009F:0009	FINAL_DOS_LOCATION
009F:000B	DEVICE_LIST
009F:000F	MEMORY_SIZE
009F:0011	DEFAULT_DRIVE
009F:0012	BUFFERS
009F:0013	FILES

THE LINKER PROGRAM (MS-LINK)

6.10 ERROR MESSAGES

All errors cause the link session to abort. After the cause has been found and corrected, MS-LINK must be rerun. The following error messages are displayed by MS-LINK:

ATTEMPT TO ACCESS DATA OUTSIDE SEGMENT BOUNDS, POSSIBLY BAD OBJECT MODULE

There is probably a bad Object file.

BAD NUMERIC PARAMETER

Numeric value is not in digits.

CANNOT OPEN TEMPORARY FILE

MS-LINK is unable to create the file VM.TMP because the disk directory is full. Insert a new disk. Do not remove the disk that will receive the List.MAP file.

ERROR: DUP RECORD TOO COMPLEX

DUP record in assembly language module is too complex. Simplify DUP record in assembly language program.

ERROR: FIXUP OFFSET EXCEEDS FIELD WIDTH

An assembly language instruction refers to an address with a short instruction instead of a long instruction. Edit assembly language source and reassemble.

INPUT FILE READ ERROR

There is probably a bad Object file.

THE LINKER PROGRAM (MS-LINK)

INVALID OBJECT MODULE

An object module(s) is incorrectly formed or incomplete (as when assembly is stopped in the middle).

SYMBOL DEFINED MORE THAN ONCE

MS-LINK found two or more modules that define a single symbol name.

PROGRAM SIZE OR NUMBER OF SEGMENTS EXCEEDS CAPACITY OF LINKER

The total size may not exceed 384k bytes and the number of segments may not exceed 255.

REQUESTED STACK SIZE EXCEEDS 64K

Specify a size greater than or equal to 64K bytes with the /STACK switch.

SEGMENT SIZE EXCEEDS 64K

64K bytes is the addressing system limit.

SYMBOL TABLE CAPACITY EXCEEDED

Very many and/or very long names were typed, exceeding the limit of approximately 25K bytes.

TOO MANY EXTERNAL SYMBOLS IN ONE MODULE

The limit is 256 external symbols per module.

THE LINKER PROGRAM (MS-LINK)

TOO MANY GROUPS

The limit is 10 groups.

TOO MANY LIBRARIES SPECIFIED

The limit is 8 libraries.

TOO MANY PUBLIC SYMBOLS

The limit is 1024 public symbols.

TOO MANY SEGMENTS OR CLASSES

The limit is 256 (segments and classes taken together).

UNRESOLVED EXTERNALS: <list>

The external symbols listed have no defining module among the modules or library files specified.

VM READ ERROR

This is a disk error; it is not caused by MS-LINK

WARNING: NO STACK SEGMENT

None of the object modules specified contains a statement allocating stack space, but you typed the /STACK switch.

THE LINKER PROGRAM (MS-LINK)

WARNING: SEGMENT OF ABSOLUTE OR UNKNOWN TYPE

There is a bad object module or an attempt has been made to link modules that MS-LINK cannot handle (e.g., an absolute object module).

WRITE ERROR IN TMP FILE

No more disk space remains to expand the VM.TMP file.

WRITE ERROR ON RUN FILE

Usually, there is not enough disk space for the Run file.

APPENDIX A

HOW TO CONFIGURE YOUR SYSTEM

This appendix tells you how to specify MS-DOS settings that need to be configured at start-up time. An example of this is a standard device driver, such as an online printer. In many cases, there are installation-specific settings for MS-DOS that need to be configured at system startup. An example of this is a standard device driver, such as an online printer.

The MS-DOS configuration file (CONFIG.SYS) allows you to configure your system with a minimum of effort. With this file, you can add device drivers to your system at startup. The configuration file is simply an ASCII file that has certain commands for MS-DOS startup (boot). The boot process is as follows:

1. The disk boot sector is read. This contains enough code to read MS-DOS code and the BIOS.
2. The MS-DOS code and BIOS are read.
3. A variety of BIOS initializations are done.

HOW TO CONFIGURE YOUR SYSTEM

4. A system initialization routine reads the configuration file (CONFIG.SYS), if it exists, to perform device installation and other user options. Its final task is to execute the command interpreter, which finishes the MS-DOS boot process.

HOW TO CONFIGURE YOUR SYSTEM

A.1 CHANGING THE CONFIG.SYS FILE

If there is not a CONFIG.SYS file on the MS-DOS disk, you can use the MS-DOS editor, EDLIN, to create a file; then save it on the MS-DOS disk in your root directory.

The following is a list of commands for the configuration file CONFIG.SYS:

BUFFERS = <number>

This is the number of sector buffers that will comprise the system list. If not set, 10 is a reasonable number.

FILES = <number>

This is the number of open files that the system calls 2FH through 57H can access. If not set, 10 is a reasonable number.

DEVICE = <filename>

This installs the device driver in <filename> into the system list. (See below.)

BREAK = <ON or OFF>

If ON is specified (the default is OFF), a check for CTRL/C as input will be made every time the system is called. ON improves the ability to abort programs over previous versions of the MS-DOS.

SHELL = <filename>

This begins execution of the shell (top-level command processor) from <filename>.

HOW TO CONFIGURE YOUR SYSTEM

COUNTRY = <number>

This number is set to allow for international date, time, currency, and case conversion. Acceptable values are:

United States = 1 (default value)

France = 33

Spain = 34

Portugal = 35

Italy = 39

United Kingdom = 44

Germany = 49

Japan = 81

Israel = 97

A typical configuration file might look like this:

```
Buffers = 10
Files = 10
Device = \BIN\NETWORK.SYS
.Break = ON
Shell = A:\BIN\COMMAND.COM A:\BIN /P
```

Note here that the Buffers and Files parameters are set to 10. The system initialization routine will search for the filename \BIN\NETWORK.SYS to find the device that is being added to the system. This file is usually supplied on disk with your device. Make sure that you save the device file in the pathname that you specify in the Device parameter.

HOW TO CONFIGURE YOUR SYSTEM

This configuration file also sets the MS-DOS command EXEC to the COMMAND.COM file located on disk A: in the \BIN directory. The A:\BIN tells COMMAND.COM where to look for itself when it needs to re-read from disk. The /P tells COMMAND.COM that it is the first program running on the system so that it can process the MS-DOS EXIT command.

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READER'S COMMENTS

Did you find this manual understandable, usable, and well-organized? Please make suggestions for improvement.

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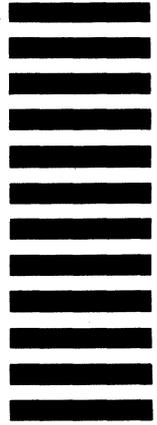
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