VECTOR

VECTOR 4

User's Manual

VECTOR
VECTOR GRAPHIC INC.

VERSION CHANGE NOTICE

In its continual effort to update and enhance its products, Vector Graphic, Inc. has revised the product described below. In order to release this change as quickly as possible, this Version Change Notice will be included in applicable documentation until the entire document can be revised. Please keep the following information in mind as you read the following section or manual.

Document Name **Vector 4 User's Manual**

Version Described **Revision A** Date **9-01-82**

New Version Number **Revision B** Date **2-15-83**

Product Addition: Vector 4/40 with 10-Mbyte hard drive

The new Vector 4/40 small business computer is now available with a 10-megabyte hard disk drive, providing increased information storage space.

If you have purchased a Vector 4/40, please insert the following pages (marked as Revision B) in your Vector 4 User's Manual, replacing or supplementing for the pages already in place (marked Revision A). These pages indicate the screen displays and commands available with this newly-released product.

If you have not purchased a Vector 4/40, you may choose to disregard this revision package. However, you may still wish to include Appendix F, "Caring For Your Vector 4", which describes the correct methods for cleaning the anti-glare coating on the Vector 4's screen.

Thank you for purchasing Vector Graphic products.

VECTOR 4

USER'S REFERENCE MANUAL

Revision B

P/N 7100-0001

February 1, 1983

DISCLAIMER

Vector Graphic makes no representations or warranties with respect to the contents of this manual itself, whether or not the product it describes is covered by a warranty or repair agreement. Further, Vector Graphic reserves the right to revise this publication and to make changes from time to time in the content hereof without obligation of Vector Graphic to notify any person of such revision or changes, except when an agreement to the contrary exists.

REVISION NUMBERS

The date, revision, and part number of each page herein appears on its bottom line. The revision level (such as A or B) appears next to the date of that revision. The date and revision on the title page corresponds to that of the page most recently revised. In addition, a page listing the latest revision level and date of each page is included. THIS MANUAL SHOULD ONLY BE USED WITH THE PRODUCT(S) IDENTIFIED ON THE TITLE PAGE.

TRADEMARK (if applicable)

CP/M is a registered trademark of Digital Research.

Page	Revision	Date	Page	Revision	Date
i	Rev. B - 02-01-83		V 2	Rev. A - 09-01-82	
ii	Rev. B - 02-01-83		V 3	Rev. A - 09-01-82	
iii	Rev. B - 02-01-83		V 4	Rev. A - 09-01-82	
iv	Rev. B - 02-01-83		V 5	Rev. A - 09-01-82	
v	Rev. B - 02-01-83		V 6	Rev. A - 09-01-82	
vi	Rev. B - 02-01-83		V 7	Rev. A - 09-01-82	
A 1	Rev. A - 09-01-82		V 8	Rev. A - 09-01-82	
A 2	Rev. A - 09-01-82		V 9	Rev. A - 09-01-82	
A 3	Rev. A - 09-01-82		V 10	Rev. B - 02-01-83	
A 4	Rev. A - 09-01-82		V 11	Rev. A - 09-01-82	
A 5	Rev. A - 09-01-82		V 12	Rev. A - 09-01-82	
A 6	Rev. A - 09-01-82		V 13	Rev. A - 09-01-82	
A 7	Rev. A - 09-01-82		V 14	Rev. A - 09-01-82	
A 8	Rev. A - 09-01-82		V 15	Rev. A - 09-01-82	
A 9	Rev. B - 02-01-83		V 16	Rev. B - 02-01-83	
A 10	Rev. A - 09-01-82		V 17	Rev. A - 09-01-82	
A 11	Rev. A - 09-01-82		V 18	Rev. A - 09-01-82	
I 1	Rev. A - 09-01-82		V 19	Rev. A - 09-01-82	
I 2	Rev. A - 09-01-82		V 20	Rev. A - 09-01-82	
I 3	Rev. A - 09-01-82		V 21	Rev. A - 09-01-82	
I 4	Rev. B - 02-01-83		V 22	Rev. A - 09-01-82	
I 5	Rev. A - 09-01-82		V 23	Rev. A - 09-01-82	
I 6	Rev. A - 09-01-82		V 24	Rev. A - 09-01-82	
II 1	Rev. A - 09-01-82		V 25	Rev. A - 09-01-82	
II 2	Rev. A - 09-01-82		V 26	Rev. A - 09-01-82	
II 3	Rev. A - 09-01-82		V 27	Rev. A - 09-01-82	
II 4	Rev. A - 09-01-82		VI 1	Rev. A - 09-01-82	
II 5	Rev. A - 09-01-82		VI 2	Rev. A - 09-01-82	
II 6	Rev. A - 09-01-82		VI 3	Rev. A - 09-01-82	
III 1	Rev. A - 09-01-82		VI 4	Rev. A - 09-01-82	
III 2	Rev. A - 09-01-82		VI 5	Rev. A - 09-01-82	
III 3	Rev. A - 09-01-82		VI 6	Rev. A - 09-01-82	
III 4	Rev. A - 09-01-82		VI 7	Rev. A - 09-01-82	
III 5	Rev. A - 09-01-82		VI 8	Rev. B - 02-01-83	
III 6	Rev. A - 09-01-82		VI 9	Rev. A - 09-01-82	
III 7	Rev. A - 09-01-82		VII 1	Rev. A - 09-01-82	
III 8	Rev. A - 09-01-82		VII 2	Rev. A - 09-01-82	
III 9	Rev. A - 09-01-82		VII 3	Rev. A - 09-01-82	
III 10	Rev. A - 09-01-82		VII 4	Rev. A - 09-01-82	
III 11	Rev. A - 09-01-82		VII 5	Rev. A - 09-01-82	
IV 1	Rev. A - 09-01-82		VII 6	Rev. A - 09-01-82	
IV 2	Rev. A - 09-01-82		VII 7	Rev. A - 09-01-82	
IV 3	Rev. A - 09-01-82		VII 8	Rev. A - 09-01-82	
IV 4	Rev. A - 09-01-82		VII 9	Rev. A - 09-01-82	
V 1	Rev. A - 09-01-82		VII 10	Rev. A - 09-01-82	

VECTOR GRAPHIC, INC.

Page	Revision	Date
X C-1	Rev. A - 09-01-82	
X C-2	Rev. A - 09-01-82	
X C-3	Rev. A - 09-01-82	
X C-4	Rev. A - 09-01-82	
X C-5	Rev. A - 09-01-82	
X C-6	Rev. A - 09-01-82	
X C-7	Rev. A - 09-01-82	
X C-8	Rev. A - 09-01-82	
X C-9	Rev. A - 09-01-82	
X C-10	Rev. A - 09-01-82	
X C-11	Rev. A - 09-01-82	
X D-1	Rev. A - 09-01-82	
X D-2	Rev. A - 09-01-82	
X D-3	Rev. A - 09-01-82	
X D-4	Rev. A - 09-01-82	
X E-1	Rev. A - 09-01-82	
X E-2	Rev. A - 09-01-82	
X E-3	Rev. A - 09-01-82	
X E-4	Rev. A - 09-01-82	
X E-5	Rev. A - 09-01-82	
X E-6	Rev. A - 09-01-82	
X E-7	Rev. A - 09-01-82	
X E-8	Rev. A - 09-01-82	
X E-9	Rev. A - 09-01-82	
X E-10	Rev. A - 09-01-82	
X E-11	Rev. A - 09-01-82	
X F-1	Rev. B - 02-01-83	

VECTOR 4 USER'S MANUAL

TABLE OF CONTENTS

HOW TO USE THIS MANUAL

This User's Manual is divided into ten sections. The first two sections introduce you to the components of your Vector 4 and describe the methods of its installation:

Section I - Meet Your Vector 4

Section II - Installation Instructions

The next two sections make up the **User's Guide,** an introduction to the operation and functions of the Vector 4

Section III - Starting Up Your Vector 4

Section IV - Operating Instructions

As an aid to memory during operation, the next section outlines (in brief, tabular format) the basic commands needed to run your Vector 4:

Section VI - Quick Reference Index

The following three sections, taken together, offer a more complete explanation of the program options available on Vector 4's Vector 4 CP/M Operating System:

Section VII - Introduction to Vector 4 CP/M

Section VIII - Vector 4 CP/M Resident Commands

Section IX - Vector 4 CP/M Transient Commands

The last section is made up of several appendices:

Section X - Appendices:

Appendix A - Vector 4 Specifications

Appendix B - User's Troubleshooting Guide

Appendix C - Diskette Care And Handling

Appendix D - Glossary Of Terms

Appendix E - Contents Of System Diskettes

If You Have Never Used A Computer Before...

...then read the following sections:

- Meet Your Vector 4 (Section I),

- Installation Instructions (Section II),

- the User's Guide (Sections III, IV, and V).

This will give you enough information to begin working on the system. After you are familiar with the Vector 4, use the Introduction to Vector 4 CP/M and the Resident and Transient Command sections (Sections VII, VIII, and IX) as learning and reference guides. If you would like more information on how the system works, read these sections thoroughly. Section VI, the Quick Reference Index, is a good reminder of the format for commands you need to run the Vector 4.

If You Have Used Computers, But Never Vector 4 or Vector 4 CP/M...

...then read the following sections:

- Meet Your Vector 4 (Section I),

- Installation Instructions (Section II),

- Starting Up Your Vector 4 (Section III),

- Quick Reference Index (Section VI).

For comprehensive information on the commands used to run your Vector 4, read the Introduction to Vector 4 CP/M, the Resident and Transient Commands sections (Sections VII, VIII, and IX). Or you can read the Operating Instructions (Section V) for an introduction to Vector 4 CP/M commands.

SECTION I

MEET YOUR VECTOR 4

The Components Of Your System

Your Vector 4 computer system is composed of different components which work together to store and process information. Before going on, it will help to look briefly at what these components do.

The console is the part of the Vector 4 with the video screen. Inside the console is a microprocessor. Beneath this console are the disk drives. In front of the console is a separate keyboard.
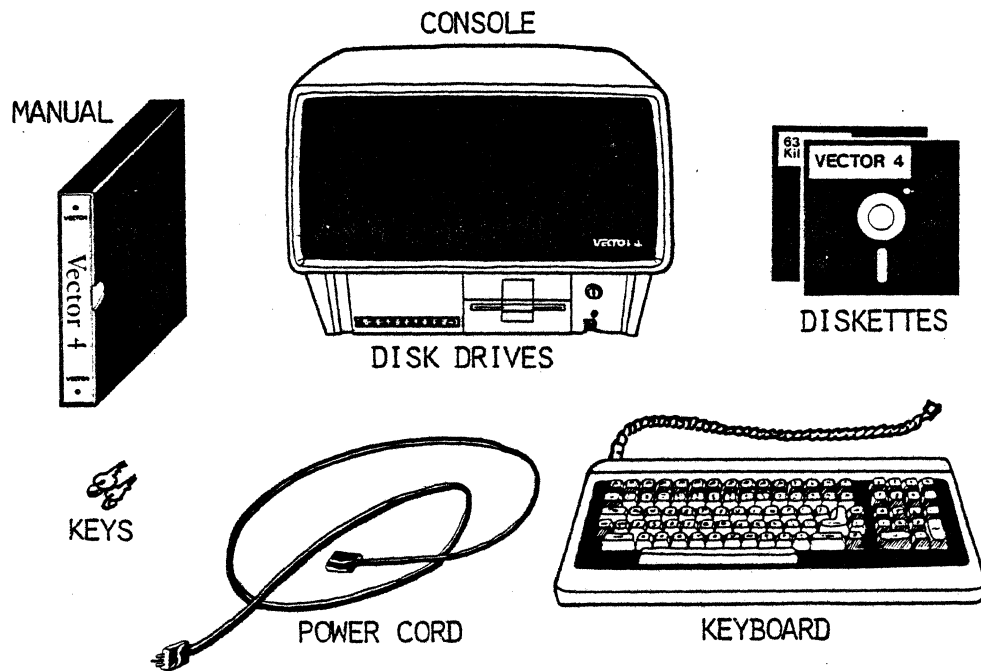
The Keyboard

You use the keyboard to give instructions to your Vector 4. The layout of the keyboard is very similar to an electric typewriter. In addition to the usual typewriter keys, you will find a ten-key calculator-type pad for rapid number entry, 15 special function keys, and a few special keys such as DEL and ESC. These extra keys help you do things with your computer. They will be explained later on.

SPECIAL FUNCTION KEYS

CALCULATOR-STYLE
TEN-KEY PAD
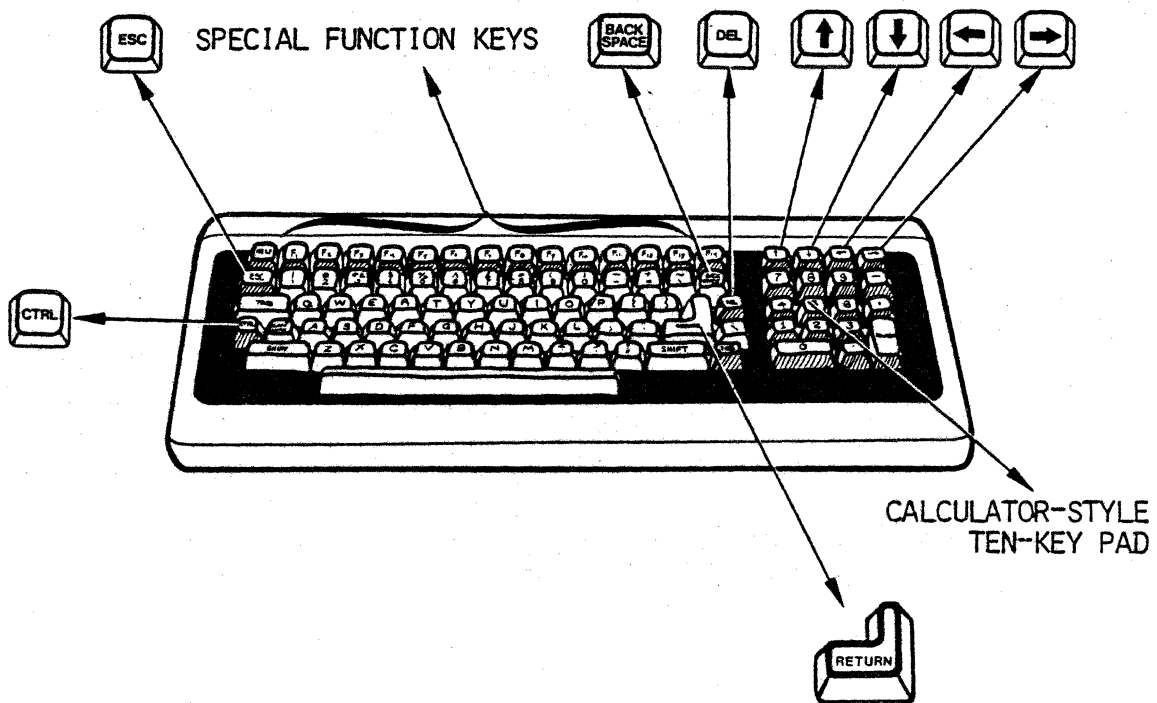
The Microprocessor

The microprocessor "chip" is the most important component of the computer. Your Vector 4 has the capability of using either of two different microprocessor chips. Whichever chip is in use is responsible for making decisions, performing calculations, and executing the instructions or commands that you give it. The microprocessors, along with other electronic devices, are mounted on a printed circuit board inside the console.
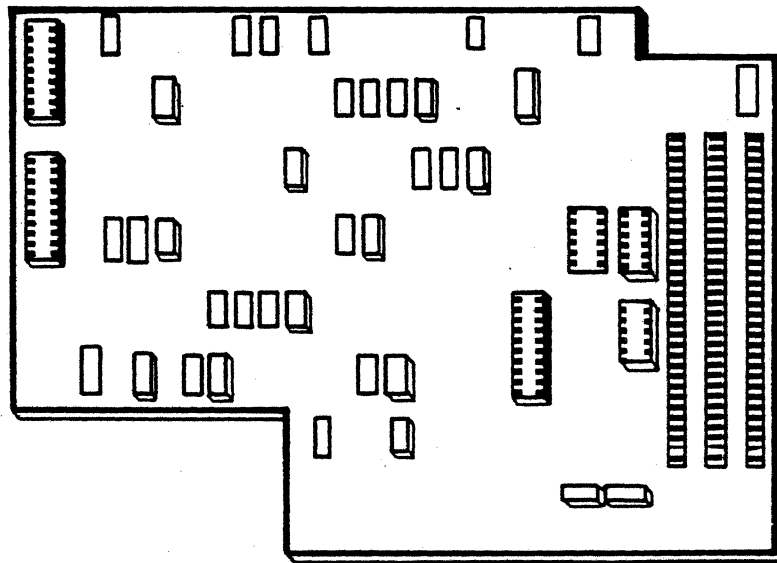
The Disk Drives

Your Vector 4 contains one or two kinds of disk drives depending on the configuration of your system. Disk drives are mechanical devices which are used to store information. The base of your Vector 4's console will resemble one of the two following illustrations:
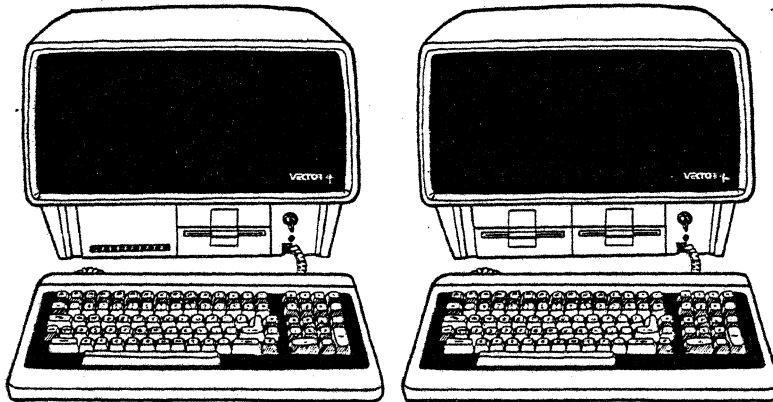
The system on the right uses two floppy drives for storage. The floppy drive to your right is called Drive A: and the left drive is called Drive B:.

The system on the left uses one floppy drive and one hard drive for storage. On this kind of system, the hard drive is usually called Drives A: and B:, and the floppy drive is called Drive C:. The reason the hard drive is logically split into two drives A: and B: is to allow the user more flexibility. You will learn more about this later.
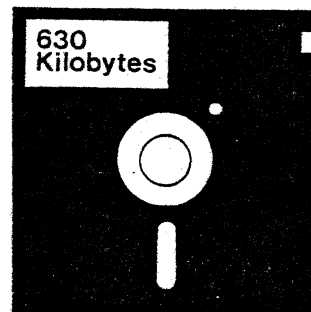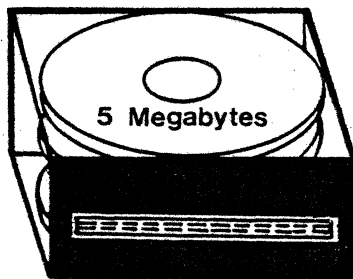
The Printer

A printer is used to provide permanent copies of your work. Although the printer is not part of your Vector 4, it is an important part of your computer system. With the printer, you can produce "hard copy" of the work you do with your Vector 4.
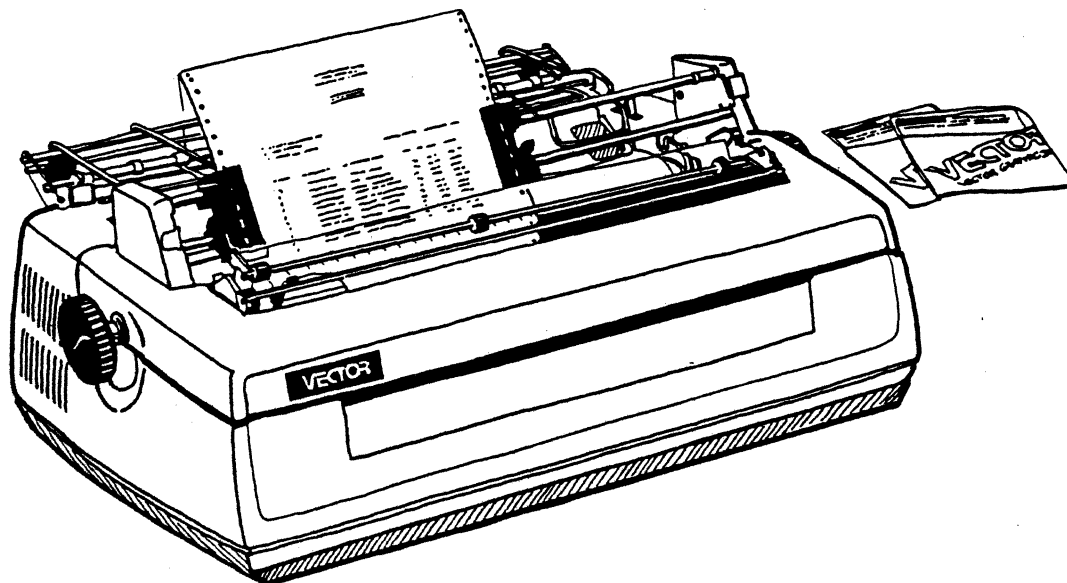
The Hidden Component

The hidden or "invisible" component of your computer is called <u>software</u>. What we have been describing so far is called <u>hardware</u>. Software (or programs) are the instructions which tell the hardware components what to do. They tell the hardware things such as "print this character at the printer" or "display this number on the screen" or "look at the keyboard to see if anything has been typed."

Software is stored on disks in the disk drives, on the same kind of material used to make recording tapes. You can change software as easily as changing a record.
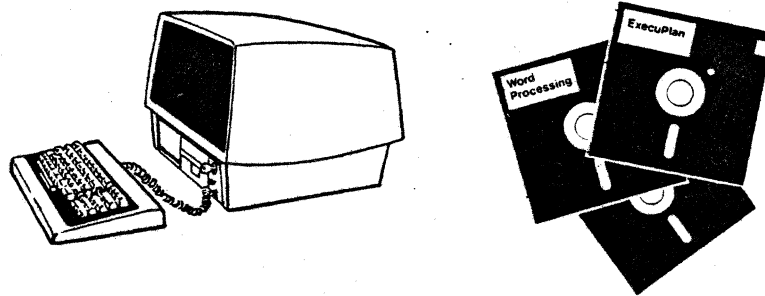
SECTION II

INSTALLATION INSTRUCTIONS

Connecting Your Vector 4 Components

Your Vector 4 packing box should contain the following components:
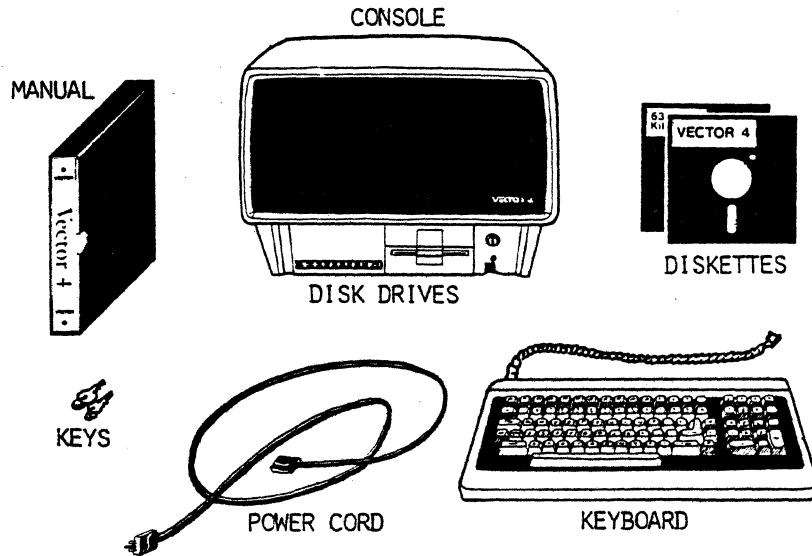
1. Place console on flat and sturdy surface.
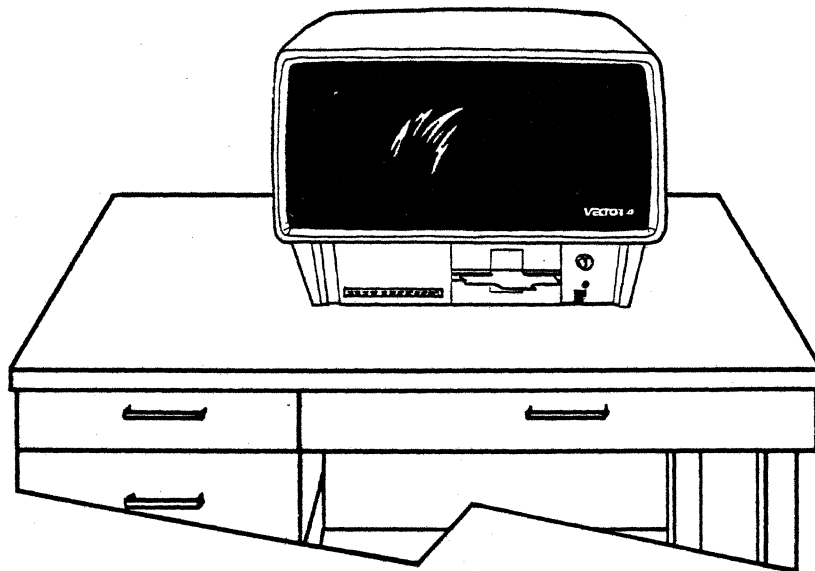
2. Place keyboard in front of console.
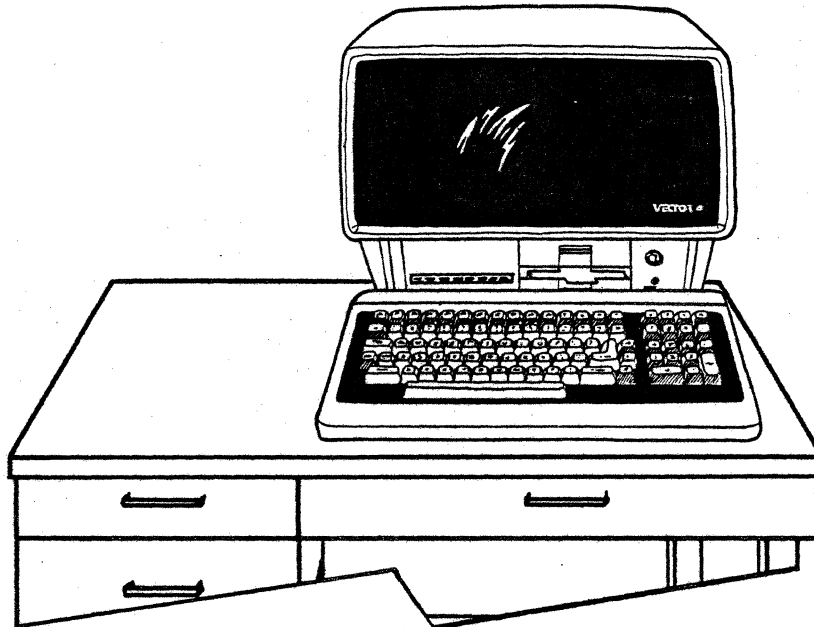
3. Push end of keyboard connector into socket on lower right front of console. Listen for connector to "click" into place.
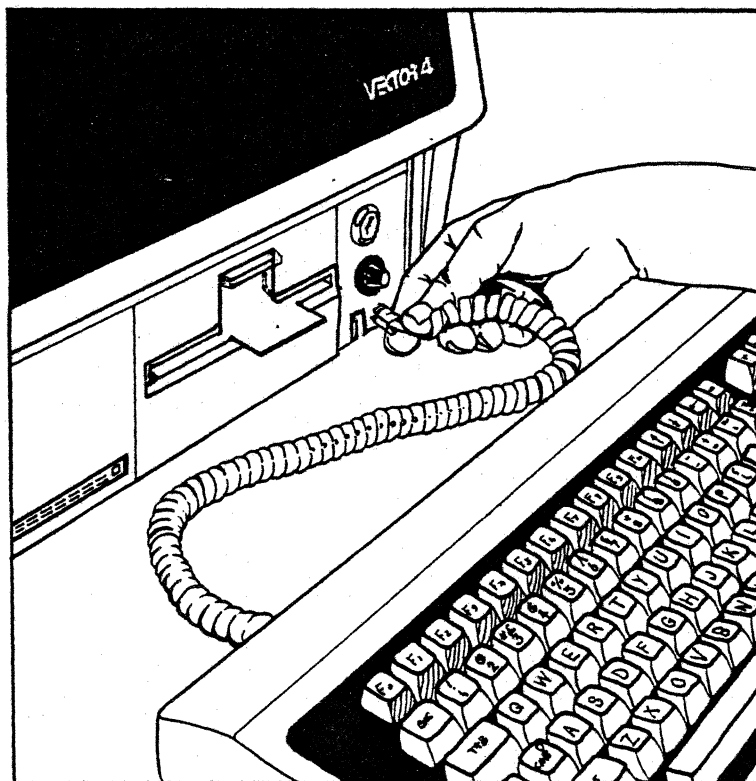
Connecting Your Printer To Your Vector 4

Your Vector 4 is designed to use a Vector 7700 Letter Quality Printer. Once you connect the cables, it will be necessary to set up your system to operate the printer you have attached. See the Operating Instructions for information.

If you will not be installing a printer, go to the next heading, **Connecting Your Vector 4 to Power.**

Installing The Vector 7700

1. Place the printer on flat and sturdy surface, one to five feet from your Vector 4.
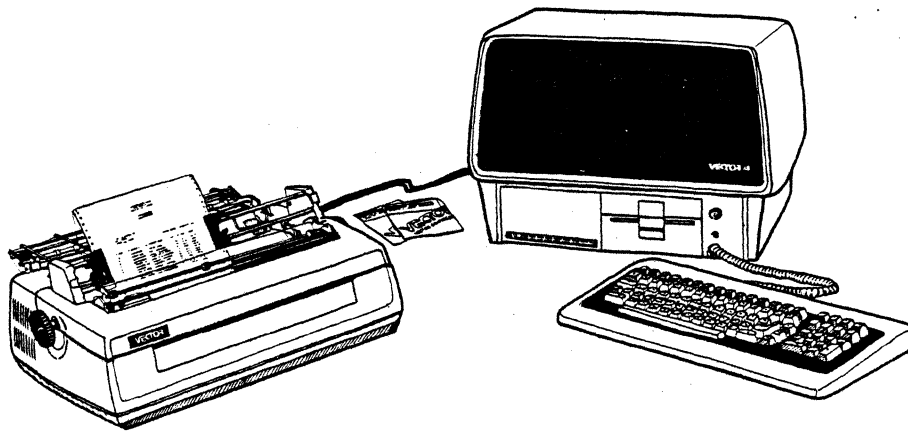
2.   Slide brass clips over tabs on each end of printer cable connector. Then insert printer cable connector into large socket on rear of console (see illustration). When connector is firmly in place, tighten screws of both clips as indicated.
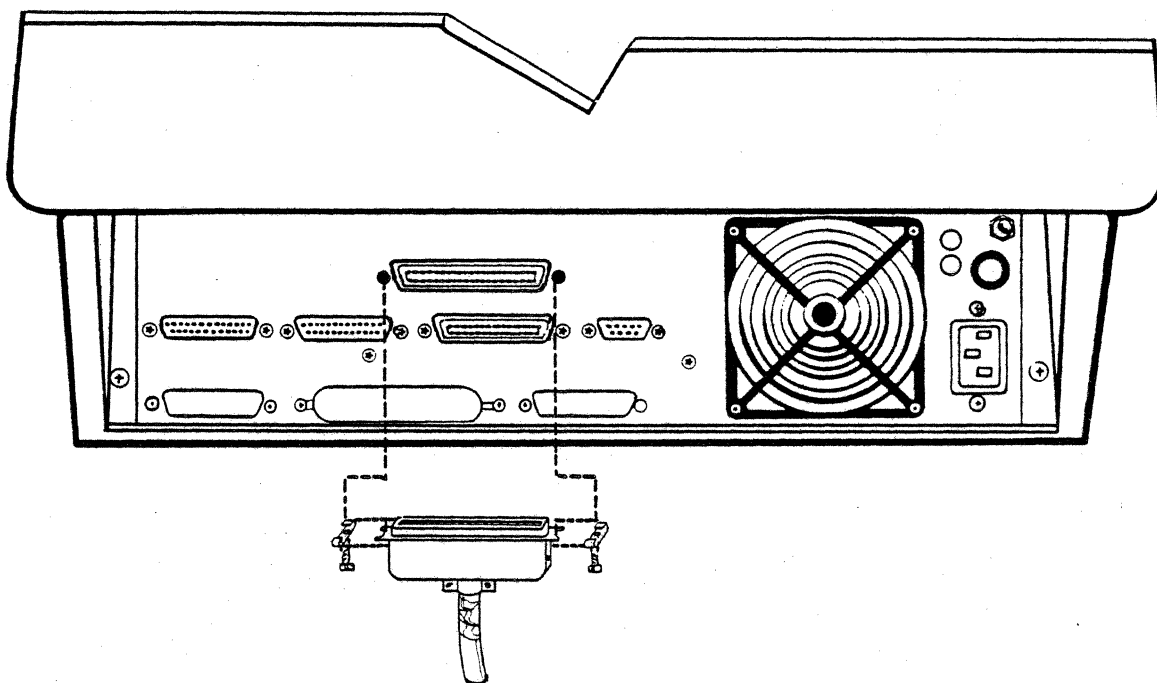
3.   Connect printer power cord to three-prong socket on rear of printer and to grounded AC outlet.
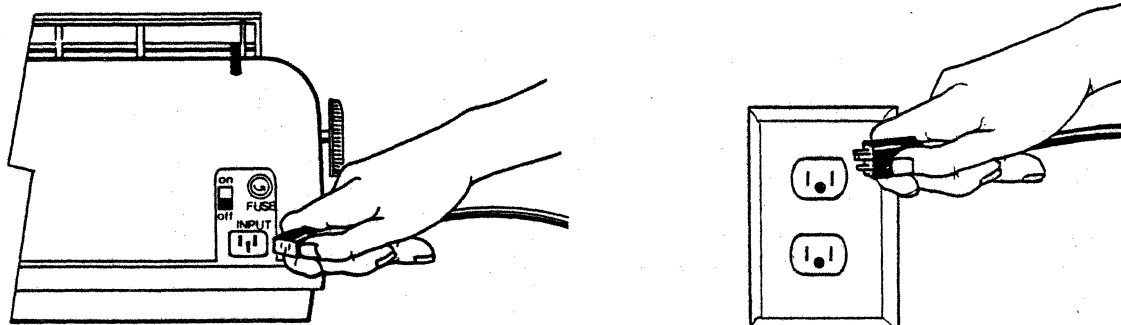
Connecting Your Vector 4 to Power

1. Remove cardboard insert from disk drive or drives, by pulling tab marked **REMOVE THIS AT OPERATION** straight out from drive.
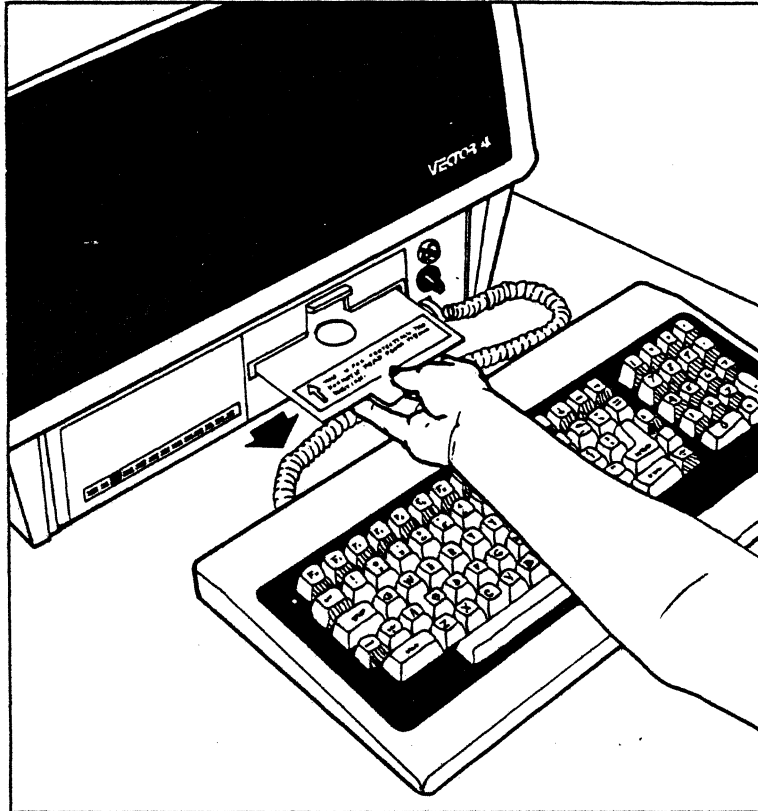
2. Connect Vector 4 power cable to 3-prong connector at rear of computer.
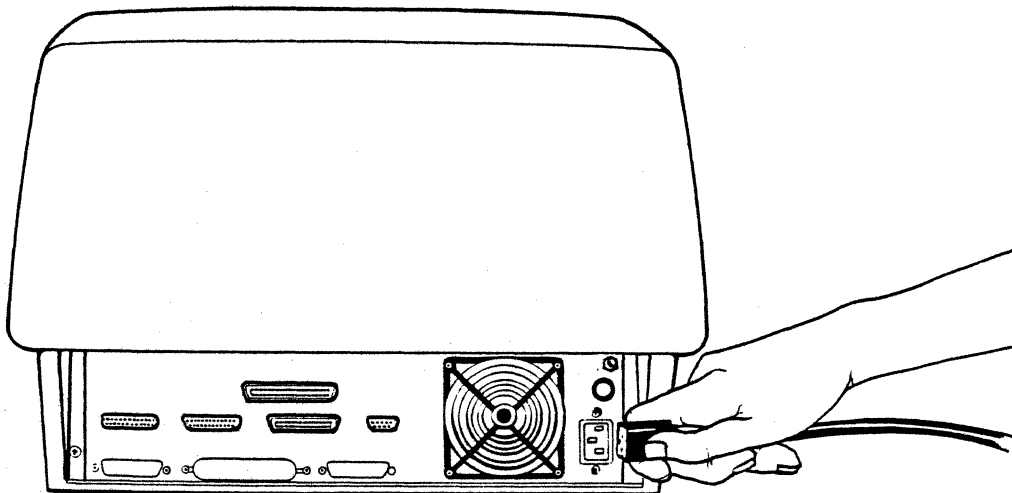
3.   Make sure that Vector 4 power key on front panel is in vertical position. If necessary, turn key to vertical position.
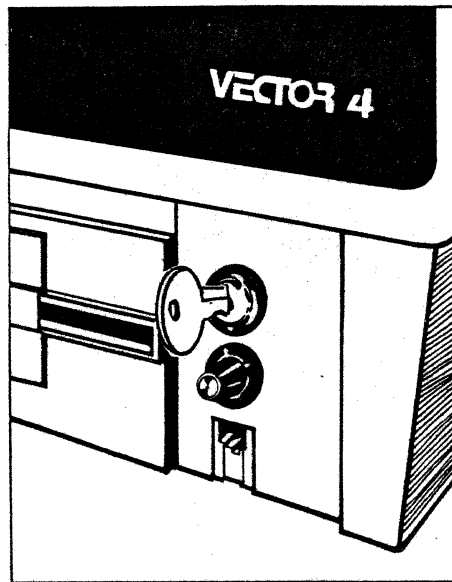
CAUTION

In order to assure proper operation try to connect your Vector to a dedicated power line, that is one that is not shared with high-load machines such as photocopiers or air conditioners. For more details, read the information on **Power Source** in Appendix A.

3.   Connect power cable to appropriate wall outlet.
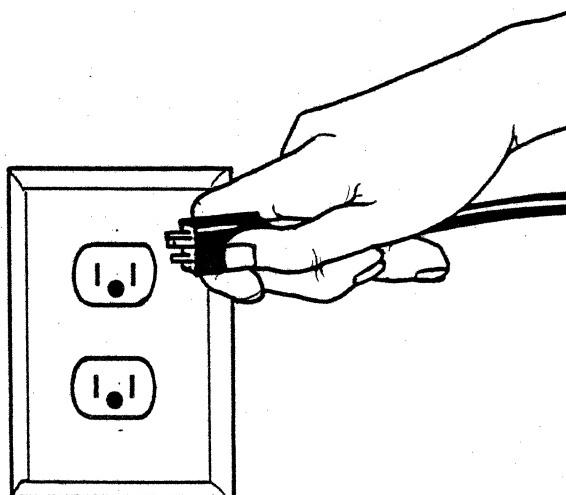
SECTION III

STARTING UP YOUR VECTOR 4

Turning On the Computer

1. Turn contrast knob clockwise.
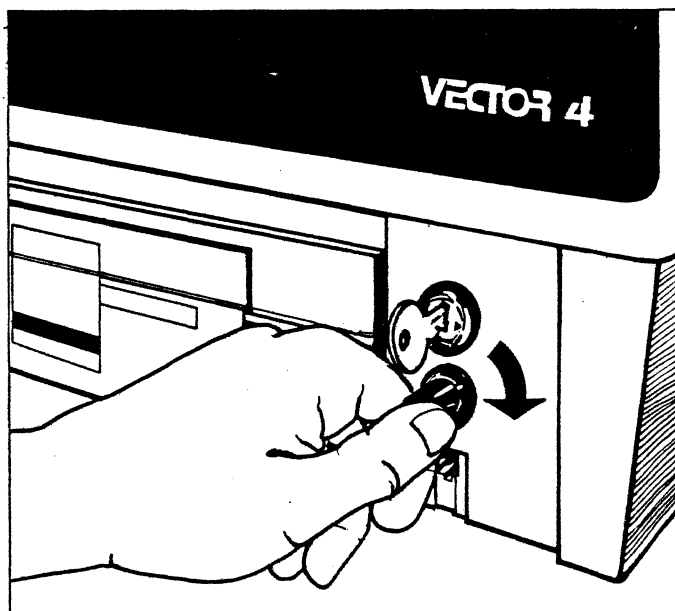
2. Insert key into lock on front of computer and turn clockwise. Console will "beep" to indicate power on.
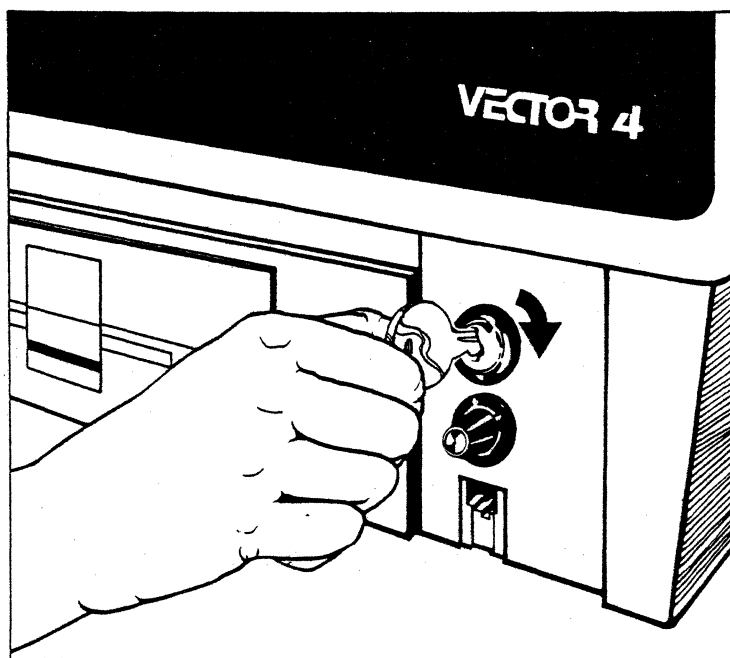
Console will take approximately 30 seconds to warm up.

3.   When console warms up, the following banner will appear on screen:

```
VECTOR 4 SBC EXECUTIVE 1.X*
```
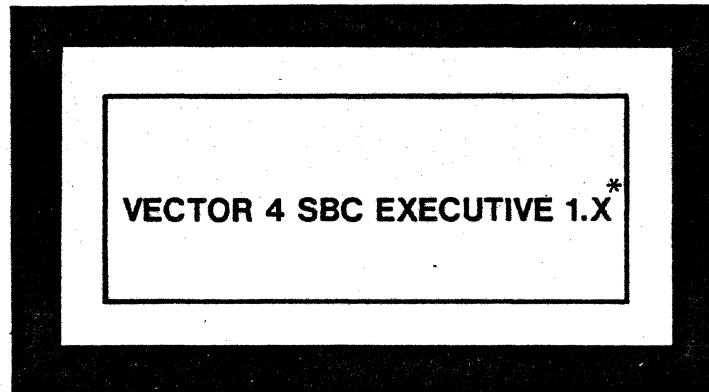
Testing...

* X represents current program number.

If banner does not appear after several minutes:

- turn system off,

- wait 60 seconds,

- then repeat this section, beginning with Step 1.

If banner will not appear after repeated tries, refer to Appendix B, **User's Guide to Troubleshooting The Vector 4.**

A more detailed explanation of the automatic self-test feature follows in this chapter.

NOTE

In the following step, if the screen displays any message above SBC > prompt, refer to Appendix B, **User's Guide To Troubleshooting The Vector 4.**

4.   After a few seconds, the following banner will appear on screen:

```
VECTOR 4 SBC EXECUTIVE 1.X
```
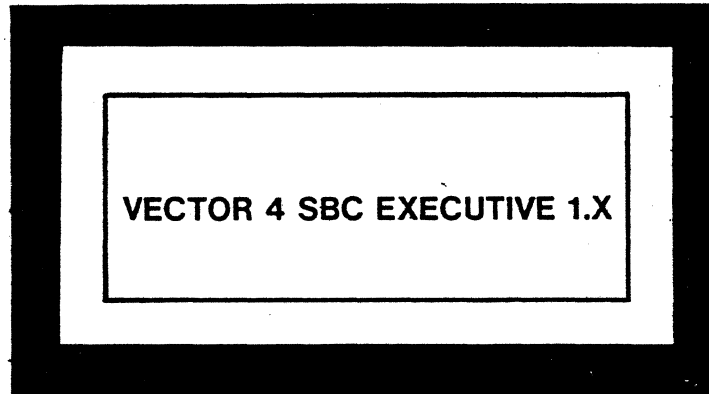
[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >

NOTE

Turning contrast control knob on front of computer clockwise will make screen brighter, counterclockwise will make screen dimmer.

5. Adjust screen display to suit personal taste and lighting conditions.
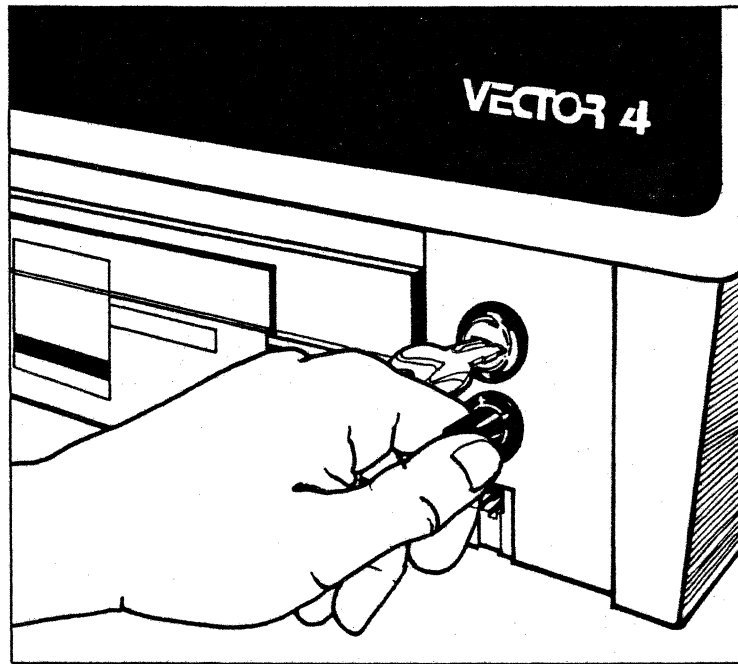
Using Diskettes

Diskettes are in many ways the most important part of your system. All the information that you store on your Vector 4 will be stored either on diskettes or on the hard disk. An improperly-mounted diskette can cause a loss of valuable information.

The following section gives a brief introduction to the proper methods for using diskettes with your Vector 4. If you have never used diskettes before, read through this section before continuing with the start-up instructions. Even if you plan to do most of your work on the hard drive, you should periodically back up your work on diskettes.

Loading Diskettes

There are two steps to loading a diskette: inserting and mounting.

1. Insert the diskette with the label side up, the square notch in the edge pointing to the left, and the oblong area of exposed disk media pointing inward. Press lightly against the diskette until it seats itself in the drive. Do not push so hard that the diskette bends.
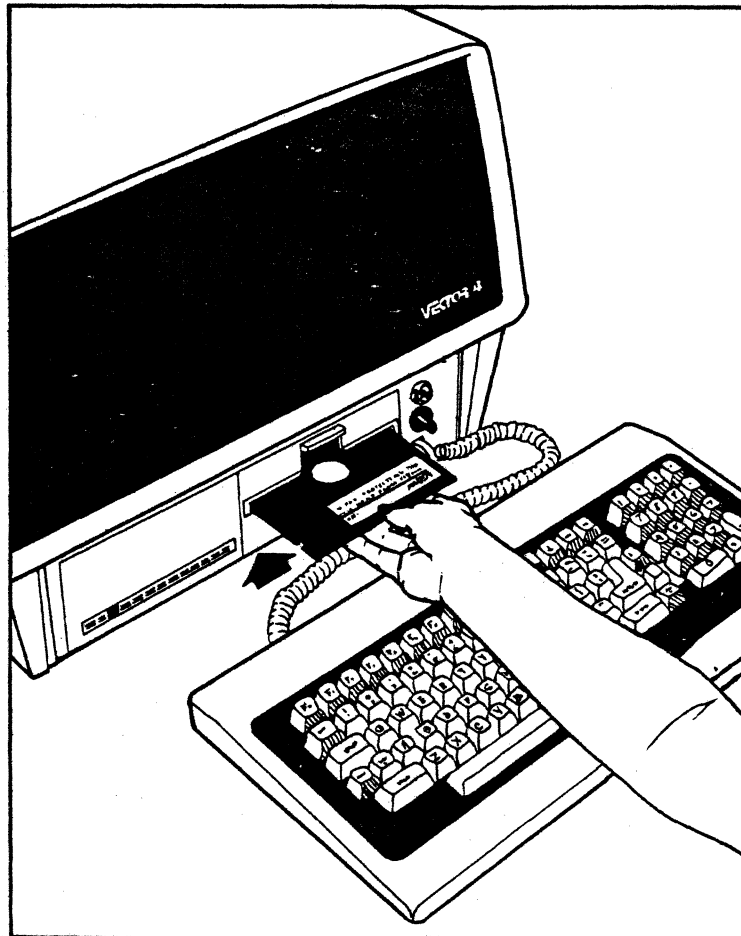
2. The diskette is now inserted but not yet mounted. To mount the diskette, push down on the door of the drive until you feel increased resistance at the half-way point, then STOP. Continue pushing slowly until the door "clicks" and stays closed.
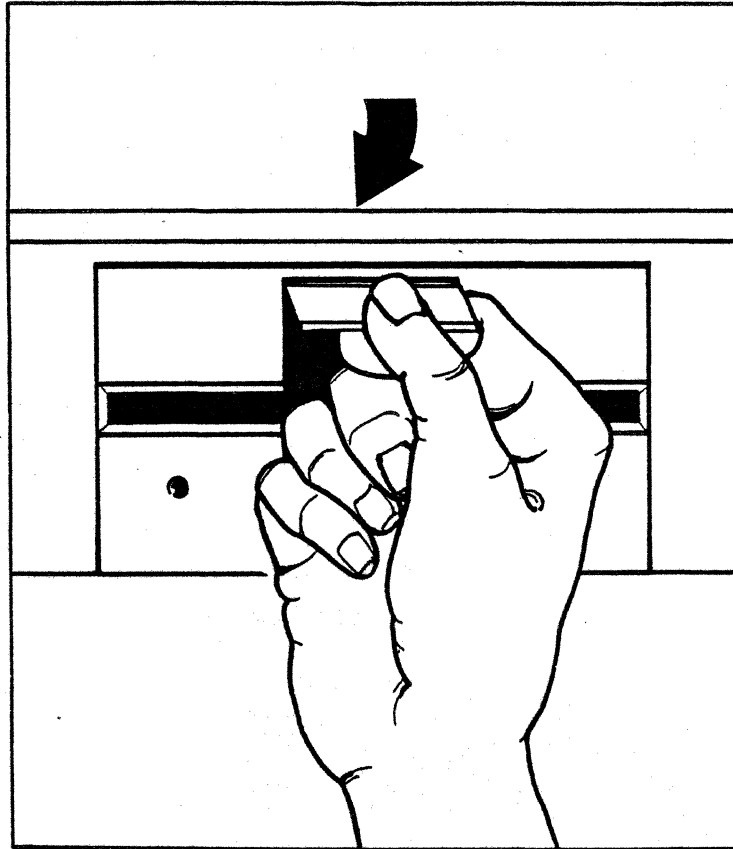
If you cannot fully close the door, the diskette is not inserted properly. Open the door, remove the diskette, and repeat Step 1.

Once the diskette is loaded, the computer can use it. When the computer is using the diskette, its red light will glow. When the computer is no longer using the diskette, the red light will go out.

Unloading Diskettes

To unload a 5-1/4-inch diskette:

1. Make sure that the red light is off. Slowly open the door by swinging the panel upward.
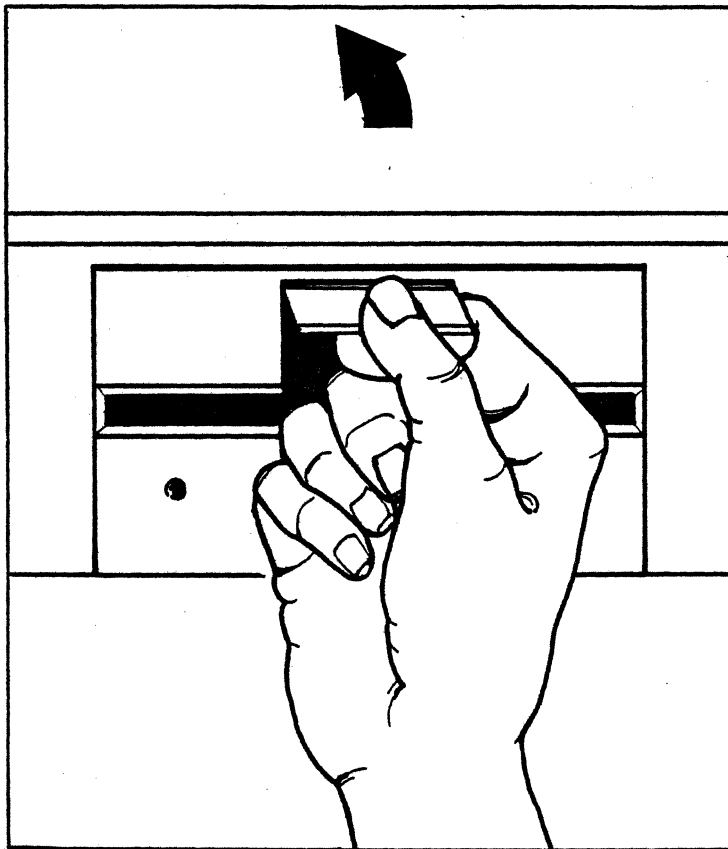
2. Gently pull the diskette straight out from the drive. It should move easily out. If there is any resistance be careful not to pull too hard, excessive force may tear or otherwise harm the surface.
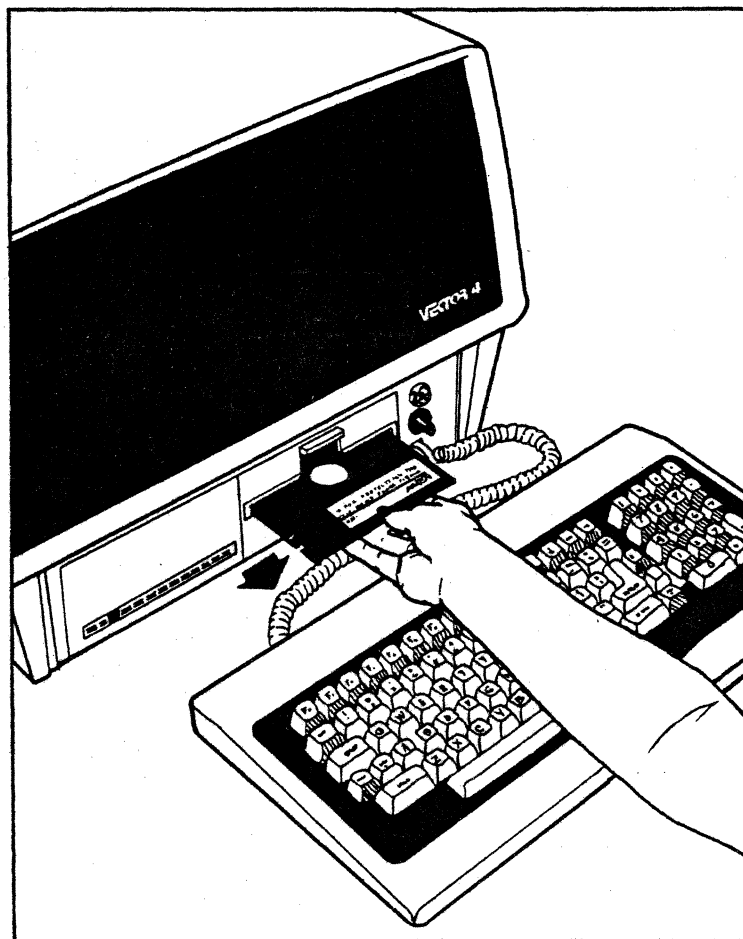
It is best to remove the diskette when it is not in use. This reduces wear of the diskette against its protective jacket. You may leave it inserted but not mounted (that is, with the door to the drive open), or simply take the diskette out of the drive and replace it in its protective storage envelope. **Refer to Appendix C, Care and Handling Of Diskettes, for more information.**

The Automatic System Test

One of the important features of the Vector 4 is the Automatic System Test. You will notice that the screen displays the message:

Testing...

when you first turn on the power or press the RESET button. The Vector 4 performs three automatic test programs every time you start up.

These test programs check:

- the ability of the memory to retain information accurately.

- the system executive program for any errors.

- the keyboard, to ensure that it is correctly attached and functioning.

This helps assure you that your Vector 4 is functioning properly.

Should the automatic test uncover any errors, it will display one of the three following messages:

RAM MEMORY ERROR: BLOCK xx : EVEN/ODD ADDRESS : BITS IN ERROR = xx *
PROM CHECKSUM ERROR
KEYBOARD I/O ERROR

* represents a two-digit number.

Should you get any of these messages when you turn your system on, refer to Appendix B, **User's Guide To Troubleshooting The Vector 4.**

Getting Started

In order for the computer to fully make use of the programs on the diskette or hard disk, a particular set of instructions called the operating system must be copied from the disk into the computer's memory. This is called booting the system. Booting comes from the expression "pulling yourself up by your bootstraps", since the computer is loading itself with its own instructions.

Booting is important because:

- it copies the operating system from the disk or diskette into the computer's memory.

- this information goes away every time the system is turned off.

- the computer can function only when the operating system is resident in memory.

Booting is an automatic program which:

- finds the operating system on the disk or diskette.

- copies it into the computer's memory.

- gives you the A> prompt to tell you that the computer is ready for action.

Booting requires no complicated action on your part, it's handled with pushbutton convenience by the computer. All you need to do is to push a button!

[W] if you have a system with a floppy and hard disk.

[F] if you have a floppy-only system.

Once booted, you can use your Vector 4.

How To "Boot" The Vector 4

1. If you have been following the Installation Instructions so far, your Vector 4 should display the following banner:

```
VECTOR 4 SBC EXECUTIVE 1.X
```
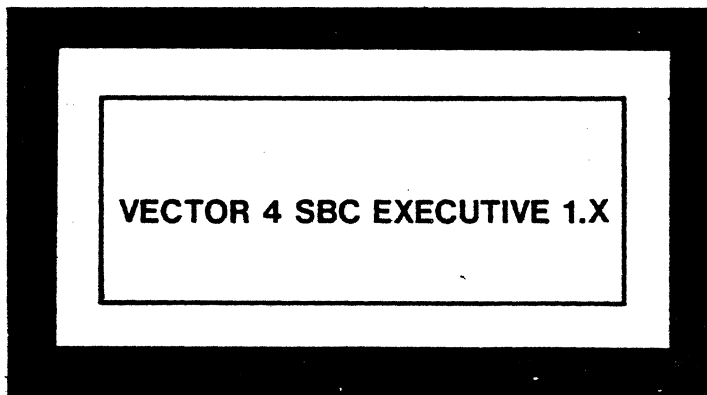
[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >

2. If you have a floppy drive system, insert the Vector Graphic System Diskette into Drive A: (right hand drive), as described above. If you have a hard disk system, your operating system software is already present on your hard disk. Press the appropriate key to boot the type of system you have:

    [W] to boot from hard disk.

    [F] to boot from floppy disk.

The banner will disappear and the screen will display:

    VECTOR GRAPHIC EXTENDED CP/M VERSION 4.X
    PRINTER 1 LOADED WITH A DRAFT DRIVER
    PRINTER 2 LOADED WITH A WORD PROCESSING DRIVER

    A>

Your system is now ready for operation. For further details continue on to the next section.

If anything else happens, see Appendix B, User's Guide to Troubleshooting The Vector 4.

SECTION IV

VECTOR 4 OVERVIEW

To understand and best use your Vector 4, let's discuss how it can work for you. You or your company purchased your computer system in order to allow you to work more effectively and to turn out more work in a shorter period of time. Two different elements of the system, "hardware" and "software", work together to accomplish these goals.

The hardware, the mechanical and electrical devices you have met, perform physical and electronic functions. The software, or programs that have been written for the system, perform logical and mathematical operations and provide instructions to tell the computer what to do next.

There are two categories of software. The first, applications software, includes any data processing packages you may purchase. The second, system software, provides instructions to the hardware so that the computer can function. The combination of all system software on any one computer is called the operating system.

What is an Operating System?

An operating system is a special kind of program which controls the electronics of a computer. You give simple commands to the operating system, and the operating system carries out complicated tasks to do your job for you. You control the operating system, by means of commands. The operating system directs the hardware to perform four interconnected tasks:

- input, which in most cases means interpreting the commands you enter at the keyboard.

- transfer, which includes sending instructions from the keyboard to the microprocessor, and sending results to the screen.

- processing, which can range from simply displaying input data to complicated mathematical calculations.

- permanent storage, recording and reading programs and data in your disk drives.

Using your computer involves many of the same operations as using a pushbutton telephone:

1. With a telephone, you first input the number of the party to whom you wish to speak.

2. Then the telephone company's machines arrange the _transfer_, matching up the number you entered with the right wires and cables to connect you with your party.

3. They do _processing_ by keeping track of how long you spend on the phone.

4. When you hang up, the phone company _permanently stores_ information on your call.

With your phone, you never see all the complicated switching that goes on in Step 2, when you want to make a call across the country. All that affects you is the conversation.

The same is true of the computer: you will never have to program the microprocessor, or know which circuits should open for how long to get your job done. The _operating system_ manages all that for you.

The operating system even handles "wrong numbers." If you accidentally press the wrong key, and the operating system cannot find a command to match your input, it just displays what you entered, followed by a question mark.

Review

It is the _operating system_ of a computer which must decide:

• what command you have input.

• what action is required to carry out that command.

Only then can the computer do its work. Then the operating system determines:

• what to do with the results of the command.

• where to store these results for the future.

How Does This Operating System Get Started?

While the computer is turned off, the operating system is stored on a disk. To operate the computer, these instructions must themselves be copied from the disk into the memory. Since the computer's memory only works when the power is on, the operating system must be copied from the disk into the computer's memory each time you turn on the power.

Recall from the Start-Up Instructions that this is called booting the system. Booting comes from the expression "pulling yourself up by your bootstraps", since the computer is loading itself with its own instructions. It doesn't mean kicking your computer to get it started!

When you boot, you are telling the computer to copy the instructions that make up the operating system into its memory. This runs an automatic program (stored in a silicon chip inside the console) which tells the computer to go to a specified location on the disk called the system tracks.

It will then copy the information it finds there into the computer's memory, and "await further instructions". The operating system is now at the command level.

To boot, just press [F] for a floppy-only system, or [W] if you use a hard disk. You need to press one of these keys whenever this banner is displayed on the screen:


```
                VECTOR 4 SBC EXECUTIVE 1.X*
```

[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >
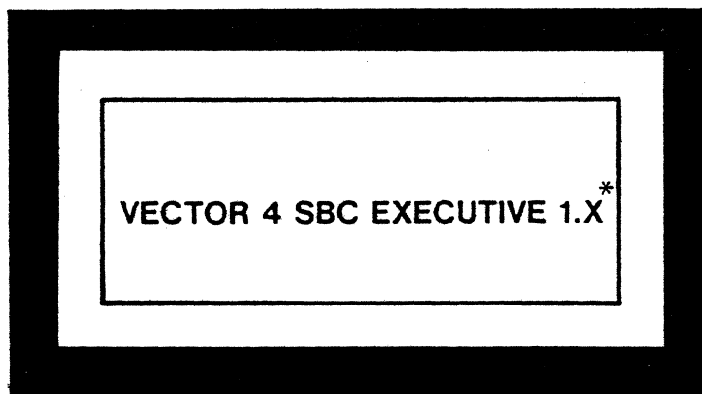
* X represents current program number.

SECTION V

VECTOR 4 OPERATING COMMANDS

When you sit down to type at the keyboard (or console) of your computer, you work with the operating system at the command level. There are several commands, of a specified format and type, which you can give the computer to make it do what you want.

Command Entry Conventions

This manual, along with other Vector Graphic software or user's manuals, uses the following conventions to describe the keys used to enter commands. Locate each key on your Vector 4's keyboard, using the diagram as an aid. Note that specific keys are designated by being enclosed in square brackets: [ ].
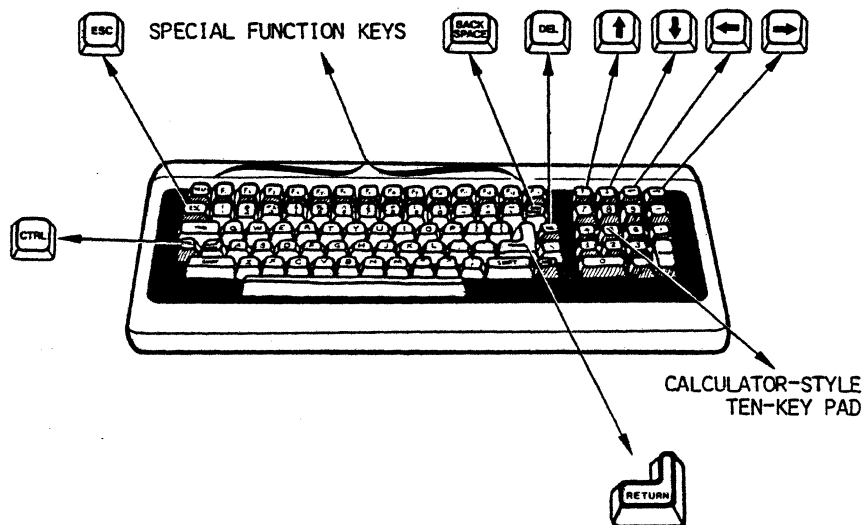
Return key   [RETURN]
Control key   [CTRL x] where x = any of the keys used in a control sequence; be sure to press the [CTRL] key first and hold it down while entering the other command key.
Escape key   [ESC]
Tab key   [TAB]
Spacebar   [SPACE]
Backspace   [BACKSPACE]
Delete key   [DEL]
Line Feed   [LF]
Shift   [SHIFT]
Disks   d: indicates any logical drive supported by the system.
Options   <option(s)>, where available, are represented by < >.
Arrows   [UP ARROW], [DOWN ARROW], [LEFT ARROW], [RIGHT ARROW].
Function keys   [F n] where n = the number of the function key to press.

For each of the keys listed above, an entry in brackets [] represents pressing a single key once with the exception of the [CTRL x] commands which require holding down two keys simultaneously.

Also note the <option> format. Where you see brackets indicated in command lines, enter any of the optional commands or file names listed or indicated in the explanation. The <angle brackets> do not represent any actual Vector 4 command.

Also, note the following symbol:

This indicates that the text set in from the video screen marker represents what you will see on your computer.

In some cases, the commands you enter will be represented the same way. When this is required, the commands you are supposed to type in will be emphasized so that you can tell them from what the computer is displaying back to you. Note also that, while all entries in this manual are indicated in UPPER CASE, it is not necessary to enter the commands described here in all capital letters.

What Kinds Of Commands Are There?

One useful division is the difference between screen handling commands and program commands. Screen handling commands control the input and output at the screen; they allow you to erase characters or lines, stop the scrolling of a screen display, stop a program operation, or edit your command lines.

The following screen handling commands can be used to pause the screen, edit program command entries, or clear the screen for new activity.

SCREEN HANDLING COMMANDS

To Do This...	Enter This...
Erase a character entered incorrectly.	[BACKSPACE]
Erase an entire line before sending it.	[CTRL X]
Clear screen before executing command line entered.	[CTRL D]
To start printer printing from keyboard: press once to start printing and once again to stop it.	[CTRL P]
Pause scrolling of display while reading or taking notes: press once to stop, again to resume.	[CTRL S]

"Emergency Brakes"

Under some circumstances, you may decide to stop a program before it reaches its normal conclusion. The following commands will cause most programs on your Vector 4 to quit and return to the Extended CP/M command level (the A> prompt).

To Do This...	Enter This
Stop a program from continuing.	[CTRL C]
Stop certain programs from continuing.	[ESC]
Stop all activity (and most likely lose information in memory). NOTE: This will lose any changes or additional information added since last disk storage operation. It will also be necessary to reboot the system.	RESET

Program Commands

Program commands allow you to use various utility or applications programs. Some of these can be built into the operating system, be a Vector supplied support program or be a purchased applications program such as Memorite or ExecuPlan . All program commands consist of a line of letters and/or numbers, followed by a [RETURN].

Some of these commands work any time you have "booted", no matter what diskette you have in the drive; others must be on the specific diskette you have mounted, before they can be used. The first type of commands are called "resident" commands, since they "live" in the operating system. The second type are called "transient" commands, since they only "visit". They must be located on the disk being used and are in the computer memory only when in use.

These transient commands are stored on the disk or diskette, in separate areas called "files". Since the way your Vector 4 keeps files will be so important to the way you will perform your job, let's take a look at them.

The Electronic Filing Cabinet

A computer file is much like a file in a desk drawer or filing cabinet: both consist of single access points where related information is stored. The paper file has a folder and perhaps a typed label to maintain its integrity and identity. The computer file has some space allocated on a disk or diskette and a name in the directory.

Computer file names follow a few easily understood rules. For your Vector 4, which uses the VECTOR 4 CP/M operating system, the file names can be up to eight letters or alphanumeric characters long. Type DIR in response to the "A>" prompt to illustrate this.

But you'll also notice that after the eight (or fewer) characters of the filename, there is a space, followed by three more characters. These three characters are called the extension. Basically, the difference between the file's name and its extension is that the name identifies the contents, while the extension tells the computer what kind of file it is.

Wild Cards

Note that the directory on your console screen lists several files with an extension of COM. (That extension means that these are command files, and will be treated in a special way which will be explained shortly.)

If you wanted to look at a directory of all your .COM files and no others, you have a way of doing this: a wild card character. The phrase "wild card" comes from a common term in card games such as "deuces wild". This means, of course, that the "deuce" (a two card) can substitute for any other value card. With the Vector 4 CP/M operating system, you can use a wild card character to stand for another letter or combination of letters. On your Vector 4, the wild cards are the asterisk (*) and the question mark (?).

The question mark is a single-character wild card. It represents any single character that can be entered in the location of the question mark. The asterisk, on the other hand, can represent any combination up to the maximum number of characters (eight or three).

Why Use Wild Cards?

The wild card gives you a simple way to look at groups of files that share a similar characteristic such as type (example: all files with a .BAS extent) or title (example: all files which are titled JAN83). The wild card lets you enter one command to cover many files.

For example, if you wanted (as we discussed a few paragraphs back) to look at only the files with an extension of COM, you could enter the command:

A>DIR *.COM [RETURN]

This will display only the command files on the A drive.

What Kinds Of Files Are There?

There are two basic types of files: program files and data files. Program files contain the detailed instructions that the computer needs to perform its tasks. The transient commands already discussed are a special kind of program file, called command files.

You will use command files to move, copy, rename, delete, change the status of, and check on the other type: data files. Data files contain information which you wish to store or process in some way, such as a list of customers who have purchased a certain product, or a letter to a vendor regarding purchasing supplies. They store the information you will need to do your job.

Review

To review the file structure used on your Vector 4:

● A file is represented by each entry displayed on screen by the disk directory (when you enter the command DIR [RETURN]).

● The operating system uses names and extensions to keep track of these files.

● Files can store both information and instructions.

● Command files (with the COM extension) can be used by entering the name, followed by a [RETURN].

Getting Around The Disks

If you have been following the Installation and Start-Up Instructions, your screen should show the A> prompt now. To "move" to another drive, just enter the letter of the drive, followed by a colon. (If you have a floppy-only system, insert a diskette into the left-hand drive before continuing.)

Now enter the command:

A>B: [RETURN]

The screen will look like:

A>B:
B>

If you enter this command with no diskette in the drive, you will experience your first "error message":

ERROR - B: DRIVE NOT READY

Just press [RETURN] and the A> prompt will return.

Displaying A File's Name

The resident command DIR is used to display a directory of files on the current disk while you are in the operating system.

Recall from the discussion of file names that the CP/M wild cards * and ? can be used to stand for a range of characters. A file name which uses a wild card is called an ambiguous file name, or AFN. By contrast, a file which addresses one file only is called an unambiguous file name, or UFN.

The DIR command is one of many which accept optional ambiguous file names in the command line. So you can use this command to check for a range of files on the disk, by entering the command:

DIR <AFN> [RETURN]

replacing the wild cards representing the files you want for the <AFN> in the example.

EXAMPLE:

A>DIR *.COM [RETURN]

RESULT:

The screen will display all files with an extension of COM.

EXAMPLE:

A>DIR VECTOR.* [RETURN]

RESULT:

The screen will display a directory of all files with the name VECTOR, with any extension.

EXAMPLE:

A>DIR ST*.COM [RETURN]

RESULT:

The screen will display two files, STORE.COM and STAT.COM, since they begin with ST, have an extension of COM, and have any combination of characters in the middle.

Setting Up Your System

Although your Vector 4 is ready to work now, there are a number of options you can and should set to make your operation more efficient. These options allow you to:

- choose different disk drives for single and double sided diskettes (even if you have only one physical drive.)

- choose between the two possible printers you may attach.

- set up an optional automatic run command.

The generic name for this action is "configuring" your system. To specify these selections, you will use the CONFIG program.

Single Or Double Sided?

Your Vector 4 has the appropriate hardware to use both double-sided and single-sided diskettes. However, you must tell the operating system which drives use which kind of disk. To do this, you use the F option of the CONFIG program.

Since some Vector 4 models have only one physical drive for floppy diskettes, the operating system can consider several logical drives in one physical location. This way, it is possible to set up the computer with one logical disk drive for single-sided diskettes, and another drive for double-sided (even if you only have one slot in which to insert your diskettes).

Why Do I Need Both Kinds Of Diskettes?

You may not. A double-sided diskette can hold twice as much information as a single. But if you have an older Vector Graphic machine which uses single-sided diskettes, and you wish to transfer information from the older machine to your Vector 4, you will need a single-sided drive.

To run the CONFIG F options:

1. When you see the A> prompt, enter CONFIG F [RETURN]. The screen will display:

   FLOPPY DISK CONFIGURATION (SINGLE/DOUBLE)

   SET DRIVE d: TO [S] SINGLE OR [D] DOUBLE – (D):

2. The set drive line will display for each available drive (listed as d: in the above example) currently supported by your system. Set up diskette configuration according to the following:

   Press [S] to set drive to single-sided.

   Press [D] to set drive to double-sided.

   Press [RETURN] to leave drive as indicated on screen.

3. When all floppy drives have been selected for configuration, the screen will display:

   MAKE SELECTION PERMANENT [Y]-[N]?

   Entering [Y] will make the selection permanent until the next time you change it. That is, the floppy drive will be configured for either single or double sided operation. Entering [N] will make the system return to the previous settings after the next reset or other cold boot.

   Remember also that "permanent" means until you change it to another way. You can alter this, simply by running CONFIG F again, at any later date.

When the program is completed, the system will boot itself to reset the operating system for the newly-specified drives.

Choosing Printers

Although your Vector 4 is designed to use a Vector 7700 letter-quality printer, it has the built-in capacity to use several other types of printers. In fact, you can connect two different printers to your Vector 4 at the same time.

Remember the banner you see when the system boots:

```
VECTOR  4 CP/M VERSION X.X
PRINTER 1 LOADED WITH <current setting> DRIVER
PRINTER 2 LOADED WITH <current setting> DRIVER

A>
```

This indicates that this capacity is built into your system.

But to use the printer, you must tell the operating system which one is connected. To do that, use the **CONFIG <#>** option. It must be used every time you wish initialize the printer. Make sure the printer is turned on before you do this.

The **<#>** here stands for one of four possible options. To see them, you can enter **CONFIG [RETURN]**. The screen will display:

```
VECTOR GRAPHIC SYSTEM CONFIGURATION PROGRAM  VER. 1.X

[0] DISCARD PRINTOUT
[1] LIST DEVICE 1 - <current setting>
[2] LIST DEVICE 2 - <current setting>
[3] ROUTE PRINTER OUTPUT TO SYSTEM CONSOLE

ENTER SELECTION (#):
```

Here is an explanation of all four options:

DISCARD PRINTOUT

If you do not have a printer connected to the system, set the CONFIG P option for **[0]**. In addition, some applications programs (such as Vector Graphic's MEMORITE III) handle selecting the printer directly.

LIST DEVICE 1 or LIST DEVICE 2

Enter either **[1]** or **[2]**, depending on the printer you would like to use. The Vector 7700 is set to operate as Printer 2.

ROUTE PRINTER OUTPUT TO SYSTEM CONSOLE

This option sends the printout to the terminal. You will probably use this only if you are testing a new printer driver or if you are training in the commands for printing.

Once you have entered the number of the option you want, the screen will display:

PRESS [RETURN] TO CONTINUE OR [ESC] TO ABORT...

If for any reason you do not wish to change the setting at this time, simply press the [ESC] key. The prompt for the drive on which you are logged will appear.

To make your selection, press **[RETURN]**. If the printer you have selected is in use by another program, the screen will display:

PRINTER IS BUSY

If the printer is off or not properly connected, you will see the message:

PRINTER IS NOT OPERATIONAL

Make sure that the printer is connected to your system, to the power source, and turned on before seeking service.

If the printer is free, the screen will display:

OPTION SELECTED

The screen will display:

VECTOR 4 CP/M VERSION 1.X
PRINTER 1 LOADED WITH A DRAFT DRIVER
PRINTER 2 LOADED WITH A WORD PROCESSING DRIVER

A>

Setting Up An Automatic Run Command

As mentioned in the Start-Up Instructions, booting the system consists of giving a command to copy the operating system from its location on the disk or diskette, into the computer's memory. The CONFIG A command lets you set up an automatic run command which will automatically allow you to load and run a particular program or transient command each time the system is booted.

The CONFIG A option creates a file on the disk which the booting program looks for. If you put in an auto command, the booting program will do whatever the auto command instructs it to do, each time you boot. If it doesn't find this file, you get the A> prompt and business as usual after booting.

What Can I Do With An Auto Command?

You can instruct the system to run any command file, including applications programs as well as transient commands. This way, if you use your Vector 4 for the same thing every morning, you can set it up so that it automatically begins with that task.

There are a few restrictions, however. You can only have one auto command set up per disk or diskette, and that must be the one from which you boot. Naturally, you can change the auto command later if you decide to. Also, the auto command cannot be more than one line long.

For an example, recall from the section above on the CONFIG 0/1/2/3 command that you can enter CONFIG <#> to select a printer from the two list devices for which your system is set up. If you want to select that printer each time you boot the system, you can use the CONFIG A option to set up your computer for exactly this kind of "custom sign-on", in the following way.

1. Enter CONFIG A [RETURN]. The screen will display:

    [0] CLEAR AUTO COMMAND
    [1] AUTO COMMAND ON COLD BOOT
    [2] AUTO COMMAND ON WARM BOOT
    [3] AUTO COMMAND ON COLD AND WARM BOOT

    CURRENTLY - 0 *** NO COMMAND ASSIGNED ***

    ENTER DESIRED SELECTION:

The line which shows current command assigned may, of course, be different on your system. However, if you are just beginning to use your computer, there will probably be no command assigned.

2.   Enter your choice for the auto command. You would enter 0 to clear any command already selected, 1, 2, or 3 according to the following:

"Cold" boot only [1]: the auto command will execute only when you first turn on the power, or when you boot after pressing the [RESET] button, enter BYE, or run another program which leaves through a cold boot. If you want the program to run whenever you turn the system on, this is the option to select.

"Warm" boot only [2]: the auto command will execute only when a program is run which leaves the system, clears and then restores only a portion of system memory (a "warm" boot).

Cold and warm boot [3]: command will execute any time a program is finished and every time you boot the system. Option 3 is as nearly permanent as it is possible to get with a computer, so use it carefully or not at all.

3.   Once you have entered your choice, the screen will prompt you to:

ENTER AUTO COMMAND STRING:

Here, you enter the entire command you want to run after booting. Since our example uses the CONFIG program, let's assume that you wish to select List Device 2 (the Vector 7700 printer). You would enter:

CONFIG 2 [RETURN]

From now on, the system will automatically select and attach the Vector 7700 printer whenever you boot.

Diskette Preparation

Now that the system has been configured to take single and double-sided disk drives into account, you are ready to start copying information onto them. But before blank diskettes can be used, they will have to be formatted.

Formatting Diskettes

In order to tell the operating system where each file is stored, a disk or diskette must first be formatted. A program called FORMAT.COM is used to do this to either a diskette or a hard disk. The FORMAT program writes special characters onto the disk. Some of these act as "road signs" to tell the system where to find a particular file or program on the disk.

Once a disk is formatted, it is a "clean slate", ready for use. However, all the work you may have had on it is now about as legible as the chalk dust under a clean slate. In short, never format a disk or diskette that has valuable information on it.

You can use the FORMAT program to:

- "initialize", or prepare for use, a brand-new floppy diskette.

- "recycle" an old floppy diskette that has been fully backed up onto another storage system, or which contains useless information.

Other than that, formatting should be restricted, since it is potentially dangerous. It is a good idea, however, to format a new box of blank floppy diskettes as soon as you receive them. Also, using Vector Graphic approved diskettes helps reduce the likelihood of any manufacturing errors on the disk you use.

The FORMAT Program

One advantage of the formatting program is that the operating system "knows" how you have configured your drives. This means that you need not specify any detailed information about single or double-sided drives. The screen will prompt you with the current settings as you have specified them in the CONFIG F program. You need merely select from the options presented.

To format a diskette, enter the command:

FORMAT <R/E> [RETURN]

You have the option of using either or both of the two options: R, to repeat the formatting process for several disks; or E, to display any errors that the program uncovers on the disk surface while formatting it. To use both

options, enter the line: FORMAT RE [RETURN].

Repeat Formatting:

Use this option whenever you purchase a new box of diskettes. It's often more convenient to format an entire box of diskettes when you first get them. This will prevent having to format a new diskette in the middle of an important job.

Reporting Errors:

If you select the E option, the screen will display the track and sector location of any errors it uncovers on the surface of the disk. (Refer to the Appendix on Error Handling in the Troubleshooting section, for an explanation of the most common errors.) For the most part, if a disk you are formatting displays errors, simply format it again. The error will probably be erased in the next format procedure. This type of error is called a "soft error".

Whatever option you choose, you should see the following:

DRIVE: [A] 5 INCH WINCHESTER – SURFACE 0,1
        [B] 5 INCH WINCHESTER – SURFACE 2,3
        [C] 5 INCH SINGLE SIDED FLOPPY
        [D] 5 INCH DOUBLE SIDED FLOPPY
        MAKE SELECTION FROM ABOVE:

(The actual display will reflect the type of storage media used by your disk drives and the configuration of your floppies. Naturally, two-floppy systems will not prompt for a hard drive.)

You now have the following options:

- to format one or more surfaces of the hard disk (where applicable)

- to format a single-sided floppy diskette

- or to format a double-sided floppy diskette

When you enter the letter to select the floppy drive you want, the screen will display:

INSERT DISKETTE AND PRESS [RETURN] TO BEGIN, [CTRL C] TO ABORT

With all options, you can stop the procedure by pressing [CTRL C]. Otherwise, press a [RETURN] when the diskette has been inserted. After a

few minutes, the screen will display:

FORMAT COMPLETE

If you have entered the **R** option, the screen will display all available drives again; repeat the program for all the diskettes you wish to format. Once you have formatted your last diskette, simply enter a **[CTRL C]** and Extended CP/M will return to command level.

Copying The Operating System

You will need to learn how to copy the operating system onto floppy diskettes only if you wish to be able to boot off that particular floppy. A transient command called GENSYS.COM (since it generates a system) does this. GENSYS copies the Vector 4 CP/M operating system onto a formatted floppy diskette and can also be used for putting the operating system onto a newly-formatted hard disk. The screen will offer options at each step of the program.

The program automatically determines the type of system used, the applicable number of disk drives, and will prompt you for one of the two possible systems to generate.

If you have a hard disk Vector 4 system, you should not need to generate a system on it because it has been configured at the factory. Only if you format the hard disk will it be necessary to run GENSYS on it. In that case, see Appendix B.

1. With your system diskette in the current drive (or while logged onto a drive which contains the program GENSYS.COM), enter the command **GENSYS [RETURN].** The screen will display:

   VECTOR GRAPHIC EXTENDED CP/M SYSTEM GENERATION UTILITY - VERSION 1.x

   [1]   GENERATE A FLOPPY ONLY SYSTEM
   [2]   GENERATE A HARD DISK + FLOPPY SYSTEM

   SELECT ONE OF THE ABOVE:

2. Enter the number 1 **[RETURN].** The screen will display the available floppy drives for your system in the following format:

INSERT DESTINATION DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

4. Press [RETURN] when you have inserted and mounted the diskette in the drive. The screen will display:

DO YOU WANT THE VECTOR SYSTEM AND LIST DEVICE FILES COPIED? [Y] OR [N]:

Enter **Y** if you intend to boot from the newly-generated system diskette. If you enter **N**, you will not be able to use the diskette for booting.

5. The screen will display:

INSERT SOURCE DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

If you are using the same physical drive, remove the destination diskette from the drive and insert the source diskette. Press [RETURN]. The drive will access as indicated by the red light. Then the screen will display:

INSERT DESTINATION DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

6. Again, remove the source diskette from the drive and insert the backup diskette. When you press [RETURN], the drive will click again. The screen will display:

VECTOR.CPM FILE COPIED TO DESTINATION DRIVE
VECTOR.LD1 FILE COPIED TO DESTINATION DRIVE
VECTOR.LD2 FILE COPIED TO DESTINATION DRIVE
GENSYS.COM FILE COPIED TO DESTINATION DRIVE

7. The screen will display:

SYSTEM GENERATION COMPLETED

You now have a backup of the operating system. If you lose or damage the System diskette, you can boot from the newly-made diskette. However, you will still have to copy the Transient Commands (such as STAT and PIP), as well as any other programs you use, onto this disk before you can use it for all your work.

Copying Files: The PIP Command

Although there are several ways of copying files, the program you are most likely to use is the transient command PIP.

PIP is an acronym for "Peripheral Interchange Program". However, you can think of it as "Put In Place", since that is what the PIP program does.

You will probably use PIP to put all the programs, and possibly backup copies of information files as well, onto the diskettes you will work from. PIP can copy between disks or diskettes, between user areas on the disks' surfaces, and with the option of using the same name for both the new and the original files, or using a different name for the new file.

In addition, you can use PIP with ambiguous file names to copy whole ranges of files, at once. But note the order in which filenames must be specified. You must give it:

- the name (and disk location) of the copied file first.

- the name (and location) of the file being copied next

- any other options third

- the [RETURN] command last

First you must specify name and location: you can't move information into a new file name until the file name or location has been specified. But once you do, the new file will have the same capabilities or information as the original.

The following table lists the command line formats available with the PIP program.

Make a copy on disk B of the file FILE.EXT from disk A.	PIP B:=A:FILE.EXT
Copy all files from disk A to disk B.	PIP B:=A:*.*

PIPping Several Files At Once

There are several ways that you can use PIP to copy more than one file at a time. The simplest is shown in the table above: use the CP/M wild card functions (* and ?) to match your entry against a number of different files on the drive. To copy all the command files from the A drive to the B drive, you would enter:

PIP B:=A:*.COM [RETURN]

Another way, if there is no single wild card which includes what you want but excludes what you don't, is to enter the command:

PIP[RETURN]

Do not enter a [SPACE] before the [RETURN]. (If you do, the screen says **INVALID FORMAT:** and returns to the command level of Vector 4 CP/M.)

When the * prompt displays, you can enter any valid PIP command line (without having to repeat the letters PIP). This saves a little time with each entry. And of course, you can still enter ambiguous file names in the command line.

Example:

    A>PIP[RETURN]
    B:=A:.COM

    COPYING:

    STAT.COM
    PIP.COM
    (etc.)

    *[RETURN]
    A>

To end the multiple PIP command line session, just enter a [RETURN] when you see the * prompt.

Other Methods Of Copying Files

For individual files, you have already learned the PIP command. But there are two other ways of copying to a floppy diskette, one for copying the entire contents of a source floppy in one action, and another for copying the entire contents of a hard disk at once. Floppies can be reproduced by the DISKCOPY command; hard disks can be backed up onto floppy diskettes through the STORE and RESTORE programs.

The DISKCOPY Command

This program provides you with a way to do quick and complete backup from floppy to floppy. Instead of using PIP to move a disk file by file, you can run DISKCOPY to move everything at the same time. It should be used with caution, however, it erases everything on the disk being copied to.

Since DISKCOPY makes a "mirror image" of everything on a diskette, it does not require that the disks be formatted first. You can back up on an already-used diskette without erasing and reformatting it, or copy onto a new diskette without having to run the FORMAT program first. In addition, if you make a DISKCOPY of your System Diskette, you can use that diskette to boot your Vector 4.

This program offers the same two options as the FORMAT program, R and E. They serve the same purpose: to Repeat the action over several disks, or to return a message for any Errors the program discovers. And as with FORMAT, you can enter both R and E in the same command line, if you need to.

To run the program:

1. Enter the command **DISKCOPY <R/E> [RETURN]**. The screen will display a message similar to this one:

    DISKCOPY - VERSION 1.x

    DRIVE: [C] 5 INCH DOUBLE SIDED FLOPPY
    [D] 5 INCH SINGLE SIDED FLOPPY
    [E] 5 INCH DOUBLE SIDED FLOPPY

    SELECT SOURCE DRIVE FROM ABOVE:

    Again, the drives indicated in this message will vary depending on the exact type of hardware that makes up your system, and the specifications you have indicated in the CONFIG program.

    If you have a hard-disk system, the screen will ask you if you wish to use the hard disk as a temporary file buffer. Enter **Y**.

2. Enter the letter (from the list on screen) in which the source disk (where the information is to be copied from) is mounted. The screen will display:

    SELECT DESTINATION DRIVE FROM ABOVE:

3. Enter the letter for the destination (or "target") drive (where the blank diskette is mounted).

NOTE

You can only copy diskettes:

● from double-sided to double-sided

● from single-sided to single-sided

● from single-sided to double-sided (target diskette will only have information on one side)

You cannot copy from a double-sided drive to a single-sided drive.

4. Once you have selected the source and target drives, the screen will display:

INSERT DISKETTES AND PRESS [RETURN] TO BEGIN, OR [CTRL C] TO ABORT

It does no harm to place the diskettes in the drives at the beginning of the procedure, in which case you would simply press [RETURN] at this time. However, be sure that you have the source and the target diskettes in the correct drives. (You wouldn't want to copy a blank diskette over a diskette full of a week's work.) One way to prevent this would be to place a write protect tab over the write enable notch on the diskette.

Also, if you discover at this time that the diskette you have in the target drive contains information you wish to keep, press [CTRL C] and you will not lose it.

The STORE Command

This program serves the same function as DISKCOPY, but is used to back up files from a hard disk to a floppy. (If your system only has floppy drives, you can ignore this section, as well as the section on RESTORE.) For more information on the STORE and RESTORE programs, refer to the section on Extended CP/M Transient Commands.

One word of caution before you plan your entire office system: the STORE and RESTORE programs will only take files with names of seven characters or less. This is because the STORE program adds a number to the end of each filename that has to be continued onto another floppy diskette, to indicate whether it belongs on disk 0, disk 1, disk 2, et cetera. Since CP/M allows eight characters per filename, this extra number has to come from somewhere.

The command line form of the STORE and RESTORE programs is virtually identical to that of the PIP program. This includes all references to disks, user areas, and ambiguous file name and unambiguous file name specification. To copy all files from the A disk to the C floppy drive (again, the specific letters used in your system may be different), you would enter (while logged into the A drive):

A> STORE C:=*.* [RETURN]

This will copy all files with names of seven letters or less. If you plan to use the STORE/RESTORE programs on a regular basis, bear this in mind.

To indicate that the portion of a file (called SAMPLE.DOC for this example) stored on a given diskette is the only or final portion of the entire file, the STORE program adds a $ to the name.

When one diskette is filled, the program will prompt you to insert another. If a file crosses over several diskettes, it will be stored as SAMPLE0.DOC on the first diskette, SAMPLE1.DOC on the second, and so forth. The final section will be called SAMPLE$.DOC.

Be sure to use formatted diskettes, and to number each diskette as you take it out of the drive. Numbering is essential for use in the next program, RESTORE.

The RESTORE Command

This program returns the files put on diskette by the STORE program to hard disk. You cannot use RESTORE to put files on hard disk, if they were put on the floppy by the DISKCOPY or PIP programs. All the information described above for the STORE program holds true for RESTORE as well, except that the action is in reverse.

Be sure to enter diskettes in the correct order. Once RESTORE has begun copying files, it will ask you for new diskettes as it needs them and copy each incomplete file in the order in which they were put on diskette. Therefore it is essential not to enter Part 2 before Part 1 of the same file.

Recall that the programs keep track of this by copying each partial file with a number at the end of its filename. Since the computer counts starting with 0, you will need to enter the RESTORE command as follows.

If you want to RESTORE the file SAMPLE.DOC to your hard disk, you would insert the first of your diskettes and enter the command:

A>RESTORE A:=C:SAMPLE0.DOC [RETURN]

This would begin the restoration of the entire file SAMPLE.DOC.

The RESTORE program will prompt you when it has finished with all matching files on that diskette with the line:

INSERT NEXT DISK TO CONTINUE OR [CTRL C] TO EXIT

At this time, you can stop the program by entering [CTRL C].

Erasing Files

If you are copying files onto another diskette and you realize that the new diskette contains some unnecessary files, you can erase (or delete) them using the ERA resident command. Be very careful using the ERA command, though, once a file is erased, it cannot be retrieved. Erase only files which are unnecessary, or files which you know have been backed up. Diskettes are less expensive than information.

To erase a file from the current disk, enter the command:

ERA SAMPLE.DOC [RETURN]

When the A> prompt returns, the file will have been erased.

To erase a file from the B drive while logged onto the A drive, you have two choices. You can either move from A to B by the usual method (entering the command B: [RETURN]), then erase the file you want to; or you can enter the command:

A>ERA B:SAMPLE.DOC [RETURN]

This latter method saves a little time.

Erasing A Range Of Files

The ERA command accepts ambiguous file names as well, so you can erase more than one file at a time by using the CP/M wild cards. But be very careful about how you specify the wild card names: make sure that the combination you enter does not apply to files that you wish to keep.

To erase all the command files from a diskette — not that you would want to — you would enter the line:

A>ERA *.COM [RETURN]

This would result in the erasure of all files with an extension of COM.

To erase all the files on a diskette, enter the command:

A>ERA *.* [RETURN]

Since this could be disastrous, the operating system gives you one "last chance" to reconsider, by asking you:

ALL FILES (Y-N)?

If the diskette is old and worthless, enter **Y [RETURN]**. If you realize that the diskette being erased has valuable information on it, you have the opportunity to enter **N [RETURN]** and keep the files on that diskette.

What If...

If you erase a good file, one which you did not want to erase?

Don't. Learn to be extra careful with the ERA command, and erase only files which are of no importance. Also, be sure to back up any information which may be of value. In the long run, disks cost a lot less than the time spent putting information onto them.

For suggestions on backup schedule and techniques, refer to the section on Diskette Handling in the Appendices. But remember the "Backup Rule Of Thumb", which is:

Always make a backup copy as soon as you have more information than you can afford to lose.

Checking The Remaining Storage

Now that you have copied information onto a floppy diskette, you have begun to work with it. But a diskette has a limit of how much information you can put on it. To find out how close you are to that maximum limit, you can use the STAT command.

To check the remaining area on the currently-logged disk, enter the command:

A>STAT [RETURN]

The screen will display:

disk: <ATT>, Space: ###k

where ### indicates a number from 000 to the capacity of the drive in K bytes.
(1K bytes=1024 characters of storage.)

for each disk that has been accessed since the last boot. The <ATT> column lists the attributes of the disk or the file being examined. These attributes describe any limits that have been placed on the disk, in respect to changing or erasing it. These attributes are:

R/O: Read-only status; document cannot be changed or deleted until reset by STAT command.

R/W: Read-write status; document can be changed or deleted.

SYS: Changes file to system type which does not appear on screen when directory command is given. It can only be viewed by use of the STAT command. (Also, SYS files cannot be copied with PIP but can be copied with DISKCOPY).

DIR: Changes file back so that it appears in directory (and can be PIPped).

You can also enter the command:

STAT d:[RETURN]

This will result in the display:

Bytes remaining on d: ###k

This displays only the information for the disk requested, where the **STAT [RETURN]** command displays the information for all drives which have been accessed since the last cold boot.

You can use the STAT command to find out how much space is left on a disk or diskette.

Running STAT For Files

You can also use the STAT command to determine the size and attributes for a file or a range of files. The size indicates how much of the disk surface is dedicated to the particular file; the attributes of a file indicate any restrictions which apply to the file. You can also change the attributes of a file to protect important files against accidental erasure or to change the attributes of a protected file that you deliberately want to erase.

Both displaying and changing a file's attributes use the STAT command. To use STAT to check the size and attributes of a file or range of files, enter the command:

STAT <AFN> [RETURN]

Example:

STAT *.COM

The screen will display a line similar to the following for each individual file that matches the AFN:

```
        Recs  Bytes  Ext Acc
        ###   ##k      # xxx d:FILENAME.EXT
   Bytes remaining on d: ##k
   A>
```

The four columns mean:

The Recs column indicates the number of records (a CP/M storage unit of 128 bytes) that make up the file.

The Bytes column indicates how much disk space is used by the file you are checking.

The Ext column indicates the number of extents in which the file is stored (one extent = 128 records).

The last column in the STAT display, marked Acc, stands for the access attributes of the file, as described earlier. A typical status line for the file SAMPLE.DOC, including your command, would look like this:

```
   A>STAT SAMPLE.DOC [RETURN]

        Recs  Bytes  Ext Acc
         27    8k     1 R/W A:SAMPLE.DOC
   Bytes remaining on d: 422k
   A>
```

This would mean that the file SAMPLE.DOC, which exists on Drive A, consists of 27 records of 128 bytes each, is allocated 8 kilobytes of the disk surface (even though 27 times 128 is only 3456). It uses one extent, and is available for read and write activity. In addition, the total unused space on the disk in drive A is 422 kilobytes. A kilobyte is 1024 bytes or characters.

Most of the information in this status line will only prove valuable to people who are writing programs which must deal with exact storage of data on disk. Refer to the section on The STAT Command in VECTOR 4 CP/M TRANSIENT COMMANDS for more detail.

Other Functions Of The STAT Command

If you would like to protect a file or diskette from accidental erasure or change, the STAT program allows you to specify it as "read-only". This means that (in the case of a program), you can use the file, but you can make no changes to the file as stored on the disk.

To specify a file as having a particular attribute, just enter the following line:

STAT d:SAMPLE.DOC $<ATT> [RETURN]

where <ATT> is replaced with one of the four attributes (R/O, R/W, DIR, or SYS) explained above. Be sure to enter the $ in front of the attribute; this tells the STAT program that you wish to change the status of the file.

The STAT program can be used on files stored on another disk by simply entering the name of the drive in place of the d: in the line above.

If you have a file that you do not want to change or erase accidentally, you can use the STAT command to protect it. To protect the file SAMPLE.DOC (stored on the B drive), enter the command:

STAT B:SAMPLE.DOC $R/O [RETURN]

The screen will display the message:

SAMPLE.DOC set to R/O
A>

To save an entire disk or diskette the same way, enter the command:

STAT d: $R/O [RETURN]

This will protect all files on the drive which you substitute for d:.

QUICK REFERENCE INDEX TO VECTOR 4 COMMANDS

Setting Up Your System

To Do This...   **Enter This...**

Boot from floppy disk	F
Boot from hard disk	W
Repeat system testing NOTE: The above commands apply to system that has been recently powered or reset.	T
Select single- or double-sided configuration for floppy drives (Permits multiple logical configurations for each physical floppy drive)	CONFIG F

Set up disk or diskette for operation:
Options (may be used together) are:
 	
    E   Report any errors found on the disk surface.
 	
    R   Repeat formatting (used for formatting several diskettes, such as a new box, in succession).
 	
    P   Format hard disk (where appplicable).
 	
CAUTION: This program erases all information from disk. Use only if no valuable information is stored on disk to be formatted.
	FORMAT <options>

To Do This...	Enter This...
Copy operating system to new disk or diskette: Allows booting from new disk or diskette. Must use formatted diskette.	GENSYS

Specify system options and setup:
 	
Some options are:
 	
Send information to be printed:
 	
    Ø: discard information
    1: send to draft printer
    2: send to word-processing printer
    3: send to screen
 	
Set up auto-boot command as "P.S." to booting procedure: allows creation of a one-line command read each time the system is started.
	CONFIG <options>
	
	CONFIG Ø/1/2/3
	
	CONFIG A

Clear memory, account for new system settings (a keyboard-operated reset).	BYE

Entering Commands

To Do This...	Enter This...
Send command line to be processed.	[RETURN]
Erase a character entered incorrectly.	[BACKSPACE]
Erase an entire line before sending it.	[CTRL X]

To Do This...   **Enter This...**

Clear screen before executing command line entered.	[CTRL D] [RETURN]
Cancel program operation, return control to keyboard.	[CTRL C]
Printer "ON" from keyboard: press once to send entry and screen response to printer, again to cancel.	[CTRL P]
Pause scrolling of display while reading or taking notes: press once to stop, again to resume.	[CTRL S]

"Emergency Brakes"

To Do This...   **Enter This**

Stop a program from continuing (common command).	[CTRL C]
Stop some programs from continuing (less common).	[ESC]

To Do This...	Enter This...
Stop all activity (and lose information in memory) **NOTE:** This will lose any changes or additional information added since last disk storage operation. It will also be necessary to boot system. After booting, enter **TPA** and it may be possible to retrieve data.	**RESET** (located on rear of Vector 4)
"Freeze" screen for observation (press any key to resume display).	**[CTRL S]**
"Jump" back to program and settings being used before cancelling.	**TPA**

Wild Cards

To Do This...	Enter This...
Refer to several file names (1): . . . CP/M matches any <u>single</u> character in the location, as it finds files on the drive. Examples: **FIL?.EXT** CP/M will assume that command refers to files FILE.EXT, FILO.EXT, FILL.EXT, FILM.EXT, etc., if these are on the disk drive.	**?**

To Do This...   **Enter This...**

Refer to several file names (2):
 	
 . . . CP/M matches any <u>group</u> of characters in the location. Can be used in combination with regular letters, or used as *.* to cover all files. Examples:
 	
 FILE.*   CP/M will refer to FILE.EXT,
                FILE.MEM, FILE.COM, FILE.ASM,
                FILE.LD1, etc.,
 Note: The question mark and asterisk are called "wild cards". Entry with wild card is called <u>ambiguous file name</u>. Entry without wild card is called <u>unambiguous file name.</u>
	*

Copying and Backing Up Files

To Do This...   **Enter This...**

Make a copy: . . . of <u>old</u> file or disk, with name or location of <u>new</u>. Enter new name first, then old. Old file or disk still exists.	PIP <new>=<old>

Some of the more commonly-used PIP command lines are:
 	
      Make a copy on disk B of the file
      FILE.EXT from disk A.
 	
      Same as above, but goes to User Area
      entered in # position for source file.
 	
      Copy all files from disk A to disk B.
 	
      Copy per command line entered, and <u>verify</u>
      transfer of data (slows operation somewhat
      but ensures accuracy).
	
	 PIP B:=A:FILE.EXT
	
	 PIP
	 B:=A:FILE.EXT[G#
	
	 PIP B:=A:*.*
	
	 PIP <command>[V]

To Do This...	Enter This...
Enter multiple PIP command lines: (Do not enter [SPACE] before [RETURN]). Enter any valid PIP command line (without having to repeat the letters PIP) when * prompt displays.	PIP[RETURN]
End multiple PIP command line session.	[RETURN]
Copy files from hard disk to floppy diskette(s), continues files from one diskette to another.	STORE <afn/ufn>
Copy files placed by STORE program on floppy diskette, back to hard disk.	RESTORE <afn/ufn>
Make "mirror image" of a diskette, without requiring formatted diskette.	DISKCOPY

File Management

To Do This...	Enter This...
View directory of all files on currently-logged disk.	DIR
View directory of all files on disk d:.	DIR d:

To Do This...   **Enter This...**

"Move" to (read from, write to) another drive. Substitute desired drive name for d:.	d:
"Move" to (read from, write to) another user area on current drive. Substitute 0 through 15 for #.	USER #
View directory for FILE.EXT on currently-logged disk; verifies that FILE.EXT exists on that disk.	DIR FILE.EXT
Rename an "old" file name to a "new" file name; old file name no longer accesses file.	REN new.ext=old.ext Must give UFN for both.

Erase (or Delete) Files and Disks

To Do This...   **Enter This...**

Erase file FILE.EXT from disk d:.	ERA d:FILE.EXT

File Checking and Printing

To Do This...	Enter This...
Display file on screen (must be unambiguous file name).	TYPE FILE.EXT
Begin spooling (creating printout file). Used to store reports or other files until convenient to print. Must be ufn.	BSPL d:FILE.EXT
End spooling operation.	ESPL [RETURN]
"Despool", or send spooled file to attached printer: where # is the list device (1 or 2), and the file name must be unambiguous.	DSPL # ufn
"Kill" spooling operation before normal completion.	KSPL [RETURN]

Check And Change Status of Devices, Disks, and Files

To Do This...	Enter This...
Display status (R/W=read/write, R/O=read-only) and remaining storage space on currently-logged disk.	STAT [RETURN]
Display remaining storage on disk d:.	STAT d:[RETURN]

To Do This...   **Enter This...**

List records, bytes, and extents used by file(s) of files entered. Can be entered for another disk drive (STAT d:<afn>).	**STAT <afn>[RETURN]**
Change the attributes of file(s) to one of the following access <Acc> types: **R/O:** Read-only status; document cannot be changed or deleted until reset by STAT command. **R/W:** Read-write status; document can be changed or deleted. **SYS:** Changes document to system type; does not appear on screen when directory command is given. **DIR:** Changes document back so that it appears in directory.	**STAT <afn>$<Acc>**

INTRODUCTION TO VECTOR 4 CP/M

This Introduction is divided into two parts: the Overview, which explains the functional structure of Vector 4 CP/M and how it affects the mechanical components of the Vector 4 Single-Board Computer; and the Guide, which explains a few principles of data management which may help you to use the Vector 4 more easily. Even if you are familiar with the operating principles behind computers, it might help you understand how the Vector 4 works to read the Overview before continuing on to the Guide.

VECTOR 4 CP/M OVERVIEW

To understand and best use Vector Graphic's Vector 4 CP/M Operating System, let's discuss how your computer can work for you. You or your company purchased your computer system in order to process data, store information, or solve problems. Two different elements of the system, "hardware" and "software", work together to accomplish these goals. The hardware, the mechanical and electrical devices, perform physical and electronic functions. The software, or programs that have been written for the system, perform logical and mathematical operations which in turn control the hardware.

The hardware portion of your Vector 4 consists of several components which perform three basic functions:

- memory,

- processing,

- and input/output.

These components are connected by printed circuit boards, jumper wires, and other electronic connections. Although each has its own function, they relate together to perform the work of the system.

Different Types Of Memory

The memory subsystem is divided into three types: volatile memory, which means that it can be changed easily; stable memory, which is harder to change; and mass memory, which consists (on the Vector 4 computer) of one of two types of disk drives.

The main type of volatile memory used in the Vector 4 is called Random Access Memory (abbreviated as RAM), and is used for storing instructions for tasks which you, the user, have commanded the computer to perform. It is also used for storing data which you are either entering or changing. This type of memory must have electric current running through it for it to be active; it only "remembers" when the computer is turned on. Random Access Memory is stored in a number of silicon "chips" on the printed circuit board of your computer.

Stable memory is also stored in different types of chips (varieties of Read Only Memory or ROM chips). Since stable memory can hold its instructions even when the machine is turned off, it is used for automatic procedures (such as starting up your computer or storing the shapes of the letters and numbers you see on the screen). ROM-type memory is more difficult to change than RAM.

For the Vector 4, mass memory refers either to "floppy diskettes", which are 5-1/4" circles of Mylar (though other systems may use larger or smaller diskettes), or to "hard disks", made of a metallic alloy. Each medium of mass memory has its own advantages: hard disks make storage and retrieval a little faster, and can be a permanent part of the computer since they can hold so much information; floppy diskettes can be removed from one machine and inserted into another of the same type, giving you the flexibility to insert new information in about the time it takes to change a tape cassette.

Processing

Processing is performed by the Central Processing Unit (or CPU) of your computer, in this case a microprocessor called a Z80B. The microprocessor works very closely with the RAM, where instructions and information are stored and can be updated. The RAM and the microprocessor are both mounted on the same printed circuit board to make this cooperation easier. As an example, this is what happens when you give a command in a program to multiply two numbers together:

- the microprocessor reads those two numbers from the keyboard or the RAM,

- pulls the multiplication routine out of its own memory,

- and performs the calculations you desire.

Input And Output

But to read those numbers, and to display their product to you, the system must use its third subsystem: input and output. Input ultimately consists of you, the user, pressing letters and numbers on the keyboard. Sometimes this input tells the system to go somewhere else and get more information for a kind of second-generation input. Output usually displays on your screen; depending on the instructions, it can also be sent to mass memory (the disk drives), or to the printer.

How Hard Is This?

Controlling all the electronic and logical functions that make this possible is, as you can probably imagine, a very complicated task which requires specific and exact instructions. But to make your computer time as easy and profitable as possible, the instructions to perform all these electronic functions are planned and written by computer professionals. These instructions control all the detailed electronic functions so that you enter simple, one- or two-word commands at the keyboard. The complete set of these instructions is called software.

Software falls into two categories. The first, applications software, includes word-processing programs, accounting and inventory packages, and any other editing or data processing packages you may purchase. The second, system software, provides a framework of instructions inside which the computer can function. The combination of all system software on any one computer is called the operating system.

What is an Operating System?

In order to control what is going on inside the computer, an operating system combines the skills of translator, switchboard operator, and bookkeeper. It begins by "translating" the letters and numbers entered from the keyboard into instructions that the computer can read. Next, it looks up the right circuits along which to send the translated messages, like an old-fashioned switchboard operator, and relays commands to the microprocessor, which acts on its instructions.

Once the information has been processed, the right files are pulled out of mass memory by the "bookkeeper" of the system, updated with the new information, and returned to storage so that they can be found and used again.

It is important to understand that the operating system itself initiates none of this. **You** control the operating system, by means of commands. The operating system simply consists of instructions to the machinery of the system. In the "Stone Age" of microcomputers — the early 1970's — the user had to determine and give practically all of these electronic commands each time he or she wanted to use the computer.

But today, controlled by the instructions coded in the software, the hardware is driven by the operating system at what is called a very high level. That is, you merely tell the computer to copy data from Disk A: to Disk B:, and the operating system does all the rest: opens and closes the exact circuits between the two disks, determines where the data you want begins and ends, and tells you when it is finished. So the operating system directs the hardware to perform four more or less separate tasks:

- input, which in most cases means interpreting the commands (letters and numbers) you enter at the keyboard.

- transfer, which includes both sending information from the keyboard to the RAM or the microprocessor, and also results (output) to the screen, the printer, or to mass memory.

- processing, which can range from simple displays to complicated mathematical calculations.

- permanent storage, which is done on the same kind of material used by a tape recorder (the "mass memory" described earlier). As with a tape recorder, this stored information can be "played" (through a printer or directly on the screen) at any time.

Using your computer involves many of the same operations as using a pushbutton telephone. With a telephone, you first input the number of the party to whom you wish to speak. Then the telephone company's machines arrange the transfer, matching up the number you entered with the right wires and cables to connect you with your party. They do processing by keeping track of how long you spend on the phone. You talk each others' ears off, and when you hang up, the phone company permanently stores information.

But with the phone, you never see all the complicated switching that goes on when you want to make a call across the country. All that affects you is the conversation. Unless you decide to write your own software, the same will be true of the computer: you will never have to deal with the RAM, or the microprocessor, or decide which microcircuits should open for how long to write the data onto the disk. The operating system manages all that for you.

Like a telephone, the computer needs very specific input. You're no doubt familiar with what happens when you input a wrong number into a telephone: if the number even matches a real phone, it won't be the person you wanted. Entering a "wrong number" on the computer, however, usually has even less serious consequences. In the case of a simple typing error where the computer can't understand your entry, the computer will do nothing more than ask you to repeat what you entered. (Refer to the Quick Reference Index for an overview of screen handling commands, including erasing and cancelling input.)

Review

It is the operating system of a computer which must decide:

- what you have input.

- whether or not it is a "wrong number".

- what is required from the hardware.

Only then can the processing portion of the computer do its calculations. And after that it is the job of the operating system to determine:

- where to send the results of processing.

- what lines to use for sending the results.

- where to store these results for the future.

Command   Processing   Storage

Command   Processing   Storage
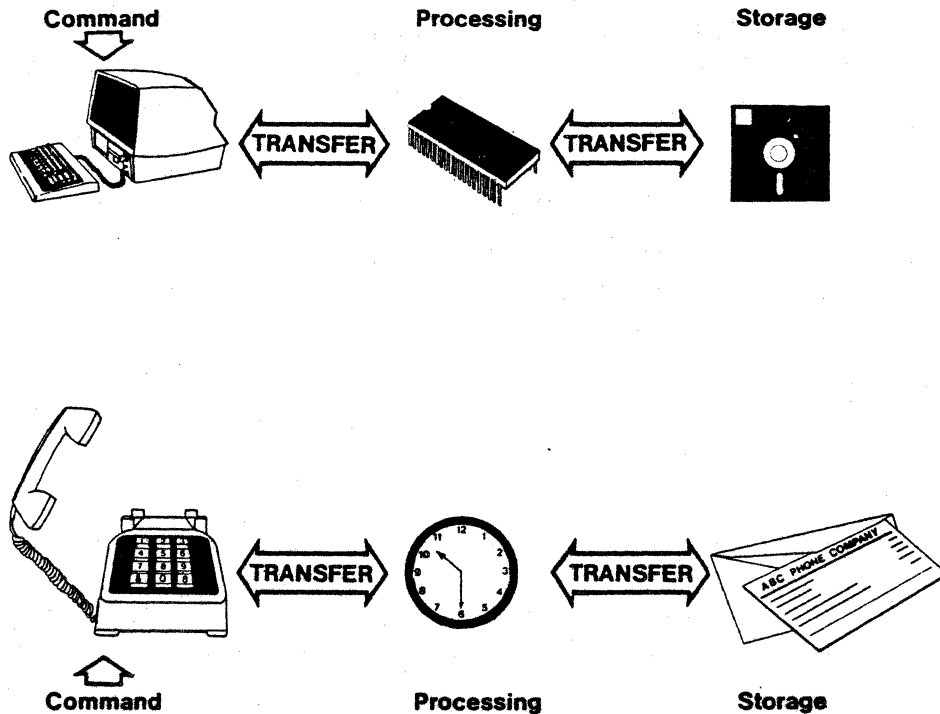
FIGURE 1 — SIMILARITIES BETWEEN PHONE SYSTEM AND COMPUTER SYSTEM

This diagram shows how much using a computer system is like using a telephone.

Both systems take commands from keyboards; both systems transfer information to a location entered from the keyboard; both systems process that information in some way and store the results of that processing. (Of course, you don't have to write a check every time you use a floppy disk.)

How Vector 4 CP/M Does This

The Vector 4 CP/M program is divided into four separate functional "areas", all working together to accomplish the tasks described earlier:

- The Console Command Processor (or CCP)

- The Transient Program Area (or TPA)

- The Basic Input/Output System (or BIOS)

- The Basic Disk Operating System (or BDOS)

When you sit down to type at the keyboard (or console) of your computer, you deal with the operating system at a command level. That is, there are several commands, of a specified format and type, which you can give the computer to make it do what you want. (The two sections of the manual which follow this Introduction will explain the uses of every command in detail.)

Briefly, there are screen handling commands and program commands. Screen handling commands control the input and output at the screen; they allow you to erase characters or lines, stop the scrolling of a screen display, stop a program, et cetera. Program commands call various programs, either a built-in part of the operating system or additional support programs. Most screen handling commands use the [CTRL] key to send them to processing; all program commands consist of letters and numbers, followed by a [RETURN].

The keys you enter are read and "translated" into commands by the Console Command Processor (CCP). Some commands you can enter are an integral part of the Console Command Processor; since they "live" in the CCP, these are called "resident commands". You can also command the computer to run additional programs which support the CP/M operating system. These are called "transient commands", since they are only "visiting" the operating system. If the CCP is told to run one of these, it will "load" or copy the program into the Transient Program Area.

The Transient Program Area is a section of the volatile memory (in the RAM chips) used for storing and running programs. It occupies the "left over" memory from loading the operating system to the RAM. Except for the resident commands mentioned earlier, all processing is done by the instructions moved to the TPA. When processing is completed and you call another set of instructions, the old instructions are erased from the Transient Program Area (which is why it is called transient).
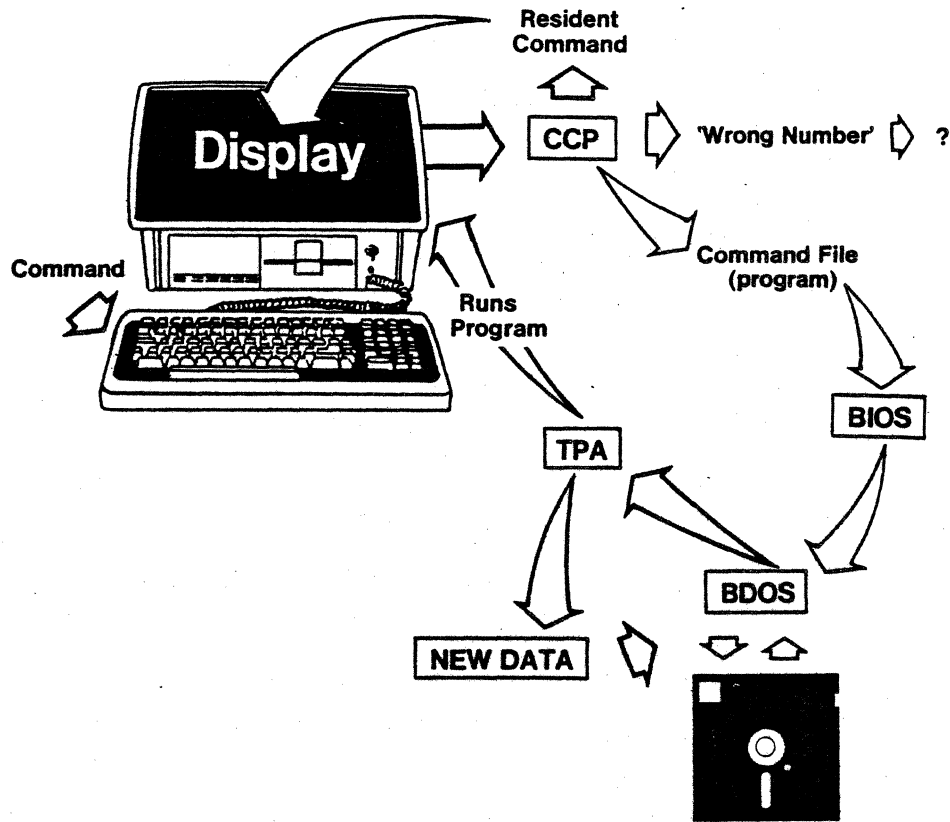
FIGURE 2 — VECTOR 4 CP/M'S LOGICAL STRUCTURE

When you enter a command, the Console Command Processor (CCP) checks your entry against the Resident Commands. If your input matches one of these, the result of the command (for instance, DIR for directory) is displayed on the screen. If you entered something else, the CCP looks at the directory on your drive. (If it can't find what you entered, it prints your entry followed by a question mark.)

The program you called is found by the Basic Disk Operating System (BDOS) and sent to the Transient Program Area (TPA), through lines opened by the Basic Input/Output System (BIOS). The Transient Program Area stores and runs the program. The results of the program are displayed on the screen, and any new data are recorded by the BDOS.

But to load from disk into the TPA, the operating system must first find out where to look on the disk, and then copy into the Transient Program Area. To do this, it uses the other two functions of the system. The Basic Input/Output System (BIOS) acts like the switchboard operator, opening lines between disk and TPA so that the program can be copied. Then the Basic Disk Operating System (BDOS) "reads" the directory of programs, finds the desired information on the disk, and sends a copy over the lines opened by the BIOS.

Review

The Console Command Processor interprets user commands and either works from its own instructions (in the case of resident commands), or calls programs from mass memory (in the case of transient commands.)

The Transient Program Area stores and runs programs called by user commands.

The Basic Disk Operating System keeps track of all the data as the operating system sends it off to storage, or pulls it from mass memory into the RAM.

The Basic Input/Output System controls the circuits to be used for all transfer, turning the hardware on and off when required.

How Does The System Get Started?

Recall from the discussion of volatile memory that the RAM will only hold information while it is supplied with electrical current. While the computer is turned off, the operating system is stored on disk. These instructions must be copied from the disk into the RAM, where they can control the computer. But if the power has been turned off, the RAM is "emptied" and must be "refilled" from the disk. Once the system is operating, loading a program would be a simple task: the Basic Disk Operating System (BDOS) would look up the right files on the disk and copy them into volatile memory. But the BDOS itself hasn't been copied into memory yet.

Let's compare this to a stereo. The music is always on the record, whether it is in the store, in its jacket, or on the turntable. But the music can only get from the grooves of the record, out the speakers, and into your ears when you have the power switch turned on. And even then, there are actions you must take: position the tone arm over the song you want to hear, set the volume and speed control, adjust the balance between the speakers, and maybe more if you have a complex system. But if you turn the power off, the music stops. It just goes away.

This is basically what happens when you turn off the power to your computer. The operating system, which is stored in those chips inside the case of your computer, just "evaporates". And when you turn the system on the next day, there is no more an operating system inside the computer than there is any music left inside your stereo the day after you play your latest album. The only way either one will get there is off the disk.

With a stereo, it seems fairly easy to get the information off the disk. You take the record out of the album cover, put on Side 1 or 2, and set the needle over the track you want to hear. (Of course, the stereo only "plays" the disk, sending the electric impulses out to the speakers. The computer copies the information from the disk into its memory.)

On the computer, this action of setting the "tone arm" over the right tracks is called booting the system, and it is even easier than playing an LP. To boot, just press [F] for a floppy-only system, or [W] if you use a hard disk. (Booting doesn't mean kicking the disk drive to get it started. It comes from the phrase "pulling yourself up by your bootstraps", since that is basically what the computer has to do.) The rest of the program is automatic.

You need to boot whenever this banner is displayed on the screen:

```
VECTOR 4 SBC EXECUTIVE 1.X*
```

[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >
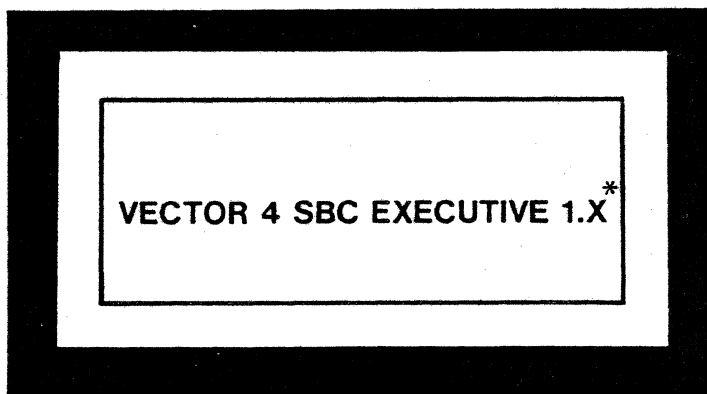
* X represents current program number.

When you boot, you are telling the computer to copy the instructions that make up the operating system into its memory. This runs an automatic program (stored in one of those stable memory or ROM chips) which tells the computer to go to a specified location on the disk, called the system tracks.

Not every floppy has a copy of the operating system, just as not every record has the same music on it. A floppy which does contain the operating system is called a system diskette. Before you can boot from a floppy, you will need to have a system diskette loaded in the drive.

Once the automatic booting program finds the system tracks, it copies the operating system into the RAM, and "awaits further instructions". (If you could do this on your stereo, it would be like making a copy of a record which told your stereo how to play other records.) The computer is now at the command level of Vector 4 CP/M.

In this and other manuals, you will also find references to a "warm boot" and a "cold boot". In a cold boot — performed after the power has been turned off, when you press the RESET button, or during some programs which alter certain important settings of the system — the entire operating system is copied into the RAM. A warm boot simply reads in a specified portion of the operating system, to take new settings or conditions into account. Some utility programs you will be running end with a warm or cold boot, in order to bring CP/M up to date.

Review

Booting is important because:

- it copies the operating system into computer memory (the RAM), where it can interpret commands.

- this area of memory is erased every time the system is turned off or reset.

- only when the operating system is in memory can the computer perform any activity.

Booting consists of:

- finding the "recording" of the operating system in the system tracks.

- copying the entire operating system into the RAM for a cold boot.

- copying only the parts which have been affected by new activity for a warm boot.

- giving you the A> prompt to tell you that the computer is ready for action.

Booting requires no complicated action on your part. You need only determine whether your system uses a hard or a floppy disk, and press [F] to boot from the floppy, [W] to boot from the hard disk. (The [W] stands for Winchester, the style of the disk used in your Vector 4, so the letter makes a little sense after all.)

The Electronic File Cabinet

The work you do with your Vector 4 will consist of manipulating data stored in individually-accessed areas of the disk called files. A file in the computer is a collection of data under a given name; like the office file for which it is named, it is stored in the same place, which implies some relation between the elements. All information stored in mass memory is kept in some type of file.

There are two basic types of files: program files and data files. Program files contain instructions for the computer; the transient commands already mentioned are examples of program files. Program files are generally not changeable without the assistance of a skilled programmer. You will use the program files to move, copy, rename, delete, change the status of, and check on the other type: data files.

Data files contain information which you wish to store or process in some way, such as a list of customers who have purchased a certain product, or a letter to a vendor regarding purchasing supplies. What you put into a data file is up to you, and the program you choose to run. How it gets there is up to Vector 4 CP/M.

The first step in file storage is the selection, by you, of a disk drive. When you boot, the screen shows the A> prompt. This indicates that your Vector 4 is currently addressing Drive A. The A drive is said to be "logged in".

To move to another drive, just enter the letter of the drive, a colon, and a [RETURN]. To allow you to expand your storage, Extended CP/M is capable of reading from as many as 16 drives, given the letters A through P as their names. To determine how many drives your system supports, see the CONFIG F option, explained under Vector 4 CP/M Transient Commands.

As you enter information to the logged-in drive, CP/M keeps track of the data in the RAM by using "records" made up of 128 bytes (the computer term for a character.) When you want to copy this data to the disk, the computer sends each record off to the Basic Disk Operating System (BDOS), which "writes" it onto the current disk or diskette. But a single record takes up too small an area; it would be impractically slow for the BDOS to search through every 128 bytes when it had to copy large quantities of data. So Vector 4 CP/M uses several larger divisions to make its file management faster.

Consider an office clerical system. One simple-seeming way to file business documents might be to keep them in one cabinet, with each new entry being filed in front of the one filed last. With a few dozen entries, this might be practical. But raise the number to several hundred pieces of paper (using a new piece of paper for every 128 characters), and you can imagine the difficulty. No one could ever find the file he or she wanted, and business would grind to a halt each time you needed a document other than the last one filed away.

But if you break the file organization into larger chunks, you get a much more practical system. You can file documents alphabetically, by month, by accounts, or in almost any way that makes sense to you or your company. This eliminates all but a limited area of the filing cabinet, leaving you free to search there, rather than look for one piece of paper out of all the hundreds which may be anywhere inside. And the way that the computer arranges this higher-level organization is what gives Vector 4 CP/M its speed and flexibility.

Vector 4 CP/M counts every 128 records, and puts them in an "extent". Each file is considered to have at least one extent (whether it actually contains 128 records or fewer). Furthermore, CP/M divides the surface of the disk into "allocation units". The size of an allocation unit can range, depending on the disk configuration, from 2,000 to 8,000 bytes.

Make Room for Data

If the program must change any information already stored on disk (the way an accounting program might update a total of accounts receivable), the Basic Disk Operating System has another job as well: to find the data to be updated, then to remove, add, or change information as the program directs it. But the BDOS can't "squeeze" new data into the existing files, the way you can in a file folder. The computer must store where it has space on the disk surface, then remember where each file is "continued".

If a file needs more space for new records, a full new allocation unit is assigned, even if only one record (128 bytes) is used. Each extent can have up to eight allocation units assigned to it. All this location or "address" information (disk drive, file name, extent, and allocation unit) is stored in a File Control Block (FCB) for each file. CP/M keeps a master list in memory of all allocation units currently assigned to each file, along with all unused units remaining on the disk.

As new records are entered or created, CP/M updates its master list and assigns new allocation units where it "knows" it has room. The File Control Block (a copy of which is stored in the Transient Program Area for the file being accessed) is also updated to include the "address" of the new allocation units. This way, the operating system keeps track of all the various parts of the file so that you need only refer to it by name.
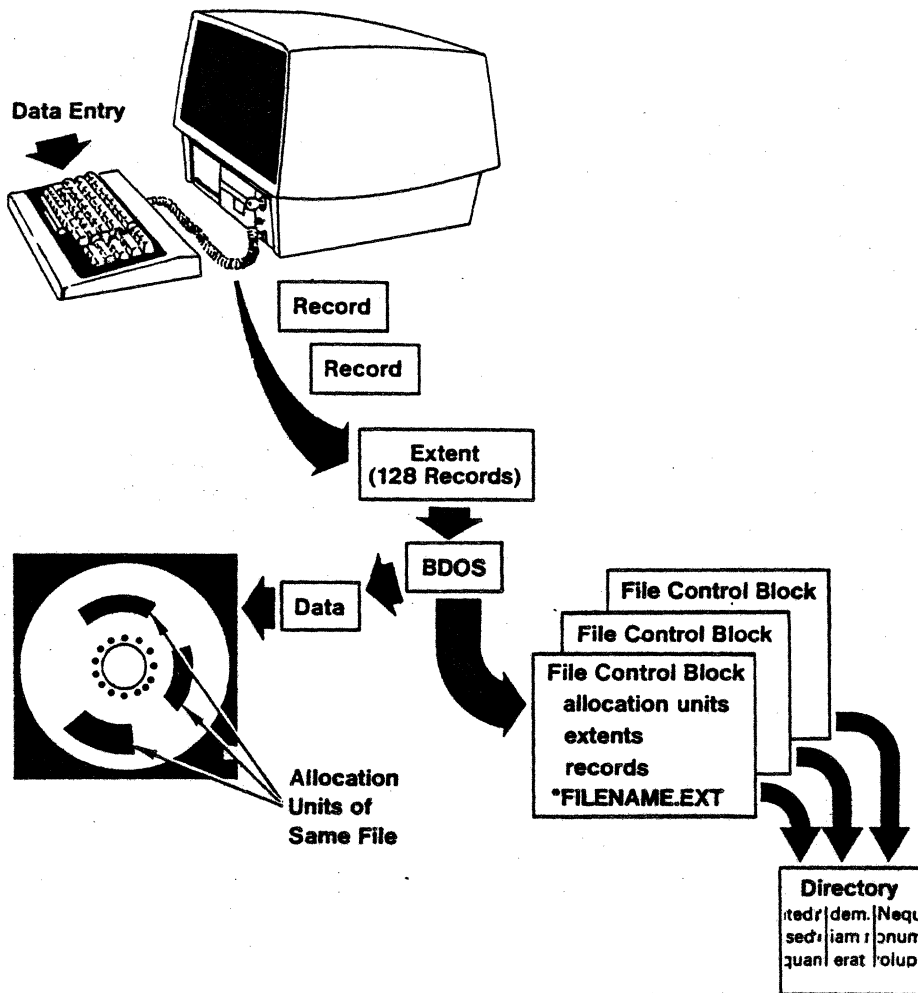
**FIGURE 3 — VECTOR 4 CP/M'S FILE STORAGE
AND ACCESS METHODS**

As you enter data at the terminal, CP/M counts each 128 bytes as a record. It counts 128 records entered to the same file as an extent. When you copy to disk, the Basic Disk Operating System sends the file to an allocation unit, which is a "geographic" section of the disk surface. This way, the BDOS needn't move information already on the disk.

The BDOS keeps track of allocation units (the way an office manager might keep track of the paperwork in several drawers) in a File Control Block or FCB. When you call the file, the BDOS looks up the FCB for each file and copies the file into the Transient Program Area.

When you type "DIR" for a directory, the Console Command Processor simply reads the File Control Blocks for the disk, then displays the file names on screen. Up to 128 FCBs can be held in memory for each disk in use, making file access even faster.

As a file is erased or made smaller, the master list (and of course the file's FCB) is corrected to show the new free disk space, which means that new information can be written there. This technique, called "dynamic file management", is one of the reasons why the CP/M operating system has proven so popular since its introduction.

Because of this organization, the BDOS can eliminate all but the desired allocation unit and begin searching there rather than having to read the entire disk. This is similar to the way you may play only one track on a phonograph album, by moving the tone arm where you want to begin. But due to the speed with which the computer can operate, the exact location on the surface of the disk where the BDOS writes data is of no consequence. Rather than having to follow a sequence, such as the grooves in a phonograph record, the computer can move the disk and read-write head to any record position with very little search time.

How You See This

The final step in CP/M's storage technique is forming the disk directory. At the beginning of the data storage area (that is, after the system tracks) of each disk or diskette, CP/M writes an entry for each extent of each file. The first entry for each file is displayed when you enter the "DIR" command. (The other entries simply tell the computer where to go when it reaches the end of the first extent.) This is possible because the directory you see is acopy of the first 32 bytes of the File Control Block for each document, and the FCB is automatically updated when any change is made to the file.

When you first access a disk or diskette, Vector 4 CP/M copies up to 128 FCBs from the directory into memory. This way, the memory already "knows" where to look on the disk for any file for which it pulls an FCB. For a floppy, this means that the entire directory is copied (since a double-sided floppy diskette can hold 128 entries, while a single-sided holds 64). For a hard disk, you may get only a portion of the files actually on record.

Since you can configure your hard disk to hold up to 1,024 separate files, the directory in memory will obviously not manage all of them at once. But for smaller directories, you can still get the entire contents into memory. In any case, this means that the Basic Disk Operating System doesn't need to look at the disk to find out where it has to look on the disk, and this means a faster operation to you.

Review

To review the file structure of Vector 4 CP/M:

- A file is represented by each entry displayed on screen by the disk directory (when you enter the command **DIR [RETURN]**).

- Each file is made up of at least one extent, which can contain up to 128 records of 128 bytes each. (Total bytes per extent = 16,384.)

- Each extent may take up no more than 8 allocation units of the disk surface.

- The location of allocation unit(s), extent(s), and file name for each file is stored in a File Control Block or FCB.

- All this information is handled by the operating system; you need only use the name of the file.

GUIDE TO USING VECTOR 4 CP/M

Now that you should have some idea about the way Vector 4 CP/M accomplishes its job, you can better understand how to make it help you with yours. You have already read the computer's definition of a file. From your point of view, a file is where you keep any related information, just the way you would in a filing cabinet. Your work with Vector 4 CP/M will consist primarily of entering commands which change, move, or otherwise manipulate the files stored in mass memory: the disk drives. To begin, let's cover how CP/M allows you to address this memory.

Disk Drives, And How To Use Them

Your Vector 4 comes with two physical drives: either one hard drive and one floppy drive, or two floppy drives. However, it can be set up to run with several different logical drives, each given a letter of the alphabet as a name. For example, the 5-inch hard drive is usually set up to operate as Drive A and Drive B, with the floppy drive acting as Drive C (and sometimes another drive as well, to act as either single- or double-sided drive). Having the system use different disk drives has benefits for both the computer and the user.
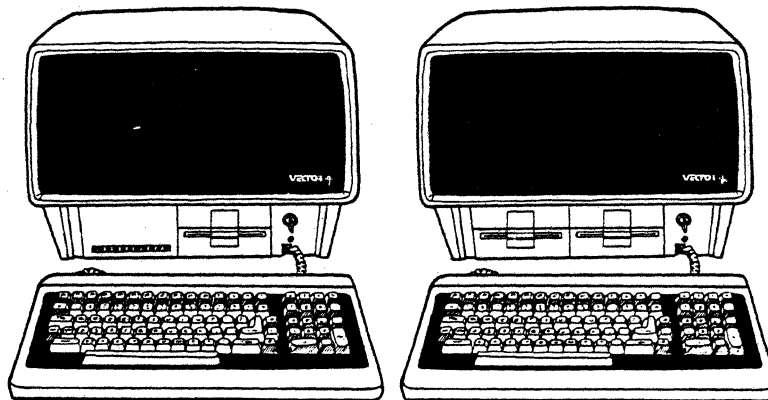
From the point of view of the operating system, multiple drives provide a further way of dividing storage space. This way, the BDOS need only look through one section of the available mass memory to find a requested file. If the BDOS can assume that the file you want is on the A drive, it need not look on the others.

The computer always assumes that you refer to the current drive, unless you specify a different drive name. This automatic assumption is called a default, and it is a term that will come up many times in your work with computers. Basically, since the computer cannot really "think" for itself, it must have an automatic response to fall back on when specific instructions are not given to it. Defaults free you from the necessity of giving tediously explicit instructions with every command.

Using Your Drive Configurations

On a system with two floppy drives, the double slots let you run a program diskette in the A drive and a data diskette in the B drive. This way you can use programs that take up more volatile memory than the RAM may contain.

Both hard and floppy-only systems allow you to select single-sided or double-sided formats for the floppy drive or drives. This gives you the opportunity to insert program diskettes of either format, should you purchase or already own another Vector with compatible software, or if you are considering a software package which is available on one or the other type of diskette.

There are two programs that you will use to select and use single- and double-sided floppies. To specify the type of each logical drive in the system, use the CONFIG F program. This option of the CONFIG program allows you to use the same physical drive as two different logical configurations. The screen provides prompts, allowing you to select either single-sided or double-sided configuration for each logical floppy drive.

Once the drives have been specified, you will need to FORMAT all new blank diskettes. The FORMAT program reads the specification for each logical drive and formats the diskette accordingly. This program erases the diskette and puts track and sector markings in the locations that Vector 4 CP/M will look for them. These track and sector markings are the indicators that the BDOS uses to keep track of all the allocation units and extents used in a file.

Further Memory Divisions

An additional (but optional) system division is the user area. This allows you, if you choose, to specify a section of the disk as an individual user area. You can take advantage of up to sixteen different user areas; the default is User Area 0. The highest number you can use is 15.

Once you are operating inside that area, you should treat it just as if it were its own disk. That is, entering **DIR** while working in user area 5 on Disk B will not display any files stored in user area 1 on Disk B. This gives you a further way to divide your storage; you can also allocate your computer use among several people or tasks, assigning each a different user area on the disk.

It is worth noting that a user area is not a physical separation on the disk or diskette. The operating system simply considers it different for file management. In that respect, user areas are entirely unlike diskettes: there is no maximum size to any individual user area, except the maximum size of the recording medium (hard or floppy disk) which uses it.

Assigning files to different user areas takes a little extra planning on your part. If you have a floppy-only system, keeping track of user areas is probably more work than it will be worth; it is so easy just to remove one floppy and insert another in its place. But for a hard-disk system, the user area division may make your organization that much more efficient. Think of the user areas as different drawers in the same filing cabinet.

If you work with different user areas, you may want to post some kind of log explaining what each user area contains. If you use Area 1 for accounting, Area 3 for word processing, Area 4 for mailing lists, et cetera, the log might hold down potential confusion if different people will use the computer. On the one hand, your experience will grow as you use your Vector 4; on the other hand, everything that you can plan in advance will let you get up to speed on the computer in the least amount of time.

Getting Started

You should have gone through the process of booting at least once already in the Installation and Start-Up instructions. The following section will help you understand *what* was going on while you were booting up. Of course, you can follow along with the instructions if you like; it will help make booting as natural a procedure as possible.

When you first turn on the power to your computer, the screen displays:


```
VECTOR 4 SBC EXECUTIVE 1.X
```
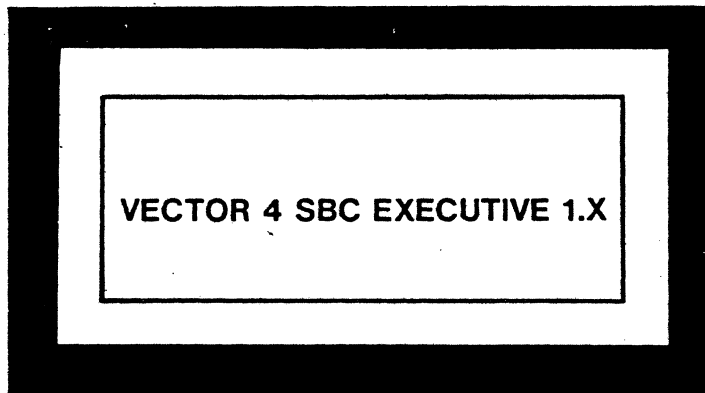
Testing...

SBC >

After several seconds, the screen will display:

```
                    VECTOR 4 SBC EXECUTIVE 1.X*
```

[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >
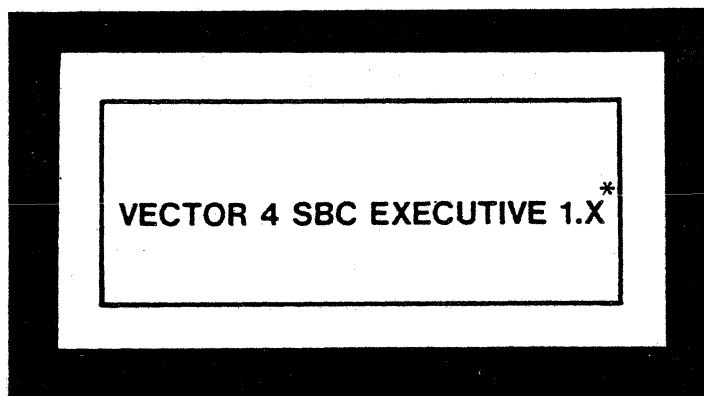
* X represents current program number.

It is now necessary to boot the system, as explained earlier. If you have a floppy-only system, skip ahead to **Booting From a Floppy,** below. If you have a hard disk system, continue.

Press **[W].** If, after several seconds, the screen does not indicate that it is booting, refer to the User's Troubleshooting Guide in the Appendix.

If all goes as it should, after several seconds the screen will clear and the following will display:

VECTOR 4 CP/M – VERSION 1.x
PRINTER 1 LOADED WITH <printer driver type>
PRINTER 2 LOADED WITH <printer driver type>

A>

Now skip ahead to **Printer Driver Types.**

Booting From a Floppy

Make sure that you have the system diskette installed in the right-hand drive. The screen will display:

```
VECTOR 4 SBC EXECUTIVE 1.X*
```

[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >
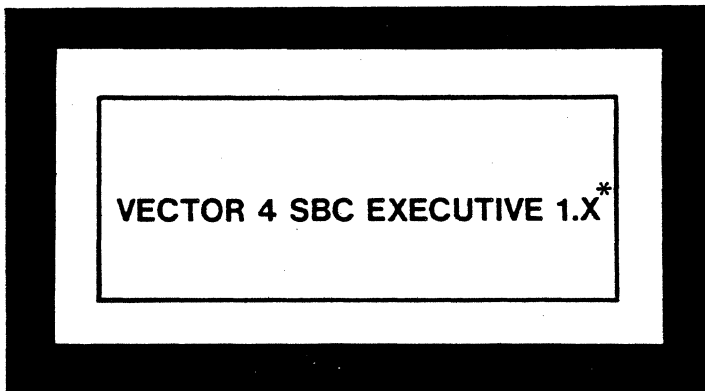
* X represents current program number.

Press [F]. After several seconds, the screen will clear and display:

VECTOR 4 CP/M – VERSION 1.x
PRINTER 1 LOADED WITH <printer driver type>
PRINTER 2 LOADED WITH <printer driver type>

A>

Printer Driver Types

A printer driver is the program which controls the printer. It sends the specific instructions to advance, type characters, et cetera. Vector uses List Device files as printer drivers; any program or command which uses the printer will go to the selected List Device file to drive the printer. These drivers are loaded into the RAM as part of the booting process.

The printer driver type can be draft, word processing, "UNKNOWN", or "NO DRIVER". If both printer drivers indicate "NO DRIVER", it will be necessary to copy the correct driver into the Vector List Device file for the printer you will use. Check the manual for the specific type of printer you have purchased with your system, and look for any "software bulletins" which may have been included.

To select a printer, you will use one of several optionsof the CONFIG command file. See the TRANSIENT COMMANDS section of this manual for a detailed overview, or refer to the Quick Reference Index.

Getting Around The Disk

Notice the **A>** at the bottom of the display. This indicates that the Console Command Processor is ready for input. It also indicates that the operating system is currently set to read or write using disk drive A. The system is said to be "logged in" on drive A, with Vector 4 CP/M at the command level.

To move to another disk drive, enter the letter of the drive you want, followed by a colon and a **[RETURN]**. (Be sure that you have a diskette installed, if you log into a floppy drive.) A typical screen display, representing a move from drive A to drive B, would look like this:

A>**B:** [RETURN]
B>

From here, you can run any program or access any file stored on drive B. You can also give any resident command (such as DIR to display the files stored on the logged-in drive). If you have just turned on and booted your system, you will automatically be in user area 0. To move to another user area, enter the command **USER #** **[RETURN]** (substituting the user area you want for the # sign). Continuing the screen displayed above, you end up with the following:

A>**B:** [RETURN]
B>**USER 5** [RETURN]
B>

The operating system will now write any data that you enter to user area 5 of the current disk, until you change user areas again. If you are in doubt as to what user area you are in at a given time, simply enter the command **STAT USR:** [RETURN]. The screen will display:

Active User: 5
Active Files: 0 5

which (in this example) indicates that you are logged in to Area 5, and that there are active files in user areas 0 and 5.

Under normal circumstances, a user area is just like a disk: if the disk isn't in the drive, you can't run the programs on it, and if you aren't logged onto the right user area, you can't access the data. For instance, if you are logged into B5 and you enter **DIR**, the screen will display the file names for user area 5 on disk B; any files in other user areas will not be displayed.

You will get a similar result for whatever program or command you enter: if you add, change, or delete files, they will show up as added, changed, or deleted in the current user area. The COM files indicated on the directory for User 0 of the System diskette are accessible from any user area. Any command file which exists in User Area 0 can be run from any user area.

If you return to the A drive now, the operating system will write data to Area 5 on the disk in Drive A. Also, note that you will need to specify source (and sometimes target) user areas when you copy information back and forth between disks. (The specific command lines you enter are explained under the section on the PIP command.)

Telling The Computer Where To Go

What if you want to run a program which does not exist on any user area of the currently-logged disk, but which does exist on another drive? You have two choices. You can either copy the program you want from the drive where it exists, to the drive where you are logged; or you can simply enter the command line with the drive in front of it.

Here's an example. Let's say you wanted to find out how much space is left on a floppy disk loaded in Drive B, where you are currently logged. The STAT program will do this for you, but when you enter **STAT [RETURN]**, the screen simply says, "STAT?" So you enter **DIR [RETURN]**, and you see that the program STAT.COM is not on your diskette. But you know that it is on the diskette in Drive A. So you can enter:

    A:STAT [RETURN]

The screen will display:

    B>A:STAT [RETURN]

    A: R/O, Space: ###k
    B: R/W, Space: ###k
    B>

Briefly, this example means that the diskette in the A drive is read-only, or write protected. If this is the Vector Graphic System Diskette, it will probably have a silver write-protect tab over the notch in the upper right-hand corner of the diskette. The diskette in drive B is both read and write enabled; you can copy information onto it as well as use programs which already exist on it. The Space column indicates the amount of storage area, in kilobytes, left on the diskette.

As you see, you can run any programs, transient commands or otherwise, from any mounted diskette or disk, even if you are not logged onto that drive at the CP/M command level. As long as the file exists somewhere in the computer, you can get to it somehow. The way you can find out whether or not the program exists is by finding the file you want. To understand this better, let's take a closer look at how Vector 4 CP/M assigns and understands its file names.

Vector 4 CP/M File Naming Conventions

Files are identified by a two-part code, consisting of the file name and the extension. The file name usually describes the contents in some way; the extension indicates the type of file or the language in which the file was programmed. You can think of the name as the way you call the file, and the extension as the way the computer knows how to interpret it. File names can be up to eight characters long, extensions three characters, and the two are separated by a period. So a typical entry, with a filename of SAMPLE and an extension of DOC might look like:

SAMPLE.DOC

Furthermore, file names can be "ambiguous" or "unambiguous". An unambiguous file name (ufn for short) refers to a keyboard entry which describes one file and one file only. The example above, "FILENAME.EXT", is an unambiguous file name according to CP/M. An ambiguous file name (or afn) means that what you enter might refer to several different files. An afn is made possible by a CP/M function called the "wild card".

The wild cards used by Vector 4 CP/M are the symbols ? and *. The question mark tells the computer to accept any single character located where you placed the ?. The asterisk stands for any combination of characters needed to fill in the eight file name characters or three extension characters.

Why Would You Want To Use An AFN?

Because most utility programs you will be using will ask for file names, so that the program will know what files you want to copy, delete, move, or whatever. By entering an afn, you can call several files with similar names at the same time. This might help if you wanted to copy all command files, erase all files beginning with "ACCOUNT", or list Vector Graphic's printer driver (or List Device) files, with extensions of .LD1 and .LD2.

Using the example FILENAME.EXT, you can use wild cards in the following ways to produce the indicated response:

ENTER	TO DISPLAY
FILENAME.*	All files called FILENAME, but with any extension
*.EXT	All files with any name, but only the .EXT extension
FILENAME.E??	All files called FILENAME, with extensions beginning with E; (e.g., FILENAME.EXT, FILENAME.EGR, FILENAME.EPL)
FILE*.*	All files whose names begin with FILE and have any extension; e.g., FILENAME.EXT, FILELIST.MEM, FILE.ASM, FILEUSR.COM

The asterisk * can also represent spaces, as indicated above in FILE.ASM and FILEUSR.COM, where the names do not fill out all eight characters. (In the example above, for instance, FILENAME.E?? could be replaced with FILENAME.E*. However, the * would pick up FILENAME.EX and FILENAME.E as well, since the asterisk accepts spaces as well as characters.

As a quick aside, standard computer convention refers to the asterisk as "star" and the period between the filename and the extension as "dot". It saves time when pronouncing, for example, the ambiguous file name which means "everything on the disk": *.* ("star-dot-star", which is six syllables shorter than "asterisk-dot-asterisk".)

You can use any characters to specify a file name, with the exception of the following:

< > . , ; : = ? * [ ]

Since these are used to control functions in CP/M or to represent wild cards, you cannot create a file name using one of these characters.

Valid File Extensions Under Vector 4 CP/M

These are some of the more common extensions you might see in a directory:

EXTENSION	DESIGNATION
ASM	Assembly language source code for program file
PRN	Printer listing for program file
HEX	Hexadecimal (machine) code, ready to LOAD
BAS	BASIC language program file
$$$	Temporary file (used by the operating system while copying files)
BAK	Backup file (used in most text-editing programs)
COM	Command file (see below)

Other than these, you can give a non-program file any extension you want (any combination of three characters). The extensions listed above have a specific meaning to the operating system, though, and should not be used except where appropriate. (In addition, there may be other specific extensions used by programs which you may obtain or use in the future.) For the remainder of this manual, the Command (.COM) file will be mentioned most frequently.

Command Files

Recall that "transient commands" and "applications programs" are loaded by the Console Command Processor into the Transient Program Area before they can be run. Program files for Vector 4 CP/M are stored on disk in what are called "command files". These are displayed in the directory with the extension .COM. All Command Files are used in much the same way, since they are all created in much the same way.

Briefly, a Command file starts its career as an .ASM file, in a code that looks a little bit (but not much) like English: assembly programming language. Once the program is ready to be run, it is converted to machine code (the actual numeric instructions that the microprocessor acts on) by two other programs, ZSM.COM and LOAD.COM. Only then is the .COM file ready to be used by the Console Command Processor.

To use a command file, you need only enter the file name, plus any command line which the file requires for input. Most transient commands, for example, use optional command lines which may save you time and effort. For instance, the PIP command (which you will probably be using a great deal) allows you to make a copy of one file in another area, another disk drive, or with another name.

You can either enter the command **PIP [RETURN]**, in which case the screen will prompt you with an asterisk to tell you it is ready for the command line; or you can enter the command all at once, by entering **PIP <target>=<source> [RETURN].** Some other command files use this kind of optional entry. All the transient commands will be explained in detail in the TRANSIENT COMMANDS section of this manual.

Review

Files under Vector 4 CP/M are identified by two parts:

- a filename, which identifies and is used to call the file, and which can be up to eight characters long.

- an extension, which helps the computer interpret the file, and is three characters long.

File names can be of two types:

- unambiguous, which refers to only one file. All the spaces are taken up by acceptable characters (anything except CP/M's controls and punctuation marks).

- ambiguous, which can refer to several different files.

Vector 4 CP/M's wild cards are:

- the ?, which stands for any character in that location,

- the *, which stands for any combination of characters in that location.

RESIDENT COMMANDS

What is a Resident Command?

As you recall from the introduction, resident commands are an integral part of the Console Command Processor (CCP). Resident commands are those commands that reside permanently, or "live" in the CCP. Vector 4 CP/M provides you with several resident commands which may be interpreted and immediately executed by the CCP.

Remember that as you enter a command, the CCP interprets it and helps execute it. The CCP communicates with the user, interprets the commands and helps in the execution of the commands by making use of BIOS and BDOS. In addition, the CCP allows you to correct your mistakes when entering command lines. Before listing and describing the "resident commands", below you will find a list of control keys that may be used when editing (correcting) the mistakes you may make while entering a command line.

CCP Control Keys

Reminder: the [CTRL]-key sequences are executed by holding down the [CTRL] key while pressing the desired letter key.

[BACKSPACE] or [DEL] - deletes the last character(s) entered at the terminal. There is no difference in the function of either control key. Both will perform the same task: deleting (erasing) the last character(s) entered at the terminal.

[CTRL X] - deletes (erases) the entire line entered at the terminal. If you have made a mistake and find it simpler to erase the entire line than to use the [BACKSPACE], enter [CTRL X].

[CTRL U] - cancels the current line by not transmitting it to CP/M. [CTRL U] does not delete the line as [CTRL X] does, but simply skips over the line and goes on to the next clean line. When you press [CTRL U], you will get the cursor but not the prompt. It is not necessary to get the prompt in order to enter your command again; however, if you want the prompt, you must press [RETURN].

[CTRL E] - physical end of line; splits a long command line for readability. Carriage is returned but line is not sent until a [RETURN] is entered.

[CTRL C] - there are two functions that [CTRL C] performs: first, it restarts the system via a warm boot (effectively cancelling the program in progress); second, it warm boots for a newly inserted diskette.

[CTRL D] - clears the screen before executing any CCP command; it must be entered before the command. You can also enter [CTRL D] [RETURN] to clear the screen.

[CTRL Z] - allows you to end the input from the terminal. Only used when entering a file from the keyboard, when the PIP program has assigned the keyboard as an input file. (This, like several other CCP commands, is a carry-over from the days when the keyboard was a Teletype-style terminal, working directly to punched tape.)

[CTRL P] - copies all subsequent console output to the currently assigned printer. To cancel [CTRL P], simply enter a second [CTRL P].

[CTRL K] - sends a form feed to the currently assigned printer; if no printer is assigned, [CTRL K] will be ignored.

[CTRL S] - stops the terminal output temporarily; program execution and output continues when any key, except [CTRL C], is entered at the terminal. This feature is used to stop output on high speed terminals (such as the CRT on your Vector 4) in order to view a segment of output before continuing.

Below is a list of the "resident commands" that you will be using with your system. Every command will be explained and described. The format for the commands is as follows: A><command> [RETURN].

Note that, although all commands are represented in UPPER CASE, the CCP accepts either upper or lower case letters as input.

List of Resident Commands

ERA	Erases specified files
DIR	Lists file names in the directory
REN	Renames the specified file
SAVE	Saves memory contents in a file
USER n	Allows you to choose different working areas within a drive
TYPE	Types or displays the contents of a file on the logged disk to the terminal
TPA	Jumps to address 100H in user's memory
BSPL	Begins Spooler

ESPL	Ends Spooler
DSPL	Activates Despooler to print a specified spooled file.
ESPL	Ends Spooler
KSPL	Aborts the Despooler
BYE	Performs a cold boot process.

The ERA Command

The ERA (erase) command allows you to erase from the disk one or more files at a time. You can use both ambiguous and unambiguous file names with the ERA command. (Recall from the Introduction To Vector 4 CP/M that an ambiguous file name refers to more than one file at a time by means of the CP/M wild cards * and ?, while an unambiguous file name refers to one and only one.) The following examples show you the different ways you can use ERA.

Erasing With Unambiguous File Names

1. Suppose that you have a file named SALES.MEM. To erase this file you would proceed by using the following command format:

    FORMAT:

    ERA <UFN> [RETURN]

    EXAMPLE:

    A>ERA SALES.MEM [RETURN]

    RESULT:

    The file SALES.MEM has been erased.

Erasing With Ambiguous File Names

2. To erase several files with the same name (e.g., SALES) but a different extension, you would use the following format:

    FORMAT:

    ERA <filename>.* [RETURN]

EXAMPLE:

A>ERA SALES.* [RETURN]

RESULT:

All files with the name SALES (no matter what their extension) have been erased.

3. To erase all files with different names but the same extension (e.g., MEM), use the following format:

FORMAT:

ERA *.<EXT> [RETURN]

EXAMPLE:

A>ERA *.MEM [RETURN]

RESULT:

All files with an extension of MEM have been erased.

4. On drive C, you have several files with different names; however, they all share a common denominator in that they all share certain characters. Let's say you have the following filenames: Pat, Put, Pot, Pet. As you can see all the filenames share the characters 'P' and 'T'. The same is true of the extensions, you have: 'MEM', 'MOM', 'MAM', 'MUM'. The character 'M' is shared by the extensions. You need a command format that will include a 'wild card' to find the rest of the letters or numbers that are not shared by the filenames and/or extensions.

FORMAT:

ERA X?Y.C?M [RETURN]

EXAMPLE:

A>ERA P?T.M?M [RETURN]

RESULT:

All filenames that share the same characters in their filenames as well as in their extensions, have been erased.

5.   You have 20 different files on the disk, you want to erase them all no matter what their name or extension:

FORMAT:

   ERA *.* [RETURN]

EXAMPLE:

   A>ERA *.* [RETURN]

RESULT:

All files on the current disk are being considered for erasure. However, in case you have made a mistake, or changed your mind, the system prompts you to verify your decision of erasing all data on the disk by asking you the following question:

   ALL FILES (Y/N)?

Since you do want all the files erased, you would enter [Y] and [RETURN] to verify the command.

6.   You want to erase all files with a MEM extension on drive C. The format would be the following:

FORMAT:

   ERA d:*.EXT [RETURN]

EXAMPLE:

   A>ERA C:*.MEM [RETURN]

RESULT:

All files on Drive C, with an extension of MEM, are erased without erasing the files on the other drives.

The DIR Command

The DIR (directory) command allows you to list the files that are on your disk. With DIR, you can display any filename that is on your disk. You can access these files from any drive.

1. To list the directory entry for the file RECORD.MEM, which is an unambiguous filename, you would enter the following:

FORMAT:

    DIR <UFN> [RETURN]

EXAMPLE:

    A>DIR RECORD.MEM [RETURN]

RESULT:

The filename RECORD.MEM will be displayed, with the indicator A: at the head of the line to indicate that the file exists on the current drive.

2. You have several files with different names, but several of the same characters or numbers within their filenames and extensions. Recall that in the ERA command, Example 4, you used the following examples:

    Filename: PUT, POT, PET, PAT.

    Extension: MEM, MOM, MAM, MUM.

The same examples will be used here.

FORMAT:

    DIR X?Z.C?M [RETURN]

EXAMPLE:

    A>DIR P?T.M?M [RETURN]

RESULT:

All filenames and extensions that match the specified reference will be displayed.

3. Suppose you have several files, all with different filenames; however, they share the same extension. In this case, you want to display all the files with an extension of MEM.

FORMAT:

    DIR *.<EXT> [RETURN]

EXAMPLE:

A>DIR *.MEM [RETURN]

RESULT:

All files with an extension of MEM will be displayed.

4. Many times, you may want to find out the names of files stored on another drive. For example, you may want to obtain a listing of the filenames in drive B, while logged into the A drive.

FORMAT:

DIR d: [RETURN]

EXAMPLE:

DIR B: [RETURN]

RESULT:

All files in Drive B will be displayed. (This may save time over the alternative method, which is to log into the B drive first, then enter DIR [RETURN].)

5. To list a particular file within Drive B, enter the following:

FORMAT:

DIR B:<UFN> [RETURN]

EXAMPLE:

A>DIR B:TECH.COM [RETURN]

RESULT:

The file TECH.COM on Drive B will be displayed.

6. Again, if you have several files with different filenames, but which share several characters or numbers (similar to ERA question 4, and DIR question 2) you would do the following:

FORMAT:

DIR B:*.A?M [RETURN]

EXAMPLE:

A>DIR B:P*T.C?M [RETURN]

RESULT:

All ambiguous files which match the specified reference will be displayed.

The REN Command

The REN (rename) allows you to change the name of any of the files on your disk. The command format is:

REN <new>=<old>

where **<new>** is the name that will access the file, and **<old>** is the name used to access the file before renaming it.

1. You have a file which is named PRIMER.MEM. You want to change the name of this file to RECORD.TXT. The format to use would be:

FORMAT:

REN NEWFILE.EXT=OLDFILE.EXT [RETURN]

EXAMPLE:

A>REN RECORD.TXT=PRIMER.MEM [RETURN]

RESULT:

The file PRIMER.MEM is now accessed by the name RECORD.TXT.

2. REN can also be used to change the extension of a file without changing its name.

FORMAT:

REN Y.TXT=Y.MEM [RETURN]

EXAMPLE:

A>REN DAISY.TXT=DAISY.MEM [RETURN]

RESULT:

The file DAISY.MEM has been changed to DAISY.TXT.

3. REN can also be used to change the name, but not the extension, of a file within the same drive. Let's look at the following example:

FORMAT:

REN X.ASM=Y.ASM [RETURN]

EXAMPLE:

A>REN RECORD.ASM=TECH.ASM [RETURN]

RESULT:

The file TECH.ASM has been changed to RECORD.ASM.

4. You can also rename a file on a drive other than the currently-logged disk:

FORMAT:

REN B:X.BAS=Z.BAS [RETURN]

EXAMPLE:

A>REN B: INITIAL.BAS=PROMPT.BAS [RETURN]

RESULT:

On Drive B, the filename PROMPT.BAS has been changed to INITIAL.BAS.

The SAVE Command

The SAVE command is most useful to programmers and to users who need to write data directly to disk from the TPA. Under most circumstances, using SAVE requires experience with data addressing and the specific location in the RAM of individual blocks of data. However, this command may provide a way to create emergency disk copies of data, if you are trying to retrieve the data after a RESET. See the TPA Command for details of that procedure.

The SAVE command copies "pages" (256-byte blocks) onto disk from the TPA and names this file with a specified unambiguous file name. In the CP/M distribution system, the TPA starts at 100H (hexadecimal), which is the second page of memory; therefore, if the user's program occupies the area from 100H through 2FFH, the SAVE command must specify two (2) pages of memory. The machine code file can be subsequently loaded and executed. The SAVE command can also specify a disk drive in the <ufn> portion of the command. Following are examples of the SAVE command:

SAVE 3 X.COM   Copies the data located at RAM addresses 100H through 3FFH to a file named X.COM.

SAVE 40 C   Copies 100H through 28FFH to a file named 'C' (note that 28 is the page count in 28FFH and that 28H = 2x16+8 =40 decimal).

SAVE 4 X.Y   Copies 100H through 4FFH to a file named X.Y.

SAVE 10 B:ZOT.COM   Copies 10 pages (100H through 0AFFH) to a file named ZOT.COM on Drive B.

The USER n Command

USER n allows you to divide the user space within a disk into several sections. User areas are numbered 0 to 15 (n stands for the various user areas). This command is useful if you are going to share your disk with other users, or if you need to have separate compartments within your disk to store files. You can think of user areas as different drawers in the same filing cabinet. As you probably know by now, when you start up CP/M, it assumes that you are in user 0. You must tell it that you want to go to another user area.

FORMAT:

USER n [RETURN]

EXAMPLE:

A>USER 3 [RETURN]

RESULT:

CP/M will take you to user area three.

The TYPE Command

The TYPE command allows you to display the contents of any file within the same or a different drive.

1. Let's say you have a file with the name SAVE.MEM. You would TYPE it in the following manner:

    FORMAT:

    TYPE X.Y [RETURN]

    EXAMPLE:

    A>TYPE SAVE.MEM [RETURN]

    RESULT:

    If you actually had this file on your disk, you would have the contents of this file displayed on your screen.

2. There may be times when you need to TYPE files on other drives. To do this, use the following format:

    FORMAT:

    TYPE d:filename.ext [RETURN]

    EXAMPLE:

    A>TYPE B:PROTOCOL.PRN [RETURN]

    RESULT:

    The file PROTOCOL.PRN on Drive B would be displayed on your screen.

The TPA Command

The TPA (Transient Program Area) command will allow you to get back to the last program from CP/M, as long as that program is still in memory. Many times, while you are working within a program (Memorite, ExecuPlan), you may decide to quit and go to CP/M. The TPA command lets you go directly from CP/M to the last file you worked on in a particular program.

1.   Suppose that you are working within Memorite with the file RECORD.MEM. For some reason, you have to leave the MEMORITE program and go to CP/M. Once you are in CP/M, you can go directly to MEMORITE and the file you were working on by entering **TPA [RETURN]**. The following example will show you how to use TPA when already in CP/M:

FORMAT:

   TPA [RETURN]

EXAMPLE:

   A>TPA [RETURN]

RESULT:

Any prompts or actions resulting from the last program you were using will display on your screen.

2.   If you have to press the RESET button to stop a program from executing, normally this results in a loss of all information you have entered since the last SAVE command (or the last time you wrote to disk). Enter the TPA command after booting, and you may be able to save the information you had entered before resetting.

The format and example for this use of TPA are identical; the only difference is that you would use it after a RESET to try to retrieve lost information.

Note also that, should you accidentally leave a program and use the TPA command to reenter it, you can copy that program (and all its data) to disk by using the SAVE command described earlier. You will need to specify the approximate size of the program or data in memory, in "pages" of 256 bytes.

The BSPL Command

The BSPL (begin spooler) command allows you to spool (send) a particular file to the disk so that eventually it can be printed out. The BSPL command will begin the spooler function and send all subsequent printer characters to a specified file. BSPL will detach any attached printer device before spooling. Therefore, after completion of BSPL, make sure you attach your printer.

As another suggestion, consider using a specific extension for all spooled files. Although the spooler will accept any extension, it is usually a good idea to use a certain type of extension to signify that all files with that extension are to be dealt with in the same way.

FORMAT:

BSPL d:filename [RETURN] (must be ufn)

EXAMPLE

A>BSPL D:RECORD.SPL [RETURN]

RESULT:

A blank file called RECORD.SPL will be opened on the disk. Now, the next time you run a program which would normally send output to the printer, that output would be sent to this file. (To quit sending output to the spooler file, see the ESPL command, below.)

After the command is entered, one of the following messages will display on the terminal giving the status of the spooler:

SPOOLER ACTIVATED spooler has been successfully activated

SPOOLER ALREADY ACTIVE spooler has already been activated and is ready

FILE EXISTS spooler is trying to work with an existing spooled file

DIR FULL no room left in directory

ILLEGAL FILENAME filename specified has illegal characters in the entry.

The ESPL Command

The ESPL (end spooler) command will close the spooled file and deactivate the spooler. The spooler will not close after a warm boot, it will remain open; therefore, this command must be executed when the user no longer wants the printer information to go to the spooler file. After the command is entered, one of the following messages will display on the terminal giving the status of the end-spooler attempt:

FORMAT:

ESPL [RETURN]

EXAMPLE:

ESPL [RETURN]

RESULT:

The spooler will be deactivated, or one of the other messages below will appear on your screen:

SPOOLER CLOSED spooler has been successfully activated.

SPOOLER NOT ACTIVE spooler has already been deactivated, or if the spooler gets an I/O error of some sort.

BAD WRITE spooler encounters a disk I/O error when trying to write the last sector.

CLOSE ERROR spooler encounters a problem writing to the directory or trying to spool to a deleted file.

The DSPL Command

The DSPL command will despool the specified file to a specific print device. The format of the command line is as follows:

FORMAT:

DSPL n< d:filename [RETURN]

Where **n** is the print device (either 1 or 2), and < will optionally turn on the **auto-paging** function. The filename must be unambiguous. The despooler runs in "background", i.e., the despooler may be printing to the list device and the user can continue with some other task, such as editing another file.

EXAMPLE:

A>DSPL 2< D:RECORD.SPL [RETURN]

RESULT:

After the command is entered, one of the following messages will display on the terminal giving the status of the despooler.

DESPOOL ACTIVATED despooler has been activated successfully.

DESPOOL ALREADY ACTIVE despooler has been asked to work on more than one file at a time.

NO FILE despooler cannot find the specified file on that disk, or the file has not yet been spooled.

ERROR - d:ILLEGAL '?' IN FCB entry uses wild-card in file name specification; file entered must be ufn.

PRINTER IS BUSY printer is in use by another program.

If no error-causing condition exists, the previously-spooled file RECORD.SPL will be printed out on printer 2.

The KSPL Command

The KSPL command will abort, or prematurely stop, the operation of the despooler; otherwise, the despooler will turn off normally once the specified file has been printed.

FORMAT:

KSPL [RETURN]

EXAMPLE:

A>KSPL [RETURN]

RESULT:

After the command is entered, one of the following messages will display on the terminal giving the status of the abort attempt:

DESPOOL ABORTED despooler has been aborted successfully. The printer will stop.

DESPOOL NOT ACTIVE despooler is not active so cannot be aborted.

NOTE: The despooler will not expand tabs or initialize pagination control; it will send characters to the printer exactly as they are in the file. It is important to spool to a file using a printer driver to achieve printing effects.

The BYE Command

The BYE command will allow you to perform a cold boot procedure at your terminal, without having to press the RESET button. The command format is the following:

FORMAT:

BYE [RETURN]

EXAMPLE

A>BYE [RETURN]

RESULT:

The screen will clear and display:

VECTOR 4 CP/M VERSION 1.X
PRINTER 1 LOADED WITH A DRAFT DRIVER
PRINTER 2 LOADED WITH A WORD PROCESSING DRIVER

A>

TRANSIENT COMMANDS

What Is a Transient Command?

Recall from the Introduction to Vector 4 CP/M that Transient Commands are additional command files written to support the operating system. A command file is stored in machine code, a language that the computer can read and process very quickly. You can tell a command file from the directory by the fact that it has an extension of COM.

Each program is called in basically the same way: you simply type the file name, any command lines or options used by the program, and a [RETURN]. If the input doesn't match a command file stored on that disk drive, the screen will display your entry followed by a question mark.

If this happens, make sure that the entry was typed correctly. If so, enter DIR and make sure that the file you want is on that disk drive. If it isn't, log onto the other drive (or check your other diskettes) and keep entering DIR until you find the file you need.

When the CCP finds the command file that matches your entry, a copy of the file is sent through the Basic Input/Output System (BIOS) to the Transient Program Area (TPA). From there, the program is run and its function is performed.

What The Transient Commands Accomplish

Transient commands fall into three categories: utilities, tests, and programming commands. Utilities help with disk and file management; tests and programming commands are used for program development, as well as when you suspect a problem or "bug" in either hardware or software and want to define this problem further. Of the programming and test commands, most are used in advanced programming functions, and are explained in the optional Vector 4 Programmer's Guide. They will not be discussed in this manual.

Most transient commands have two or more options to allow you to achieve the exact effect you desire. In the Overview which follows, these options will be mentioned; in the PROCEDURES FOR USING TRANSIENT COMMANDS, the methods of using each option will be described in full. Be sure you know what options are available before you enter any transient command.

Overview Of Transient Commands

GENSYS: Copies the Vector 4 CP/M operating system onto a formatted target disk or diskette. You can use this to set up your computer the first time, and you will probably use it to make back up copies of the system diskette.

CONFIG: "Personalizes" your system. Using CONFIG, you can specify printers, set disk drive assignments, or arrange for an "auto-command" (specify a program which automatically runs each time you bring up the system). There are several other options as well.

STAT: Lists the number of bytes of storage space remaining on the specified disk or used by the specified file, and can display or alter disk, file, or device status.

PIP: Copies programs and text files between disks and user areas. Can also be used to transfer files to or from logical devices, such as printers or communication lines.

FORMAT: Copies a "framework" for the operating system onto a blank disk or diskette. (Actually, this program erases information before formatting, so do not format any disk or diskette which contains valuable information.) Once this framework exists, you can copy files to the disk or use the GENSYS to create a backup copy.

DISKCOPY: Creates a copy or backup of single or double sided diskettes. For this program, it is not required to format the diskette first.

STORE: Used for backing up a hard disk to a floppy, if there is more information on the hard disk than can be contained on a single floppy. Automatically keeps track of files which are continued across two or more diskettes.

RESTORE: Returns the files put on diskette by the STORE program to hard disk. (Typically, you would use STORE to create a backup copy of hard disk information, then use RESTORE to copy from the backup to the main disk.)

PROCEDURES FOR USING TRANSIENT COMMANDS

All transient commands, like the resident commands, are called by entering the name of the command, any options or information that the commands require, and a [RETURN]. However, be sure to read the explanation of each command (either here or in the Appendix, "Diskette Directories") before entering a command. Some programs may cause unexpected results if used without understanding of all options.

The GENSYS Command

This command copies the Vector 4 CP/M operating system (GENerates a SYStem) onto a formatted target disk or diskette. The screen will offer options at each step of the program. The program writes a copy of Vector 4 CP/M on the first two tracks (called the system tracks) of the destination drive so that you will be able to boot the system from the new copy.

Note, however, that this will not copy the entire operating system. All the transient commands mentioned in this section are separate files, and must be copied individually before you have a complete system.

The program automatically determines the type of system used, the applicable number of disk drives, and will prompt you for one of the two possible systems to generate.

If your system uses a hard disk, and you want to copy the operating system onto the hard disk prior to beginning work, go to **Preparing A Hard-Disk System for Operation,** below.

If you simply want to make a backup copy on a floppy disk, or if you want to make a new copy of the system disk for a floppy-only system, continue.

Preparing A Floppy-Only or Backup System Disk

If you are making a backup diskette for a hard-disk system, the prompts to "insert source and destination diskettes" will not appear, since the program will take its information from the hard disk.

1. With your system diskette in the current drive (or while logged onto a drive which contains the program GENSYS.COM), enter the command **GENSYS [RETURN].** The screen will display:

VECTOR GRAPHIC VECTOR 4 CP/M SYSTEM GENERATION UTILITY - VERSION 1.0

[1]   GENERATE A FLOPPY ONLY SYSTEM
[2]   GENERATE A HARD DISK + FLOPPY SYSTEM

SELECT ONE OF THE ABOVE:

2. Enter the number **1 [RETURN]**. The screen will display:

SELECT THE DESTINATION DRIVE [A], [B], [C] :

3. (The actual drive selection will reflect your system configuration). Enter the letter for the drive to which you will copy the operating system. The screen will display:

INSERT DESTINATION DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

4. You can use the same physical drive for both destination and source diskettes. Press **[RETURN]** when you have inserted and mounted the diskette in the drive. The screen will display:

DO YOU WANT THE VECTOR SYSTEM AND LIST DEVICE FILES COPIED? [Y] OR [N]:

Enter **Y** if you intend to boot from the newly-generated system diskette. If you enter **N**, you will not be able to use the diskette for booting.

5. The screen will display:

INSERT SOURCE DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

Remove the destination diskette from the drive and insert the system diskette. Press **[RETURN]**. The drive will make a "clicking" sound for several seconds. Then the screen will display:

INSERT DESTINATION DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

6. Again, remove the diskette from the drive and insert the backup diskette. When you press **[RETURN]**, the drive will click again. The screen will display:

VECTOR.CPM FILE COPIED TO DESTINATION DRIVE
VECTOR.LD1 FILE COPIED TO DESTINATION DRIVE
VECTOR.LD2 FILE COPIED TO DESTINATION DRIVE

7. If you have a floppy-only system, the screen will prompt you to:

INSERT SOURCE DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

Once you have done so, the drive will click for several seconds, then the screen will display:

INSERT DESTINATION DISKETTE AND PRESS THE [RETURN] KEY WHEN READY:

8. At this time the screen will display:

GENSYS.COM FILE COPIED TO DESTINATION DRIVE

9. The screen will display:

SYSTEM GENERATION COMPLETED

You now have a backup of the operating system. If you lose or damage the System diskette, you can boot from the newly-made diskette. However, you will still have to copy the Transient Commands, as well as any other programs you use, onto this disk before you can use it for all your work.

Preparing A Hard-Disk System For Operation

If your Vector Graphic computer system uses either optional hard disk (5 or 10 megabyte), you may also use the GENSYS program to set up the hard disk so that it can be used to boot the system. Although this function will already have been performed at the factory, you may someday need to run the program again (for example, after formatting your hard disk).

With the 5-megabyte drive only, you have the option of being able to specify whether you desire 1 or 2 "logical surfaces" on the disk. Choosing one logical surface (the "A" drive only) means that all files stored on hard disk can be accessed through the same directory, whether by you or by another program. This may be convenient if you only use your computer for one type of work.

On the other hand, using two logical surfaces may make it easier for you to keep track of your files. If you use your computer for more than one task (let's say accounting and word processing), you might find it sensible to keep Vector's MEMORITE Word Processing Software on one drive, along with all the files you create, and load the PEACHTREE Accounting Package on the other drive.
The 10-megabyte hard drive, however, is available only as a two-drive system (Drives A: and B:).

You can also choose the number of directory entries used on each logical surface (256, 512, 768, or 1,024 entries per surface). If you plan to create only a few, fairly large files, you should select one of the smaller directory sizes. This may make the system run a tiny bit faster as well, since the Basic Disk Operating System will not have to read as many entries to find the file you request.

If, however, you plan to use your system for a large number of fairly small files (such as letters, individual bills, et cetera), choose one of the larger numbers of directory entries.

CAUTION

Make sure that the number of directory entries is not decreased unless the disk is completely erased (formatted). Conflicting numbers of directory entries will lead to disastrous confusion on the part of the Basic Disk Operating System.

1. Enter **GENSYS [RETURN].** The screen will display:

    VECTOR GRAPHIC VECTOR 4 CP/M SYSTEM GENERATION UTILITY – VERSION 1.x

    [1] GENERATE A FLOPPY ONLY SYSTEM
    [2] GENERATE A HARD DISK + FLOPPY SYSTEM

    SELECT ONE OF THE ABOVE:

2. Enter **2 [RETURN].**

    If you have a 10-megabyte hard drive, skip to Step 4.
    If you have a 5-megabyte drive, the screen will display:

    SELECT THE NUMBER OF LOGICAL SURFACES [1] OR [2]:

3. Enter [1] if the hard disk is to consist of Drive A only; enter [2] if you plan to use two disk drives, A and B.

4. The screen will display:

    [1] 256 ENTRIES
    [2] 512 ENTRIES
    [3] 768 ENTRIES
    [4] 1024 ENTRIES

    SELECT THE DIRECTORY SIZE FROM ABOVE:

CAUTION

Make sure that the number of directory entries is not reduced unless the disk has been completely formatted. (Standard directory size is 512.) Reducing the directory size can cause the Basic Disk Operating System to lose files which extend beyond the new maximum, or to lose data stored in tracks which must be used for an enlarged directory.

5. Enter the number corresponding to the size of directory you plan to use. The screen will display:

SELECT THE BOOTSTRAP SURFACE [1] OR [2]:

The numbers correspond to the letters of the alphabet (A=1, B=2). Enter 1 to store the operating system on Drive A>; if the system is stored on Drive B, you will need to enter **2** from the **SBC >** prompt to boot. The screen will display:

DO YOU WANT THE VECTOR SYSTEM AND LIST DEVICE FILES COPIED? [Y] OR [N]:

NOTE

If you have formatted your disk drive, you must enter Y to store the operating system, or you will not be able to boot from the hard drive. If you are simply changing the directory size - which is not advisable without formatting - or changing the number of surfaces, you may enter either **Y** or **N.**

6. Enter **Y [RETURN].** The screen will display:

VECTOR.CPM FILE COPIED TO DESTINATION DRIVE
VECTOR.LD1 FILE COPIED TO DESTINATION DRIVE
VECTOR.LD2 FILE COPIED TO DESTINATION DRIVE
GENSYS.COM FILE COPIED TO DESTINATION DRIVE

7. After a few minutes, the screen will display:

SYSTEM GENERATION COMPLETED

At this point, you can boot the system from the surface selected in the last step. However, this procedure does not copy any transient commands or applications programs to the target disk, though you can use it to boot the system, and to GENSYS another diskette. To copy the entire Vector 4 CP/M operating system to your hard disk, you will have to use the PIP program to copy the remaining transient commands.

Since GENSYS writes a new operating system onto the first two tracks (called the system tracks for this reason) of the target, it does not destroy files already on the target disk or diskette (except for older copies, if any, of the operating system). If you need to make a backup copy of the operating system, and all you have is a partially-filled diskette, you can run GENSYS without fear of erasing data files.

Likewise, you can run GENSYS on your hard disk without formatting or erasing the disk first. However, make sure that there is space on the disk for each transient command file if you will be copying them as well. (To determine the size of each transient command, enter the line **STAT *.COM [RETURN]** while you are logged into the source disk.)

The CONFIG Command File

The purpose of the CONFIG program is to "customize" your system to fit the different possible types of printers, disk drives, and versions of the operating system used on different Vector products. The program automatically detects the type of system software and hardware used, which means that you don't have to give detailed instructions about the specifications of your computer. You can use different options in the program to:

- select and attach the specific type of printer you use

- adjust the layout of the page for different applications

- adjust the baud rate (speed of transmission) of the serial printer or modem temporarily

- set floppy drives to double- or single-sided operation

- change the disk access conditions for error detection

- change the system characteristics

- introduce an "auto-command" to the booting procedure

It might be more accurate to think of CONFIG as several different programs, each called by the command line **CONFIG <options> [RETURN]**. Based on the past experiences of Vector users, you will probably use CONFIG for selecting printers more than any other activity; with that in mind, the majority of the program's options are dedicated to the task of choosing and controlling printers.

Selecting Printers: List Device Files

Your Vector 4 is capable of supporting two printers. To control these printers, Vector 4 CP/M reads list device files (also called printer drivers) into memory. Vector 4 CP/M supports two list device files (shown in the directory as VECTOR.LD1 and VECTOR.LD2). Once you have copied the correct instructions for your printer into each list device file, you will use the CONFIG program to select the printer for current use.

Selecting a printer is necessary for any printing operations from the operating system. Some applications programs you use may have routines which handle the printer selecting and attaching for you. If you print exclusively from Vector Graphic's MEMORITE word-processing program, for example, you should not have to use CONFIG to select the printer: MEMORITE contains commands which manage this for you. To be certain, check the manual for the specific applications program, regarding references to attaching the printer.

Before you can use the CONFIG program to select a printer, you must have the correct printer driver specified. If you are using the Vector 7700 letter-quality printer, that will not be necessary. The 7700 is set to read from Driver 2.

However, if you are using a different type of printer, you will need to know the type of printer you are using, whether it is serial or parallel (electronic terms for the way information is sent to the printer for decoding), and whether the printer driver file exists on your disk or diskette.

If you have purchased a non-standard printer, you will probably need a special driver to run it. See the operating instructions for the specific type of printer you have to determine which list device file to use for your printer; then refer to the Programming Manual for instructions on how to set up your printer drivers for non-standard list devices.

Once you specify the programs for both List Device files, you can choose which one of them you wish to use at that time with the CONFIG command.

Attaching Printers: Configuring The System

The system is now set to read from one or the other of two list device files. You now need to tell it which one you want it to read, and the way to tell it that is through the CONFIG command.

To the operating system, printing consists of sending a stream of characters — some data, some instructions — to a location in the system which is specified by the CONFIG program. This program allows you four options: to send the printout nowhere, to send it to Printer 1, to Printer 2, or back to the screen.

Entering **CONFIG 0/1/2/3 [RETURN]** allows you to select from these four different options. For example, to choose to print from List Device 2, enter the command:

CONFIG 2 [RETURN]

The program will "select" and "attach" the system, and adjust its settings to send all printer-bound instructions to the printer set up as Printer 2 (the Vector 7700 in standard systems).

If you would like the screen to prompt you with the available options, you can also enter the command:

CONFIG [RETURN]

This will make the screen respond with:

VECTOR 4 CP/M CONFIGURATION PROGRAM   VER. 1.X

PRINTER SELECTION

[0] DISCARD PRINTOUT
[1] LIST DEVICE 1 - <current setting>
[2] LIST DEVICE 2 - <current setting>
[3] ROUTE PRINTER OUTPUT TO SYSTEM CONSOLE

ENTER SELECTION (#):

(where the (#) indicates the present selection). Entering each of the options will have the following result:

[0] DISCARD PRINTOUT

Choose this option if you do not have a printer connected to the system. In addition, some applications programs (such as Vector Graphic's MEMORITE III) handle selecting and attaching the printer directly, and the printer cannot be attached using CONFIG. (See the specific program manual for information on printers.)

[1] LIST DEVICE 1 or [2] LIST DEVICE 2

Enter either **[1]** or **[2]**, depending on the printer you would like to use. On standard Vector 4 systems, Printer 1 is not used, and Printer 2 is the Vector 7700 letter-quality printer.

[3] ROUTE PRINTER OUTPUT TO SYSTEM CONSOLE

This option sends the printout to the terminal. You will probably use this only if you are training in the commands for printing, while no printer is attached to the system.

Once you have entered the number of the option you want, the screen will display the A> prompt, indicating that Vector 4 CP/M has returned to command level. If some other program is using the printer, the screen will display the message:

PRINTER IS BUSY

Wait for the other program to end, or reboot and run the CONFIG program again, selecting 0 to clear the system, then one more time to select the desired printer.

Configuring Floppy Drives

The command to configure floppy drives is **CONFIG F [RETURN]**

This option allows you to set your floppy disk drives for single- or double-sided configuration. Each drive may be set individually; it is thereby possible to set up the computer with one logical disk drive for single-sided diskettes, and another drive for double-sided (even if you only have one actual physical slot to insert your diskettes).

1. When you see the A> prompt, enter **CONFIG F [RETURN]** The screen will display:

    FLOPPY DISK CONFIGURATION (SINGLE/DOUBLE)

    SET DRIVE d: TO [S] SINGLE OR [D] DOUBLE - (D):

2. This line will display for each available drive (listed as d: in the above example) currently supported by your system. Set up diskette configuration according to the following:

    Press [S] to set drive to single-sided.

    Press [D] to set drive to double-sided.

    Press [RETURN] to leave drive as indicated on screen.

3. When all floppy drives have been selected for configuration, the screen will display:

MAKE SELECTION PERMANENT [Y]-[N]?

Entering [Y] will make the system come up according to the newly-entered instructions each time you boot up. Entering [N] will make the system return to the previous settings after the next reset or other cold boot.

Remember also that "permanent" means until you change it to another way. You can alter this, simply by running CONFIG F again, at any later date.

The screen will then display:

PRESS [RETURN] TO CONFIRM SELECTION OR [ESC] TO ABORT...

If you decide that the setting is not as you would like it, press the [ESC] key and the program will not continue. Otherwise, enter a [RETURN] and the program will store your selection.

When the program is completed, the system will go through a cold boot to reset the operating system for the newly-specified drives.

The CONFIG A Option

Recall from the Introduction that booting the system consists of giving a command to copy the operating system from its location on the disk or diskette, into the computer's memory. The CONFIG A command lets you set up a sort of "P.S." to the booting procedure.

The CONFIG A option creates a file called VECTOR.CMD, which the booting program looks for. If it finds no VECTOR.CMD, you get the A> prompt and business as usual after booting. But if you have put in an auto command, the booting program will do whatever you instruct it to do, each time you boot. You can instruct the system to run any command file, including applications programs as well as transient commands.

There are a few restrictions, however. You can only have one auto command set up per disk or diskette, and that must be the one from which you boot. Naturally, you can change the auto command later if you decide to. Also, the auto command cannot be more than one line long.

As an example, recall from the section above on the CONFIG 1/2/3/4 command that you can enter CONFIG # to select a printer from the two list devices for which your system is set up. If you want to select that printer each time you boot the system, you can use the CONFIG A option to set up your computer for exactly this kind of "custom sign-on", in the following way.

1. Enter **CONFIG A [RETURN]**. The screen will display:

    VECTOR 4 CP/M CONFIGURATION PROGRAM   VER. 1.X

    AUTO COMMAND SELECTION

    [0] CLEAR AUTO COMMAND
    [1] AUTO COMMAND ON COLD BOOT
    [2] AUTO COMMAND ON WARM BOOT
    [3] AUTO COMMAND ON COLD AND WARM BOOT

    CURRENTLY - (0) * NO COMMAND ASSIGNED ***

    ENTER DESIRED SELECTION:

The line which shows current command assigned may, of course, be different on your system. However, if you are just beginning to use your computer, there will probably be no command assigned.

2. Enter your choice for auto command. You would enter 0 to clear any command already selected, 1, 2, or 3 according to the following:

    Cold boot only [1]: command will execute when you first turn on the power, or when you press the **[RESET]** button, enter **BYE**, or run another program which leaves through a cold boot.

    Warm boot only [2]: command will execute when a program is run which exits to the operating system, returning CP/M to the command level. (Command will not run on reset or power-on.)

    Cold and warm boot [3]: command will execute any time CP/M returns to the command level. You should only use option 3 on a hard-disk system if the command you set up allows you to access CP/M directly, with the option of erasing the VECTOR.CMD file; otherwise you will be locked in the auto command program, with no chance of exiting, and the computer will take over your mind.

Seriously, option 3 with a hard disk is as nearly permanent as it is possible to get with a computer, so use it carefully or not at all. Correcting a warm/cold auto boot command requires running the GENSYS program to generate a new operating system on your hard disk, which will erase the VECTOR.CMD file. It's not dangerous, but it means a little unnecessary work. Naturally, for a floppy-only system, simply boot from a different disk.

3. Once you have entered your choice, the screen will prompt you to:

ENTER AUTO COMMAND STRING:

Here, you enter the file name (along with any necessary parameters) which you want to run after booting. Since our example uses the CONFIG program, let's assume that you wish to select List Device 2. You would enter:

CONFIG 2 [RETURN]

4. The screen will display:

MAKE SELECTION PERMANENT ([Y]-[N])?

"Permanent" only means until you change it again. Enter [Y] to have the auto command run every time you boot up, [N] for the command to be erased when next you power on the system.

The screen will then display:

PRESS [RETURN] TO CONFIRM SELECTION OR [ESC] TO ABORT...

If you decide that the setting is not as you would like it, press the [ESC] key and the program will not continue. Otherwise, enter a [RETURN] and the program will store your selection.

From now on, the system will automatically select and attach the printer youspecify as List Device 2 whenever you boot (warm, cold, or both, depending on whether you chose 1, 2, or 3).

The CONFIG O Option

If you find that you must frequently adjust the page settings of your printer (to fit different forms, for example), you might want to consider the CONFIG O option. (Right now, note that this is CONFIG O as in Option, not CONFIG O as in zero.) This command allows you to specify:

- total physical lines per page

- total number of printed lines per page

- number of lines to leave blank at the top of each page

- automatic paging (on or off)

Note that it is possible to generate a printer driver which will automatically and permanently use the page settings you desire. For information on this, see the Vector 4 CP/M Programmer's Guide (Vector Graphic part number 7100-0003).

Before you run CONFIG O, make sure you have selected a printer through the CONFIG or CONFIG 1/2 option. If you have not selected a printer, the screen will display:

PRINTER PAGE LAYOUT SELECTION
NO LIST DEVICE SELECTED

A>

Select a printer through the appropriate CONFIG option, then return to this page.

1. Enter **CONFIG O [RETURN].** The screen will display the following, a line at a time (substituting your current system values for the values indicated here in parentheses):

    TOTAL NUMBER OF PHYSICAL LINES PER PAGE (66):
    TOTAL NUMBER OF PRINTED LINES PER PAGE (58):
    NUMBER OF LINES TO SKIP AT THE TOP OF EACH PAGE (3):
    [E]NABLE OR [D]ISABLE AUTO-PAGING (ENABLED):

2. Enter the number you desire, followed by a [RETURN], as each line appears on screen. When you have entered your specification for each line, the next one will appear. Make sure that:

    a. the number of printed lines per page plus the number of lines to skip does not exceed the total number of lines per page, or:

        Line 2 + Line 3 <= Line 1

(In the example above, 58 + 3 = 61).

The remainder will be the lower margin.

b. the total number of lines per page equals the number of lines per inch used by your printer times the number of inches per page, or:

Length of page (in inches) X Lines per inch = Line 1

(If the printer above prints 6 lines per inch, then the setting above is correct for 11-inch paper, since 11 X 6 = 66).

3. For the auto-paging prompt, select either "enabled" or "disabled" as the actual printing routine will determine the location of page breaks.

4. The screen will display:

PRESS [RETURN] TO CONFIRM SELECTION OR [ESC] TO ABORT:

Again, you have a "last chance" to get out of this program without changing any values. Enter the appropriate key for your choice.

NOTE

The CONFIG O program will not check for impossible, or even unsightly, page specifications. Be sure to check the values carefully.

If you wish to make a more certain and permanent change to your list device driver, consult the Vector 4 CP/M Programmer's Guide (P/N 7100-0003). The GENLIST command explained there lists the various printer driver files which may be available to you. Some of these can be assembled with optional page sizes.

The CONFIG B Option

This option allows you to adjust (temporarily) the baud rate, which is the speed (in bits per second) at which the printer and/or modem receive instructions from and send data to the central processing unit. This probably should not be changed unless you are using an applications program (such as a telecommunications program) which requires sending information at a specified baud rate.

To determine and (if necessary) adjust the baud rate for your printer and/or modem, enter:

A>CONFIG B [RETURN]

The screen will display:

VECTOR 4 CP/M CONFIGURATION PROGRAM VER. 2.X

BAUD RATE SELECTION

CURRENT PRINTER BAUD RATE IS ####.

[1] 110   [2] 150
[3] 300   [4] 600
[5] 1200   [6] 2400
[7] 4800   [8] 9600

SELECT NEW BAUD RATE FROM ABOVE:

Enter the number corresponding to the baud rate specified by the program which requires the change, or press [RETURN] to accept the current rate. The screen will then display:

CURRENT MODEM BAUD RATE IS ####.

[1] 110   [2] 150
[3] 300   [4] 600
[5] 1200   [6] 2400
[7] 4800   [8] 9600

SELECT NEW BAUD RATE FROM ABOVE:

Again, select the number corresponding to the baud rate desired by the modem program, or press [RETURN] to accept the current rate.

This option cannot be made permanent; you will have to adjust the baud rateeach time it is required.

The CONFIG D Option

This option allows you to change your disk access settings. Different disk access options make it possible for you to protect a disk drive from unauthorized changes, or to choose between a slightly faster system with less error detection, or a slightly slower system in which errors will be noted.

The CONFIG D settings should only be changed by, or at the specific request of, an experienced programmer. Most of these settings have been specified at the factory for optimum performance under normal conditions; they are changeable only with an eye to upward compatibility.

1.   As with other CONFIG options, enter **CONFIG D [RETURN].** The screen will display:

DISK ACCESS OPTIONS FOR DRIVE d: - ENTER [E] FOR ENABLE OR [D] FOR DISABLE

READ BEFORE WRITE (ENABLED):
READ AFTER WRITE (ENABLED):
WRITE PROTECT DETECT (ENABLED):
READ ONLY (DISABLED):

As with other options, each line will come up as you process the previous line. If the value in parentheses is correct, press a **[RETURN]** to keep it.

NOTE

"READ BEFORE WRITE" and "READ AFTER WRITE" should be enabled to ensure error detection. With both disabled, the system will be slightly faster, but errors may not be caught during disk reading and writing.

"WRITE PROTECT DETECT" should be kept enabled if you are using write protect tabs, or if the "READ ONLY" command on files or disks is being used. (For more information on how to make a file or disk write-protected, see the section on the STAT command.)

2.   When you have entered your choice for each line, the screen will display:

MAKE SELECTION PERMANENT [Y]-[N]?

Enter **[Y]** if you desire the newly-selected disk configuration to come up automatically upon booting. Enter **[N]** if you desire the original disk selection to come up when you boot the system next.

The system will go through a warm boot to reset the operating system for the new settings.

The CONFIG C Option

This option allows you to disable and enable control character input. Under normal circumstances, the BDOS interprets **[CTRL P]** and **[CTRL K]** as commands to the printer (**[CTRL P]** toggles the printer on and off for direct typing from the screen, **[CTRL K]** sends a form feed, or single-page advance, to the printer). Using the **CONFIG C** option, you can specify whether you desire this function to be enabled (as normal) or disabled (to meet the needs of some applications programs you may write or purchase).

This option of the program may not be available on early Vector 4 systems. If you require it and it is not on your version of the CONFIG program, check with your dealer regarding standard update procedures.

As with the other options of the CONFIG program, you need simply enter:

A>CONFIG C [RETURN]

The screen will display:

ENTER [E] TO ENABLE TRAPPING OR [D] TO DISABLE TRAPPING OF THE FOLLOWING CONTROL CHARACTERS (ENTER A RETURN FOR NO CHANGE):

"P" (ENABLED):
"K" (ENABLED):

The prompt for each control character will appear, showing the current value, as you enter the command for the previous character. When you have entered both commands, the screen will display:

MAKE SELECTIONS PERMANENT [Y]-[N]?

Enter **[Y]** for new settings to come up each time you boot, **[N]** to return to old settings at next reset. Again, note that "permanent" simply means that you don't have to specify this again until you wish to change it to a different setting.

The CONFIG S Option

This option will let you alter the system directly. With one possible exception, you should not have to use this option. It deals with elements of the system that only a very experienced user should consider, since the values it changes have been set for optimum system performance under almost all conditions.

The one exception is the CP/M Version number option. One of the improvements designed into Vector 4 CP/M deals with "locking" files and records while in use. Although this gives an added measure of security to files in use by one task or user, and also allows a slightly faster system, it is not compatible with earlier non-Vector 4 CP/M versions (CP/M 2.2, to be specific).

In order to give Vector users the flexibility to use previously-purchased applications software, your Vector 4 has the ability to tell various programs that it is either of two versions of CP/M: Version 2.5, which is compatible with earlier CP/M software; and Version 3.0, which takes advantage of file and record lockout facilities. If you will be using other Vector Graphic software, be sure to check the manual for any indication that it is designed to run under one or the other version of the CP/M operating system.

1. Enter **CONFIG S.** The screen will display:

DESPOOL TAB EXPANSION (DISABLED):

Enter [E] to enable the despool tab expansion at intervals of eight characters. The option is normally set for "DISABLED". Enter a [RETURN] to leave the default (original) value.

2. The screen will display:

DESPOOL CHARACTERS PER TIME SLICE (3):

Enter the number of characters you want to be sent out during each time slice. (A time slice is the amount of processing time that each task or user is given in turn.) The normal value is 3 characters per slice; you can specify a range from 0 through 9.

3. The screen will display:

CCP TO BDOS CROSS BANK CALLS (DISABLED):
BDOS TO BIOS CROSS BANK CALLS (DISABLED):

These cross bank calls should be left disabled. They are only changeable because some advanced programming functions may eventually need to use them.

4.   The screen will display:

RETURN CP/M VERSION NUMBER [2]5 OR [3]0 (2.5):

Press 2 to use earlier CP/M-based software, 3 to use Vector 4 CP/M-based software.

5.   The screen will display:

MAKE SELECTION PERMANENT [Y]-[N]?

Enter [Y] to make the system come up with the new settings each time, [N] if you want the system to come up with the original settings. The system will go through a warm boot to reset the operating system for the new settings.

The STAT Program

This program can be used for:

● listing statistical information about files or disks ("passive").

● changing the status of disks, devices, or files ("active").

The STAT program can be called as a single command, or in conjunction with optional command lines. Most of these command lines fall into the "active" category, since they allow you to change some aspect of the system.

Checking Size And Storage

You can use the STAT program to check the size of a file, or you can use it to check the remaining area left on a disk or diskette.

To check the remaining area on the currently-logged disk, enter the command:

STAT [RETURN]

The screen will display:

disk: <ATT>, Space: ###k

for each disk that has been accessed since the last boot. As with files, the <ATT> column lists the attributes of the entire disk.

Note that disks cannot be set to $SYS or $DIR the way files can; however, it is possible to use the **STAT d: $R/O** command to make a disk or diskette read-only. To set it back to read and write enabled, use the **$R/W** option.

You can also enter the command:

STAT d:[RETURN]

This will result in the display:

Bytes remaining on d: ###k

Also, this displays only the information for the disk requested, where the **STAT [RETURN]** command displays the information for all drives which have been accessed since the last cold boot.

You can use the STAT command to obtain an account of the remaining disk space available on a floppy diskette, in order to determine whether or not you can fit more files onto it.

You can also find out the current user area by entering:

STAT USR:

The screen will display:

Active User : #
Active Files: # # # # #

where the # signs represent user areas which contain files.

Checking Files

The typical command format for using the STAT program on a file is:

STAT <AFN> [RETURN]

To use STAT to check the size and attributes of a file or range of files, enter the command:

STAT d:SAMPLE.DOC

The following will display:

```
       Recs   Bytes  Ext Acc
        ###    ###k    #  xxx  d:SAMPLE.DOC
       Bytes remaining on d: ###k
       A>
```

The "Recs" column lists the number of records (128 bytes in each) which make up the file; the Bytes column indicates the number of bytes assigned to the file. This last number will usually be more than the number of records times 128, because the number in the "Bytes" column reflects the maximum number of bytes which can be stored in the allocation units used for the file.

An allocation unit is a physical section of the disk surface, of a size which varies depending on the type of disk being used. Basically, the larger the disk capacity, the larger the allocation unit. Floppy disks, for example, use allocation units of 2 kilobytes each, where Vector Graphic's largest current hard disk, which measures eight inches, uses allocation units of 8 kilobytes.

Since the allocation unit is a physical portion of the disk, it works much the same way as a spiral notebook: even if only two pages in the notebook have text written on them, there are still the same number of blank pages left in the notebook, and the notebook takes up a certain amount of space in a bookcase. Allocation units can be combined; several of them make up an Extent, which is another way that the BDOS looks at file management. There is at least one extent per file; the number of extents used in a file is listed in the "Ext" column.

The chief difference is that an extent defines the relationship of data in a file; the allocation unit defines the actual physical location on the disk surface. It is really no more complicated than reading a newspaper story which begins on Page 1 and continues on Page 3, only to have the story from Page 3 be continued on Page 9, et cetera. The story would be the file which takes up one extent; each page, another allocation unit where the extent is continued. But again, you will probably never have to deal with this unless you take up programming.

The extent and allocation units used by a file give the computer a larger division in which to begin searching for a file when you enter a command, the way a file clerk would look in a specific drawer of a particular file cabinet before trying to find a single sheaf of papers. This way the computer can isolate to a fairly large area of the disk before it starts loading the file a character at a time.

(For a more complete explanation of how files are stored and written to disk, refer to the Introduction to Vector 4 CP/M in this manual.)

The last column in the STAT display, marked Acc, stands for the access attributes of the file. Vector 4 CP/M defines four attributes, which can be assigned to a file individually or in limited combination. These attributes are:

R/O: Read-only status; document cannot be changed or deleted until reset by STAT command.

R/W: Read-write status; document can be changed or deleted.

SYS: Changes document to system type; does not appear on screen when directory command is given. Also, $SYS files cannot be copied through PIP.

DIR: Changes document back so that it appears in directory.

A file cannot be both read-only and read-write at the same time, nor can it be both system and directory. But it is entirely permissible for a file of either access type to be given either of the two directory attributes.

A typical status line for the file SAMPLE.DOC might look like this:

```
Recs   Bytes   Ext Acc
  27     8k      1 R/W A:SAMPLE.DOC
Bytes remaining on d: 422k
A>
```

This would mean that the file SAMPLE.DOC, which exists on Drive A, consists of 27 records of 128 bytes each, is allocated 8 kilobytes of the disk surface (even though 27 times 128 is only 3456). It uses one extent, and is available for read and write activity. In addition, the total unused space on the disk in drive A is 422 kilobytes.

Running An "Active" STAT

As mentioned above, an "active" STAT command is one which changes a file, disk, or device in some way. To see a list of all commands you can give, enter **STAT VAL: [RETURN]**. The screen will display:

```
Temp R/O Disk: d:=R/O
Set Indicator: d:filename.ext $R/O $R/W $SYS $DIR
Disk Status  : DSK: d:DSK:
User Status  : USR:
IObyte Assign: <possible assignments>
```

This probably doesn't help much right now, so here is a translation of the more useful functions.

Changing File Attributes

To change the attributes of a file, enter the command:

STAT d:<AFN> $<attribute>[RETURN]

where <attribute> can be any mentioned above (R/O, R/W, DIR, or SYS). Be sure to enter the $ before the three-letter attribute code to indicate to the STAT program that you wish to <u>change</u> the file.

Remember that the STAT program can be used on files stored on another disk by simply entering the name of the drive in place of the d: in the line above. Otherwise, the program performs for the current disk or diskette.

If you have a file that you do not want to change or erase accidentally, you can use the STAT command to protect it. To protect the file SAMPLE.DOC (stored on the B drive), enter the command:

STAT B:SAMPLE.DOC $R/O [RETURN]

The screen will display the message:

SAMPLE.DOC set to R/O
A>

Changing Disk Attributes

If you want to protect an entire disk from changes, enter:

STAT d:=R/O [RETURN]

substituting the drive you wish to protect for the d: in the example. This temporarily sets the whole disk as read-only, the same way that a write-protect tab would keep a floppy safe from changes. However, you can protect hard disks as well as floppies by using the STAT d:=R/O command. It is now temporarily impossible to copy information onto the disk, to erase files or parts of files from the disk, or to add information to individual files on the disk.

To change the disk back, enter [CTRL C]. The STAT d:=R/O command will only protect a disk until the next warm or cold boot. If you need more permanent protection, consider the CONFIG D option and enable the last prompt. See Page IX-18 for information.

Other Functions of the STAT Program

As indicated in the STAT VAL: display, you can use the STAT program for several other things in addition to these. However, most additional commands change input and output devices, such as tape readers, batch processors, teletypes, paper tape punch devices, or non-standard list devices.

Enter **STAT VAL: [RETURN]** for a list of the valid device names (listed under **IObyte Assign**) supported on your specific system.

Enter **STAT DSK: [RETURN]** to find out the specific status and capacity of the disk, in records, bytes, extents, et cetera.

Changing the status of other devices will not be covered in this manual, since it requires more experience with the system. For more information, see the Vector 4 CP/M Programmer's Guide.

Review

The STAT program can be used as a simple command (**STAT [RETURN]**), which shows remaining disk space. It can also be used with the following command lines:

TO FIND/CHANGE	COMMAND LINE AND COMMENTS
Size of a file	**STAT d:SAMPLE.DOC [RETURN]** (Lists number of virtual records per extent under "Recs" column)
	STAT d:SAMPLE.DOC $S (Lists virtual file size in records under "Size" column)
Change file/disk attributes	**STAT d:<SAMPLE.DOC> $R/W** (Makes file or disk available for editing or other changes)
	STAT d:<SAMPLE.DOC> $R/O (Protects the file or disk from changes)
	STAT d:SAMPLE.DOC $SYS (Changes the file to a "system" file, which does not appear in the directory)
	STAT d:SAMPLE.DOC $DIR (Changes the file back so that it will appear in the directory)

The PIP Command

The PIP command, which stands for "Peripheral Interchange Program", copies programs and text files between disks or to new file names. It can also be used to transfer files to or from logical devices, such as printers or communication lines (the devices mentioned in the section about the STAT command).

The basic command line format for using PIP is:

PIP <target>=<source> [RETURN]

where **<target>** and **<source>** can be disks, files (ambiguous or unambiguous), or logical devices. As with the STAT command, this manual will only cover disks and files; refer to the manual for the specific device you plan to use for instructions on how to "pip" information to and from it.

If you try to PIP to a read-only (write-protected) disk, the screen will flash the message, **ERROR - DISK IS READ-ONLY.** If this happens, make sure that there is no write-protect tab on the diskette. If the write-protect notch is clear, remember to enter a [CTRL C] after inserting a new diskette in the drive. (Until you perform a warm boot (with the [CTRL C]), the disk in the drive will be considered read-only.) If the disk is still considered read-only, refer to the STAT instructions to find out how to open the diskette.

The One-Line PIP Command

The PIP program is very flexible and powerful; it is probably safe to say that you will use it more than any other CP/M utility. Since you have the option of using ambiguous file names as source names, you can copy a tremendous amount of information with only a few movements of the fingers.

As an example: let's say you want to make a copy of everything in the current user area of the A drive. To copy it to the B drive, you need only enter:

A>PIP B:=A:*.* [RETURN]

The screen will announce that it is

COPYING -

and then display each file's name as it is copied to the target drive. This command even keeps the same file names in the target as the source, so that all the transient commands on the A drive will still have the same command names on the B drive.

If you want to move one file from A to B (in the same user area), enter:

A>PIP B:=A:SAMPLE.DOC [RETURN]

The next time you enter DIR on the B drive, you will see SAMPLE.DOC in the directory.

But what if you want to make an extra copy of a file, with a different name? Let's say you want to make a spare copy of the file SAMPLE.DOC, but you want to change the extension to .OLD. The command line for that is:

A>PIP SAMPLE.OLD=SAMPLE.DOC [RETURN]

In which disk drive would the .OLD file end up? (Drive A, of course. Since you didn't specify another, the program assumes you are copying within the same surface.)

All of these possibilities can be used in combination. So the full PIP command line (with all available options) is as follows:

PIP <disk:><target.ext>=<disk:><source.ext><[G#]><[V]>

The [V] (for verify) option may be useful to you. It tells the program to make a final check for an accurate copy. It does slow the operation significantly, but it may be important for those "better safe than sorry" operations (such as copying a backup diskette).

The [G#] option tells the BDOS to go to the user area indicated by the number sign (#). When working between user areas, PIP can only "pull" to the current area, it cannot "push" to another. You need to be logged into the target user area, then enter the option [g#], substituting the actual number (between 0 and 15) of the user area where the information is stored.

The system assumes, as a default, that you want the information to end up in the same user area from which you are working. As an example:

If you are working in User 5 of the A drive, and you want to copy a backup onto a floppy diskette in the C drive, you would first insert a formatted diskette in Drive C.

To copy the information to the floppy, you have two choices: to copy to User Area 5 (which is the area you are logged in on the A drive), or to some other User Area. Here is how you would accomplish each choice:

a. To copy to User Area 5 on the C drive from User Area 5 of the A drive, enter:

A>PIP C:=A:SAMPLE.DOC [RETURN]

The PIP program will default to the current user area (in our example, User 5) for the destination. When the A> prompt appears, the file has been copied to User Area 5 on Drive C.

b.   To copy to User Area 0, you would enter:

A>C: [RETURN]
C>USER 0 [RETURN]
C>A:PIP C:=A:SAMPLE.DOC[G5 [RETURN]
C>

By logging into the user area and disk where you want the information to end up, you assure the transfer (assuming, of course, that you remember to enter [CTRL C] when you insert the diskette). Entering A:PIP tells the BDOS that you want to go to Drive A for the program PIP.COM; if you know that a copy of PIP.COM exists on Drive C, this is not necessary. But remember that it is a feature of Vector 4 CP/M that you can run programs from other drives, simply by entering the command preceded by the letter of the drive on which the program is stored.

The Repeat PIP Command

If you plan to move many documents to different places at the same time, you can save typing by entering **PIP[RETURN]**. (Note that you cannot enter a space after PIP: the screen will display the error message **INVALID FORMAT:**). This puts PIP in a "repeat" mode, during which the screen will prompt you with a * to tell you it is ready for the next command. Enter any valid PIP command line at this time. When you are finished copying, enter a [RETURN] and the disk prompt will reappear.

Valid PIP Command Lines

The PIP utility will accept the following command lines (either one at a time entering PIP for each line, or in repeat mode, after you see the *. Wherever an ambiguous file name (afn) is indicated, you can substitute an unambiguous filename (ufn) if desired. Unless you specify another user area with the [G#] option, the system will default to the current user area for the destination.

B:=A:<afn>

Copies all files which match the ambiguous file name entered, from the A disk to the B disk.

B:=\<afn\>

> Copies to disk B all files which match the ambiguous file name entered, from the disk your are currently addressing.

B:=A:\<ufn\>

> Copies from A to B the specific unambiguous file name entered.

B:=\<ufn\>

> Copies the specific file entered from the drive you are addressing to drive B.

B:=A:\<afn/ufn\>[G5]

> Copies an ambiguous or unambiguous file name _from_ Disk A, User Area 5, to Disk B, _current_ user area. (You can pull from another area, but you can't push to it.) The file name will be the same.

\<ufn2\>=\<ufn1\>

> Copies, within the same drive (and area), the text of specific file \<ufn1\> to another file with a different name \<ufn2\>. The source file \<ufn1\> still exists.

In short, you can get a lot of mileage by using ambiguous file names and wildcarding wherever you can. Remember these rules to save time:

- You don't need to specify the target file name unless you plan to rename the file.

- If you're in the same drive and area, the target name _must_ be different from the source name. CP/M will not allow two files to exist in the same drive with the same filenames and extensions. You _can_ copy two identical file names to two different user areas on the same disk. (Be careful not to get them confused.)

- You don't need to specify the source disk name if it's the disk you're logged into.

- When copying between user areas, specify the source area, and log into the target area.

● If you're moving files from one disk to another, either the target file name or target disk must be mentioned. (If you're logged on drive A, you can't just enter **PIP =B:*.COM.** You'll have to type **PIP A:=B:*.COM,** even though you're in the A drive. You can, however, log into the source drive and then type **PIP A:=*.COM.)**

● The target file or disk name comes first — PIP reads from right to left.

● Look at your source files carefully for patterns. If you want to copy five files all beginning with TR (e.g., TRANSCOM.MEM, TROUBLE.COM, TRIP.DOC, TRAINING.ASM, and TRANSLAT.BAS), you can copy all five at once with the line, **PIP <target disk>=<source disk>TR*.*** [RETURN].

One final note on the PIP program: You cannot PIP any files set to SYS status by the STAT program, or files which have an extension of DBS (for database). You can either use STAT to set the SYS files to DIR, or simply use the DISKCOPY or STORE programs to move the entire contents of the disk. (See below for more information about DISKCOPY and STORE.)

The FORMAT Command

This program copies a "framework" for the operating system onto a blank disk or diskette. This framework makes it possible for the Basic Disk Operating System to orient itself to the disk and keep track of where it writes data; until FORMAT has been performed, no other activity is possible on the disk. You must format brand-new blank diskettes before you use them for the first time.

For software diskettes, on the other hand, where there is a program or a set of programs already copied on to the diskette, formatting is not only unnecessary, but expensive as well: the FORMAT program erases the entire disk surface before putting the orientation markers in place. Never format any disk or diskette which contains valuable information. Always check the directory before formatting a used diskette, and look at any file you can't immediately identify. It's always less expensive, in the long run, to buy a new diskette than it is to redo all the work on an older one.

If your hard disk is already in use, formatting will wipe it clean. However, the command for formatting your hard disk is different from the command for formatting a floppy, so you needn't fear doing this accidentally. In addition, you will be offered a warning before a disk is actually erased, and given a chance to quit before any damage is done.

Initial Format of Hard Disk

1. Enter the command line, **FORMAT P [RETURN].** The screen will display:

    DISK FORMATTER VERSION x.x

    WARNING – THIS PROCEDURE ERASES DATA.
    PRESS [RETURN] TO CONTINUE, [CTRL C] TO ABORT –

    If you press a **[RETURN]**, the program will automatically determine the type of hard drive used and prompt you with the following (replacing **XX** with the disk capacity).

    DRIVE TO BE FORMATTED IS A xx MBYTE WINCHESTER
    ENTER [Y] IF CORRECT:

2. Enter **Y [RETURN]** if the capacity is correct. If you enter anything but Y, the screen wil prompt you with:

    SELECT: [1] 5 MBYTE WINCHESTER DOUBLE PLATTER
    [2] 5 MBYTE WINCHESTER SINGLE PLATTER
    [3] RESERVED
    [4] 10 MBYTE WINCHESTER
    SELECT DRIVE TYPE FROM ABOVE:

    Enter the number corresponding to the type of drive used, folowed by a **[RETURN].** NOTE: Standard 5 Mbyte drive on the Vector 4 is a <u>double platter.</u>

3. For both 5 and 10 Mbyte drives, the program will prompt you to:

    SELECT: [A] SURFACES 0,1
    [B] SURFACES 2,3
    [C] ALL SURFACES

    SELECT SURFACES FROM ABOVE:

    Enter the selection you need to use. Note that this allows you the option of formatting only selected logical drives.

4. The screen will display:

    WARNING – PROCEDURE ERASES DATA,
    PRESS [RETURN] TO BEGIN, [CTRL C] TO ABORT

    Press **[CTRL C]** to stop the program and save the information you need. (If you still need to format the disk, copy the required files onto a floppy diskette and return to Step 1.) Otherwise press **[RETURN].**

6.   It will take several minutes for the program to erase and then format the disk. When the program is finished, the screen will display:

FORMAT COMPLETE

You can now copy any information to the disk by using PIP, STORE, or GENSYS. Be sure to read the instructions for the program you will be using.

Options Available With FORMAT

Entering the command **FORMAT [RETURN]** with no option runs the regular FORMAT program, prompting you with the drives for which your system is configured. (The actual display will be different from system to system, reflecting the type of storage media used by your disk drives.) A typical display is as follows:

DRIVE: **[A] 5 INCH WINCHESTER – SURFACE 0,1**
[B] 5 INCH WINCHESTER – SURFACE 2,3
[C] 5 INCH SINGLE SIDED FLOPPY
[D] 5 INCH DOUBLE SIDED FLOPPY

MAKE SELECTION FROM ABOVE:

Once again, note that the actual display may not look like the one pictured here. But in all cases you will have one of three choices:

●   format one or more surfaces of the hard disk (where applicable)

●   format a single-sided floppy diskette (in appropriate drive)

●   format a double-sided floppy diskette (in appropriate drive)

The screen will display:

WARNING – PROCEDURE ERASES DATA

If you choose one of the floppy drives, the screen will display:

INSERT DISKETTE AND PRESS [RETURN] TO BEGIN, [CTRL C] TO ABORT

With all options, you can stop the procedure by pressing [CTRL C]. Otherwise, press a [RETURN] when the diskette has been inserted. After a few minutes, the screen will display:

FORMAT COMPLETE

At this point, the disk prompt will return and you can go on to another program.

FORMAT R

Enter this command line when you have several diskettes to format at one time. This may save you time when, for instance, you have just purchased a new box of diskettes and you plan to format them all in a single sitting.

After entering the **FORMAT R** command line, all the screen prompts will display as described above. However, when the first disk is formatted, the screen will not display the **FORMAT COMPLETE** message, but will return to the list of drive selections. This way you can format many diskettes, both single and double-sided, in one session.

Once you have formatted your last diskette, simply enter a [CTRL C] and Vector 4 CP/M will return to command level.

FORMAT E

This option should be used when an individual disk or diskette currently in use is suspected of causing errors. After entering the command line shown above, the same prompts and list of drive selections will appear. However, when the disk or diskette is formatted, the screen will display any error-causing situations it has discovered while erasing and formatting the disk or diskette.

Remember that you will lose all information on the disk when you format. Be sure that you only format a hard disk if you have all the information that you can save on either a backup diskette or another backup medium (such as Vector Graphic's SAFSTOR tape backup system).

Once the FORMAT E program lists the errors it uncovers, write down the message exactly as it appears on the screen. Refer to the error listing in Appendix B, or check with your service contract for the appropriate step.

The DISKCOPY Command

This program provides you with a way to do quick and complete backup from floppy to floppy. DISKCOPY does not require that the disks be formatted first. You can back up on an already-used diskette without erasing and reformatting, or copy onto a new diskette without having to run the FORMAT program first.

If your Vector 4 uses either a 5 or a 10 megabyte hard drive, you can use it as temporary storage while copying disks. Normally, the DISKCOPY program loads as much as it can from your source disk into the Vector 4's memory; then it prompts you to insert the destination diskette and it copies the information onto it. The process then repeats until the source diskette has been duplicated. But if you are logged into a Winchester (hard-drive) during the program, you have the option of telling the program to copy everything on the source diskette onto the hard drive. From there it is copied to the destination floppy, saving you the time required to swap diskettes repeatedly.

This program offers two options, **R** and **E**. These serve basically the same purpose as the similar options in the FORMAT program: to Repeat the action over several disks, or to return a message for any Errors the program discovers. You can enter both **R** and **E** in the same command line, if you need to.

To run the program:

1. Enter the command **DISKCOPY <R/E> [RETURN]** The screen will display a message similar to this one:

    DISKCOPY - VERSION 1.X

    DRIVE: [C] 5 INCH DOUBLE SIDED FLOPPY
    [D] 5 INCH SINGLE SIDED FLOPPY
    [E] 5 INCH DOUBLE SIDED FLOPPY

    SELECT SOURCE DRIVE FROM ABOVE:

Again, this message will vary depending on the exact type of hardware that makes up your system, and the way in which your drives are configured.

2. Enter the letter (from the list on screen) in which the source disk (where the information is to be copied from) is mounted. The screen will display:

    SELECT DESTINATION DRIVE FROM ABOVE:

3. Enter the letter for the drive where the blank diskette is mounted.

NOTE

You will notice that the sample screen display gives two double-sided drives and one single-sided drive. You can only copy diskettes:

- from double-sided to double-sided
- from single-sided to single-sided

You cannot copy from a double-sided drive to a single-sided drive. Remember also that you cannot copy the System diskette to a single-sided diskette.

If you are logged into a hard drive with sufficient free space, the screen will ask you:

> **DO YOU WANT TO USE THE**
> **WINCHESTER AS TEMPORARY STORAGE? (Y-N)**

> Selecting **Y [RETURN]** will save you time. (This prompt will not display if you are not logged into a hard drive or if there is not enough room on the default drive, even if your system uses one.)

4. Once you have selected the source and target drives, the screen will display:

> **INSERT SOURCE DISKETTE AND PRESS [RETURN]**

If you are using a Winchester or a two-floppy system, the screen will display this and the following prompt once only. If you cannot use the Winchester, the screen will display these two prompts until the source disk has been fully copied:

> **INSERT DESTINATION DISKETTE AND PRESS [RETURN]**

When the source diskette has been fully copied, the screen will display:

> **DISKCOPY COMPLETE.**

The STORE Command

This is used to back up files from a hard disk to a floppy. (If your system only has floppy drives, you can ignore this section, as well as the section on RESTORE.)

Note: the STORE and RESTORE programs will only take files with names of seven characters or less. The STORE program adds a number to the end of each filename when it is continued on another diskette, to indicate whether it belongs on disk 0, disk 1, disk 2, et cetera. Since CP/M allows eight characters per filename, this extra number has to come from somewhere.

The command line form of the STORE and RESTORE programs is virtually identical to that of the PIP program. This includes all references to disks, user areas, and ufn/afn specification. To copy all files from the A disk to the C floppy drive (again, the specific letters used in your system may be different), you would enter (while logged into the A drive):

STORE C:=*.*

This will copy all files with names of seven letters or less. If you plan to use the STORE/RESTORE programs on a regular basis, bear this in mind.

Here's what happens when you enter the command:

1. STORE copies the files, adding the character $ to the end of each filename.

    EXAMPLE:

    PROGRAM.COM is copied to the diskette as PROGRAM$.COM.

2. If the target diskette fills up in the middle of copying the file, the $ is changed to a 0. Then the program will prompt you to enter a new diskette to continue.

    EXAMPLE:

    The first part of PROGRAM$.COM is stored on the first diskette as PROGRAM0.COM.

3. The file that was half-copied will be continued on the next diskette. When the end of the file is reached, the program will add a 1 to the filename to indicate that it comes after the 0 file.

    EXAMPLE:

    As the rest of PROGRAM.COM is copied from the hard disk to the second floppy, it is transferred as PROGRAM1.COM. This way, the program "knows" that there is still more information as part of that file.

4. When the last section of a file has been copied, STORE leaves the last character $.

    EXAMPLE:

    The diskette that has the last section of PROGRAM.COM will store that file as PROGRAM$.COM. This will tell the RESTORE program that the file is not continued on another disk.

5. This can continue until all 5 megabytes have been copied. Should you have a single file (a data base or a huge program) which crosses more than 2 floppies, STORE will continue to add numbers (from 0, through 1, 2, 3, et cetera). Nine floppy diskettes can handle the largest file possible under the 5-megabyte system.

EXAMPLE:

Should PROGRAM.COM take up over 1900 kilobytes (which exceeds three diskettes, not to mention being about 15 times larger than the maximum RAM), it would be stored as:

DISKETTE	FILE NAME
1	PROGRAM0.COM
2	PROGRAM1.COM
3	PROGRAM2.COM
4	PROGRAM$.COM (final section)

For this reason, you can see that it is essential that you number your diskettes. When you go to RESTORE the information later, you will have to insert the disks in the correct order. Otherwise the $ will tell the RESTORE program to stop copying that file name, and everything will get confused.

The RESTORE Command

This program returns the files put on diskette by the STORE program to hard disk. (That is all that it does, too: you cannot use RESTORE to put files on hard disk, if they were put on the floppy by the DISKCOPY or PIP programs.) All the information described above for the STORE program holds true for RESTORE as well, except that the action is in reverse.

Be sure to enter diskettes in the correct order. Once RESTORE has begun copying files, it will ask you for new diskettes as it needs them.

If the file you are copying spans several diskettes, make sure that you insert the diskettes in order. You will need to enter the exact name of the file as it has been stored on that diskette.

EXAMPLE:

If you want to RESTORE the file PROGRAM.COM to your hard disk, you would insert the first of your diskettes and enter the command:

RESTORE A:=C:PROGRAM0.COM [RETURN]

This would begin the restoration of the entire file PROGRAM.COM, which wasstored (in our earlier example) across 4 diskettes.

When the program has copied the last file on the diskette's directory, the screen will display:

INSERT NEXT DISK TO CONTINUE OR [CTRL C] TO EXIT

This is the only time you can stop the program without resetting the entire system.

If the hard disk is full or out of directory space, the program will stop automatically. One option available with the RESTORE program (and nowhere else) is the **K** (for "Kill") option. Use this cautiously: this kills (deletes) the file being copied, before it is copied to the hard disk.

The normal procedure (without the **K** option) that the program goes through is:

- The file in process is copied with an extension of **$$$.**

- Once this file is closed, the original output file will be killed.

- The temporary **$$$** file is renamed to the proper extension.

Use the **Kill** option only if:

- The file you want to copy already exists on the hard disk.

- There is not enough room on the hard disk for the file.

- You cannot make enough room on the hard disk for the file.

SUMMARY

Although the information covered here is sufficient to operate and control your Vector 4, there is much more to learn about the capabilities built into your computer. If the understanding you now have helps you do your job more quickly and easily, then it is enough. But, like a large number of computer users, you may want to continue exploring.

If You Decide To Go On With Computers . . .

. . . then consider Vector Graphic's optional Vector 4 CP/M Programmer's Manual Set for the Vector 4. This manual and diskette combination offers a more comprehensive explanation of the Vector 4 CP/M operating system, including the program calls necessary to write your own instructions for your Vector 4, as well as several other utilities which will help you create, edit, and run your own programs.

In addition, there is a Vector Graphic Demonstration diskette, which contains several demonstration programs which illustrate some of the more advanced functions of the Vector 4. Be sure to ask your dealer about these packages when considering any additional software purchases.

SYSTEM SPECIFICATIONS

CPU

The Z80B and 8088-2 CPUs can be individually selected through the use of Port 0CH and Port 0DH.

Z80B	Data Lines	8
	Address Lines	16
	Instructions	158 (including 8080 instructions)
	Clock Speed	5.1 MHz
	Power Supply	+5 V
8088-2	Data Lines	8
	Address Lines	20
	Instructions	235
	Clock Speed	5.1 MHz
	Power Supply	+5 V

MEMORY

PROM - One 4 K 2732 (or an 8 K 2764) and two 2 K 2716s. The 2732 is used for the Executive system program and the 2716s house the Character Generators.

2732   Addressed from 0000H to 0FFFH. This 4 K block is enabled/disabled through use of Port 02H or 03H. PROM is enabled (RAM disabled) when bit "0" is 0 and is disabled (RAM enabled) when bit "0" is 1.

2716   Used as Character Generators for the standard alphanumeric mode.

RAM - Sixteen 4164s (128 K system), four 74LS189s and one 74LS670.

An additional RAM memory board (using sixteen more 4164s) can be added to increase main memory from 128 K to 256 K.

I/O

Serial Ports - Three 8251 USART Chips are used to interface with the keyboard, serial printer and modem.

Keyboard	01H (Status/Control)
	00H (Data)
Serial Printer	06H (Data)
	07H (Status/Control)

Modem   04H (Data)
                                 05H (Status/Control)

Parallel Ports – One 8255 programmable I/O chip (with supplementary decoder chips) is used to interface with parallel printers using either a Centronics or NEC/Qume protocol.

Port A   08H
Port B   09H
Port C   0AH
Control Port   0BH

Other Ports – Other ports are used for the programmable timer, video controller, tone generator and to set various subsystem parameters.

ROM Enable (and color)   02H
                                        03H

CPU Swap   0CH
                                        0DH

Video Controller   0EH
                                        0FH

Timer   10H (Timer 0)
                                        11H (Timer 1)
                                        12H (Timer 2)
                                        13H (Control)

RAM Address Map   16H
                                        17H

Tone Generator   18H
                                        19H

Color Map   1CH
                                        1DH
                                          1EH
                                          1FH

Expansion Slots – Two modified S-100 expansion slots are available for additional boards. Since the main system uses a Switching Regulated Power Supply these boards must not have on–board regulation.

CLOCK SIGNALS

A 32.640 MHz oscillator generates a signal which is used directly by the Video (Dot Clock) and other subsystems.

INTERRUPTS

A programmable timer (8253) is used to generate one interrupt and two baud rates.

KEYBOARD

The Vector 4 uses a detachable keyboard which has 91 keys that are accessed through a serial interface.

DRIVES

The Vector 4 can use several different disk drive configurations. These include one 5 1/4 inch floppy and one 5 1/4 inch hard disk, or two 5 1/4 inch floppies. The following chart gives the specifications for the individual drives.

Drive Type	Specifications
5 1/4 inch Floppy	
	Capacity- 630 Kilobytes
	Transfer Rate- 250 Kilobytes/sec
	Rotation Speed- 300 RPM
5 1/4 inch Hard Disk	
	Capacity- 5 or 10 Megabytes
	Transfer Rate- 5 Megabytes/sec
	Rotation Speed- 3600 RPM

VECTOR GRAPHIC, INC.

VIDEO MONITOR

Screen Size	12 in. diagonal CRT	
Resolution	312 lines	
	Green Phosphor	
	Alphanumeric Mode	24 lines x 80 characters
		Each character is a 16h x 13v pixels
	High Resolution Mode	640h x 312v pixels (B & W)
	Gray Scale Mode	160h x 312v pixels (16 levels)
		320h x 312v pixels (any 4 or 16 levels)
	Color Mode (use external monitor)	
		160h x 312v pixels (8 colors)
		320h x 312v pixels (any 4 of 8 colors)
Bandwidth	25 MHz	
External Controls	Contrast	
Internal Controls	Vertical Hold	
	Vertical Height	
	Vertical Linearity	
	Vertical Centering	
	Focus	
	Brightness	
	Horizontal Centering	

POWER REQUIREMENTS

Uses a Switching Power Supply which provides regulated, DC voltage to the Monitor (+12 V), main PCB (+5 V, -12 V, +12 V) and drives (+5 V, +12 V).

Voltage Option	115 AC +/- 15%	230 AC +/- 15%
Frequency	47 Hz to 63 Hz	47 Hz to 63 Hz
Current, Operating [1]	2 A	1 A
Current, Surge [1]	2 A	1 A
Power Dissipation [1]	190 W	190 W
Heat Generation [1]	60 BTUs	60 BTUs

[1] Maximum values.

DIMENSIONS AND WEIGHT

Main Enclosure (1)

Height	14.0 in	35.5 cm
Weight	37.5 lbs	17.0 kg
Depth	17.0 in	43.2 cm
Width	19.0 in	48.3 cm

Keyboard Subsystem

Height	1.9 in	4.8 cm
Weight (2)	4.0 lbs	1.8 kg
Depth	8.6 in	21.8 cm
Width	17.5 in	44.4 cm
Length (3)	40.0 in	101.6 cm

(1) Values given are for system which includes one 5 1/4 inch floppy drive, one 5 1/4 inch hard disk, one FD Controller Board and the external power cable. Two-floppy system will be slightly lighter.
(2) Includes cable.
(3) Connecting cable fully extended.

USER'S GUIDE TO TROUBLESHOOTING THE VECTOR 4

BEFORE YOU BEGIN

The following section outlines a few simple procedures for determining the causes of any problems you might have with your Vector 4 single-board computer.

These troubleshooting procedures are divided into three parts:

- a description of the enironmental considerations necessary to operate your Vector 4;

- a flowchart describing a procedure in which the system is run in a controlled environment until the symptom is duplicated;

- and a series of symptom-related checkout procedures, where the symptoms identified in the first procedure are checked against their possible causes.

If you have never used diskettes before, be sure to read Appendix C, "Care And Handling of Diskettes", before using your Vector 4. This will ensure that any system problems are not the result of having inadvertently damaged or disabled your system diskette.

ENVIRONMENTAL CONSIDERATIONS

Vector 4 SBC Power Requirements

For accurate troubleshooting or operation, make sure that the Vector 4 is supplied with current which meets the specifications outlined in Appendix A. Use another appliance, if necessary, to test whether the power outlet used for the Vector 4 is functioning. A typewriter, clock, or desk lamp will suffice. Be sure to remove the appliance before installing the Vector 4.

Make sure that no machinery or motor-driven equipment drawing large amounts of current, such as a copier or air conditioner, is connected to the same line as your Vector 4. Any equipment which pulls a heavy and intermittent load from the power line can cause the Vector 4 to lose current and shut down. This may cause loss of data during operation.

Connectors

Make sure that all cables and connectors on the Vector 4 are tightly inserted into the appropriate socket. Refer to the following diagram for proper placement:

VECTOR 7700   POWER
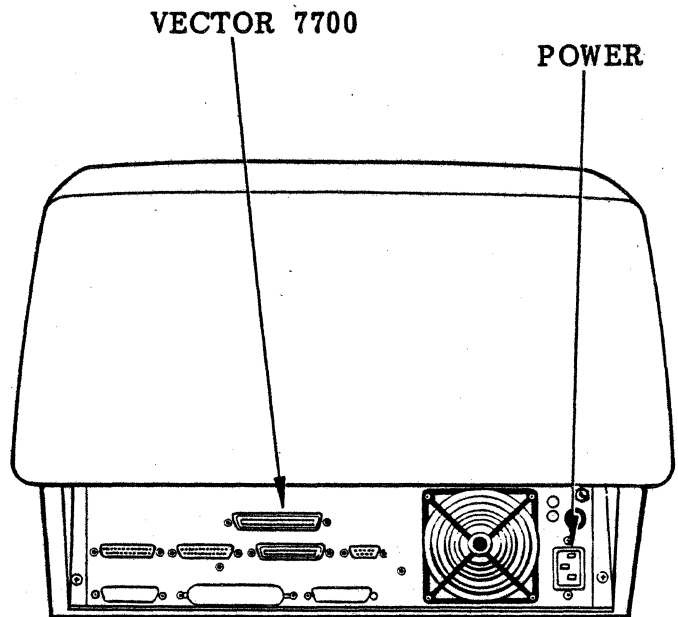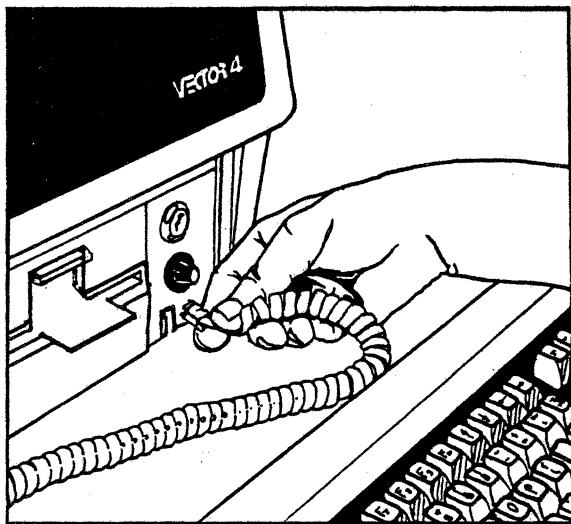
In particular, check the tightness of the keyboard cable and the power cord. These two connectors are crucial to the operation of the Vector 4. If necessary, remove the keyboard connector, then reinsert it into the socket. Be sure to squeeze the locking tab toward the connector during insertion. When inserting, listen for a "click" as the locking mechanism indicates a proper connection.

General Instructions

If the Vector 4 has been set up according to its requirements, the following troubleshooting procedures should provide a valid and accurate guide to user-serviceable malfunctions. At this point, the system should be:

- turned OFF (with the key in a vertical position),

- plugged into a verified power outlet,

- with all connectors (power cord, keyboard cable, printer or peripheral strips, et cetera) checked for correct positioning and tight fit.

Next, identify your Vector Graphic System Diskette. If you have a floppy-only system, insert the diskette into the right-hand drive (Drive A). If it has already been inserted, remove it and reinsert it according to the procedure outlined in Appendix C, "Care and Handling Of Diskettes". If you have a hard-disk system, keep the diskette nearby for possible use.

Now, proceed to the Troubleshooting Flowchart. Follow the checks outlined there, while trying to make the symptom repeat in the controlled environment.

If the symptom does not repeat, then the problem must have been either due to an improperly-connected power cord or cable, some characteristic of the power line itself, an improperly-inserted diskette, or some environmental problem. Note the condition (power outlets, temperature, et cetera) of the Vector 4 and make sure that it is always operated under similar conditions.

If the symptom does repeat, refer to the indicated symptom (isolated by number), against the Symptom Checks. Follow these procedures closely until the Vector 4 is functioning.

If you still cannot get your Vector 4 to work, then check your service agreement to determine the appropriate action.

TROUBLESHOOTING FLOWCHART

```
+-----------------------------------+
|            POWER ON               |
|                                   |
|      "Clean" power source         |
|      All connections tight        |
|                                   |
|        Turn key to ON             |
|      (horizontal position)        |
|                                   |
|            "BEEP"                 |
+-----------------------------------+
                 |
                 v
+-----------------------------------+
|         BANNER APPEARS?           |
|                                   |
|     NO: Go to Symptom 1           |
|                                   |
|  YES, with error message on       |
|   screen:  Go to Symptom 2        |
|                                   |
|  YES, with no error mesage:       |
|      Press [F] or [W]             |
|                                   |
|            "BEEP"                 |
+-----------------------------------+
                 |
                 v
+-----------------------------------+
|         SYSTEM BOOTS?             |
|                                   |
|     NO: Go to Symptom 3           |
|                                   |
|   YES, but A> prompt displays     |
|      ERROR - A:<error> :          |
|      Go to Error Handling         |
|                                   |
|    YES, no error message:         |
|       END OF ACTIVITY             |
+-----------------------------------+
```
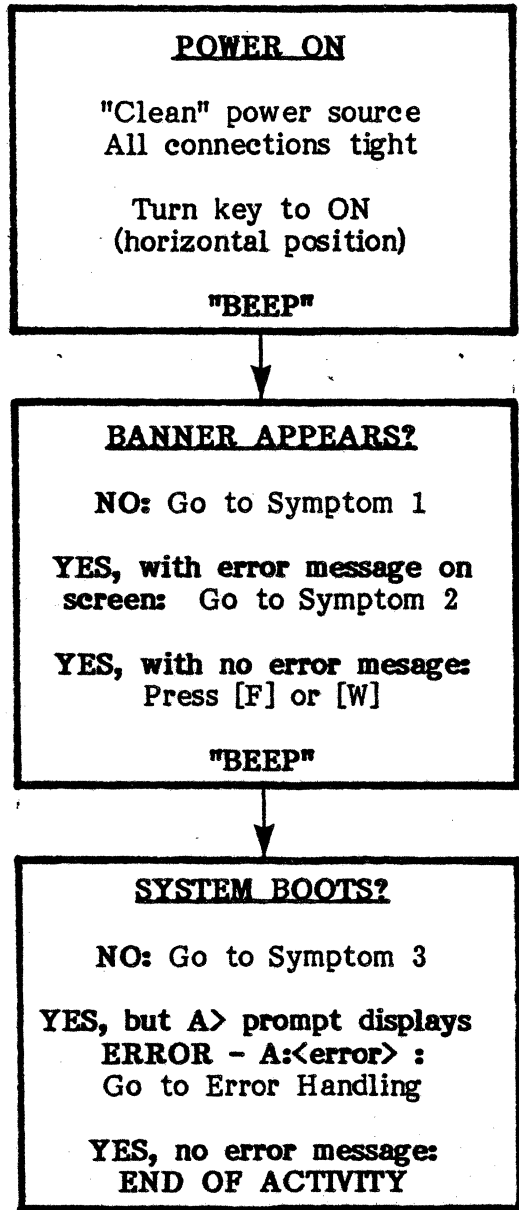
SYMPTOM CHECKOUT PROCEDURES

SYMPTOM 1 - NO BANNER AT POWER-ON

Symptom Review: Your Vector 4 shows no "Executive" banner, nor any other screen display, at power-on or reset.

1. Turn system OFF. Wait 60 seconds, then turn system ON. Make sure that key is at fully horizontal position. Listen for tone generator to "beep".

    If tone generator "beeps", go to Step 3.

    If tone generator does not "beep", feel for air coming out of fan at rear of terminal. If no air comes out of fan, continue.

2. Make sure that Vector 4 is correctly plugged into working electric socket, and that connector of power cord is fully plugged into Vector 4 with no obstructions. If necessary, verify electric socket with other appliance.

    If other appliance does not work in electric socket, install Vector 4 in known working socket (and call electrician regarding other socket).

    If other appliance works in electric socket, Vector 4 power supply needs inspection. Check your service agreement for the appropriate action; the power supply is not user-serviceable.

3. Wait 30 to 60 seconds for terminal to warm up. If no banner displays after 60 seconds, turn contrast knob all the way counterclockwise, then back to full clockwise position.
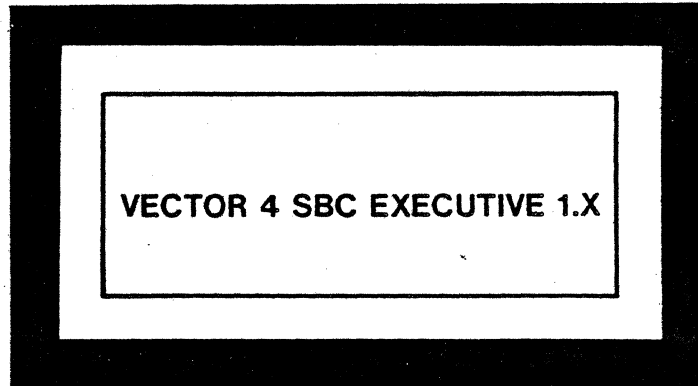
    If banner displays, return to Operating Instructions.

    If banner still does not display, Vector 4 monitor or power supply will need inspection. Check your service agreement for the appropriate action; this problem is not user-serviceable.

END OF ACTIVITY

SYMPTOM 2 - ERROR MESSAGES ON SCREEN

Symptom Review: Your Vector 4 turns on with the key, generates the tone to indicate power-on, and displays the following banner, with an "error" message where indicated:

```
┌─────────────────────────────────────┐
│  ┌───────────────────────────────┐  │
│  │                               │  │
│  │                               │  │
│  │    VECTOR 4 SBC EXECUTIVE 1.X │  │
│  │                               │  │
│  │                               │  │
│  └───────────────────────────────┘  │
└─────────────────────────────────────┘
```

<ERROR MESSAGES>

[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >

The Automatic System Test runs each time the Vector 4 is powered or reset. It checks the memory, the booting program, and the keyboard. Should the automatic test uncover any errors, it will display one of the three following messages where indicated on the display:

RAM MEMORY ERROR: BLOCK xx : EVEN/ODD ADDRESS : BITS IN ERROR = xx *
PROM CHECKSUM ERROR
KEYBOARD I/O ERROR

* "xx" represents a two-digit number.

These errors may be the result of a temporary condition.

1.   Turn the system OFF with the key, wait 60 seconds, and then turn the power ON.

     If the error message repeats, repeat Step 1 once more. If the screen still displays the same error message, write down the error message exactly as it appears on your screen and check your service agreement for the appropriate action.

     If **KEYBOARD I/O ERROR** displays, continue.

2.   The **KEYBOARD I/O ERROR** message may result for the simple reason that the keyboard connectors are not sufficiently tight. If you get this message, remove the keyboard cable and connect it firmly, listening for the "click" to indicate a positive connection. Then repeat Step 1 once.

     If the **KEYBOARD I/O ERROR** message repeats, check your service agreement for the appropriate service action.

END OF ACTIVITY

SYMPTOM 3 - VECTOR 4 WON'T BOOT

Symptom Review: Your Vector 4 has successfully powered on, and the screen displays the following banner:

```
VECTOR 4 SBC EXECUTIVE 1.X
```
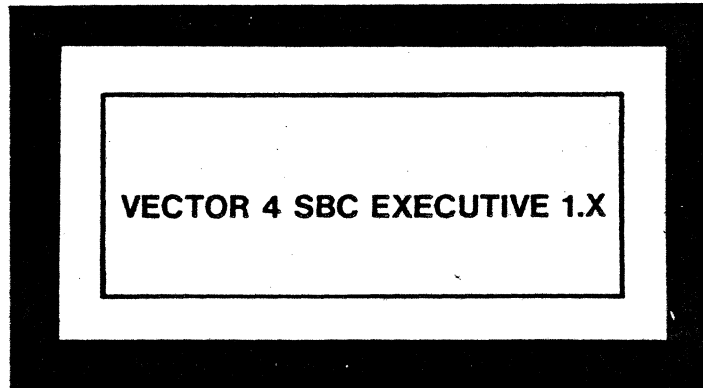
[W] ... Winchester boot   [F] ... Floppy boot
[T] ... System Test

SBC >

Furthermore, no error messages appear as a result of the Automatic System Test, but when either F or W key is pressed, the screen doesn't not (after several seconds) clear and display:

VECTOR 4 CP/M VERSION 1.X
PRINTER 1 LOADED WITH <current setting>
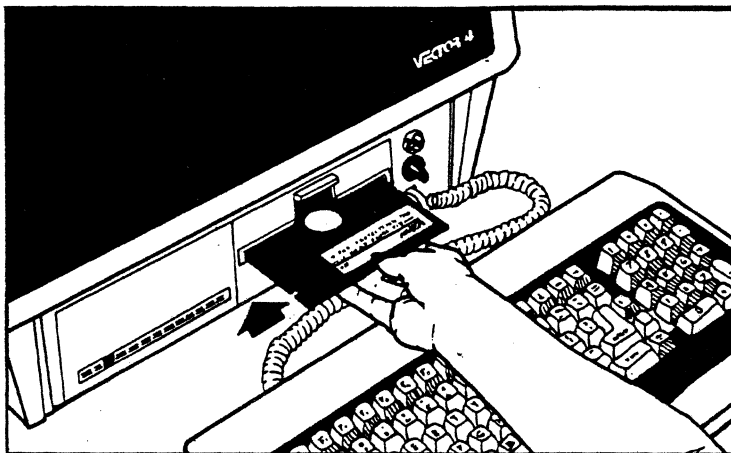PRINTER 2 LOADED WITH <current setting>

A>

For A Floppy-only System:

1. Determine which diskette supplied with your system is the Vector Graphic System Diskette #1.

2. Make sure that this diskette is inserted in the right-hand floppy drive, in the illustrated position. Refer to Appendix C, "Care and Handling Of Diskettes", for information.

Press [F] to boot from the System Diskette.

If system still will not boot, check your service agreement for the appropriate action.

For A Hard-disk System

If the banner disappears, and the screen displays the letter "e" on a light background, press the RESET button. Go to "Preparing Your Hard Disk For Operation", below.

If the banner does not disappear, but the top of the screen displays the message:

VECTOR.CPM FILE NOT FOUND

then continue.

Preparing Your Hard Disk For Operation

1. Press the reset button on the rear of the terminal. When the SBC > banner appears, insert and mount the Vector 4 System Diskette in the floppy drive. Press [F] to boot from the floppy diskette.

2. When the screen clears and the VECTOR 4 CP/M banner appears, along with the A> prompt, enter the command:

A>GENSYS [RETURN]

3. The screen will display:

VECTOR GRAPHIC SYSTEM GENERATION UTILITY - VERSION 1.x

> **[1]   GENERATE A FLOPPY ONLY SYSTEM**
> **[2]   GENERATE A HARD DISK + FLOPPY SYSTEM**

SELECT ONE OF THE ABOVE:

4. Enter 2 [RETURN].

If you have a 10 Mbyte system, skip to Step 6.

If you have a 5 Mbyte system, the screen will display:

SELECT THE NUMBER OF LOGICAL SURFACES [1] OR [2]:

5. Enter [1] if the hard disk is to consist of Drive A only; enter [2] if you plan to use two disk drives, A and B.

6. The screen will display:

[1] 256 ENTRIES
[2] 512 ENTRIES
[3] 768 ENTRIES
[4] 1024 ENTRIES

SELECT THE DIRECTORY SIZE FROM ABOVE:

NOTE

Most common directory size is 512. Choosing a different directory than the one in use may cause the system to lose files which extended beyond the new maximum, or which were written to the outside tracks of the disk now used by the enlarged directory. If the disk has just been formatted, choose any desired size.

7. Enter the number corresponding to the size of directory you plan to use. The screen will display:

SELECT THE BOOTSTRAP SURFACE [1] OR [2]:

The numbers correspond to the letters of the alphabet (A=1, B=2). Enter the number for the disk drive you wish to use to store the operating system. (Selecting surface 2 will require entering 2 to boot from the SBC > prompt.) The screen will display:

DO YOU WANT THE VECTOR SYSTEM AND LIST DEVICE FILES COPIED? [Y] OR [N]:

NOTE

In the following step, if you enter **N [RETURN]**, the hard disk will not be usable for booting the system.

8. Enter **Y [RETURN]**. The screen will display:

VECTOR.CPM FILE COPIED TO DESTINATION DRIVE
VECTOR.LD1 FILE COPIED TO DESTINATION DRIVE
VECTOR.LD2 FILE COPIED TO DESTINATION DRIVE
GENSYS.COM FILE COPIED TO DESTINATION DRIVE

9. After a few minutes, the screen will display:

SYSTEM GENERATION COMPLETED

but then immediately reset to the **VECTOR 4 SBC EXECUTIVE** banner.

10. When the **SBC >** prompt appears, the system will automatically enter **[W]** to boot from the hard disk. If your system still will not boot, check your service agreement for the appropriate action.

END OF ACTIVITY

ERROR HANDLING

"Bad Sector" Disk Errors

Bad sector disk errors are reported on the screen in the following format:

ERROR - drive:<error>

They usually indicate some simple problem with the diskette. However, the problem may also come from the drive or the disk controller board.

If one of these errors occurs, repeat the procedure that resulted in the error. If the error occurs again, refer to the section below on recovery techniques. If you consistently get such disk errors, be sure to use Vector Graphic approved diskettes. If the errors persist, check your service agreement for the appropriate action.

There are several errors which the Basic Disk Operating System (BDOS) detects. The BDOS prints the error in the format listed above, replacing <error> with one of the following messages:

DISK READ/WRITE(xxyy)

The DISK READ/WRITE message will display when the disk controller detects an error in reading or writing to the disk. Here, "xx" stands for a hex code denoting the particular physical BIOS error detected by the physical disk driver; "yy" corresponds to the BDOS physical and extended error codes. See the Programmer's Manual for an explanation of all the error codes you may encounter.

This error message generally displays either because of a malfunction in the disk controller, or because of a badly-worn diskette. If your system reports this error more than once a month, your disk surface should be replaced or your system serviced.

Recovery from this condition may be accomplished by responding to the next prompt:

PRESS [CTRL C] TO REBOOT OR [RETURN] TO CONTINUE

Entering a [CTRL C] will abort the current program and return control to the CCP. Pressing [RETURN] will cause the error to be ignored by the program and execution will continue normally.

You should only press [RETURN] when copying a file for which it is important that as much of the file be recovered as possible. Note, however, that entering a [RETURN] may destroy diskette integrity if the operation is a

directory write; therefore, make sure an adequate backup has been made.

Other Disk Errors

The following BDOS errors will display the particular error message and simply wait for user input to reboot; entering any key will cause a warm boot.

DRIVE SELECT

The DRIVE SELECT message will appear when there is an attempt to access a drive not supported by the current hardware/software configuration. (For instance, this message will appear if you miss the B: and type V: instead.) In this case, the drive which is out of range is displayed along with the error message. The system reboots following any input from the terminal.

DISK IS READ-ONLY

The DISK IS READ-ONLY message will be displayed when there is an attempt to write to a diskette which has been designated as "READ/ONLY" using the STAT command, or uses a write-protect tab.

Also, note that you must enter [CTRL C] whenever you insert a new diskette. Until you enter a [CTRL C] (which performs a warm boot for the newly-entered floppy), the diskette is considered R/O. The status of the drive is subsequently changed back to "Read/Write" following a warm boot (unless the diskette is protected in some other way, of course). Upon displaying the READ-ONLY message, CP/M waits for any input from the terminal; an automatic warm boot will occur as soon as you touch any key.

FILE IS READ-ONLY

The FILE IS READ-ONLY message will be displayed when there is an attempt to change a file (by writing to or erasing it) which has been declared as "R/O" using the STAT command or by an applications program, or if the file is opened (by some program) in READ-ONLY mode. The file may be returned to READ/WRITE status using the STAT command, if necessary.

FILE CURRENTLY OPEN

The FILE CURRENTLY OPEN message will be displayed if an attempt is made to access a file which is in use by another task. Find out what task is locking the file open, and stop the program. One way of finding out more information about this problem is to enter the command OPEN [RETURN], which will list all programs and data files which are open at that time.

ILLEGAL FILE ACCESS

The ILLEGAL FILE ACCESS message will be displayed when an attempt is made to access a file that is not available for use.

FILE ALREADY EXISTS

The FILE ALREADY EXISTS message will be displayed when a user or program is trying to create or rename a specific file which already exists on disk. Determine if you wish to keep the current file; if not, you can erase the file and repeat the command that resulted in the FILE ALREADY EXISTS message. Or you can assign a different name to the file you are trying to create.

ILLEGAL "?" IN FCB

The ILLEGAL "?" IN FCB message will be displayed when a question mark "?" is used within the File Control Block (FCB) in any file function other than SEARCH FIRST, SEARCH NEXT, and DELETE FILE.

FILE OPEN LIST FULL

The FILE OPEN LIST FULL message will be displayed when an attempt is made to open, create, or copy a file while the system's File Open List is full. The File Open List can contain up to 32 files. It is maintained by the operating system, and indicates open files in the system, the task(s) which have the files open, and the mode in which the file is open (locked or unlocked). On a single-user system, this is generally not a problem.

RECORD LOCK LIST FULL

The RECORD LOCK LIST FULL message will be displayed when an attempt is made to LOCK a record and the Record Lock List is full. The Record Lock List can contain up to 512 records. It consists of a series of lists linked to the open file entries of the System File List. The Record Lock List describes which records are locked, and which task has them locked.

DRIVE NOT READY

The DRIVE NOT READY message will be displayed when an attempt is made to read from a drive and the disk is either not properly seated or there is no disk in the drive. Enter [CTRL C] to perform a warm boot, then check the position of the diskette. Sometimes all it takes is for you to remove the diskette, remount it, and enter [CTRL C]

Recovery Techniques

If you repeatedly get bad sector disk errors using one particular diskette, then that diskette is probably defective. This will sometimes happen with a new diskette when you are formatting it to use as backup. After several attempts, discard it or return it if possible. Whenever you repeat a disk operation after an error, always unload and reload the diskette to ensure that it is seated correctly.

If you still get bad sector errors, try copying to another diskette using the DISKCOPY utility in CP/M; on a hard-disk system, try to PIP the contents to your hard disk. If the error still occurs, try switching source and destination drives. Sometimes a repositioning of diskettes within drives will result in a successful copy.

If you cannot copy a diskette at all, then try to "PIP" it, file by file, to another formatted diskette. If the problem is limited to one or two files, you will probably not be able to PIP them onto the new diskette. But with any luck, all the other files will copy over successfully and you will have eliminated the source of the error (although it means losing a file or two).

When you get a bad sector error message, CP/M allows you to skip over the bad sector and continue the operation. This is not usually desirable because the bad data will cause other problems. However, if there is no other way to get the file off the diskette intact, simply bypass the error message by pressing the [RETURN] key immediately after the bad sector error message occurs. The disk operation will continue, ignoring the fact that a bad sector was transferred.

In a copy, for example, the new file may contain errors which you will have to correct one at a time. You will have to determine at the time what the tradeoff is worth: whether it might be easier to use an earlier (but good) backup, and duplicate a little work; or to use the latest (but error-prone) diskette and correct any errors that were copied from the bad diskette.

Again, the best way to avoid this is to use a good, reliable brand of diskette such as Vector Graphic approved diskettes, and replace each individual diskette as often as you need to.

CARE AND HANDLING OF DISKETTES

## Type Of Diskettes

All Vector 4 systems with floppy drives require an industry–standard 5-1/4" floppy diskette with 16 "hard sectors". This means that there are 16 sector guide holes around the center drive hole. These sector guide holes help the computer align itself for reading from and writing to the disk.

■ Write-Protect Notch

■ Center Drive Hole
■ Sector Guide Hole

■ Recording Media
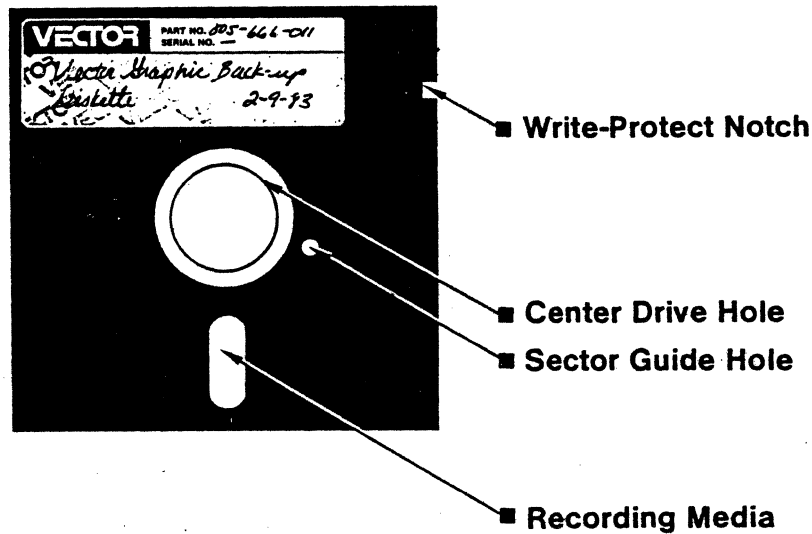
When purchasing diskettes, be sure to specify "hard-sectored" disks in your
purchase order or with your salesman. "Soft-sectored" diskettes (which do not
have the sector guide holes) will not work on your machine. For best results,
be sure to use Vector Graphic Approved diskettes.
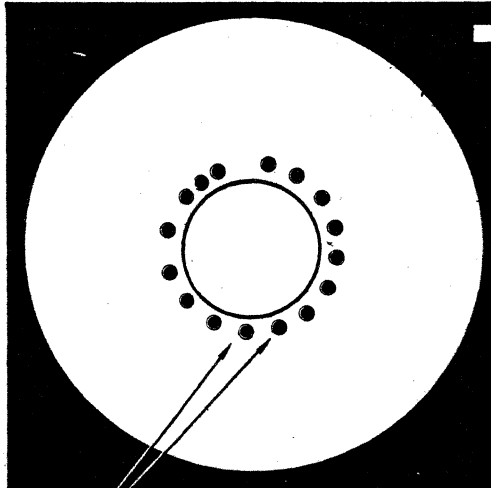
Sector Guide Holes (16)

Handling And Safety Precautions

Guidelines

The ideal conditions for diskettes are much the same as those for humans: a temperature of about 70 degrees, a relative humidity of 50%, and a dust- and dirt-free environment. (The maximum range of temperature and humidity for diskettes is 50-125 degrees, 8%-80% relative humidity. Avoid the extremes if at all possible.) For maximum effective use of your diskettes, the following guidelines should be observed at all times.

- Do not touch or attempt to clean the surface of the diskette itself.

- Do not smoke, eat, or drink while handling the diskette. (A particle of smoke is actually larger than a particle of the magnetic oxide on the recording surface!)

- Do not place heavy objects on the diskette.

- Do not expose the diskette to direct sunlight or excessive heat.

- Do not use rubber bands or paperclips on the diskette.

- Use only fiber-tipped pens to write on diskettes. Ball-point pens can distort the surface of the diskette. Even with a fiber-tipped pen, use very little pressure when writing, and make sure that the diskette is placed in its protective envelope before writing on it.

- Do not use labels which have been written with a pencil. Graphite particles which rub off the pencilled letters can have a disastrous effect on the diskette recording surface.

- The best way to label a diskette is to write or type the information on an adhesive label, then apply the label carefully to the diskette. Be careful not to let the adhesive touch the disk recording surface.

- Do not expose the diskette to magnetic fields. A strong magnet can erase all the information on a diskette. Avoid static electricity for the same reason.

- After use, always return the diskette to its protective envelope, or to some other protective container, such as the Vector Graphic Diskette storage case.

- Store diskettes vertically. Like phonograph records, diskettes are very susceptible to warping and compression if stacked.

● If a diskette becomes damaged or contaminated, replace it. Placing a contaminated diskette in the disk drive can pass the contaminant on to the read/write head. If you've ever had a recording tape ruined from a dirty tape player, you know how disastrous this can be.
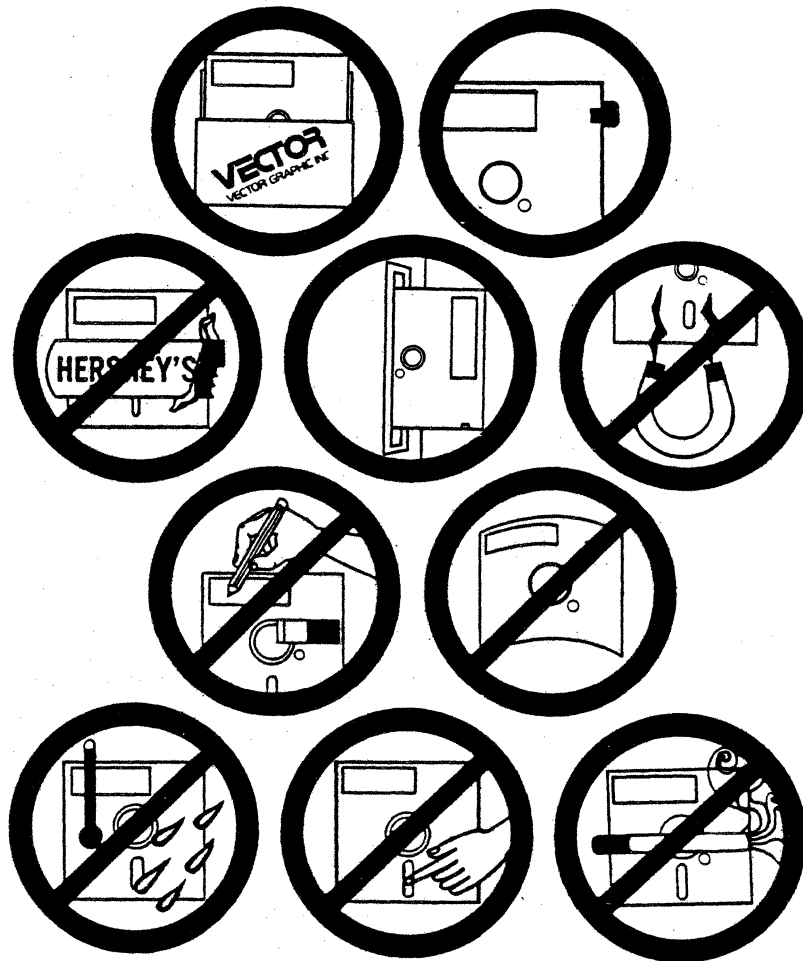
Loading Diskettes

There are two steps to loading a diskette: <u>inserting</u> and <u>mounting</u>.

1.   Insert the diskette with the label side up, the square notch in the edge pointing to the left, and the oblong area of exposed disk media pointing inward. Press lightly against the diskette until it clicks into place. Do not push so hard that the diskette bends.
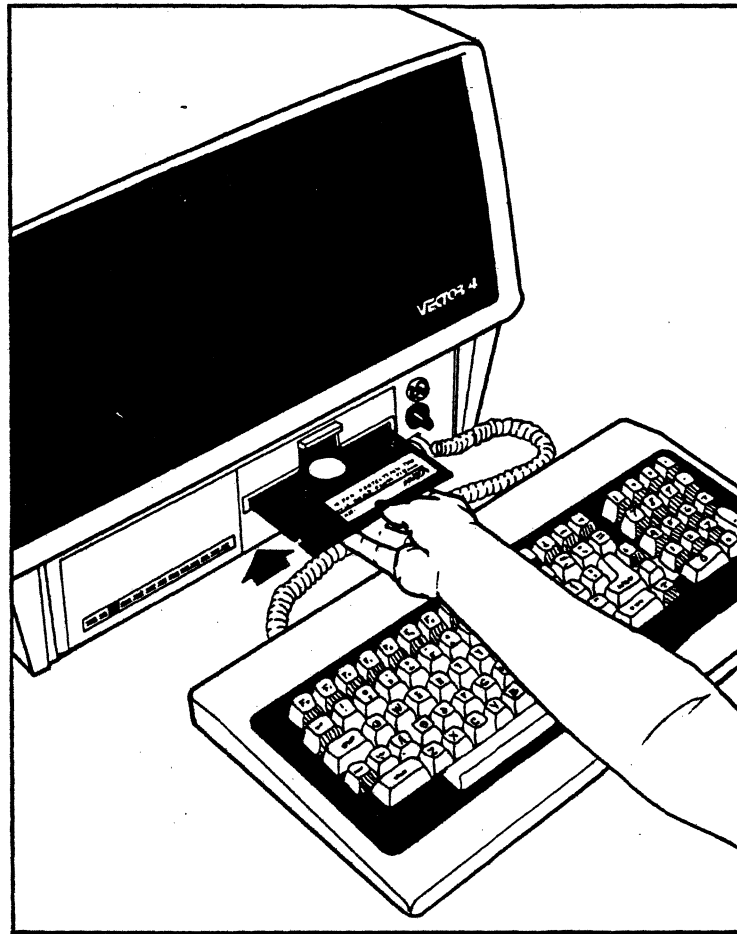
The diskette is now inserted but not yet mounted. Although not good practice for long periods, you may leave the diskette like this briefly, and even turn the power on or off.

2. To mount the diskette, push down on the door of the drive until you feel increased resistance at the half-way point, then STOP. Continue pushing slowly until the door "clicks" and stays closed. Be sure to enter a [CTRL C] to tell the computer that you have inserted a new diskette.
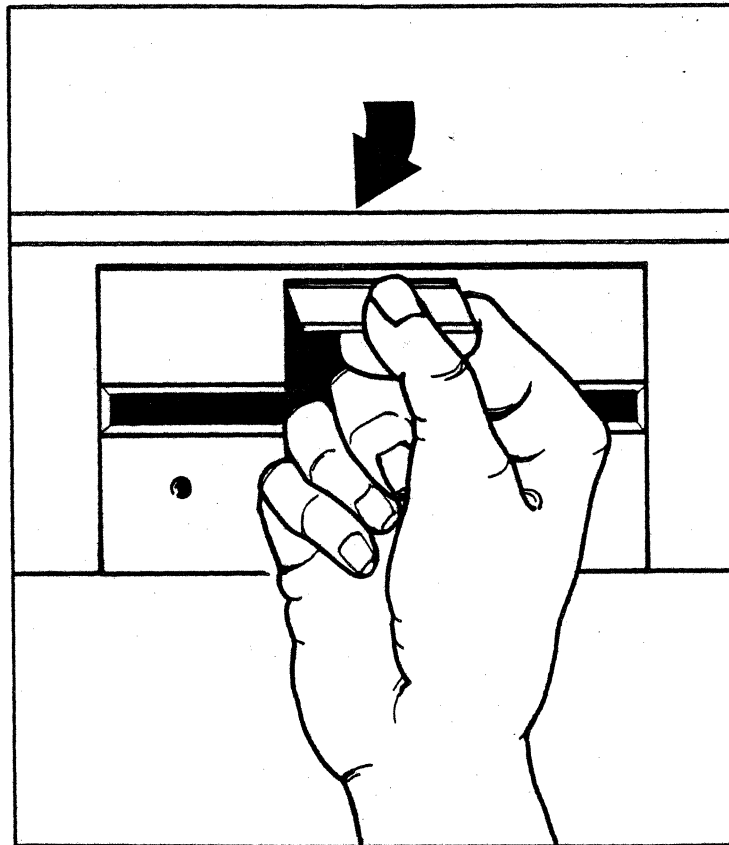

If you cannot fully close the door, the diskette is not inserted properly. Open the door, remove the diskette, and repeat Step 1.

Once the diskette is mounted, the computer can use that diskette. When the computer accesses the diskette, you will hear a click from the drive and its red light will glow. After the disk accessing operation is complete, the drive will remain on for about five seconds. You can be entering new material at the keyboard during this time.

At the end of five seconds, the red light will go out, and there will be another click as the read/write head is raised off the surface of the diskette. This feature is important in lengthening the life span of diskettes.

Unloading Diskettes

To unload a 5-1/4-inch diskette:

1. Make sure that the red light is off. Slowly open the door by swinging the panel upward. This stops the rotation of the diskette.
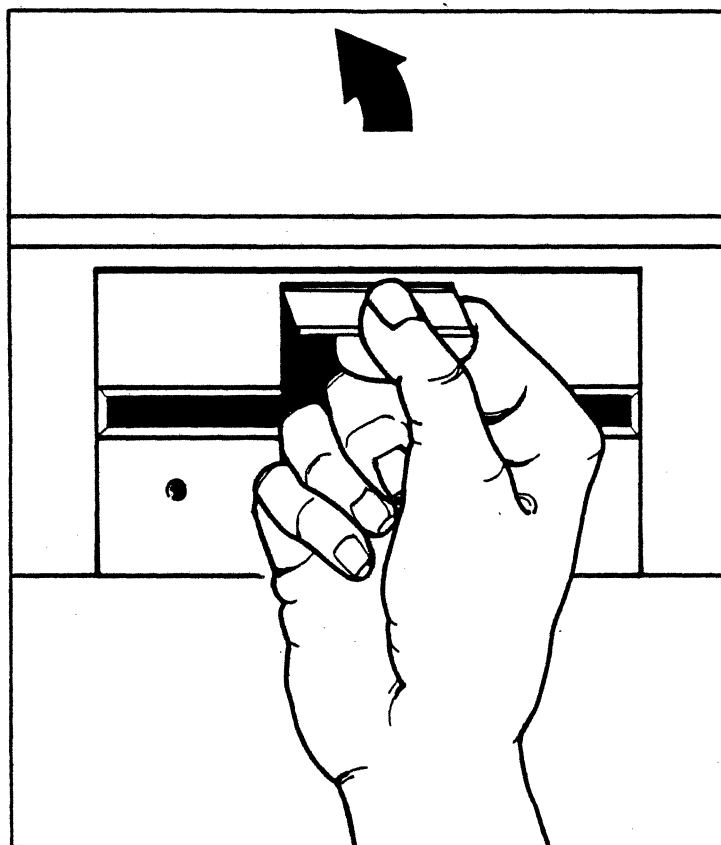
2.   Gently pull the diskette straight out from the drive. Be careful not to pull too hard; if the diskette is caught, excess force may tear or otherwise harm the surface.
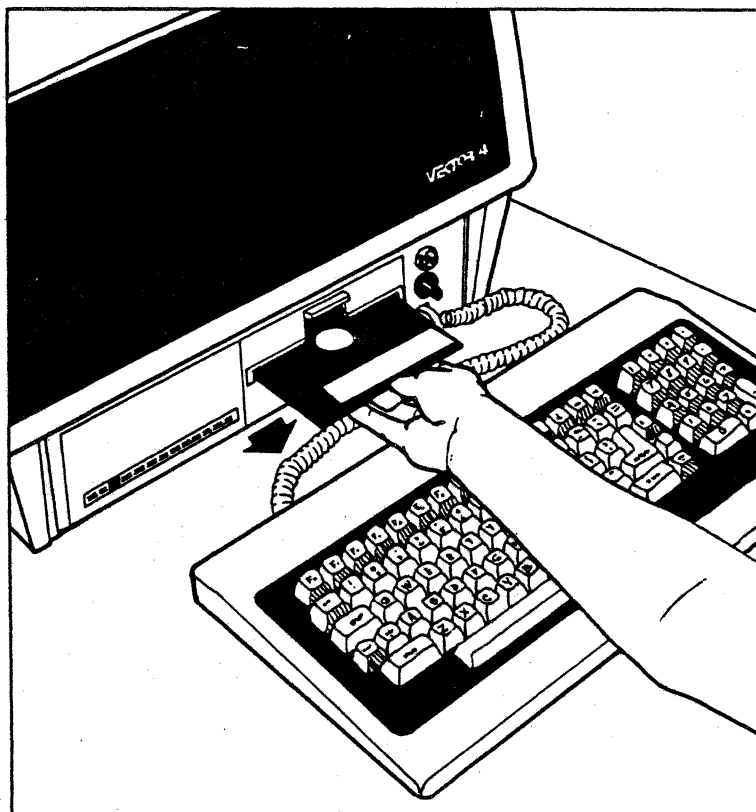
For maximum use and safety, remove the diskette when it is not in use, or at least leave the drive door open so that the diskette is not mounted. This reduces wear of the diskette against its jacket. For best results, start with a tested brand of diskette such as Vector Graphic Approved diskettes. Then take care of them according to the directions here.

Diskette Backup, Replacement, And Protection

From time to time, you may encounter an individual diskette which may not work. Some computer users have occasionally found a batch of diskettes with the wrong number of sector holes, with two diskettes mounted in one jacket, or with other manufacturing defects. If a diskette does not work, and work reliably, replace it immediately.

If you have any very old records or tapes, you know that any electronic recording medium will gradually deteriorate with time. But where an old tape or album will begin to hiss and crackle after a few years, an old diskette will begin producing errors. You can avoid this, not to mention the subsequent problems, by making backup copies from time to time. Both program diskettes and data base diskettes should be backed up on a regular schedule.

Backup

The best defense against loss of diskette-based data is to maintain a backup diskette for each diskette you use. Some users keep a copy of valuable or confidential data in a safe, or in some other secure place where it will be difficult to change the data or destroy the diskette. It is a good idea to place the extra key that came with your Vector 4 in the same location.

Make a backup copy regularly, whenever you have more information than you can afford to lose. In addition, a transaction journal, a printed copy of entries made each day into the system, is an excellent idea to build into your procedures as a "last resort" backup. With the transaction journal, you will always have a record of what went on during a given day, so that you can rebuild the day's work with a minimum of effort should you accidentally lose a diskette. As you gain experience, you will probably find the backup system and schedule that best suits your business.

Copying To The Backup Diskette

To record information onto a diskette, use any of these programs:

DISKCOPY
STORE
PIP

Use DISKCOPY and STORE for the entire contents of a disk (DISKCOPY for floppy to floppy, STORE for hard to floppy). Use PIP for individual files, files with similar names or extensions (allowing you to use ambiguous file names as described in the INTRODUCTION TO VECTOR 4 CP/M), or files to be copied from one user area on a disk to another.

These programs are explained in detail in the TRANSIENT COMMANDS section of this manual. However, the basic command to move all files from the A drive to the B drive would be:

A><PROGRAM> B:=A:*.* [RETURN]

Substitute the name of the program you choose for the <PROGRAM> indicated above.

Replacement

Be sure to replace frequently-used diskettes with fresh ones every six months. Do not wait until the old disk fails before you replace it, particularly not if you do frequent copying _from_ the disk to your computer. One suggestion is to use the backup diskette, while still fairly fresh, as the new front-line diskette, and to create a fresh backup. This will minimize both the chance of diskette failure and the cost of buying replacement diskettes.

The procedure to create a backup diskette is:

1.   FORMAT a blank diskette, or a diskette which does not contain important information.

CAUTION

Do **NOT** format the VECTOR 4 CP/M System diskette or any other diskette containing desired information. Formatting completely erases a diskette.

2.   DISKCOPY, or STORE, the entire source diskette onto the formatted target diskette. (Note: STORE transfers only from hard disk to floppy diskette.)

3.   PIP any additional files desired to the target diskette.

Protecting Diskettes From Unauthorized Changes

To keep information from being changed on an important diskette (such as the system backup diskette), use the write-protect tabs included in each box of new diskettes. If you attach a tab over the write-protect cutout on a 5-1/4-inch diskette, the disk drive will not allow you to erase or change any information on the diskette. The tab may be removed later, if required.

It is a good idea to place one of these tabs on the system diskette before working with it, if not already attached.

You can also use the STAT command to protect a diskette or individual files on the diskette from change or erasure. See the instructions for the STAT command, in the TRANSIENT COMMANDS section of this manual.

GLOSSARY OF TERMS

Where an item in a definition appears in **BOLD FACE**, it is defined under its own entry in this Glossary.

AMBIGUOUS FILENAME - Used to refer to a group of files at one time. By using a **WILDCARD** character, either * or ?, you can access more than one file at a time in various commands within CP/M. For example, the command DIR *.MEM will display a directory of all files ending with the .MEM extension. The *.MEM is the ambiguous filename. See also **UNAMBIGUOUS FILENAME.**

ASCII - American Standard Convention for Information Interchange: the code used to store letters, numbers and control characters as **BYTES**. There are 256 ASCII characters available to the Vector 4, the number and combination most common in the microcomputer industry.

BOOTING - A term used to describe the process of loading the operating system from the disk into the internal memory of the computer after the power has been turned on the system. The booting command, given by the operator, is "F" when booting from a floppy disk and "W" from the hard disk.

BDOS - Basic Disk Operating System. The portion of the Vector 4 CP/M Operating System responsible for locating and recording data stored on the disk drives.

BIOS - Basic Input-Output System. The portion of Vector 4 CP/M responsible for controlling input and output; makes sure that the correct circuits are open for transmission at the right time.

BIT - A "binary digit", or the smallest single piece of information capable of being stored in the computer's memory. Usually represented as a 1 or a 0, a bit is actually the relative presence or absence of electrical current in a particular position in some memory device.

BYTE - For the Vector 4 CP/M operating system, a coded character made up of eight bits. For example, the character [CTRL C] is viewed by the computer as the byte 00000011.

CCP - Console Command Processor. The portion of Vector 4 CP/M responsible for interpreting input from the keyboard and sending commands to the remainder of the operating system. The **RESIDENT COMMANDS** are part of the CCP.

COMMAND - An instruction given to the computer by the operator.

COMMAND KEYS - A series of buttons or keys on the keyboard that are used to send commands to the computer. For example, [ESC], [DEL] and [CTRL] are all command keys.

CONSOLE - The part of your Vector 4 which contains the video screen, central processing unit, and other electronic components.

CP/M - Control Program for Microprocessors. An extremely popular operating system used extensively in the microcomputer industry. Modified for simpler operation on the Vector 4, as Vector 4 CP/M.

CPU - Central Processing Unit. The brains of á computer. A tiny silicon chip or integrated circuit that is responsible for making decisions, performing calculations and executing instructions given to it by the user.

CURSOR - A flashing box, arrow, or line seen on the video screen, used to indicate the location of the computer's "attention".

DISK - Magnetic media used to store data and programs created on the computer. A disk may be flexible, called a "floppy diskette" or rigid, called a "hard disk".

DISK DRIVE - The hardware device that houses either the hard disk or the floppy. The storage component of the computer.

EXTENSION - The three characters after the period in a **FILE NAME.**

FILE - A block of data recorded on disk under a specific name.

FILENAME - The way to access, or refer to a **FILE** on your Vector 4. The filename consists of two parts: the name itself, which can be up to eight characters long, and the **EXTENSION**, which can be up to three characters long.

FORMAT - A transient command used to prepare a **DISK** for use. Format actually puts **TRACK** and **SECTOR** markings on the recording surface to customize it for the particular computer hardware it will be used with.

FUNCTION KEYS - A series of buttons or keys across the top of the keyboard that are used for special functions in aapplications programs.

HARDWARE - The physical components of the computer. Disk drives, consoles, printers and keyboards are all examples of hardware devices.

KILOBYTE - A term that describes 1,024 bytes, a byte being equivalent to a character. The abbreviation is "k", so a disk may be said to hold 630k or approximately 630,000 characters.

MEGABYTE - A term that describes a million (actually 1,048,576) **BYTES** or characters. The abbreviation for megabyte is mb, so a hard disk may hold 5mb or approximately 5 million characters.

MICROPROCESSOR - The "brain" of the computer. A "chip" which performs calculations, determines logical values, and guides the functions of the computer, according to the **SOFTWARE** and the user **COMMANDS.**

OPERATING SYSTEM - A program that controls the flow of data into and out of the components of the computer, manages **FILES** and allows the user to load application **PROGRAMS.**

PIP - Peripheral Interchange Program. A **TRANSIENT COMMAND** used to copy **FILES** from one disk (or device) to another.

PRINTER - A hardware component of the computer that is used for the output of data onto hard copy.

PROGRAM - A set of instructions, specially coded in a way that control the computer **HARDWARE** in order to perform functions determined by the programmer. "Application programs" are used to perform a specific task.

RAM - Random Access Memory. A type of volatile (changeable) memory used by the microprocessor to store data that it is changing, or to store the instructions called by user commands. Also used to store the operating system.

RESIDENT COMMANDS - A group of commands that are loaded into the internal memory of the computer during the booting process. These commands are part of the **CCP.**

ROM - Read-Only Memory. A type of stable memory which allows the computer to retain instructions even with the power off. The booting program, for example, is stored in ROM chips.

SOFTWARE - Instructions written for the computer to tell it how to perform various functions. There are two kinds of software: application programs, written to perform a specific task (such as calculate a balance or add material to a data base); and system software, which controls the computer **HARDWARE** so that the application software can function.

TRANSIENT COMMANDS - A group of utility programs included on the systems disk; used for file maintenance and as support to the **OPERATING SYSTEM.** The transient commands must be on the disk in order to use them, and they may be moved or copied to other disks for use by the operator.

TPA - Transient Program Area. The "left over" portion of the **RAM** after booting, used for storing applications programs, transient commands, and data being entered. Also a **RESIDENT COMMAND** which allows the user to return to the last task he or she was performing.

UNAMBIGUOUS FILENAME - A specific filename only satisfied by one file on a directory. For example, if you request STAT.COM, only one file can be accessed because there is only one file with that name. See also **AMBIGUOUS FILENAME.**

USER AREA - A space designated (by the **OPERATING SYSTEM**) on the disk, used to store files. There are potentially 16 user areas that may be accessed by the operator. The purpose of a user area is to subdivide the storage space available. They are especially useful on a hard disk system.

UTILITY - Another name for any of the transient commands used for file maintenance.

WILD CARD - A Vector 4 CP/M function which allows references to multiple files with one **AMBIGUOUS FILE NAME.** The wild cards are:

> ? - replace with any single character in the location entered

> * - replace with any character or group of characters needed to fill up the maximum (eight in name, three in extension)

DISKETTE DIRECTORIES

Vector Graphic System Diskette

The System Diskette which came with your Vector 4 contains the following files in User Area 0 (the default user area):

```
VECTOR    LD2 1 GENSYS    COM 1 FORMAT   COM 1 VECTOR    LD1
DISKCOPY  COM 1 CONFIG    COM 1 STAT     COM 1 PIP       COM
STORE     COM 1 RESTORE   COM
```

Although all the files are explained in the rest of this manual, here is a brief explanation of each file in User Area 0.

VECTOR.LD2

This list device file contains the programming for the Vector 7700 letter-quality printer.

GENSYS.COM

This command file is used to generate a system on a newly-formatted disk or diskette, which can then be used to "boot" (start) the system.

FORMAT.COM

This program is used to erase, then copy "road signs" (track and sector markings) to a new diskette, or one which is being "recycled".

VECTOR.LD1

This list device file contains the programming for an optional serial draft printer.

DISKCOPY.COM

This program allows you to make an exact copy of a diskette onto another. The diskette used to receive the copy need not be formatted first.

CONFIG.COM

This program allows you to specify the configuration of your system. Depending on the option selected, it can be used to select printers, specify baud (transmission) rate for printers and modems, specify page size, set up "auto-commands" for automatic start-up procedures, specify different logical drives as single- and double-sided, and modify the operating system in several other ways.

STAT.COM

This program can be used to determine statistical information on the amount and type of storage in disks or diskettes. It can also be used to set files or entire disks to Read-Only (R/O) status, protecting them from changes. It can also be used to set them back to Read-Write (R/W), enabling you to change them.

PIP.COM

This program is used to copy files (using unambiguous or ambiguous file names) from one disk or user area to another. It cannot be used to copy files with an extension of DBS (database files), or files which have been set to $SYS by the STAT command.

STORE.COM

This program is used to copy files from hard disk to floppy for backup. It can only copy files with filenames of seven characters or less. It will continue files across more than one diskette, and it will copy database (DBS) files.

RESTORE.COM

This program is used to copy files back to the hard disk, from a floppy where they were copied using the STORE program. If the STOREd files extend over more than one diskette, it is essential to RESTORE them in the order that they were copied.

Tests And Diagnostics - User Area 1

The following diagnostic test programs can be found in User Area 1 of the Vector Graphic System Diskette:

```
RECLAIM   COM 1 DISKTEST COM 1 MEMTEST   COM 1 PRINTEST COM
KYBDTEST COM 1 SCRNTEST COM 1 PORTEST   $$$ 1 CPUTEST   COM
CRC       COM
```

These files should only be used by service technicians, or by personnel more experienced in testing and manipulating Vector Graphic computer systems.

RECLAIM.COM

This program allows an experienced user to rewrite portions of the disk which may become inaccessible due to a "bad sector" disk error.

CAUTION

This program may change the data stored in good areas of the disk or diskette and should only be used by experienced operators.

DISKTEST.COM

The DISKTEST program is used for checking the accuracy of the disk recording media and the disk controller board. It can also be used by a service technician to align floppy disk drives.

CAUTION

The DISKTEST program may change data on the disk and should only be used by experienced service technicians or programmers. Use of this program by inexperienced operators can lead to erasure of data.

MEMTEST.COM

The MEMTEST program performs a test of the Vector 4's RAM (memory). It can be used after the Automatic System Test uncovers a memory error, and can test a specific section of the RAM or the entire range. It automatically determines the maximum memory for both 128k and 256kbyte systems. After operation, the system must be rebooted since the operating system is cleared in order to test the memory.

PRINTEST.COM

This program allows the technician to check five different functions of the printer attached to the Vector 4, for troubleshooting purposes.

KYBDTEST.COM

This program allows the technician to check for problems in the keyboard. It can be set to check the values of any individual key, or to read the value of all keys successively from the keyboard.

SCRNTEST.COM

This program is used by service technicians to adjust the focus and intensity of the Vector 4 monitor.

PORTEST.COM

This program is used to determine the correct operation of the various output ports of the Vector 4.

CPUTEST.COM

This program verifies the CPU by writing a known value into a known location in memory and displaying it on the screen.

CRC.COM

This program uses a mathematical formula to determine a constant for files on disk or diskette. If a program is giving errors, the CRC (for Cyclic Redundancy Check) will return a value which can be checked against the CRC done for the same file on a known good diskette. If the two CRC's do not match, it can be safely assumed that the inoperative program has been damaged in some way, and hardware failure should not be suspected of causing the specific errors.

For more detailed information on these diagnostic test programs, see the Vector 4 Programmer's Manual Set.

Vector 4 Programmer's Diskette

Although this diskette is part of the optional Vector 4 Programmer's manual package, it has been included here in order to explain some of the other capabilities available to your Vector 4. The Vector 4 Programmer's package is a library of development utilities and productivity enhancement documentation.

LOAD	COM	1	ZSM	COM	1	DDT	COM	1	RAID	COM	
DUMP	COM	1	DUMP	ASM	1	DUMP	PRN	1	GENLIST	COM	
SER4/H	LD1	1	EDIR	COM	1	ERAX	COM	1	SORTDIR	COM	
SER4/X	LD1	1	NV4	LD2	1	SUBMIT	COM	1	XSUB	COM	
SC	COM	1	SER4	LD1	1	QV4	LD2	1	PARALL	ASM	
START	COM	1	LATEST	DOC	1	MBASIC4	COM	1	MBASIC5	COM	
EXBASIC5	COM	1	PAR4	LD1	1	SERIAL	ASM				

Refer to the Vector 4 CP/M Programmer's Guide for more information than will be presented here.

LOAD.COM

This program is part of the package used for creating your own .COM (command) files. The LOAD program takes a .HEX file and copies it into machine-executable code. (The HEX file is itself the product of the next program.)

ZSM.COM

The ZSM program is used to translate an assembly-language program (with an extension of .ASM) into hexadecimal code (with an extension of .HEX). This HEX file is in turn translated by the LOAD program into machine code (the specific instructions used by the computer to control hardware operation). The result is a command file, ith an extension of .COM.

The life cycle of a .COM file is as follows:

Assembly language file (PROGRAM.ASM) created through text editor (such as Vector Graphic's SCOPE program).

PROGRAM.ASM file is "assembled" through the ZSM program, by the command:

ZSM PROGRAM [RETURN]

This produces files PROGRAM.HEX (the hexadecimal code file, ready to be translated into machine code) and PROGRAM.PRN (a printer-ready file, paginated for documentation).

The .HEX file is translated into machine code by the LOAD program,

using the command:

LOAD PROGRAM [RETURN]

The LOAD program creates the file PROGRAM.COM, ready to be used with the command line:

PROGRAM [RETURN]

Any errors in programming that either the ZSM or the LOAD programs uncover are announced.

DDT.COM

This program, the "Dynamic Debugging Tool", assists the assembly language programmer in locating errors uncovered in the assembly/loading process.

RAID.COM

This program, Vector Graphics, the "RApid Interactive Debugger", checks user-defined programs in order to eliminate unseen errors.

DUMP.COM

This program will produce a hexadecimal listing of any file on disk, including machine executable code used for COM files. This is another valuable tool for assembly language programming, since it tells the programmer exactly what code is used at any step in program development. To print out a copy of a file, configure the system for the connected printer and enter [CTRL P] before the DUMP <filename> [RETURN] command.

DUMP.ASM and DUMP.PRN

These give an example of what .PRN (printout) and .ASM (assembly language) files look like. In addition, experienced users can reassemble the DUMP.COM program from the assembly language file included.

GENLIST.COM

For some printer applications, it is necessary to use a specialized list device file. The GENLIST program converts the desired source file into a usable list device driver. It replaces the LOAD program in the life cycle of a printer driver.

SER4/H.LD1 and SER4/X.LD1

These are two alternate printer drivers for serial printers which can be used with the Vector 4. If you plan to use a serial printer, it my be worth your while to explore these in the Vector 4 CP/M Programmer's Manual.

EDIR.COM

This is a variation on the resident command DIR. It allows for several other options, including presenting an alphabetized directory, displaying ambiguous file names for several user areas, displaying the directory at the printer, and displaying the attributes (R/W, R/O, et cetera) on the screen. All options can be combined in one command line.

ERAX.COM

This is a variation on the resident command ERA. It allows for other options which include erasing all files on an individual query basis (where the screen prompts with a Y-N? for each file before deletion); erasing files from several user areas (with an ambiguous user area statement if desired); and erasing files set to $SYS through the STAT command.

SORTDIR.COM

This program sorts the directory in alphabetical order. Where the EDIR program simply displays the directory in alphabetical order, the SORTDIR program actually reorganizes the entries on the directory for all files in the current user area.

NV4.LD2

This is a list device driver for a non-standard printer set to operate as Printer 2, through the parallel interface.

SUBMIT.COM

This program allows you to create a list or "string" of any commands that you can enter from the keyboard, and submit it to the operating system as if you were entering each command. For instance, if you need to run the same utility programs in the same order every morning, you can create a SUBMIT file using a text editor such as Vector Graphic's SCOPE. Simply determine the exact command format of all lines in the routine you wish to standardize, enter all these commands in the file you are creating, give that file an extension of .SUB, and enter the command:

SUBMIT <FILE> [RETURN]

The screen will display each line of the SUBMIT file in succession, with the results of the program displayed in the appropriate position.

XSUB.COM

This program allows you to extend the power of the SUBMIT file, so that you can actually provide line input to programs such as PIP or CONFIG. By adding the line XSUB to your SUBMIT file, you can take advantage of the XSUB program. The XSUB program remains active until the next cold boot (a boot after clearing of the operating system from memory); entering XSUB again will result in the error message "XSUB ALREADY ACTIVE". You will have to enter the resident command BYE or press the RESET button before entering another XSUB.

SC.COM

This is Vector Graphic's SCOPE program (SCreen Oriented Program Editor). It is a sophisticated, programming-oriented text editor. It allows for many functions required during program development such as searching for text and optionally replacing it with new text, moving sections of text, appending text from another file, and many other functions. Unlike a true word-processor, the SCOPE program is more oriented towards creating and manipulating text, than towards printing it. It is an excellent productivity tool for programmers.

SER4.LD1

This is the standard printer driver for serial printers operating through Printer 1 (selected through the CONFIG program).

QV4.LD2

This is another printer driver for a different type of optional printer usable through List Device 2.

PARALL.ASM and SERIAL.ASM

These assembly language list device files will assist you in creating a customized printer driver for a non-standard printer. PARALL.ASM will generate a list device file which will operate a parallel printer through List Device 2; SERIAL.ASM will generate a driver to operate a serial printer through List Device 1. The procedure to use these two files is to enter the command:

ZSM <driver> [RETURN]

The ZSM program will provide prompts at several points during the first pass, at which time it will ask questions regarding the nature of the specific printer protocol required to operate the non-standard printer in question. When the ZSM is finished generating a HEX file, you need to enter the command:

GENLIST <driver>

This will produce a working printer driver to the specifications entered during the ZSM prompts.

START.COM

This program was designed to select and attach the desired printer as part of the CONFIG A option. The START.COM file allows you to enter the command **START [RETURN]** as the CONFIG A auto command; this would always select and attch the printer you desire. However, the CONFIG program allows you to enter **CONFIG 2 [RETURN]**, a one-line command, which meets the parameters of the CONFIG A single-line auto command.

LATEST.DOC

This text file lists any new information or alterations to existing programs that have been made available since the last revision of the manual. To review it, you can either use the SCOPE program (with the command **SC LATEST.DOC A [RETURN]**), or enter the command **TYPE LATEST.DOC [RETURN]**.

MBASIC4.COM, MBASIC5.COM, and EXBASIC5.COM

These three files are the latest three versions of Microsoft's BASIC-80 interpreter program, allowing you to create and run programs written in the BASIC programming language. MBASIC4 offers Version 4.51; MBASIC5 offers Version 5.20; and EXBASIC5 offers Version 5.213. Refer to the BASIC Programmer's manual for a discussion of the differences between the three versions.

PAR4.LD1

This is the standard parallel draft printer driver, set to run as List Device 1.

The Demonstration Diskette

The optional Demonstration Diskette contains several programs which demonstrate a few of the advanced capabilities of the Vector 4.

```
BLAKJACK  COM  1  INVADERS  COM  1  SNAKE     COM  1  OTHELLO   COM
DEMO      COM  1  DEMO      SYS
```

DEMO.COM and DEMO.SYS

These two files demonstrate some of the graphics that are available to skilled programmers using the Vector 4. By entering the command DEMO [RETURN], the DEMO.COM program accesses different portions of the DEMO.SYS file to illustrate the detailed graphics capabilities of the Vector 4.

BLAKJACK.COM

This program simulates the popular card game Blackjack by "dealing" a random selection of cards to both the user and the "dealer", which is of course the Vector 4. As each card is dealt, an illustration of the card (except for the dealer's first card, of course) appears on the "table". As in the card game, the object is to come as close as possible to 21 without exceeding it.

To see this demonstration, enter the command BLAKJACK [RETURN].

INVADERS.COM

Vector Invaders simulates a popular arcade game, by filling the screen with moving images of alien creatures of different sizes and shapes. The invaders scroll from side to side, while the user's pod can be moved across the bottom of the screen. Your object is to avoid the "missiles" of the invaders while responding with "missiles" of your own. (You can only fire one missile at a time, though, then you have to wait until your last one is off the screen.)

SNAKE.COM

This program demonstrates the cursor mobility of the Vector 4, by allowing the user to move a "snake" of light around the interior of a rectangle. You gain points by "crashing" the snake into squares of light which appear from time to time in random locations within the rectangle. As you increase your "score", the snake grows longer (actually, the screen memory is extended further). If you move the cursor backwards, or "crash" into the outside of the rectangle, the program ends.

OTHELLO.COM

This program simulates the popular board game Othello. It allows you to position your "playing pieces" at any of 60 places on an eight-by-eight square grid (the central 4 squares are already set). You have your choice of four skill levels; at each level, the computer looks farther and farther ahead.

CARING FOR YOUR VECTOR 4

Cleaning The Screen

The surface of the screen on your Vector 4 is covered with a special anti-glare coating. This helps cut down on distracting and fatigue-inducing glare from overhead lights, high-intensity desk lamps, and other sources of light.

From time to time, this coating may become smudged or otherwise marked. If the screen requires cleaning, use the Vector Graphic OptiCleaner Thin Film Cleaner included in your Vector 4 shipping carton. If you run out or misplace this, your Vector Graphic dealer should be able to supply you with a replacement.

Be sure to use only Vector Graphic-approved OptiCleaner Thin Film Cleaner to remove smudges from the screen. Water or household glass cleaners will remove this protective coating from the screen of your Vector 4. Never use another cleaning agent or the anti-glare coating will be destroyed.

To clean, apply a thin mist of OptiCleaner to the screen. Usually, two or three sprays will suffice. Too much cleaner simply wastes the product and will not clean any better. Use an untreated, lint-free cloth or paper towel to wipe the screen. (The static-free treated cloth used to clean Vector 3 terminals will smudge the Vector 4's screen!) Be careful not to spray any OptiCleaner into disk drives or keyboard openings.

Protecting Your Vector 4

Naturally, your Vector 4 is a sensitive and complicated electronic device. Be careful not to spill any liquids or powders into the disk drives, the cabinet, or the keyboard. Your Vector Graphic dealer may have a dust cover which may help prevent accidental damage while your Vector 4 is not in use.

In addition, take care while moving your Vector 4 that you do not drop it or subject it to other shocks. Be sure to check the **Environmental Considerations** in Appendix B (Troubleshooting) for a guide to the best operating environment.

The built-in capabilities of your Vector 4 promise adaptability to the software of the future. With a little care, you can ensure that your Vector 4 is still providing valuable service in the years to come.