HP 9000 Series 200 Computers

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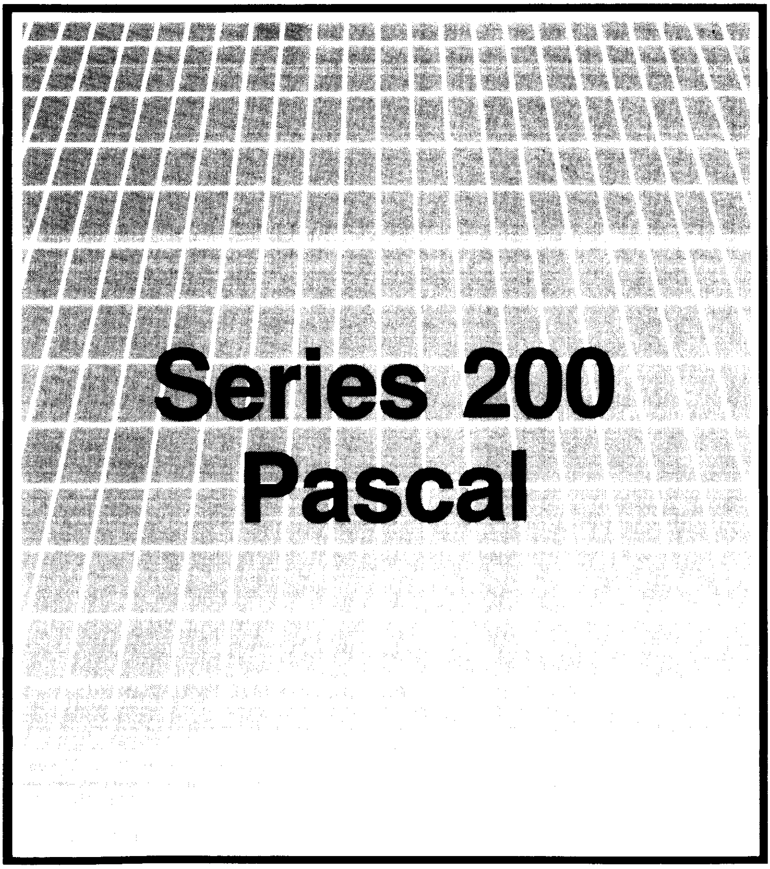
Pascal 3.0 User's Guide



Pascal 3.0 User's Guide

for the HP 9000 Series 200

Manual Part No. 98615-90040

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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revision date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

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HP 9000 Series 200

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Vital Information

Chapter 1

A Little-known Secret to Success

This book will help you to begin productive work with the Pascal system in a matter of minutes, but like any valuable tool, you must know how to use it correctly. If you will simply invest a couple of *minutes* to read the next few paragraphs, *hours* of future reading time may be saved.

Are You in a Hurry?

Yes! If so, turn directly from this chapter to the Task Reference. There you will find all of the essential instructions for using the Pascal Workstation. Follow the directions at the beginning of this section and you'll be up and running in no time, but....

Keep in mind that the Task Reference is just a set of stripped-down, bare-bones procedures: no examples or explanations are provided. This section is designed as a rapid reference for people who are reasonably familiar with computer programming: It tells you *how* to do something, assuming you already know *what* it is you want to do.

If you find yourself having problems with terminology or are confused by a particular operation, just look at the page you're on. The heading called **Additional Information** will tell you where to go for a gentler introduction to the material.

Not Really If you're *not* in a hurry, work through the information in this book in the order it is presented. Set the book down beside your computer, get out the discs that contain your Pascal system, work through the book and enjoy yourself. Because this book is a “hands on” companion to your computer, you needn't worry about reading for a long time before you actually get to do something. In just a few miniutes you'll be asked to put the book down and try out the examples for yourself.

One Assumption

This book makes only one assumption: that your computer is already set up and all of your peripheral devices (e.g., disc drive, printer) are connected to it. If you haven't done this yet, follow the instructions in the Installation Guide that came with your computer, and come back when you're finished.

One Recommendation

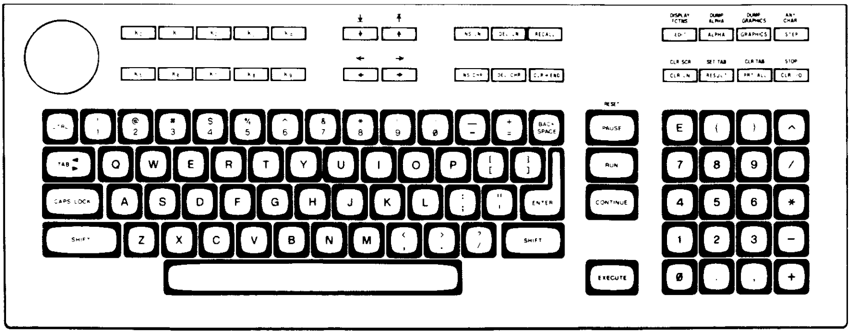
You should have at least 524 288 bytes (i.e., 512K or two HP 98256A memory cards) of random access memory (RAM) installed in your computer. Although the Pascal Workstation can function with less memory, it may be less convenient to use. If you would like a complete breakdown of memory requirements, see Appendix C.

A Word About Keys

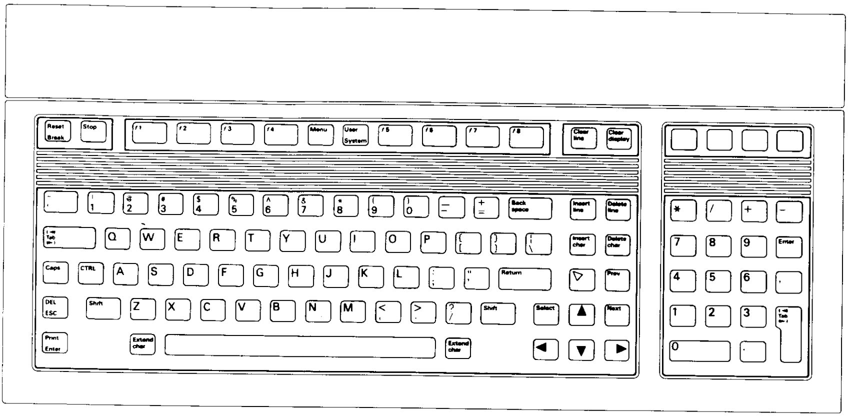
Hewlett-Packard makes three different keyboards for the Series 200 computers, and each uses different key labeling conventions. All three keyboards are documented in this manual, but for the sake of simplicity, the HP 46020A keyboard has been adopted as the standard in all examples and procedures. If you have one of the other keyboards, use the Key Correspondence Table to decide which key you should press.

Using the Key Correspondence Table

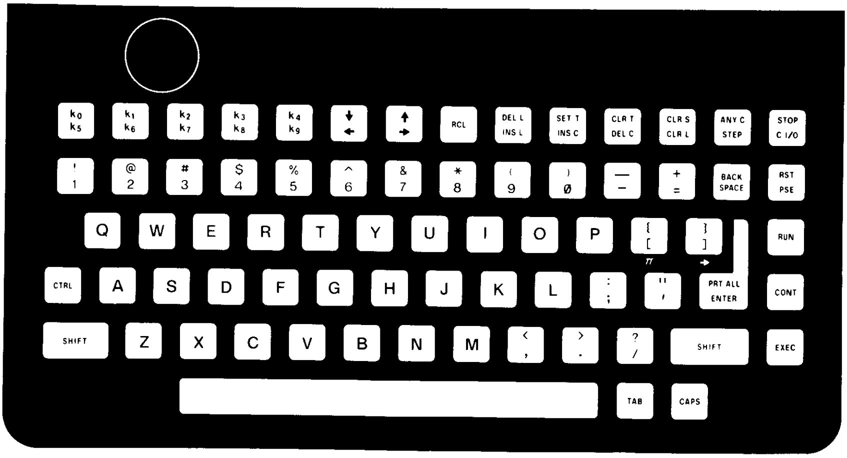
To use the Key Correspondence Table, first decide which keyboard you have. Match your keyboard to one of the illustrations below.



HP 98203B Keyboard (Model 226/236 also)



HP 46020A Keyboard



HP 98203A Keyboard

If you have the HP 46020A keyboard, you don't need the key correspondence table; simply press keys as instructed in this manual.

If you are using one of the other keyboards, get out the Key Correspondence Table (two copies are provided at the end of this chapter) and place it next to your computer. Find the column in the table that corresponds to your keyboard: column 2 for the HP 98203B keyboard or column 3 for the HP 98203A keyboard.

Whenever you are told to press a key, find the key in column 1 and press instead the corresponding key in column 2 or 3. For example, suppose the book tells you to press the Select key. The actual key you should press is:

- Select if using the HP 46020A keyboard
- EXECUTE if using the HP 98203B keyboard (column 2)
- EXEC if using the HP 98203A keyboard (column 3)

Going Home

Finally, before you get into the Pascal Workstation, it's a good idea to know how to get out of it. All procedures and demonstrations in this book assume that you start from "home base" in the Pascal Workstation. Home base, also known as the **Main Command Level**, is represented by a special "command line" running across the top of the screen that looks like this:

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

As you begin to experiment with Pascal, you may find yourself trapped in some unchartered territory, wondering how to get out. There is a way back, but you must proceed cautiously.

Pressing the Stop key immediately aborts whatever you're doing and returns you to the Main Command Level. While this may be what you wanted, exiting with Stop can cause havoc if...

- You're in the middle of saving something on your disc. For this reason, **never press Stop while your disc drive's "drive in use" light is on.** You may scramble the disc if you do. Instead, wait for the light to go off, then press Stop.
- You're in the middle of an editing session. Exiting with Stop here may cause you to lose everything you just typed in.

With these two exceptions, you may use Stop to return home at any time.

Thanks for Listening

It's time to move on, either to the Task Reference or to Chapter 2. Whatever your path, we hope your introduction to the Pascal Workstation is an enjoyable one. Please write if it isn't, and tell us where you ran into trouble. Use the Reader Reply Card at the beginning of this book.

Key Correspondence Table

HP 46020A Keyboard Label	HP 98203B Keyboard Label	HP 98203A Keyboard Label
Return	ENTER	ENTER
Select	EXECUTE	EXEC
Clear line	CLR LN	CLR L
Break	PAUSE	PSE
ESC	SHIFT EXECUTE	SHIFT EXEC
CONT	CONTINUE	CONT

Key Correspondence Table

HP 46020A Keyboard Label	HP 98203B Keyboard Label	HP 98203A Keyboard Label
Return	ENTER	ENTER
Select	EXECUTE	EXEC
Clear line	CLR LN	CLR L
Break	PAUSE	PSE
ESC	SHIFT EXECUTE	SHIFT EXEC
CONT	CONTINUE	CONT

Loading Pascal

Chapter 2

The Pascal Language System is designed like a well-structured Pascal program. It has a main program, named the Main Command Level, which "calls" the various subprograms and functions that compose the system. Each subprogram, in turn, may call its own set of subprograms. Your role in this scheme is to tell the Pascal system which subprogram you want to run next by issuing commands from the keyboard.

If the entire set of Pascal system subprograms were required to reside in your computer's memory at one time, your computer would need well over one megabyte of RAM (Random Access Memory). Fortunately, you need initially load only the *main* program–the Main Command Level–into your computer. From there, you can selectively load the portions of the system you want to use.

All of the programs that load the Main Command Level are contained on the disc labeled BOOT:. This chapter is concerned with the process (which is mostly automatic) of loading the contents of the BOOT: disc into your computer.

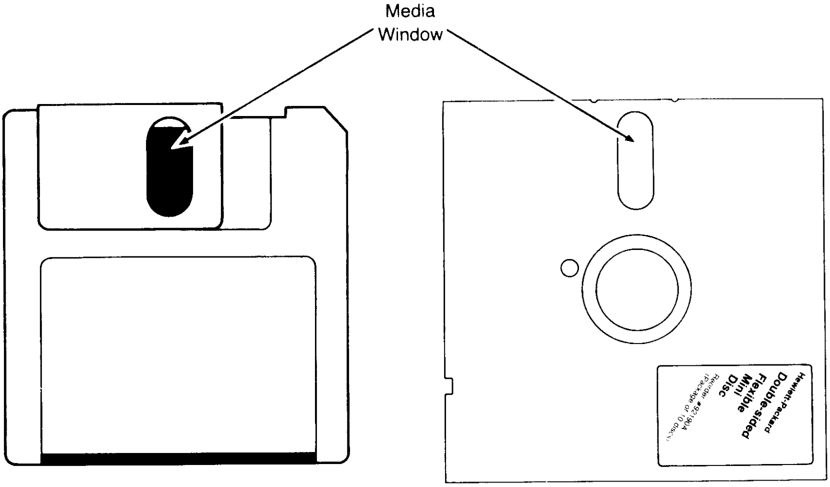
This chapter describes:

- How to properly handle flexible discs
- How to insert flexible discs into your disc drive
- How to load the Pascal Language System from the BOOT: disc into your computer

Flexible Disc Handling Guidelines

If this is your first experience with flexible discs, skim the following disc handling guidelines before attempting to load the Pascal system. Your discs represent a considerable software investment, so treat them with due respect. Even a little carelessness in handling can dramatically reduce the life of a disc.

Before reading the guidelines, determine which type of disc you're using: either the 3½-inch *micro* flexible discs, or the 5¼-inch *mini* flexible discs. Look on the disc label, and use the following illustrations to help you.



3½-inch Micro Discs

5¼-inch Mini Discs

The guidelines are:

Back up Discs Frequently

There is always a chance of losing information stored on a disc anytime you are using your computer. There are many possible causes for this: a programming bug, operator error, power failure, hardware failure, or disc media failure from wearout, damage or contamination. **The only sure protection against information loss is to back up your discs frequently**. You'll learn how to back up a disc in Chapter 3.

Cover the Media Window When Not in Use

This is the single most important thing to remember about handling your disc. Micro discs have a metal slide (disc guard) that covers the media window; mini discs have a protective storage envelope. Cover the window to protect the media against dust, finger prints and scratches.

Operate Your Computer in a Clean Environment

Keep you discs away from contaminants like chemical vapors, dust, smoke, ashes, eraser crumbs and food particles. Never attempt to blow small particles from the disc; the disc cleans itself as it rotates in the disc drive.

Maintain Proper Temperature and Humidity

The proper operating range is 10° C (45° F) to 45° C (115° F) and 20% to 80% relative humidity. Although the disc will operate outside these normal ranges, it will wear out faster and be more prone to errors.

Avoid Magnetic Fields

Data is stored on the disc magnetically, and can be erased by an external magnetic field. Avoid placing the disc near power transformers, magnets, large disc memories or motors.

Remove the Disc from the Drive When Not in Use

Remove the disc completely from the drive when you are through using it. Store it upright in a dust-free container.

Use a Felt Tip Pen to Label Your Disc

Use a soft felt tip pen to label your disc, and be careful to write only in the label area. Using a hard tip pen, such as a ball point, can damage the media.

Don't Touch the Surface of the Disc

Be careful not to touch the media surface through the media window. The thickness of a fingerprint is enough to cause errors. The oil in a fingerprint will also collect dust and cause a disc to wear out prematurely.

Don't Bend or Fold the Disc

The disc is flexible but will not operate if creased. Using ball point pens, rubber bands, paper clips, etc. can crease the disc.

Don't Attempt to Clean the Disc

The inside surface of the disc jacket is covered with a special material that cleans the disc as it rotates in the drive. Any other method of cleaning–including blowing dust from the surface–may damage the media and cause information loss. **If a disc becomes dirty or scratched, immediately transfer the data to a new disc and dispose of the old one.**

CAUTION

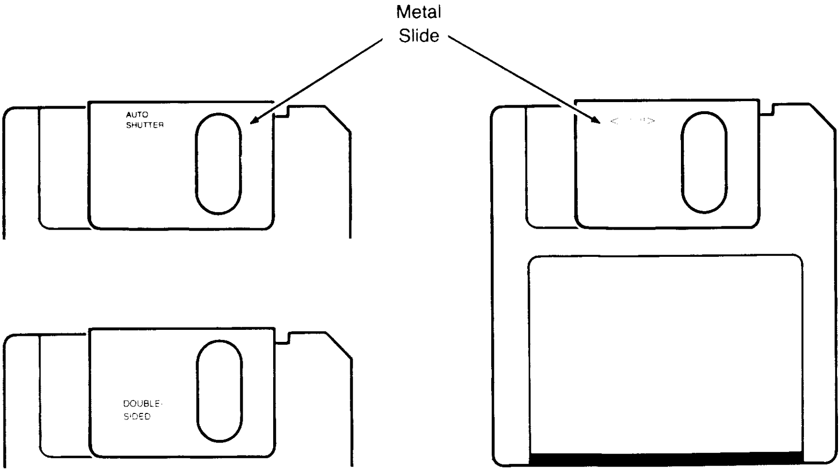
IF YOUR DISC DRIVE EVER DESTROYS THE MEDIA ON A DISC, STOP USING THE DRIVE UNTIL IT CAN BE SERVICED. THIS IS EXCEPTIONALLY IMPORTANT, AS CONTINUED USE OF THE DRIVE WILL DESTROY MORE MEDIA. IMMEDIATELY CALL YOUR NEAREST HP SALES AND SERVICE OFFICE.

Inserting a Disc Into Your Disc Drive

Inserting a disc into a disc drive is no obvious matter if you have never done it before. Instructions are provided for both mini and micro discs; read only the section that pertains to your disc size.

Inserting a Micro Disc

Micro discs come in two varieties: "auto shutter" and "manual shutter." To find out which type you have, look at the metal slide. If the words "AUTO SHUTTER" or "DOUBLE-SIDED" are printed on the metal slide, you have an auto shutter disc. If a two-directional arrow appears, you have a manual shutter disc. See the following illustrations.



Auto Shutter Discs **Manual Shutter Disc**

Note

When possible, turn the disc drive on before inserting a disc.

Inserting an Auto Shutter Disc

Slide the disc into the disc drive, label side up and metal slide facing the disc drive (try it!).

The drive should completely "swallow" the disc and flash its light to signal acceptance. If the drive rejects the disc and pushes it back out at you, follow these steps:

1. Remove the disc and make sure you inserted it label side up. Also check that the disc drive is turned on. If you inserted the disc incorrectly, try it again.
2. If you inserted the disc correctly but the drive still refuses it, move the metal slide to the left, exposing the media. Reinsert the disc.

Inserting a Manual Shutter Disc

To insert manual shutter micro discs into your disc drive, follow this procedure (try it!):

1. Move the metal slide all the way to the left, exposing the media.
2. Insert the disc into the drive, label-side up and metal end facing the disc drive.

The drive should completely "swallow" the disc and flash its light to signal acceptance. If it pushes the disc back out at you, check that the label is facing up and the drive is turned on. Reinsert the disc.

Removing a Micro Disc

Make sure the disc drive is turned on and press the disc eject button in the lower-right corner of the drive (try it!). Remove the disc and close the metal slide over the media window if it is not already covered. To close auto shutter discs, pinch the corner to the left of the metal slide (marked "PINCH").

Inserting a Mini Disc

Note

When possible, turn the disc drive on before inserting a disc.

To insert a mini disc into your disc drive, follow this procedure (try it!):

1. Open the drive door by lifting the door handle. Check that there is not already a disc in the drive.
2. Insert the disc into the drive, label-side up with the media window facing the drive.
3. Close the drive door. If the door will not close, push the disc farther into the drive and try again.

CAUTION

IF YOU ACCIDENTALLY INSERT ANOTHER DISC WHEN ONE IS ALREADY IN THE DRIVE, REMOVE THE BOTTOM DISC FIRST. OTHERWISE, THE DISC DRIVE COULD BE DAMAGED.

Removing a Mini Disc

To remove a mini disc from your disc drive, follow this procedure (try it!):

1. Make sure the disc drive is turned on.
2. Lift the drive door and carefully pull the disc out.
3. Return the disc to its protective envelope and store it upright in a dust-free box.
4. Close the drive door.

Loading Pascal into Your Computer

Which Boot ROM Do You Have?

The **Boot ROM** (ROM = Read Only Memory) is a region in the computer's permanent memory that contains instructions for finding and loading a language system (such as Pascal). Consequently, the process of loading a language system is called "booting" a system.

HP Series 200 computers have used four generations of Boot ROMs, and each works in a slightly different way. To find out which version of the Boot ROM your computer has, try this test:

1. Turn your computer on.
2. Look at the display:
    - If the message `BOOTROM 4.0` appears in the upper left-hand quadrant of the display, your computer has the 4.0 version of the Boot ROM.
    - If the message `BOOTROM 3.0` appears in the upper left-hand quadrant of the display, your computer has the 3.0 version of the Boot ROM.
    - If the message `BOOTROM 3.0L` appears in the upper left-hand quadrant of the display, your computer has the 3.0L version of the Boot ROM.
    - If the message `AVAILABLE BYTES`, preceded by a number, appears at the top of the screen, your computer has the 1.0 or 2.0 version of the Boot ROM. The difference between Boot ROM 1.0 and Boot ROM 2.0 is unimportant for our purposes.

The next two pages contain instructions for booting the Pascal system with various Boot ROMs. Find the instructions for your Boot ROM and follow them.

Important

If you have more than one Winchester (or other hard disc drive) connected to your computer, turn *off* all but one of them. Systems with more than one Winchester disc may require special configuration, which is beyond the scope of this manual. After reading this book, refer to the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual* for details.

Booting Pascal with Boot ROM 4.0 or 3.0

The 4.0 and 3.0 versions of the Boot ROM can boot the Pascal Language System from any Series 200 supported disc drive, including Winchester discs and shared discs on a Shared Resource Manager (SRM) system. The 3.0L version of the Boot ROM can boot the Pascal Language System from micro and mini disc drives *only*.

To boot the Pascal Language System from the flexible discs into your computer, follow these steps (try it!):

1. If you are using an external disc drive to boot the Pascal system, turn that drive on.
2. Turn the computer off.
3. Insert the disc labeled "BOOT:" into drive 0 of your disc drive. Drive 0 is:
   - The *right-hand* internal drive in Model 226 and 236 computers
   - The *left-hand* drive in all HP external disc drives
   - The *only* flexible disc drive in combination Winchester/flexible disc drive units
4. If you have dual disc drives, insert the disc marked "SYSVOL:" into the other drive (drive 1).
5. Turn on all external disc drives that are connected to your computer. (If you have more than one Winchester disc drive, turn *off* all but one of them.) If a disc drive is not turned on while the Pascal system is being booted, the system cannot access it later. You may turn the drive off after the system is booted, however, and turn it on again when you're ready to use it.
6. Turn your computer on. The computer locates the Pascal system on the BOOT: disc and begins loading it.
7. If you have only a single disc drive, you will be instructed to:

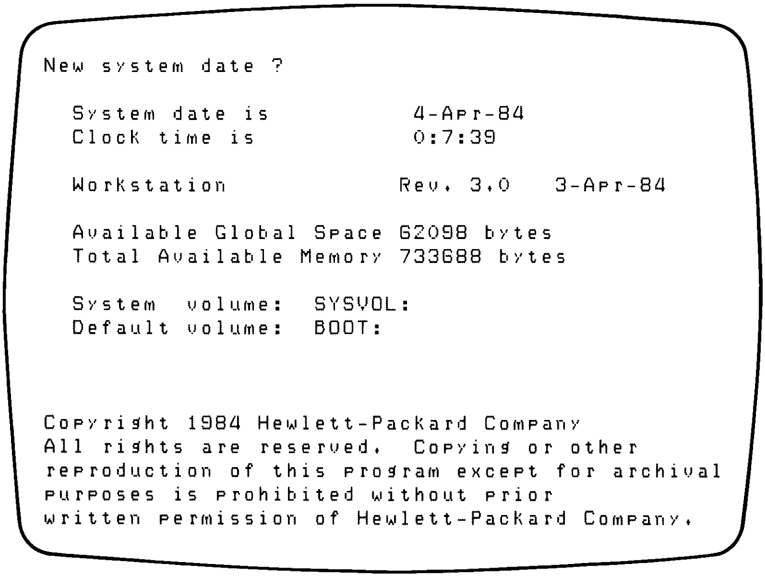
   ```
   Please put SYSVOL in unit #3
     and press the X Key...
   ```

   Remove the BOOT: disc, insert the disc labeled SYSVOL:, and press the X key. If you have a dual drive system, the boot ROM will find SYSVOL: in drive 1, and this prompt will not appear.

When the following display appears on the screen, the Pascal system is ready for use. If the display fails to appear, or an error message is displayed instead, refer to the section called "Solving Booting Problems" at the end of this chapter. Otherwise, leave the initial display on the screen and move on to Chapter 3. There you'll find directions for a few preliminary tasks you must perform before using the Pascal system for the first time.

Note

Once the Pascal system is booted, you won't need the BOOT: disc again until you turn off your computer or find some other reason to reboot. You won't be using the SYSVOL: disc again for a while, either, so store both discs properly.



```
New system date ?

  System date is           4-Apr-84
  Clock time is            0:7:39

  Workstation             Rev. 3.0   3-Apr-84

  Available Global Space 62098 bytes
  Total Available Memory 733688 bytes

  System  volume:  SYSVOL:
  Default volume:  BOOT:



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reproduction of this program except for archival
purposes is prohibited without prior
written permission of Hewlett-Packard Company.
```

Initial Display

Booting Pascal with Boot ROM 2.0 or 1.0

The 2.0 version of the Boot ROM is available only in the Model 236 computer; the 1.0 version is available only in the Model 226 computer. Both versions can boot the Pascal system *only* from the computer's right-hand internal disc drive.

To boot the Pascal Language System from the flexible discs into your computer, follow these steps (try it!):

1. Turn your computer off.
2. Insert the disc labeled "BOOT:" into the computer's right-hand internal drive.
3. If using a Model 236 computer, insert the disc labeled "SYSVOL:" into the left-hand internal drive.
4. Turn on all external disc drives that are connected to your computer. (If you have more than one Winchester disc drive, turn *off* all but one of them.) If a disc drive is not turned on while the Pascal system is being booted, the system cannot access it later. You may turn the drive off after the system is booted, however, and turn it on again when you're ready to use it.
5. Turn your computer on. The computer locates the Pascal system on the BOOT: disc and begins loading it.
6. If using a Model 226 computer, you will be instructed to:

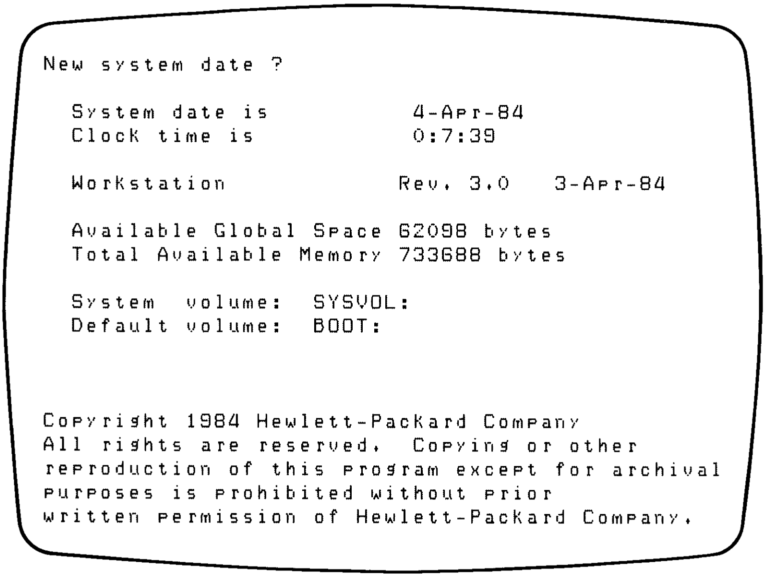
   ```
   Please put SYSVOL in unit #3
     and press the X key...
   ```

   Remove the BOOT: disc, insert the disc labeled SYSVOL:, and press the X key. If you have a Model 236 computer, the boot ROM will find SYSVOL: in drive 1, and this prompt will not appear.

When the following display appears on the screen, the Pascal system is ready for use. If the display fails to appear, or an error message is displayed instead, refer to the next section called "Solving Booting Problems". Otherwise, leave the initial display on the screen and move on to Chapter 3. There you'll find directions for a few preliminary tasks you must perform before using the Pascal system for the first time.

Note

Once the Pascal system is booted, you won't need the BOOT: disc again until you turn off your computer or find some other reason to reboot. You won't be using the SYSVOL: disc again for a while, either, so store both discs properly.



```
New system date ?

   System date is             4-Apr-84
   Clock time is              0:7:39

   Workstation               Rev. 3.0   3-Apr-84

   Available Global Space 62098 bytes
   Total Available Memory 733688 bytes

   System  volume:  SYSVOL:
   Default volume:  BOOT:



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reproduction of this program except for archival
purposes is prohibited without prior
written permission of Hewlett-Packard Company.
```

Initial Display

Solving Booting Problems

If the Pascal system failed to boot, this section will help you find and correct the problem. If the initial display appeared as expected, move on to Chapter 3.

Check the following list for an explanation of common booting error messages and how to recover from them. If your situation is not listed there, call HP for help.

SEARCHING FOR A SYSTEM

If this message remains in the lower-left corner of the screen for two minutes or more, the computer cannot find the Pascal System. Possible causes for this problem are:

- The disc drive door is not closed.
- The incorrect disc was inserted into drive 0. Make sure you use the disc labeled BOOT:.
- The disc drive is not turned on.
- The disc drive containing the BOOT: disc is not connected to the computer.
- You have two disc drives set to the same bus address on the same HP-IB interface socket (see your computer's *Installation Guide*).
- A misaligned mini flexible disc. Remove the disc and make sure the center hole is properly aligned. If its not, use a pencil to carefully shift the disc within its protective case. Do not touch the medium with the pencil. Reinsert the disc.
- You have a printer connected to the HP-IB that is set in "listen always" mode. Refer to the printer's manual and reset this switch.

Correct the problem and press the (Reset) key, or turn the computer off, then on again.

IORESULT,ERROR = 0 112

This message tells you that there was insufficient memory in your computer to load the Pascal Language System. To recover:

1. Remember that the minimum recommended memory size for the Pascal system is 524 288 (512K) bytes.
2. Remove the BOOT: disc and turn your computer on. The amount of memory present in the computer is displayed on the screen.
3. If you have memory cards installed that are not registering, turn the computer off, remove the cards, and check the address switch settings on each one. Check your computer's *Installation Guide* for correct switch settings. Replace the cards and turn the computer on. If all of the memory still fails to register, call HP for help.
4. If you have insufficient memory in your computer for the Pascal system, contact your HP Sales Representative to purchase additional memory cards.

UNABLE TO FIND SYSTEM RESET TO RETRY

This message tells you that the computer could not find the Pascal Language System. Possible causes of this error are:

- The disc drive door is not closed.
- The incorrect disc was inserted into drive 0. Make sure you use the disc labeled BOOT:.
- The disc drive is not turned on.
- The disc drive containing the BOOT: disc is not connected to the computer.
- You have two disc drives set to the same bus address on the same select code.
- A misaligned mini flexible disc. Remove the disc and make sure the center hole is properly aligned. If its not, use a pencil to carefully shift the disc within its protective case. Do not touch the medium with the pencil. Reinsert the disc.

Correct the problem and press the Reset key, or turn the computer off, then on again.

SYSTEM NOT FOUND

This message may be displayed at the bottom-left corner of the screen. It occurs when you have multiple systems on-line, and have tried to select the Pascal system for booting (see your computer's *Installation Guide* for details of booting with multiple systems present).

Press (Reset) to restart the booting process. If the message recurs, possible sources of error are:

- The disc drive door is not closed.
- The incorrect disc was inserted into drive 0. Make sure you use the disc labeled BOOT:.
- The disc drive is not turned on.
- The disc drive containing the BOOT: disc is not connected to the computer.
- The space bar (signalling that you want to choose which system to boot) was pressed too soon. Wait until the `Keyboard` message is displayed in the self-test list before pressing the space bar.

Correct the problem and press the (Reset) key, or turn the computer off, then on again.

FLOPPY ERROR #88,1 READ .. CRC ERROR RESET TO RETRY

This message tells you that your BOOT: disc is damaged. Press the (Reset) key, or turn the computer off, then on again. If the message recurs, call HP for help.

A Few Preliminaries

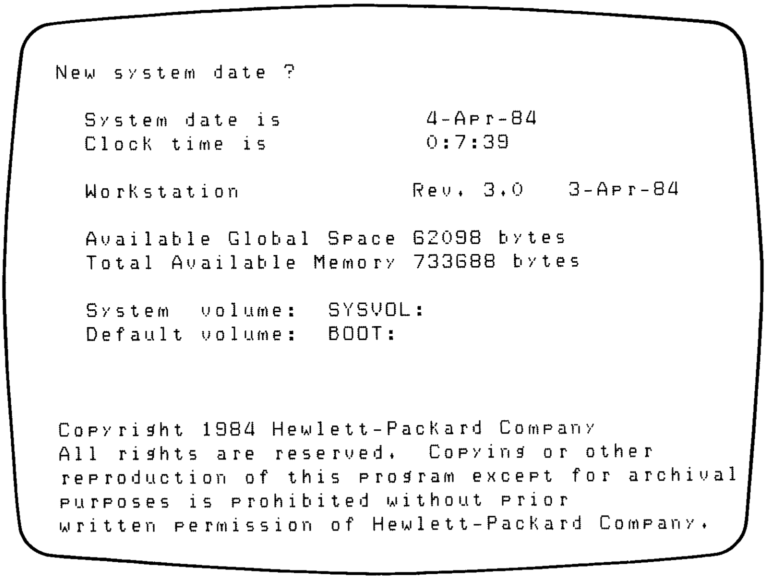
Chapter 3

Now that you have the Pascal Workstation running on your computer, there are a few preliminary tasks to perform before you program in Pascal or run an application. These tasks include:

- Setting the date and time
- Preparing your discs for use
- Making a "back up" copy of the Pascal system

Setting the Date and Time

In the last chapter, you booted the Pascal system from the BOOT: disc into your computer. You know the system was successfully booted because the following display now appears on the screen:



```
New system date ?

  System date is             4-Apr-84
  Clock time is              0:7:39

  Workstation               Rev. 3.0    3-Apr-84

  Available Global Space 62098 bytes
  Total Available Memory 733688 bytes

  System  volume:  SYSVOL:
  Default volume:  BOOT:



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reproduction of this program except for archival
purposes is prohibited without prior
written permission of Hewlett-Packard Company.
```

Initial Display

Note

If this display does *not* appear on the screen, press Stop, and then V.

Entering the Date

Notice the prompt at the top of the screen:

```
New system date ?
```

The computer is asking you to type in the current date. First check if the date already entered is correct. The date is displayed directly below the prompt and looks like this:

```
System date is       4-Mar-84
```

If the date is correct, simply press Return to accept it. If the system date is not today's date, correct it like this:

1. Type the date in the form **dd-mmm-yy** where:

   - **dd** is one or two numbers representing the day
   - **mmm** is the first three letters of the month
   - **yy** is the last two digits of the year.

For example, if today is the **7**th of **Jan**uary, 19**84**, you would type:

```
7-JAN-84
```

If You Make a Mistake...

Simply press the Backspace key until you erase your error. Then type the date over again.

2. Press Return to register the new date.

If You Make a Mistake...

Simply press Return and then the V key. The date prompt will reappear on the screen. Type the date over again and press Return.

Entering the Time

After you enter the date, the following prompt appears at the top of the screen:

```
New system clock time ?
```

The computer is asking you to type in the current time. First check if the time already entered is correct. The system time is displayed directly below the system date and looks like this:

```
Clock time is      14-50-21
```

Note that this is a *24-hour* clock, so 1 pm is hour 13, 2 pm is hour 14, and so on. Also note that the seconds are given. Thus the time shown in this example is 21 seconds past 14:50 (i.e., about 2:50 in the afternoon).

Set the time like this:

1. Type the time in the form **hh-mm-ss** where:
   - **hh** is one or two numbers representing the hour on a 24-hour clock
   - **mm** is one or two numbers representing the number of minutes past the hour
   - **ss** is one or two number representing the number of seconds past the minute (ignore this if you wish – it will automatically set to 00).

For example, if the time is 3:27 pm, you would type:

```
15-27
```

If You Make a Mistake...

Simply press the Backspace key until you erase your error. Then type the time over again.

---

2. Press Return to register the new time. Note that the system time has now changed to the new value.

If You Make a Mistake...

Simply press the V key. The date prompt will reappear on the screen. Press Return to accept the current system date. The time prompt will then reappear. Type the time over again and press Return.

Preparing Your Discs

Before your new discs can be used, they must be prepared by a process called **initialization** (also known as *formatting*). Your computer cannot read from, write to, or even recognize a disc that has not been initialized.

Two initialization procedures are provided:

- Initializing flexible discs
- Initializing Winchester (or other hard) discs

Initialize your flexible discs first. You'll need to initialize at least as many flexible discs as were provided with the Pascal system, plus one more to use in later demonstrations. If you purchased additional application software, initialize one new disc for every application disc that you have. Initialize your Winchester disc last.

Note

If you have already initialized your discs using another language system (such as BASIC), you need not initialize them again.

Initializing Flexible Discs

CAUTION

ONLY NEW DISCS SHOULD BE INITIALIZED. THIS PROCEDURE WILL ERASE ALL INFORMATION ON AN OLD DISC. IF YOU WANT TO RE-INITIALIZE A DISC FOR ANY REASON, BE SURE TO SAVE ALL OF ITS VALUABLE DATA ON A SEPARATE DISC BEFORE PROCEEDING.

1. Make sure you have booted the Pascal system and have answered the time and date prompts. The following line should appear at the top of the screen (press Stop if it doesn't):

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

2. Find the disc labelled ACCESS: and insert it into drive 0. Drive 0 is the disc drive where you inserted the BOOT: disc when booting the Pascal system. If your disc drive has a door, close it.

3. Press the X key. This corresponds to the **eXecute** command that appears in the top line of the display.
4. The **eXecute** command is used to run programs. Naturally, you need to specify which program you want to run. So the computer responds with the following question:

   ```
   Execute what file ?
   ```

   Respond to this question by typing:

   ```
   ACCESS:MEDIAINIT
   ```

   Then press the Return key. MEDIAINIT is the name of the program that initializes discs.

If You Make a Mistake...

Simply press the Backspace key until you erase your typing error. Then type it over again.

---

5. The computer responds with the message:

   ```
   Loading 'ACCESS:MEDIAINIT.CODE'
   ```

   and then presents the following display:

   ```
   Mediainit [Rev 3.0 4/3/84] 7-Apr-84 11:58:41

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                     All rights reserved.

   Volume ID ?
   ```

If Something Goes Wrong...

If instead of the above display you get:

```
Loading 'ACCESS:MEDIAINIT.CODE'
 cannot open 'ACCESS:MEDIAINIT.CODE'
 file not found
```

Check that:

- You typed `ACCESS:MEDIAINIT` *exactly* as shown.
- You have the disc labeled ACCESS: inserted into drive 0.
- Your disc drive door is closed (if it has one).

Now begin again at step 3.

---

6. Remove the ACCESS: disc from drive 0 and replace it with the new disc that you are going to initialize. If your disc drive has a door, close it.
7. At the bottom of this display, the computer is asking for the Volume ID. Type:

   ```
   #3:
   ```

   and press Return. The Pascal system has assigned this number (called a **unit number**) to drive 0. It is used to select this disc drive from among all others in your system.

If You Make a Mistake...

The computer reports that you typed something with an "illegal syntax," and asks for the Volume ID again. Retype your response. Make sure you include the # and the : exactly as shown.

---

8. The computer will pause for several seconds, then finally display something like:

   ```
   Device: internal minifloppy, 0
   Logical unit #3 - <no directory>
   WARNING: the initialization will also destroy:
    #43 <no dir>

   Are you SURE you want to proceed? (Y/N)
   ```

   Of course, if you don't have internal disc drives, the first line will be different, but otherwise, your display should be identical to this one.

CAUTION

IF THE SECOND LINE READS:

```
Logical unit #3 - ACCESS:
```

YOU ARE ABOUT TO INITIALIZE THE ACCESS: DISC. REMOVE THE ACCESS: DISC AND INSERT THE NEW DISC TO BE INITIALIZED: OTHERWISE, YOU WILL DESTROY AN ESSENTIAL PART OF YOUR PASCAL LANGUAGE SYSTEM!

Press Y to proceed.

9. The following prompt may or may not appear:

```
Formatting option? (defaults to 0)
```

If it does, refer to your disc drive manual for instructions on selecting the correct formatting option.

10. The computer now asks one last question:

```
Interleave factor? [1..15] (defaults to 1)
```

The media initialization program knows which interleave factor is optimum for the disc drive you're using, and makes this the default value. Your disc drive may have a different optimum value from that shown in the example above. Don't be concerned about this – the computer knows what it's doing. Just press (Return) to accept the default value (whatever it is).

Note

If you initialize a disc in one model of disc drive and use it in another, disc access time may be degraded.

---

11. The computer takes it from here. The screen displays:

```
Medium initialization in progress
```

After a few minutes, the computer displays:

```
Medium initialization completed
```

However, don't remove the disc just yet.

If Something Goes Wrong...

The computer will display the following message:

```
Medium initialization aborted:
medium initialization failed
```

If this happens, your disc is damaged; you cannot use it.

---

12. Volume zeroing then begins with the message:

```
Volume zeroing in progress
```

and completes with:

```
Volume zeroing completed
```

Zeroing creates an empty directory for the volume on your flexible disc.

13. Your disc is now ready for use. Remove it from drive 0 and store it upright in its box. If you have another disc to initialize, insert the new disc into drive 0, press the U key to restart the initialization program, and go to step 7. If you have initialized all of your flexible discs and now want to initialize a Winchester (or other hard) disc, refer to the next section, "Initializing a Winchester (Hard) Disc," for instructions.

Note

If you're initializing several discs, this process will take a while. Put a paper clip on this page and read the sections called "Understanding the File System" and "The Lessons of Disc Initialization" (found later in this chapter) while you wait.

Initializing a Winchester (Hard) Disc

The following procedure describes how to initialize any one of the Winchester (hard) discs supported by the Pascal Workstation, including products beginning with "91" and "79," among others.

This procedure assumes you have only one Winchester disc connected to your computer. If you have more than one Winchester disc, turn off all but one of them and reboot the Pascal system according to the directions in Chapter 2. Systems with more than one Winchester disc may require special configuration which is beyond the scope of this manual. For details, refer to the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual.*

CAUTION

ONLY NEW DISCS SHOULD BE INITIALIZED. THIS PROCEDURE WILL ERASE ALL INFORMATION ON AN OLD DISC. IF YOU WANT TO RE-INITIALIZE A DISC FOR ANY REASON. BE SURE TO SAVE ITS VALUABLE DATA ON A SEPARATE DISC BEFORE PROCEEDING.

1. **If you have more than one Winchester (hard) disc drive connected to your computer, turn off all Winchester (hard) disc drives except for the ONE you will initialize. Then reboot the Pascal system.** This is particularly important if you have a previously initialized disc containing valuable data.

Note

If you have just finished initializing your flexible discs, press the U key to restart the initialization program and skip to step 8.

2. Make sure you have booted the Pascal system and have answered the time and date prompts. The following line should appear at the top of the screen (press Stop if it doesn't):

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

3. Find the disc labelled ACCESS: and insert it into drive 0. Drive 0 is the disc drive where you inserted the BOOT: disc when booting the Pascal system. If your disc drive has a door, close it.
4. Press the X key. This corresponds to the **eXecute** command that appears in the top line of the display.
5. The **eXecute** command is used to run programs. Naturally, you need to specify which program you want to run. So the computer responds with the following question:

   ```
   Execute what file ?
   ```

   Respond to this question by typing:

   ```
   ACCESS:MEDIAINIT
   ```

   Then press the Return key. MEDIAINIT is the name of the program that initializes discs.

If You Make a Mistake...

Simply press the Backspace key until you erase your typing error. Then type it over again.

6. The computer responds with the message:

   ```
   Loading 'ACCESS:MEDIAINIT.CODE'
   ```

   The computer then presents the following display:

   ```
   Mediainit [Rev 3.0 4/3/84] 7-Apr-84 11:58:41

               Copyright 1983 Hewlett-Packard Company
                         All rights reserved.

   Volume ID ?
   ```

If Something Goes Wrong...

If instead of the above display you get:

```
Loading 'ACCESS:MEDIAINIT.CODE'
 cannot open 'ACCESS:MEDIAINIT.CODE'
 file not found
```

Check that:

- You typed `ACCESS:MEDIAINIT` *exactly* as shown.
- You have the disc labeled ACCESS: inserted into drive 0.
- You're disc drive door is closed (if it has one).

Now begin again at step 4.

7. For safety, remove the ACCESS: disc from your flexible disc drive, to protect against inadvertently initializing it. This is merely a precaution until you are more familiar with the Pascal system's unit number assignments, described later in this chapter.
8. At the bottom of this display, the computer is asking for the Volume ID. Type:

   ```
   #11:
   ```

   and press Return. The Pascal system has assigned this number (called a **unit number**) to your Winchester disc. It is used to select this disc drive from among all others in your system.

If You Make a Mistake...

The computer reports that you typed something with an "illegal syntax," and asks for the Volume ID again. Retype your response. Make sure you include the `#` and the `:` exactly as shown.

9. The computer will pause for several seconds, then finally display something like:

```
Device: HP913XC series hard disc, 700, 0
Logical unit #11 - <no directory>
WARNING: the initialization will also destroy:

#12 <no dir>       #22 <no dir>
#13 <no dir>       #23 <no dir>
#14 <no dir>       #24 <no dir>
#15 <no dir>
#16 <no dir>
#17 <no dir>
#18 <no dir>
#19 <no dir>
#20 <no dir>
#21 <no dir>

Are you SURE you want to proceed? (Y/N)
```

Your display should look something like this one–the particulars depend on which disc drive model you have and how you've connected it to your computer.

CAUTION

IF THE SECOND LINE READS:

```
Logical unit #3 - ACCESS:
```

YOU ARE ABOUT TO INITIALIZE THE ACCESS: DISC. PRESS N TO ABORT THE PROCEDURE; OTHERWISE, YOU WILL DESTROY AN ESSENTIAL PART OF YOUR PASCAL SYSTEM! PRESS U TO RESTART THE MEDIA INITIALIZATION PROGRAM, AND BEGIN AGAIN AT STEP 8.

Press Y to proceed.

10. Depending on the type of disc you are initializing, the computer may or may not ask one last question:

```
Interleave factor? [1..15] (defaults to 2)
```

If this question appears, just press Return to accept the default value (whatever it is). This is the appropriate interleave factor for most uses of your disc drive.

11. The computer takes it from here. The screen displays:

```
Medium initialization in progress
```

Initialization time varies with the storage capacity of the disc, and can take up to one hour. When initialization is completed, the computer displays:

```
Medium initialization completed
```

However, don't remove the disc just yet.

If Something Goes Wrong...

The computer will display the following message:

```
  Medium initialization aborted:
 medium initialization failed
```

If this happens, your disc is damaged; you cannot use it.

---

12. Volume zeroing then begins with the message:

```
Volume zeroing in progress
```

and completes with:

```
Volume zeroing completed
```

Zeroing creates an empty directory for each volume on your Winchester disc. Your Winchester disc is now ready for use.

Note

If you just initialized an HP 9133A, HP 9134A or HP 9135A disc drive (**not** option 010), see the special instructions following this section.

Special Instructions for HP 9133A, 9134A and 9135A Drives

The "A" versions of the HP 9133, HP 9134 and HP 9135 disc drives (**not** option 010) may not be quite ready for use. You'll recall that step 12 of media initialization "zeroed" all volumes on the disc. In the case of the "A" drives, only the volume assigned to unit #11 was zeroed; if there are more volumes present, you must *manually* zero them. To do this:

1. Remain in the Filer and press the (Z) key to invoke the **Zero** command.
2. The computer displays the following prompt?

   ```
   Zero what volume ?
   ```

   Type:

   `#12:` (Return)

   to select the next unit number that could possibly be assigned to the disc.
3. The computer now asks:

   ```
   Number of directory entries ?
   ```

   Type:

   `80` (Return)

   This will allocate 80 entries in this directory, allowing you to store up to 80 files in the volume.

If Something Goes Wrong...

Instead of this prompt, you may get:

```
Error: device absent or inaccessible
```

If this happens, skip to step 8.

---

4. The computer now asks:

   ```
   Number of bytes (1152000) ?
   ```

   This prompt is asking how large (in bytes) you want the volume to be. Press (Return) to accept the default value in parentheses.

5. The computer now asks:

   ```
   New directory name ?
   ```

   Type:

   ```
   V12: Return
   ```

   This is in keeping with the naming convention used by the media initialization program.

6. The computer now confirms your response:

   ```
   V12: correct ? (Y/N)
   ```

   Press Y to answer yes.

7. The computer now zeroes the volume and reports:

   ```
   Volume V12 zeroed
   ```

8. Repeat this procedure for all remaining volumes, substituting the next sequential unit number for #12 in step 2, and naming the volume V**X**: in step 5, where **X** is the unit number you're zeroing. When you finally get the message:

   ```
   Error: device absent or inaccessible
   ```

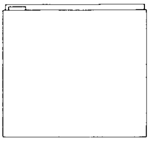
   you have zeroed all volumes on your Winchester disc drive; it is now ready for use.

Understanding the File System

The disc initialization procedure introduced several terms that you may or may not have heard before–terms like *file, volume,* and *unit number.* Together these terms describe the Pascal Workstation's file system, which controls the way information is stored, retrieved, and transferred among the various parts of the system. This section discusses how the file system is organized.

We begin with the most elemental packet of information: the *file.*

Files

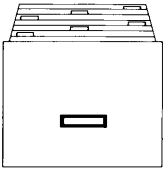


Think of a file as a file folder that holds information. The information in a file might be a program, or a table of data, or it might even be this chapter of the *Pascal 3.0 User's Guide.*

File folders are usually labeled so you can distinguish among them, and so are files. Each file has a **file name** associated with it that distinguishes it from every other file. File names can be up to nine characters long, not including extensions.

File names can be composed of most any character, but certain characters should be avoided because of their special significance to the Pascal system (see the File System chapter of the *Pascal 3.0 Workstation System Manual* for a list). For now, restrict your file names to the letters of the alphabet and the underscore (_), and you won't have any problems.

Volumes



File folders, of course, should be stored in a file drawer when not in use. Similarly, files are stored in **volumes**. A volume is nothing more than a file drawer–a collection of files.

Volumes of files are stored on discs. Flexible discs, having only a relatively small amount of storage space, are big enough to hold only a single volume. Think of a flexible disc as a small filing cabinet with only one drawer (i.e., only one volume). Hard discs, however, have a much greater storage capacity and can hold several volumes. Imagine a hard disc as a large filing cabinet with several drawers, each drawer corresponding to one volume on the disc.

Volumes, like files, must have names so you can tell them apart. In the Pascal system, a volume name is usually called a **volume ID** (pronounced eye-dee for IDentifier). A volume ID is like a label on the front of a file drawer that distinguishes it from the other drawers in the filing cabinet. A well-chosen volume ID, like a well-chosen file drawer label, should suggest what is stored inside. Volume IDs can be up to six characters long.

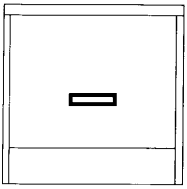
A volume also has a **directory** associated with it. The directory keeps track of all files in the volume: what their names are, where they are located on the disc, how big they are, when they were last modified, and other such information.

The directory is necessary because, unlike a well-managed filing cabinet, the Pascal system doesn't keep its files in alphabetical (or any other) order. It just searches for the first space in the volume big enough to hold the file, and slides it into the slot. If a real file drawer was "organized" this way, it would be nearly impossible to find anything–unless, of course, it had a directory.

The directory is the organized part of a disorganized volume. When the Pascal system stores a file in a volume, an entry is made for it in the directory. Later, when the file is retrieved, the disc drive uses the directory to find the requested file's location in the volume.

Again using the filing cabinet analogy, a directory would be a large list, posted on the front of a file drawer, showing the names, locations and other information about all files stored in that drawer. The file clerk would keep this list up-to-date and would use it to find a requested file.

Units



Now suppose every filing cabinet in the office is stacked one on top of another to form one tall tower of file drawers. Each file drawer in the tower is assigned a unique number. Actually, it is not the file drawer that is assigned the number, but the *location* in the tower where the file drawer is kept (i.e., the "slot" that the drawer slides into).

With this scheme, every file drawer is associated with a number that specifies its location in the tower. Since the numbers are attached to file drawer locations rather than to the file drawers themselves, you can remove one file drawer, replace it with another, and the new file drawer will now be associated with that number. Also note that a number may refer to an *empty* location that has no file drawer.

This situation exists in the Pascal system. Each *volume location* in the Pascal file system is called a **unit**. Each unit is assigned a unique **unit number** when the system is booted. Flexible disc drives can hold only one volume (i.e., one flexible disc) and are thus assigned one unit number. But Winchester discs can hold multiple volumes and thus are assigned one unit number for each volume they contain.

Flexible discs drives have removable volumes–you can remove one disc and insert another (remember, each flexible disc holds one volume). A flexible disc volume is like a file drawer that can be removed from one slot and inserted into another. Winchester discs, however, do not have removable volumes, because the disc is not removable. A Winchester disc volume is like a file drawer that is permanently secured in its slot.

An Illustrative Example

This may sound complicated, so let's look at a real example. Refer to the diagram on the facing page.

Here we have two HP 9121D dual flexible disc drives and one HP 9134A Winchester disc drive. There are four *flexible* disc drives in the system, each capable of holding one volume (i.e., one disc). The *Winchester* disc is larger and is divided into four volumes. Thus, the total number of mass storage volumes in the system is:

> (4 flexible disc drives x 1 volume each) + (1 hard disc x 4 volumes) = 8 volumes in system

Using the filing cabinet analogy, each HP 9121D dual flexible disc drive is a two-drawer filing cabinet, and the HP 9134A Winchester disc drive is a four-drawer filing cabinet.

In the illustration, we have stacked all filing cabinets into one tower and assigned unit numbers to each file drawer location. Notice that the drawers need not be assigned sequential unit numbers.

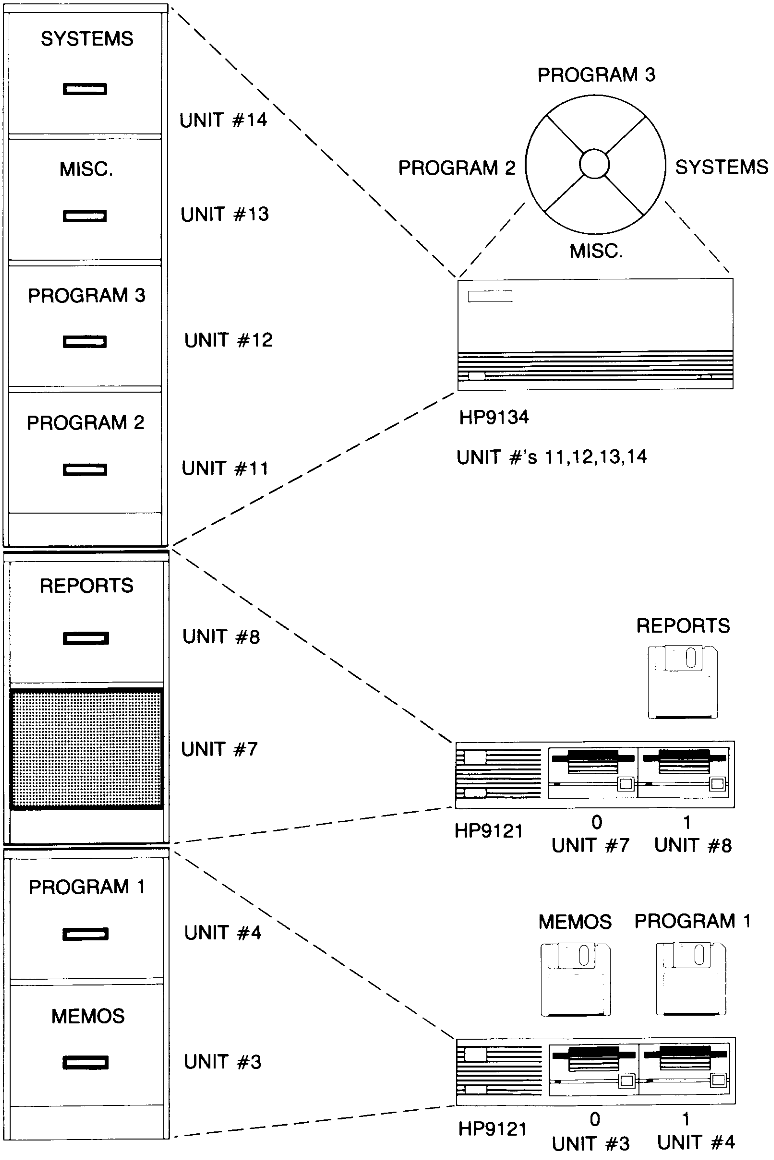
Unit #7 (drive 0 in the second HP 9121) contains no flexible disc volume (i.e., no file drawer) and thus has no volume ID associated with it. The unit number is still valid, however, because unit numbers identify locations where volumes may reside, *not* the volumes themselves. When this "empty drive" situation exists, the unit number is said to have no volume "on-line."

Flexible disc units 3, 4 and 8 *do* contain volumes, with volume IDs called MEMOS, PROGRAM 1 and REPORTS, respectively. Each volume ID is *associated* with the unit number of the drive where its volume resides. Understand, however, that this is a temporary association, and will be broken as soon as the flexible disc volume is removed from the unit. A flexible disc volume in a disc drive is said to be "on line."

The four Winchester disc volumes–PROGRAM 2, PROGRAM 3, MISC. and SYSTEMS–are assigned unit numbers 11, 12, 13 and 14, respectively. Because the volumes on a Winchester disc are not removable, the volume ID of each volume is *permanently* associated with its unit number. (This is not quite true–you can rename a volume ID with one of the Pascal system's commands. But think of this as a purely superficial change, because the *contents* of the volume remain associated with the same unit number).

Note

The volume IDs shown in this example are for illustration purposes only. Most do not represent legal volume IDs.



The Lessons of Disc Initialization

By now you've initialized a few discs, and although you may not realize it, you have mastered many of the skills needed to use the Pascal Workstation. In this section, we take a closer look at the disc initialization procedure to learn how this task is representative of most that you'll be meeting along the way.

Reading the Command Line

The first thing you did before initializing your discs was check that the following line appeared at the top of the screen:

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

This is known as a **command line** because it contains a list of commands that are active at this level of the Pascal system. Notice that each command contains one upper case letter (e.g., **C** in Compiler, **X** in eXecute, etc.). This is the letter you must type to invoke the command.

The command line shown above gives the active commands for the Main Command Level–the top-most level of the Pascal system. The first word in this command line, **Command:**, identifies the Main Command Level. From here, you can branch into lower levels of the system, like the Filer and Editor, or invoke top-level commands, like **eXecute** and **Version**.

Recall that you restarted the media initialization program by pressing the U key. This should correspond to one of the commands, but notice there is no command in the command line that has an upper-case **U** in it. Where did this command come from? Press the ? key to find out.

The **?** at the end of the command line indicates there are more active commands than can fit on one line. When you press ?, the rest of the commands are displayed:

```
Command: Assembler Debugger Memvol Newsysvol Permanent Stream User What ?
```

The **User** restart command is the second from the end. This is the command you invoked with the U key to restart the media initialization program.

Most of the Main Command Level is discussed in detail in the next chapter. What is important to remember here is that the top line of the screen will always tell you what level of the Pascal system you're in and what your command options are. Also remember that you need only press the uppercase letter in a command name to invoke it.

Selecting the Right Disc

The next step in initializing your discs was to insert the ACCESS: disc (i.e., the disc with the volume named ACCESS: on it) into your disc drive. You did this because the ACCESS: volume contains the file named MEDIAINIT.CODE, which in turn contains the program that initializes discs.

Note

Although you specified the file name as MEDIAINIT in the initialization procedure, its complete name is MEDIAINIT.CODE. The **eXecute** command automatically appends the file suffix .CODE, so there is not need to type it.

The Pascal system has several programs like MEDIAINIT.CODE that you will need to use from time to time. It's important to know which disc contains the program you want to use. You can then insert it into your disc drive where the Pascal system can access it. Appendix C contains a complete list of all files found on each disc of the Pascal system. Refer to it whenever you're wondering which disc to use.

One other point to make here: after you load a program from a disc into memory, you may remove the disc from the disc drive. The computer executes the copy of the program that resides in memory, and no longer refers to the copy on the disc. This is why you can remove the ACCESS: volume from the disc drive after running MEDIAINIT.CODE.

However, don't get the impression that once a program is loaded into memory, it is there to stay. Programs remain in memory only until another program is loaded. Then they are replaced by the new program, and must be reloaded before they can be executed again.

Note

The Pascal system does allow you to permanently load programs into memory so they can't be "bumped" every time you load another program. This is discussed further in Chapter 5.

Specifying Files

Finally, the media initialization program also demonstrated how files should be specified. When the computer prompts you for a file, you must tell it two things: the *location* where the file is stored and what *file name* it is stored under.

The File Location

Remember that files are stored in volumes, so to specify the location of a file, you must specify the location of the volume that contains it. You may do this in either of two ways:

1. Give the *volume ID* of the volume containing the file, or
2. Give the *unit number* that is associated with the volume containing the file.

When you specify the location of a file with the volume ID, the computer searches all of its disc drives for a volume with the correct volume ID. If you specify the location with a unit number, the computer looks *only* at the disc that currently resides in the specified unit.

The File Name

The file name is just the name of the file where the program is stored.

Putting It All Together

To completely specify the file, simply append the file name to the file location, remembering that the file location can be either a volume ID or a unit number. A colon (**:**) must separate the file location from the name.

Note

The colon is usually considered part of the file location; i.e., both the volume ID and the unit number include the colon.

The **eXecute** command asked you to specify the file containing the program you wanted to run with the prompt:

```
Execute what file ?
```

You responded with:

```
ACCESS:MEDIAINIT
```

ACCESS: is the volume ID of the volume containing the file named MEDIAINIT.CODE. You could just as easily have specified the unit number of the disc drive containing the ACCESS: volume instead of the volume ID. For example, if the disc drive containing the ACCESS: volume was assigned unit #3:, you could have typed the following line instead:

```
#3:MEDIAINIT
```

Note

Later in this chapter, you will discover which unit number(s) the Pascal system has assigned to each disc drive in your system.

Responding to Prompts

The media initialization process exposes you to a number of **prompts**. Prompts are nothing more than questions that appear on the screen. The computer waits for you to respond to a prompt before it resumes what it's doing.

Prompts are distinguished by the ways you respond to them and by the "clues" they provide. Let's examine each type:

Straight Questions

The first type of prompt you saw was a straight question that appeared just after the media initialization program began running:

```
Volume ID?
```

You responded to this prompt by typing the unit number of the disc drive containing the disc you wanted to initialize.

Note

Don't let the fact that the prompt asks for the volume ID confuse you. Since the disc is not initialized, it contains no volume yet, and thus has no volume ID. The prompt would be more accurate if it asked for the unit number of the drive containing the uninitialized disc.

To signal the computer that you were finished typing your response, you pressed (Return). In general, if your response requires more than a single keystroke, you will finish by pressing (Return).

Yes/No Prompts

The next prompt MEDIAINIT displayed was:

```
Are you SURE you want to proceed ? (Y/N)
```

This is a good example of a Yes/No prompt. It requires only a single keystroke: Y for Yes or N for no. You do not need to follow your response with Return. These prompts often appear when you're performing a potentially dangerous operation, giving you the opportunity for a last minute retreat. Media initialization is potentially dangerous because it destroys the existing volume(s) on a disc. If the disc is new, this is no problem, but if it is old and contains valuable data, it could be a devastating loss.

Value Range Prompts

A value range prompt tells you what range of values it will accept as a valid response. The range of values is usually enclosed within square brackets [ ]. The following prompt is of this variety:

```
Interleave factor? [1..15] (defaults to 1)
```

This prompt will accept any response in the range of 1 to 15.

Prompts with Default Values

The preceding prompt is also a good example of a prompt with a default value. A default value is the value the prompt will "assume" if no value is specified. Thus, when you respond to this prompt by simply pressing Return, the default value is taken as your answer.

Default values are usually offered to suggest what the computer perceives as the best or most likely answer. Unless you know something the computer doesn't, it is usually best to accept the default.

Aborting a Prompt

If you ever reach a prompt by mistake and simply want to abort the operation, just press Return without giving an answer. The prompt will usually disappear.

For example, if you restarted the media initialization program by mistake and wanted to abort it, you could simply press Return in response to the prompt:

```
Volume ID ?
```

Notice, however, that this won't work with prompts that have default values, such as the last prompt in the media initialization program:

```
Interleave factor? [1..15] (defaults to 1)
```

Pressing (Return) in response to this prompt is a legitimate answer. It says that you want to accept the default value as your response. To abort this kind of prompt, you must press (Stop). As in any other situation, (Stop) terminates the current operation immediately and returns you to the Main Command Level.

Know Thy System

Until now, you've been operating in the dark, trusting the procedures to see you safely to this point. Now it's time to understand how your individual system is organized, and with this knowledge comes responsibility.

When you finish this section, you should know how to access each and every disc drive in your computer system, save those that require special configuration as noted in a moment. When we tell you to type in a file specification, enter a unit number, or access a volume, you'll know what to do.

Note

The Pascal system may not recognize all of your disc drives and other peripherals if your system contains:

- More than one 30-megabyte (or larger) Winchester disc drive
- More than 3 *dual* flexible disc drive units
- A serial (RS-232C) printer
- An HP 98259A Bubble Memory card
- An HP 98255A EPROM card

To make the Pascal system recognize these situations, you must modify the way Pascal searches for peripherals. See the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual* for details. For the moment, just use the devices that the system can recognize.

Identifying Your Flexible Disc Drives

To find out how unit numbers have been assigned to your flexible disc drives, follow this procedure:

1. Insert the ACCESS: disc into any one of your flexible disc drives.

2. Make sure the command line for the Main Command Level appears at the top of the screen (press Stop if it doesn't):

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

Press the F key to load the Filer program.

3. Press the V key to execute the Volumes command. This command displays a table of all volumes that are "on-line," along with their corresponding unit numbers.

A sample table is shown below:

```
Volumes on-line
  1   CONSOLE:
  2   SYSTERM:
  3 * ACCESS:
  6   PRINTER:
Prefix is - ACCESS:
```

The left-hand column of numbers gives the unit numbers of all on-line devices. The right-hand column gives the volume ID associated with each unit number.

4. Find the volume ID `ACCESS:` in the table. The corresponding unit number is the unit number assigned to the flexible disc drive where the ACCESS: disc resides. Remember that this unit number is not permanently assigned to the ACCESS: volume, but *is* permanently assigned to the drive in which ACCESS: resides.

This unit number will be assigned to whatever disc is present in the disc drive. To see this, replace the ACCESS: disc with the BOOT: disc, and press V again to list all volumes now on-line. The unit number which was assigned to ACCESS: is now assigned to BOOT:.

Note

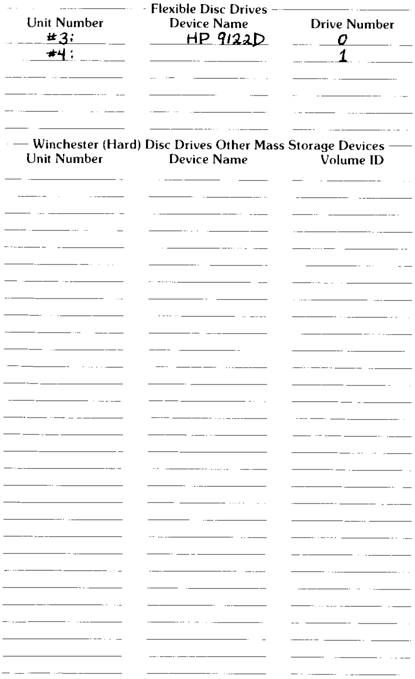
Again, we must hedge on one statement. It's true that unit numbers are permanently assigned to a disc drive–provided you insert the BOOT: disc into the same disc drive every time you boot the system. If you boot from a different flexible disc drive, or from a Winchester disc, flexible disc unit number assignments may change. This is because flexible disc drive unit numbers are assigned *relative* to the drive containing the Boot: disc.

5. Remove the last page of this manual, called the System Configuration Table. **Use a pencil** to write down the device name (i.e., the model number of your disc drive) and the drive number (O or 1) for the unit number that the system has assigned to this drive. Since there is no permanent association between a flexible disc drive unit number and a single volume ID, leave the "Volume ID" column blank (see the sample table following this procedure).

6. Now insert the ACCESS: disc into another flexible disc drive. Press V again and find the ACCESS: volume in the table. Again record the appropriate information in the System Configuration Table. Repeat this step until you have identified the unit numbers for all flexible disc drives in your system. Return the System Configuration Table to this manual.

Note

The Pascal system will recognize a maximum of three *dual* flexible disc drive units.



Flexible Disc Drives

Unit Number	Device Name	Drive Number
#3:	HP 9122D	0
#4:		1

Winchester (Hard) Disc Drives Other Mass Storage Devices

Unit Number	Device Name	Volume ID

Sample Table with Flexible Disc Drives

Identifying Your Winchester (Hard) Disc Drive

As mentioned earlier, Winchester (hard) discs initialized by the Pascal system may contain more than one volume due to their size. This procedure will tell you which unit numbers are assigned to a particular drive. Again, we assume that you have only one Winchester disc on-line.

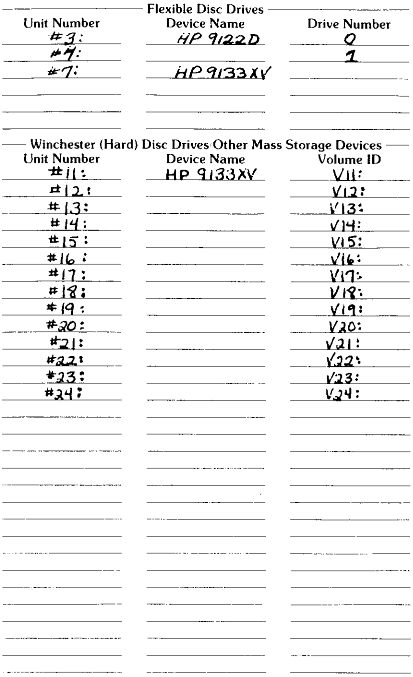
1. Make sure you are in the Filer; the word `Filer:` should appear as the first word in the command line at the top of the screen. If you are not in the Filer, follow the first two steps of the preceding procedure, "Identifying Your Flexible Disc Drives," then come right back.
2. Press V to invoke the Volumes command. All volumes that are on-line are listed on the screen. The list looks something like this:

```
Volumes on-line
  1    CONSOLE:
  2    SYSTERM:
  6    PRINTER:
 11  * V11:
 12  # V12:
 13  # V13:
 14  # V14:
 15  # V15:
 16  # V16:
 17  # V17:
 18  # V18:
 19  # V19:
 20  # V20:
 21  # V21:
 22  # V22:
 23  # V23:
 24  # V24:
Prefix is - V11:
```

The left-hand column gives all of the unit numbers for each volume; the right-hand column gives the volume ID associated with each unit number.

All unit numbers that fall within the range 11 through 40 are assigned to the Winchester disc you just initialized. Each unit number corresponds to one volume on the disc. The initialization process assigns volume IDs to each of the volumes, in the form V**X:**, where **X** is the unit number assigned to that volume.

3. Record the device name, and each unit number with its corresponding volume ID, in the System Configuration Table (found at the end of this manual). See the sample table following this procedure.



Flexible Disc Drives		
Unit Number	Device Name	Drive Number
#3:	HP 9122D	0
#4:		1
#7:	HP 9133XV	

Winchester (Hard) Disc Drives Other Mass Storage Devices		
Unit Number	Device Name	Volume ID
#11:	HP 9133XV	V11:
#12:		V12:
#13:		V13:
#14:		V14:
#15:		V15:
#16:		V16:
#17:		V17:
#18:		V18:
#19:		V19:
#20:		V20:
#21:		V21:
#22:		V22:
#23:		V23:
#24:		V24:

Sample Table with Winchester Disc Drives

Write-Protecting Your Discs

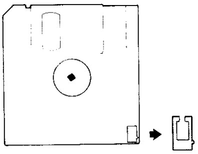
Write-protection prevents your flexible discs from being accidentally overwritten.

There are many situations where you can inadvertently destroy valuable information on a disc. For example, the procedure for making copies of your Pascal system discs at the end of this chapter can *erase* your Pascal system if you follow it incorrectly. For this reason, we urge you now to write-protect your Pascal system discs, and any application software discs that you purchased.

Micro discs and mini discs have different write-protect mechanisms. Instructions for both are provided in the following two sections; refer to the one that applies to you.

Write-Protecting 3½-inch Micro Discs

Micro discs are write-protected with a special write-protect tab. The tab is located on the back of the disc, in a corner opposite the metal slide (see the following illustration).

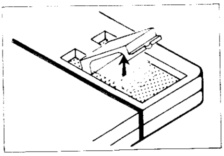


Note

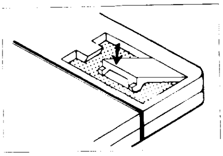
If you are using double-sided micro discs (i.e., the words "DOUBLE-SIDED" are printed on the metal slide), skip steps 1 and 2. Your disc's write-protect tab is already installed.

To use this write-protect mechanism, follow these steps:

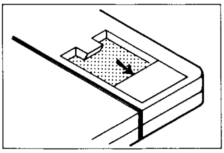
1. Use a small screw driver or pen to break the tab from the disc jacket.



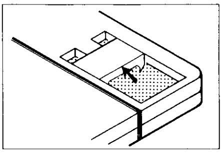
2. Snap the tab laterally into the slot, as shown in the illustration.



3. Now, to write-protect the disc, slide the tab as far as it will go toward the corner of the disc, away from the metal slide.

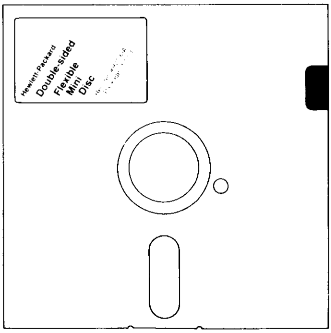


4. To remove write-protection, slide the tab as far as it will go toward the metal slide, away from the corner of the disc.

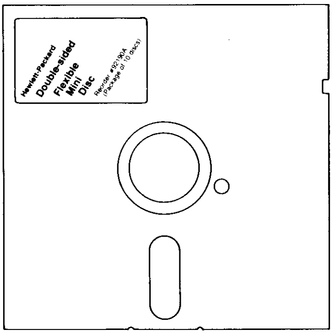


Write-Protecting 5¼-inch Mini Discs

Covering or uncovering a notch in the mini disc jacket determines whether the disc drive can write information on the disc. When the notch is covered, it's impossible for the drive to write on the disc; the disc is write-protected. See the following illustrations.



Disc Write-Protected



Disc Not Write-Protected

Write-protect labels are supplied with discs to allow you to cover the write-protect notch.

Backing Up Your System

Back-up copies are essential to protecting your software investment. Discs won't last forever: the day will come when your Pascal system discs wear out. If you maintain back-up copies, you'll simply get out your spare discs, make new copies to work with, and put your spares away again. If you don't make back-up copies, you've lost your system.

Keep the original Pascal system discs as your back-up copies. Use them only to make your *working* copies, then put them away in a safe place. Use your working copies for daily operation.

We present two procedures for backing up your system:

- Back-up Procedure with Two Flexible Disc Drives
- Back-up Procedure with One Flexible Disc Drive

Use the procedure most appropriate for your system.

Note

Keeping an *entire* back-up copy of the Pascal system on a Winchester (hard) disc is not recommended. In Part III of this manual, you will learn how to copy a portion of the system to a Winchester disc. You should still make flexible disc back-up copies, as described in the following procedures.

Back-up Procedure with Two Flexible Disc Drives

This procedure copies the contents of one flexible disc to another. The procedure assumes that the disc drives are assigned unit numbers 3 (drive 0) and 4 (drive 1). If your disc drives have different unit numbers, substitute these numbers whenever you are told to type `#3:` and `#4:`. (If you don't know the unit numbers of your flexible disc drives, refer back to the section called "Know Thy System."

1. The following line should appear at the top of the screen:

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

2. Insert the disc labeled ACCESS: into drive 0. Press the F key to load the Filer program.

3. The following line will appear at the top of the screen when the Filer program is loaded and running:

   ```
   Filer: Change Get Ldir New Quit Remove Save Translate Vols What Access Udir ?
   ```

   (Notice the first word of the new command line is **Filer:**, signifying that you are now in the Filer level of the Pascal system.) We will make a copy of the ACCESS: disc first, so leave it in drive 0 (unit #3). Insert one of your newly initialized discs into drive 1 (unit #4).

CAUTION

IF YOU DO NOT INSERT THE CORRECT DISC INTO THE CORRECT DRIVE AS DESCRIBED ABOVE, AND IF YOUR ORIGINAL PASCAL SYSTEM DISC IS NOT WRITE-PROTECTED, YOU COULD **ERASE** YOUR PASCAL SYSTEM DISC DURING THIS OPERATION. WE STRONGLY SUGGEST THAT YOU FOLLOW THE INSTRUCTIONS CAREFULLY, AND WRITE-PROTECT ALL OF YOUR ORIGINAL PASCAL SYSTEM DISCS. FOR INSTRUCTIONS ON WRITE-PROTECTION, SEE THE PRECEDING SECTION.

---

4. Press F to invoke the Filecopy command. Filecopy does just what the name suggests: it allows you to copy files (or volumes) from one disc to another.
5. The following prompt now appears on the screen:

   ```
   Filecopy what file ?
   ```

   The computer is asking for your *source* volume: the volume containing the file(s) that you want to copy. Respond by typing:

   `#3:` Return

   `#3:` refers to the entire volume in unit #3 (drive 0 in your primary flexible disc drive). Remember that the volume ID and the unit number associated with it can be used interchangeably. Thus, we could have just as well typed:

   ```
   ACCESS:
   ```

   In this example, we use the unit number instead of the volume ID because we want to select the disc in unit #3, whatever it is. We are then responsible for making sure the correct disc is indeed in unit #3.

6. The computer now responds with the prompt:

   ```
   Filecopy to what ?
   ```

   This prompt is asking you to specify the *destination* volume: the volume where you want the copies put. You want to copy all files from the volume in unit #3 (ACCESS:) to the newly initialized disc in unit #4, so type:

   ```
   #4: Return
   ```

7. The copying process now commences, as the entire volume in unit #3 is read into your computer's memory. When finished, the following prompt appears:

   ```
   Destroy directory V4 ? (Y/N)
   ```

   V4: is the volume ID of the destination volume in unit #4. Your disc may have a different volume ID depending on the unit number of the disc drive you used to initialize it (e.g., if you initialized your disc in unit #3, the volume ID would be set to V3:). **If the directory name displayed is the volume ID of one of your Pascal system discs (e.g., ACCESS:, BOOT:, etc), press N to abort the operation immediately!** Start over, making sure you insert the proper disc into the proper unit.

   The computer is asking if you really want to destroy (i.e., write over) your destination volume. It found a directory there, and is giving you the opportunity to abort the operation, in case it might contain valuable information. Since this volume is a newly initialized disc, it contains only an empty directory, so writing over it is fine. Press Y to respond to the prompt.

8. The source volume is now copied to the destination volume. The computer signals the completion of the operation with a line like:

   ```
   ACCESS:                                   ==> #4:
   ```

   This tells you that the source volume (ACCESS: in this case) has been successfully copied to the destination volume in unit #4. Since an entire volume was copied, the destination volume now has the same volume ID as the source volume. So, in this example, instead of V4: as a volume ID, the destination volume now has a volume ID of ACCESS:.

   To see this, press V to invoke the volumes command. Notice that both units #3 and #4 are assigned to volumes with the same volume ID (ACCESS:).

9. Remove the new copy from drive 1 and label it with the same volume ID as the original disc. Put the original Pascal system disc back in its disc box, and store your new working copy in a safe place.
10. Starting again at step 4, repeat this procedure for each Pascal system disc, until you have a complete set of working copies. Then store your original (master) copies in a safe place. You will not need them again until your new working copies wear out. Also use this procedure to copy any application discs you purchased.

Back-up Procedure with One Flexible Disc Drive

This procedure copies the contents of one flexible disc to another, using a single disc drive. The procedure assumes that the disc drive is assigned unit number 3. If your disc drive has a different unit number, substitute this number whenever you are told to type `#3:`. (If you don't know the unit number of your flexible disc drive, refer back to the section called "Know Thy System."

1. The following line should appear at the top of the screen:

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

2. Insert the disc labeled ACCESS: into the disc drive. Press the F key to load the Filer program.
3. The following line will appear at the top of the screen when the Filer program is loaded and running:

```
Filer: Change Get Ldir New Quit Remove Save Translate Vols What Access Udir ?
```

(Notice the first word of the new command line is **Filer:**, signifying that you are now in the Filer level of the Pascal system.) We will make a copy of the ACCESS: disc first, so leave it in the disc drive (unit #3).

CAUTION

IF YOU DO NOT FOLLOW THIS PROCEDURE CAREFULLY, AND IF YOUR ORIGINAL PASCAL SYSTEM DISC IS NOT WRITE-PROTECTED, YOU COULD **ERASE** YOUR PASCAL SYSTEM DISC DURING THIS OPERATION. WE STRONGLY SUGGEST THAT YOU FOLLOW THE INSTRUCTIONS CAREFULLY, AND WRITE-PROTECT ALL OF YOUR ORIGINAL PASCAL SYSTEM DISCS. FOR INSTRUCTIONS ON WRITE-PROTECTION, SEE THE PRECEDING SECTION.

---

4. Press F to invoke the Filecopy command. Filecopy does just what the name suggests: it allows you to copy files (or volumes) from one disc to another.

5. The following prompt now appears on the screen:

   ```
   Filecopy what file ?
   ```

   The computer is asking for your *source* volume: the volume containing the file(s) that you want to copy. Respond by typing:

   ```
   #3: Return
   ```

   `#3:` refers to the entire volume in unit #3 (drive 0 in your primary flexible disc drive). Remember that the volume ID and the unit number associated with it can be used interchangeably. Thus, we could have just as well typed:

   ```
   ACCESS:
   ```

   In this example, we use the unit number instead of the volume ID because we want to select the disc in unit #3, whatever it is. We are then responsible for making sure the correct disc is indeed in unit #3.

6. The computer now responds with the prompt:

   ```
   Filecopy to what ?
   ```

   This prompt is asking you to specify the *destination* volume: the volume where you want the copies put. Since you have only one flexible disc drive, this must also be unit #3. The computer understands this situation and will prompt you at the appropriate time to substitute you destination volume for your source volume. Type:

   ```
   #3: Return
   ```

7. The copying process now commences, as the entire volume in unit #3 is read into your computer's memory. When finished, the following prompt appears:

   ```
   Please mount DESTINATION in unit #3
   'C' continues, <esc> aborts
   ```

   The computer is asking you to remove the source volume from the disc drive and insert the destination volume. Replace the disc in unit #3 with a newly initialized disc. Then, as instructed on the screen, press C to continue copying.

8. The computer now displays the following prompt:

   ```
   Destroy directory V3 ? (Y/N)
   ```

   V3: is the volume ID of the destination volume you just inserted into unit #3. Your disc may have a different volume ID depending on the unit number of the disc drive you used to initialize it (e.g., if you initialized your disc in unit #4, the volume ID would be set to V4:). **If the directory name displayed is the volume ID of one of your Pascal system discs (e.g., ACCESS:, BOOT:, etc), press N to abort the operation immediately!** Start over, making sure you exchange discs in step 7.

   The computer is asking if you really want to destroy (i.e., write over) your destination volume. It found a directory there, and is giving you the opportunity to abort the operation, in case it might contain valuable information. Since this volume is a newly initialized disc, it contains only an empty directory, so writing over it is fine. Press Y to respond to the prompt.

9. The source volume (now in memory) is copied to the destination volume. The computer signals the completion of the operation with a line like:

   ```
   ACCESS:                            ==> #3:
   ```

   This tells you that the source volume (ACCESS: in this case) has been successfully copied to the destination volume in unit #3. Since an entire volume was copied, the destination volume now has the same volume ID as the source volume. So, in this example, instead of V3: as a volume ID, the destination volume now has a volume ID of ACCESS:.

   To see this, press V to invoke the volumes command. Notice that unit #3 is assigned to a volume with volume ID ACCESS:–not V3: as it was before the copy operation.

10. Remove the new copy from the disc drive and label it with the same volume ID as the original disc. Put the original Pascal system disc back in its disc box, and store your new working copy in a safe place.

11. Starting again at step 4, repeat this procedure for each Pascal system disc, until you have a complete set of working copies. Then store your original (master) copies in a safe place. You will not need them again until your new working copies wear out. Also use this procedure to copy any application discs you purchased.

Using the Keyboard and Display

Chapter 4

Now that the preliminaries of Chapter 3 are out of the way, it's time to look at the ways the Pascal system defines your computer's screen and keyboard. In this chapter, you will:

- Learn how to use the type-ahead buffer
- Learn how to read status information from the screen
- Become familiar with the most important keys on the keyboard

Getting Ready for Chapter 4

This chapter contains numerous demonstrations involving the Filer and Editor **subsystems**. A subsystem is a discreet functional part of the Pascal Workstation that handles a major programming task. The Editor handles editing functions; the Filer handles filing operations.

Before you begin working through the demonstrations, you should know how to enter and exit the Filer and Editor. In all cases, you enter from, and exit to, the Main Command Level.

Entering the Editor

Follow this procedure to enter the Editor:

1. Make sure the command line for the Main Command Level appears on the screen:

   ```
   Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
   ```

   Press Stop if it doesn't.
2. Insert your working copy of the ACCESS: volume into one of your flexible disc drives.
3. Now press the E key to load and run the Editor subsystem. Leave the ACCESS: volume in the disc drive while reading this chapter.

4. The following display should now appear on the screen:

```
Editor  [Rev 3.0    3-Apr-84]

Copyright 1984 Hewlett-Packard Company.
         All rights reserved.

No workfile found.
File? (<ret> for new file, <stop> exits)
:
```

   This display is the "front door" of the Editor; it is asking you if there is an existing file that you want to edit. Since you have none, simply press Return to indicate that you want to create a new file. The Editor's command line then appears on the screen:

```
Edit: Adjst Cpy Dlete Find Insrt Jmp Rplace Quit Xchng Zap ?
```

You are now inside the Editor.

Exiting the Editor

Use the following procedure to exit the Editor:

1. Make sure the Editor's command line appears on the screen:

```
Edit: Adjst Cpy Dlete Find Insrt Jmp Rplace Quit Xchng Zap ?
```

   If it doesn't, press Return, Select or ESC.

2. Press Q to quit the Editor.

3. The following prompt now appears on the screen:

```
>Quit:
     Update the workfile and leave
     Exit without updating
     Return to the editor without updating
     Write to a file name and return
```

   Since you will create no text of any value in the demonstrations, press E. This corresponds to the option, `Exit without updating`.

4. If you have not inserted text since you entered the Editor, you are now back at the Main Command Level. However, if you have inserted text, the Editor gives you one last chance to preserve your golden words before they are lost forever. It asks:

```
Are you sure you want to exit without updating?
     Type Yes  to Exit Without Update
     Type No   to Return to Editor
```

   Well, yes, you're sure you don't want to save them, so press Y.

You are now back at the Main Command Level.

Entering the Filer

Follow this procedure to enter the Filer:

1. Make sure the command line for the Main Command Level appears on the screen:

   ```
   Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
   ```

   Press Stop if it doesn't.
2. Insert your working copy of the ACCESS: volume into one of your flexible disc drives.
3. Now press the F key to load and run the Filer subsystem. Leave the ACCESS: volume in the disc drive while reading this chapter.
4. The following command line should now appear at the top of the screen:

   ```
   Filer: Change Get Ldir New Quit Remove Save Translate Vols What Access Udir ?
   ```

You are now inside the Filer.

Exiting the Filer

Use the following procedure to exit the Filer:

1. Make sure the Filer's command line appears on the screen:

   ```
   Filer: Change Get Ldir New Quit Remove Save Translate Vols What Access Udir ?
   ```

   If it doesn't, press Return or N.
2. Press Q to quit the Filer.

You are now back at the Main Command Level.

Pascal Screen Organization

Every language or operating system organizes your computer's screen a little differently. In this section, we examine the assortment of information that the Pascal system displays on your screen.

The Command Line

You have already seen several examples of command lines–those strings of commands that run across the top of the screen. Command lines tell you what commands are active, what operational mode the computer is in, what special keys are active in the current mode, how to exit the current mode, and so on.

The operational mode of the computer is always identified by the first word in the command line. Try this demonstration and watch the first word change:

1. Make sure the Pascal system is at the Main Command Level (press Stop if it isn't). Notice that the first word is `Command:`; this indicates you are at the Main Command Level.
2. Enter the Editor as described earlier in this chapter. The first word in the command line now changes to the current mode, i.e., `Editor:`.
3. Now press I to enter insert mode. Notice that the first word is now `Insert:`.

While in insert mode, look at the rest of the information in the command line:

```
Text <bs>, <clr ln>  [<sel> accepts, <esc> escapes]
```

`Text` tells you that you can type in text while in insert mode.

- `Text` tells you that you can type in text while in insert mode.
- `<bs>, <clr ln>` tell you that the Backspace and Clear line keys are active in insert mode. Whenever you see something enclosed in angle brackets (< >), it signifies an abbreviation for a key.

Note

If you don't have the HP 46020A keyboard, key abbreviations that appear on the screen will be different. `<exc>` replaces `<sel>`, `<sh-exc>` replaces `<esc>`, and `<ent>` replaces `<ret>`. See the "Exiting from Commands" procedure in Appendix A.

The rest of the line is especially important, for it tells you the various ways to exit insert mode:

- `<sel>` represents the (Select) key on the HP 46020A keyboard. The line says that `<sel> accepts`, which means that if you're satisfied with the text you've entered in insert mode, you can press (Select) to accept it (i.e., make it permanent).
- `<esc>` represents the (ESC) key. If you don't want to keep the text you've typed in insert mode, you can press (ESC) to escape; i.e., anything typed during your last insert session will be erased.

Try it. Type in something, and then press (Select) to accept it. Notice that it is permanent; you can use the arrow keys to move anywhere along the line. Now press (I) to enter insert mode again, and type a few more words. Press (ESC) to exit insert mode, and observe that your latest words are erased.

Exit the Editor as described earlier in this chapter.

Status Indicator

The lower-right corner of the screen is reserved for the status indicator. The status indicator tells you what the computer is doing at any given moment.

The most common status indicator symbol you'll see is I/O. This is displayed whenever the computer is waiting for you to type something at the keyboard, such as a response to a prompt or a command from the command line. Look at the status indicator now–it's probably displaying the I/O symbol.

If you're loading one of the Pascal subsystems, such as the Filer, Editor or Compiler, the status indicator will display the first letter of the subsystem while it is being loaded. For example, make sure the Pascal system is at the Main Command Level (press (Stop) if it isn't). Load the Filer as described earlier in this chapter. Notice that the status indicator changes to `F` while the Filer is being loaded. Exciting stuff, right? Exit the Filer as described earlier in this chapter.

If you're running an application program, either an X (for eXecute), an R (for Run) or a U (for User restart) is displayed.

If the Debugger is loaded and you press (Break), a P status indicator will be displayed and program execution will be suspended. If your ever find yourself unable to execute commands from the keyboard, check for this symbol. Press (f4) (CONT) to resume operation.

Type-ahead Buffer

The type-ahead buffer allows you to issue commands to the computer faster than the computer can carry them out. Instead of issuing one command, waiting for it to complete, then issuing another command, you can type in a whole string of commands and then wait for the computer to catch up.

To conveniently demonstrate the type-ahead buffer, you must first execute the Debugger subsystem. Pressing the (Break) key when the Debugger is present prevents the computer from executing keyboard commands; instead, all keystrokes are entered into the type-ahead buffer.

To execute the Debugger, insert your working copy of the ASM: volume into one of your flexible disc drives. At the Main Command Level, press (X) to invoke the **eXecute** command, and type the following line in response to the prompt (don't forget the period):

```
ASM:DEBUGGER. (Return)
```

When the command line for the Main Command Level reappears, the Debugger has been loaded. If you removed the ACCESS: volume to insert the ASM: volume, remove ASM: now and re-insert ACCESS:.

Now press (Break). Notice the status indicator has changed to P, telling you that the system has paused. Carefully type the following line:

```
FVQE (Return) I (Return) HI! (Select)
```

Notice the string of characters at the bottom of the screen. These are your keystrokes sitting in the type-ahead buffer, waiting to be executed. Press f4 to resume execution from the keyboard (if you do not have the HP 46020A keyboard, look up **CONT** in the Key Correspondence Table and press the appropriate key). The computer begins picking out keystrokes from the type-ahead buffer and executing them.

Type:

```
QEY
```

to exit the Editor.

You can delete one character from the type-ahead buffer by holding down CTRL and pressing Backspace. This is handy if you mistype a command, provided you can delete the errant character before the computer fetches it. Don't type Backspace by itself and expect it to delete the last command; this only enters a back-space *character* into the buffer.

To demonstrate this, press Break again, and type a few letters. Then hold down CTRL and press Backspace a few times and watch the characters disappear from the end of the type-ahead buffer. Delete all of your keystrokes in this manner, then press f4 (CONT).

You can also clear the entire type-ahead buffer by holding down CTRL and pressing Clear line, should you want to abort all of your type-ahead commands.

To demonstrate this, press Break and type a few letters. Then hold down CTRL and press Clear line, and see how the entire buffer is cleared. Press f4 (CONT) to resume normal operation.

Mouse

The HP 46060 Mouse, which is only available on Model 217 and 237 Computers, is connected to the computer through the HIL (Human Interface Loop) card. This section describes the brief software installation procedure that is required in order to use the mouse as a cursor-movement input device, and lists the input capabilities that the device provides for Workstation Pascal. Use of the mouse as a graphics input device is described in the "Interactive Graphics" chapter of the *Pascal Graphics Techniques* manual.

Installing the Mouse Drivers

Two drivers provide support of using the mouse with Pascal. They are both on the CONFIG: disc shipped with your system. There are two ways that you can install them in the system.

- You need only eXecute these driver files, and they "permanently load" themselves into memory; that is, they remain in memory until the system is re-booted. (This section describes this installation method.)
- You can add these driver files (modules) to the INITLIB file, which is automatically loaded into memory during the booting process. See "Adding Modules to INITLIB" in the "Special Configurations" chapter of the *Pascal Workstation System* manual for further details.

To load the HPHIL module, make sure that the CONFIG: volume is on-line and type the following (don't forget the period in the file name):

```
X  CONFIG:HPHIL.  Return
```

The system responds:

```
  Loading 'CONFIG:HPHIL'
```

After the program file is loaded, the system executes it. When the driver program has finished its execution, you can load the next module – MOUSE.

Make sure that the CONFIG: volume is on-line and type the following (don't forget the period):

```
X CONFIG:MOUSE. Return
```

The system responds:

```
  Loading 'CONFIG:MOUSE'
```

When this driver program has finished its execution, you can begin using the mouse.

Mouse Capabilities

The HPHIL and MOUSE modules provide the following capabilities:

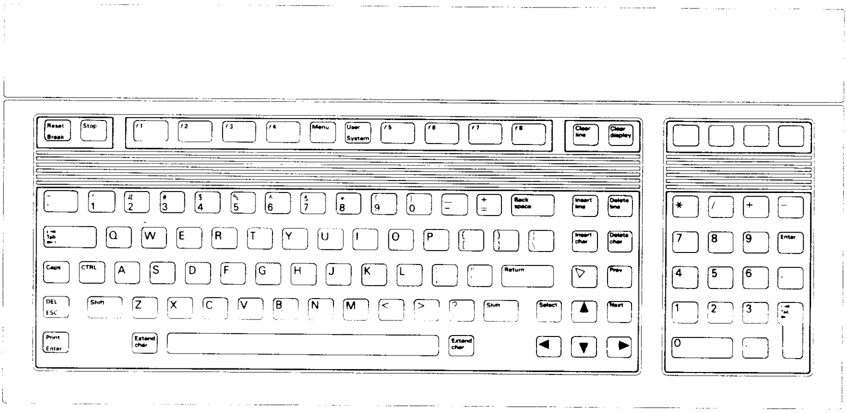
- Moving the mouse right and left will move the alpha screen cursor right and left, respectively.
- Moving the mouse forward and backward will move the alpha screen cursor up and down, respectively.
- Pressing the right mouse button is identical to pressing the Return key.
- Pressing the left mouse button is identical to pressing the Select key.

More details of moving the cursor and using the Return and Select keys are given in the subsequent "Using the 46020 Keyboard" section.

Keyboards

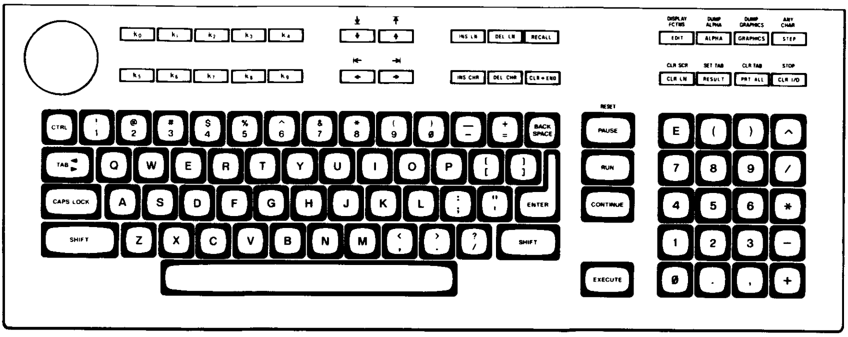
As you have seen in previous chapters, most Pascal system commands are issued with a single keystroke, and use only regular typewriter keys. Because of the simplicity and power of this scheme, many of the special function keys on your keyboard are not needed, and thus, not defined.

The following sections demonstrate the three available Series 200 computer keyboards as defined by the Pascal Workstation. Match your keyboard to the following diagrams, then turn to the indicated page and work through the demonstrations.



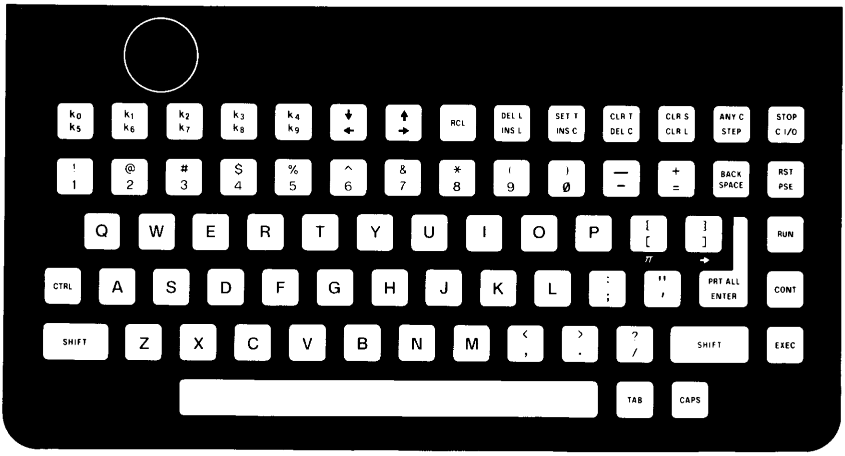
HP 46020A Keyboard

Turn to page 70



HP 98203B Keyboard (Model 226/236 also)

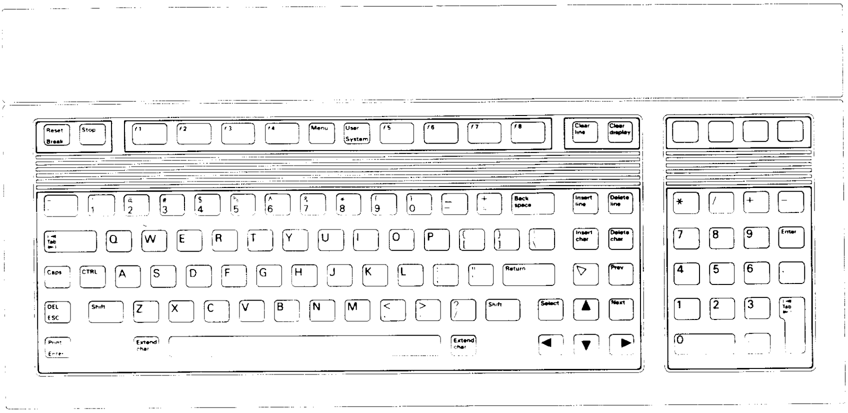
Turn to page 89


k0 k5 k1 k6 k2 k7 k3 k8 k4 k9
RCL
DEL L INS L
SET T INS C
CLR T DEL C
CLR S CLR L
ANY C STEP
STOP C I/O
! 1 @ 2 # 3 $ 4 % 5 ^ 6 & 7 * 8 (9) Ø — – + = BACK SPACE
RST PSE
Q W E R T Y U I O P [[ ]]
π
RUN
CTRL A S D F G H J K L : ; " ' PRT ALL ENTER
CONT
SHIFT Z X C V B N M < , > . ? / SHIFT
EXEC
TAB CAPS

HP 98203A Keyboard

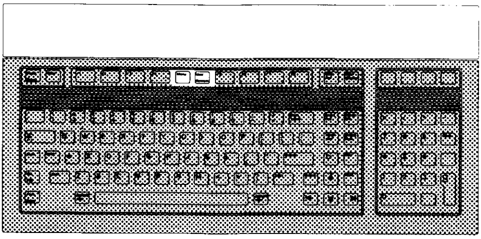
Turn to page 102

HP 46020A Keyboard



Note

The "cursor" referred to in the following demonstrations is the underline character that appears on the screen. The cursor marks the position where the next typed character will be displayed.



Modes of Operation

The keyboard has two modes of operation: **system mode** and **user mode**. The mode is set with the System/ User key.

The mode of operation defines the functions of the keys f1 through f8 that run across the top of the keyboard. In system mode, these keys are given definitions by the Pascal system, and perform such functions as display control, printing a display, etc. In user mode, the keys are given definitions that you (or some application program) provide.

The keyboard is set to system mode after the Pascal system is booted. System mode is designated by an S in the lower-right corner of the screen, immediately to the left of the status indicator.

User mode is entered by pressing User. User mode is designated by a U in the lower-right corner of the screen.

The definitions of the keys f1 through f8 can be displayed along the bottom of the screen with the Menu key. The functions of the System, User and Menu keys are described below.

System turns on system mode, giving keys f1 through f8 (and Shift f1 through Shift f8) their Pascal system definitions (see the "System-defined Keys" section that follows).

User turns on the user mode, giving keys f1 through f8 definitions provided by an application program (see the "User-defined Keys" section that follows).

Menu

The actual definitions (labels) for the system-defined and user-defined keys can be displayed at the bottom of the screen. Menu and Shift Menu are used to control the display of these labels. Menu displays the un-shifted definitions of keys f1 through f8; i.e., the definitions of these keys when pressed by themselves. Shift Menu displays the shifted definitions of keys f1 through f8; i.e., the definitions of these keys when pressed in conjunction with the Shift key.

The actions of Menu and Shift Menu depend on the current "state" and mode of the keyboard.

When in system mode, possible actions of Menu are:

- If the the *un-shifted* labels are currently displayed, they are turned off.
- If no labels are currently displayed, the *un-shifted* labels are turned on.
- If the *shifted* labels are currently displayed, they are replaced by the *un-shifted* labels.

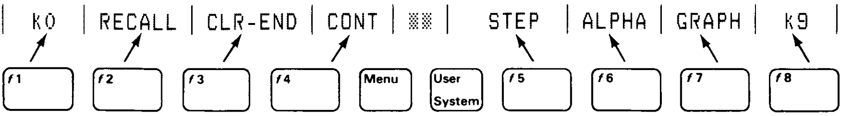
When in system mode, possible actions of Shift Menu are:

- If the *un-shifted* labels are currently displayed, they are replaced by the *shifted* labels.
- If no labels are currently displayed, the *shifted* labels are turned on.
- If the *shifted* labels are currently displayed, they are turned off.

This will sound confusing until you see it work. First, observe how the System and User keys work. If an S is not displayed in the lower-right corner of the screen, press System to put the keyboard in system mode. Now press Menu once to turn on the un-shifted labels for the system-defined keys. The labels look like this:

```
|  K0  | RECALL | CLR-END | CONT | ▒▒ |   STEP   | ALPHA | GRAPH |  K9  |
```

The order of the labels on the screen matches the order of keys (f1) through (f8) on the keyboard.



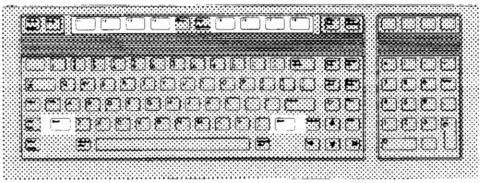
Press (User) and notice that a U is now displayed in the lower-right corner of the screen. Also notice that the labels have disappeared. Why? Because the user-defined keys are not defined (you are the user, and you have not yet defined them); thus, these keys have no labels. Press (System) again to return to system mode, and press (Menu) to bring back the labels for the system-defined keys.

Now try out the (Menu) and (Shift) (Menu) keys. Make sure you are in system mode and the labels are displayed. Press (Menu) repeatedly and notice how the un-shifted labels are turned on and off. Now press (Shift) (Menu) once and watch the labels change to:

```
|  K0   | RECALL | CLR-END | CONT | ▒▒ | ANYCHAR | DMP A | DMP G |  K9  |
```

Press (Shift) (Menu) repeatedly and see how the shifted labels are turned on and off. Press (Menu) to display the un-shifted labels again, then press (Menu) a second time to turn off the labels.

System-Defined Keys



The system-defined keys are the definitions given to f1 through f8 while in system mode. Their actual labels are displayed on the screen when Menu or Shift Menu is pressed.

CONT — **CONT** is used to exit the Debugger subsystem, or to continue normal operation after pressing Break. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.

RECALL — **RECALL** is used in the Debugger to recall the last command. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.

STEP — **STEP** is used in the Debugger for "stepping through" program execution, one line at a time. For more information, see the Debugger chapter in the *Pascal 3.0 Workstation System Manual.*

ANYCHAR — **ANYCHAR** is used to generate any US ASCII character. To use it, first press **ANYCHAR** (Remember: **ANYCHAR** is a *shifted* system key, so you must press Shift f5 to get **ANYCHAR**). Then type any three digits from 000 through 255, representing the decimal equivalent of an ASCII character. The corresponding character will be generated; it may or may not be meaningful to the Pascal subsystem you're in. For instance, you can generate an asterisk (*) with **ANYCHAR** while in the Filer, but the Filer ignores it because it does not represent a valid Filer command.

To see **ANYCHAR** work, enter the Editor and press (I) to enter insert mode. Now press **ANYCHAR**, followed by the three digits 065. Notice the letter "A" is displayed on the screen, because 065 is the decimal equivalent (the ASCII character code) of the letter "A". Experiment with other numbers, if you like. When finished, press (ESC) to exit insert mode and clear the screen.

ALPHA
GRAPH

The **ALPHA** and **GRAPH** keys allow you to turn the alpha and graphics display modes on and off. The **ALPHA** key turns *on* the *alphanumeric* display if you press it once, and turns *off* the *graphics* display if you press it a second time. The **GRAPH** key turns *on* the *graphics* display if you press it once, and turns *off* the *alphanumeric* display if you press it again.

To demonstrate these keys, exit the Editor, and enter the Filer. Press (V) to invoke the **Volumes** command. All on-line volumes will be listed on the screen.

Press **GRAPH** once to turn on the graphics display. (Unfortunately, there's nothing in the graphics display, so there is no visible change. Take our word for it: the graphics display is now on.) Press **GRAPH** again to turn off the alphanumeric display. The text on the screen disappears, including the labels for (*f1*) through (*f8*).

Now press **ALPHA** ((*f6*)) to turn on the alphanumeric display again. The text reappears. Press **ALPHA** once more to turn off the graphics display. Again, you'll have to take our word for it that the empty graphics display has now been turned off. Leave the **Volumes** display on the screen and go on to the next key demonstration.

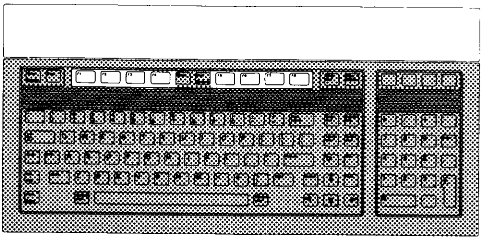
DMP A

The **DMP A** key "dumps" whatever is in the alphanumeric display to your printer. Do not use **DMP A** if you have no printer. It may cause your system to "hang" for a while, as the computer searches for a non-existent printer.

If you have a printer, make sure it is properly connected and turned on. Also make sure the "on-line" light is on (if your printer has one). Now press **DMP A** (Shift f6), and the **Volumes** display is printed on your printer.

DMP G

The **DMP G** key operates just like **DMP A**, except that it dumps whatever is in the graphics display to your printer. The key works properly only when you have a graphics printer.

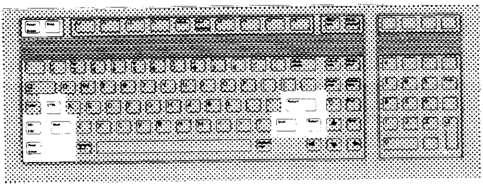


User-Defined Keys

The user-defined keys are the definitions given to (f1) through (f8) while in user mode. Their actual labels are displayed on the screen when (Menu) is pressed.

As their name suggests, user-defined keys must be defined by you, the user, or by an application program you buy. Instructions for defining keys are given in the *Pascal 3.0 Procedure Library* manual.

System-Control Keys



Return

By far, the most frequently-used key is Return. Its function varies according to the context in which it is used. The most common uses include:

- Terminating your answer to a prompt.
- Aborting a prompt entered by mistake.
- In the Editor, moving the cursor to the beginning of the next line (a carriage return).

Note

The right-hand button on the mouse has the same functions as Return.

To demonstrate these uses, press F while in the Filer to get the **Filecopy** prompt:

```
Filecopy what file ?
```

Type:

```
ACCESS:EDITOR
```

Press Return to register your response. The computer now asks:

```
Filecopy to what?
```

Press Return with no answer to abort the prompt, since we really don't want to copy anything. Now exit the Filer and enter the Editor. Press I to enter insert mode. Insert mode allows you to type in text, just as you would on a typewriter. Type the following lines, and notice the Return key is just like RETURN on a typewriter:

```
THIS IS ONE LINE. Return
THIS IS ANOTHER LINE Return
```

To exit insert mode without keeping the lines you just typed, press ESC.

Print
Enter

Enter has the same functions as Return.

Select

Select makes your actions permanent. To see what this means, press I to put the Editor in insert mode. Type the following lines again:

```
THIS IS ONE LINE. Return
THIS IS ANOTHER LINE. Return
```

Now press Backspace a few times and notice that every time the cursor backs up, it deletes one letter. The lines are not yet permanent. Now, retype the portion of the line you erased, then press Select. Now when you press Backspace , letters are not erased; they have become permanent. Leave this text on the screen for use in the upcoming demonstrations.

Note

The left-hand button on the mouse has the same function as Select.

Shift Select

Shift Select (i.e., hold down Shift and press Select) nullifies any operation that has not yet been made permanent with the Select key. It also aborts certain prompts that you enter inadvertently, in a way similar to Return.

To see how Shift Select nullifies an operation that is not yet permanent, hold down the space bar until the cursor is positioned at the end of the last line on the screen. Now press D to enter delete mode. Press Backspace a few times to delete some characters at the end of the last line. Now press Shift Select. Notice that the characters you deleted have returned, because Shift Select nullified the delete operation. Understand, this would not be possible had you pressed Select first, for Select would have made the deletions permanent.

To see how Shift Select can abort certain prompts, press the F key to invoke the **Find** command. **Find** is used to find any arbitrary sequence of characters you specify, but in this instance, let's assume you invoked the command by mistake. Notice the prompt line at the top of the screen:

```
Find[1]: L<target>=>
```

Now press Shift Select and watch the prompt disappear. The **Find** operation has been canceled.

DEL ESC

ESC generates an escape character, which behaves just like Shift Select in most parts of the Pascal system.

CTRL

CTRL, pressed in conjunction with another key, generates a control code. To demonstrate this, press I to enter insert mode. Position the cursor below the last line on the screen and type:

`THIS IS YET ANOTHER LINE.` Return

Now hold down CTRL and press C. Notice that insert mode is exited and the new line has become permanent. Thus CTRL C has the same function as Select; in fact, Select generates the control code CTRL-C.

Reset Break

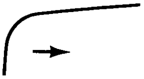
Reset allows you to boot another language or operating system without turning off your computer. Pressing Reset gives control to the Boot ROM after a few seconds. The self-test is rerun, and the computer begins searching for a system to load. It's as if you turned your computer off, then on again.

If the Debugger is loaded, Reset causes the computer to enter it.

Note

Press f4 (CONT) to exit the Debugger.

The Debugger display is blank except for a small arrow in the upper-left corner of the screen:



If you would like to demonstrate this, press Reset, but be prepared to re-boot the Pascal system according to the instructions in Chapter 2. If the Debugger is loaded, you must press Reset, then type the following line to cause the computer to reboot:

```
sb Return
```

sb stands for "system boot."

Reset Break

If the Debugger subsystem is loaded, Break suspends execution of whatever program is running. It, in effect, "pauses" the system.

CTRL Reset Break

CTRL Break is the preferred way to enter the Debugger. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.

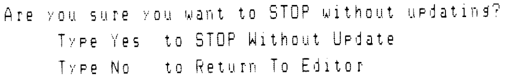
Stop

Stop immediately returns control to the Main Command Level, aborting any program that was running. It is a good way to exit an operation that you began by mistake, but be careful not to press Stop while a disc read or write operation is in progress.

If you rebooted your computer while trying out the Reset key, enter the Editor, press I, and type the following lines again:

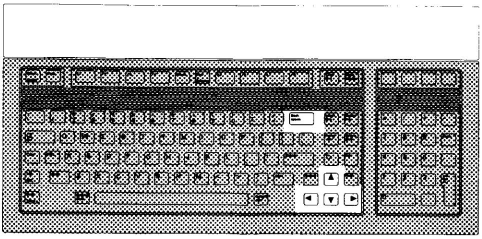
```
THIS IS ONE LINE. Return
THIS IS ANOTHER LINE. Return
THIS IS YET ANOTHER LINE. Return
```

Press Select to make these lines permanent, then press Stop. Notice that we lied to you: the Editor is *not* immediately exited, but this is the only exception to the rule. Instead the following prompt appears on the screen:



```
Are you sure you want to STOP without updating?
     Type Yes  to STOP Without Update
     Type No   to Return To Editor
```

Since you have started a file in the Editor, the computer wants to confirm that you really do want to stop without updating, i.e., stop without saving this text on a disc. If you do not update, all of your work will be lost. Since we'll be using this text in subsequent demonstration, press N. The command line of the Editor now reappears on the screen.



Cursor Control Keys

▲
◀ ▼ ▶

The arrow keys move the cursor in the indicated direction. Try them out on the text you've typed, moving the cursor up and down, left and right. Notice that the cursor will not move just anywhere on the screen, but only in the area of the text.

Back space

Backspace moves the cursor backward one space. In insert mode, and when responding to prompts, it also erases characters as it backs up.

Use Backspace to move backwards along one of the lines that you typed. Press I to enter insert mode and type a few characters. Then press Backspace to erase all of the characters you typed. Press it once more, and the error message is generated at the top of the screen:

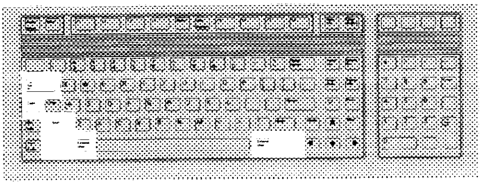
```
ERROR: Can't back up. <space> continues.
```

So you can't back up farther than you moved forward in insert mode. As indicated on the screen, press the space bar to return to insert mode, then press Select to exit.

Note

The mouse may be used as a cursor-control device. Simply move the mouse in the direction you would like the cursor to move.

Typewriter Keys



The keyboard has a full set of conventional typewriter keys, including a few special function keys described below.

Caps

Caps changes the case of all unshifted typewriter keys. When the Pascal system is booted, all letters are typed in upper case, with Shift providing the lower-case letters. Press Caps, and all letters are typed in lower case, with Shift providing the upper case letters.

Press I to enter insert mode, and type a few characters, pressing Shift occasionally to provide the alternate case. Now press Caps, and continue typing. Notice the case change. Press ESC to exit insert mode and clear what you typed.

Shift

Shift pressed in conjunction with another typewriter key produces the alternate case for that character: what is the alternate case depends on the setting of Caps. For non-typewriter keys, Shift provides access to the top-most function on the key.

|◄
Tab
►|

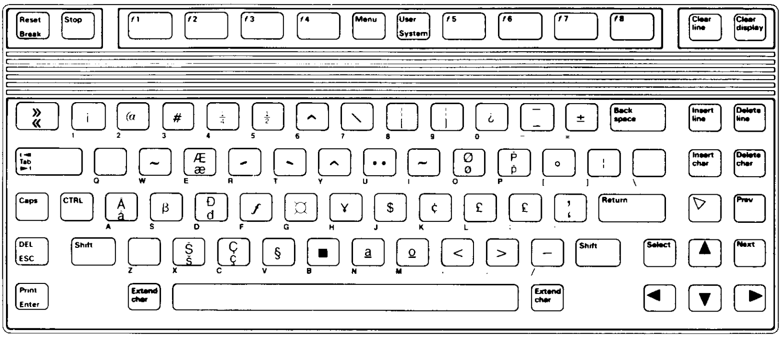
In the Editor, the Tab key moves the cursor ahead 8 spaces. Using the arrow keys, move the cursor to the beginning of one of the lines on the screen. Press Tab and watch the cursor jump forward.

Note

The Tab key is predefined to eight-space intervals; you cannot set it to a different value.

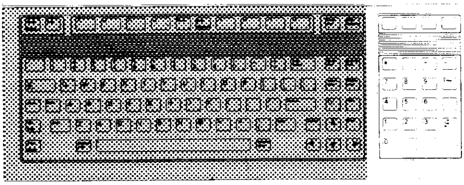
Extend char

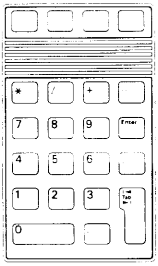
Extend char pressed in conjunction with another key accesses the Roman 8 character set. The complete Roman 8 character set "keyboard map" is provided below. Your computer may not be able to display all of these characters; when the key for an undisplayable character is pressed, an hp or regular alphabetic character will appear on the screen in its place.



Press I to enter insert mode. Hold down Extend char and press L. Notice that the Roman 8 character £ is displayed. Experiment with the other keys, if you like. When finished, press Shift Select to abort what you've typed.

Numeric Keypad



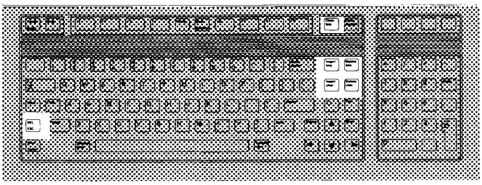


The keyboard has a numeric keypad to permit fast entry of numeric data and easy execution of arithmetic operations.

- * is provided for multiplication
- / is provided for division
- + is provided for addition
- - is provided for subtraction.

The Debugger subsystem can be used as a simple integer calculator. For details, consult the Debugger chapter in the *Pascal 3.0 Workstation System Manual.*

Editing Keys



The Pascal Editor can be operated with nothing more than typewriter keys. However, some special keyboard editing keys are implemented; use them if you find them more convenient.

Insert line

Pressing Insert line at the command level of the Editor is identical to pressing I–both put the Editor into insert mode.

Insert char

Insert char has the same function as Insert line.

Delete line

Pressing Delete line at the command level of the Editor is identical to pressing D–both put the Editor into delete mode.

Delete char

Delete char has the same function as Delete line.

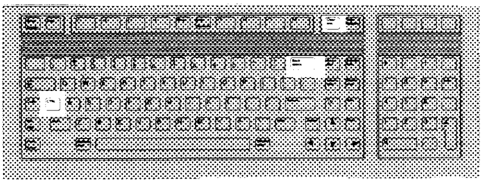
Clear line

Clear line erases the line containing the cursor while in insert mode in the Editor. Press I to enter insert mode, and type a few lines, pressing Return each time you want to start a new line. Press Clear line and notice that the line containing the cursor is removed. All but the first line you typed may be cleared this way. Press Shift Select to exit insert mode.

DEL ESC

DEL has the same function as Clear line.

Type-ahead Buffer Keys



CTRL Clear line

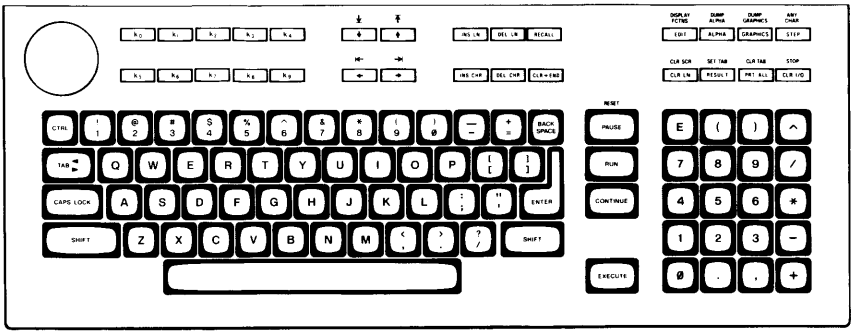
CTRL Clear line removes *all* characters from the type-ahead buffer. See the "Type-ahead Buffer" section earlier in this chapter for a demonstration.

CTRL Back space

CTRL Backspace deletes the *last* character entered into the type-ahead buffer. See the "Type-ahead Buffer" section earlier in this chapter for a demonstration.

The HP 98203B Keyboard

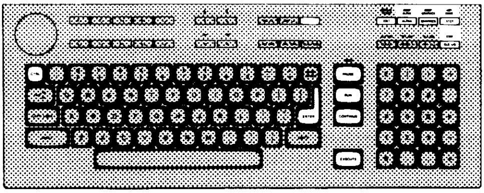
This section describes and demonstrates all of the keys Pascal defines on the Model 226/236 keyboards, and on the HP 98203B keyboard for the Model 216 and 220.



Note

The "cursor" referred to in the following demonstrations is the underline character that appears on the screen. The cursor marks the position where the next typed character will be displayed.

System-Control Keys



EDIT

Pressing EDIT is the same as pressing E: it invokes the Editor if it is on-line. Since E is in a more convenient position than EDIT, EDIT is seldom used.

ANY CHAR
STEP

ANY CHAR is used to generate any US ASCII character. To use it, first press ANY CHAR. Then type any three digits from 000 through 255, representing the decimal equivalent of an ASCII character. The corresponding character will be generated; it may or may not be meaningful to the Pascal subsystem you're in. For instance, you can generate an asterisk (*) with ANY CHAR while in the Filer, but the Filer ignores it because it does not represent a valid Filer command.

To see ANY CHAR work, press I to enter insert mode. Now press ANY CHAR, followed by the three digits `065`. Notice the letter "A" is displayed on the screen, because 065 is the decimal equivalent (the ASCII character code) of the letter "A". Experiment with other numbers, if you like. When finished, press SHIFT EXECUTE to exit insert mode and clear the screen.

ALPHA

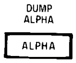
GRAPHICS

The ALPHA and GRAPHICS keys allow you to turn the alpha and graphics display modes on and off. The ALPHA key turns *on* the *alphanumeric* display if you press it once, and turns *off* the *graphics* display if you press it a second time. The GRAPHICS key turns *on* the *graphics* display if you press it once, and turns *off* the *alphanumeric* display if you press it again.

To demonstrate these keys, exit the Editor, and enter the Filer. Press V to invoke the **Volumes** command. All on-line volumes will be listed on the screen.

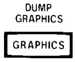
Press GRAPHICS once to turn on the graphics display. (Unfortunately, there's nothing in the graphics display, so there is no visible change. Take our word for it: the graphics display is now on.) Press GRAPHICS again to turn off the alphanumeric display. The text on the screen disappears.

Now press ALPHA to turn on the alphanumeric display again. The text reappears. Press ALPHA once more to turn off the graphics display. Again, you'll have to take our word for it that the empty graphics display has now been turned off. Leave the **Volumes** display on the screen and go on to the next key demonstration.

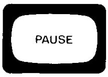


The DUMP ALPHA key "dumps" whatever is in the alphanumeric display to your printer. Do not use DUMP ALPHA if you have no printer. It may cause your system to "hang" for a while, as the computer searches for a non-existent printer.

If you have a printer, make sure it is properly connected and turned on. Also make sure the "on-line" light is on (if your printer has one). Now press DUMP ALPHA, and the **Volumes** display is printed on your printer.



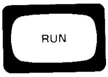
The DUMP GRAPHICS key operates just like DUMP ALPHA, except that it dumps whatever is in your graphics display to your printer. This key works properly only when you have a graphics printer.



If the Debugger subsystem is loaded, PAUSE suspends execution of whatever program is running. It, in effect, "pauses" the system.

CTRL PAUSE is the preferred way to enter the Debugger. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.

CONTINUE is used to exit the Debugger subsystem, or to resume normal operation after pressing PAUSE. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.



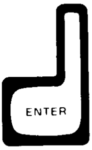
RUN loads and runs the most recently compiled program. If no program has been compiled, RUN behaves just like the **eXecute** command in the Main Command Level–it prompts you for the name of the program file you want to run.

To see this, make sure the computer is at the Main Command Level and press RUN. Since we have not compiled a program, the following prompt will appear:

```
Execute what file ?
```

Press ENTER to abort the prompt. Now press X to invoke the **eXecute** command in the command line. The same prompt appears. Press ENTER again to abort the prompt.

STEP is used in the Debugger for "stepping through" program execution, one line at a time. For more information, see the Debugger chapter in the *Pascal 3.0 Workstation System Manual.*



By far, the most frequently-used key is ENTER. Its function varies according to the context in which it is used. The most common uses include:

- Terminating your answer to a prompt.
- Aborting a prompt entered by mistake.
- In the Editor, moving the cursor to the beginning of the next line (a carriage return).

To demonstrate these uses, press F while in the Filer to get the **Filecopy** prompt:

```
Filecopy what file ?
```

Type:

```
ACCESS:EDITOR
```

Press ENTER to register your response. The computer now asks:

```
Filecopy to what?
```

Press ENTER with no answer to abort the prompt, since we really don't want to copy anything. Now exit the Filer and enter the Editor. Press I to enter insert mode in the Editor. Insert mode allows you to type in text, just as you would on a typewriter. Type the following lines, and notice the ENTER key is just like RETURN on a typewriter:

```
THIS IS ONE LINE. ENTER
THIS IS ANOTHER LINE. ENTER
```

To exit insert mode without keeping the lines you just typed, press SHIFT EXECUTE.

EXECUTE makes your actions permanent. To see what this means, press I to put the Editor in insert mode. Type the following lines again:

```
THIS IS ONE LINE. ENTER
THIS IS ANOTHER LINE. ENTER
```

Now press BACK SPACE a few times and notice that every time the cursor backs up, it deletes one letter. The lines are not yet permanent. Now, retype the portion of the line you erased, then press EXECUTE. Now when you press BACK SPACE, letters are not erased; they have become permanent. Leave this text on the screen for use in the upcoming demonstration.

SHIFT EXECUTE (i.e., hold down SHIFT and press EXECUTE) nullifies any operation that has not yet been made permanent with the EXECUTE key. It also aborts certain prompts that you enter inadvertently, in a way similar to ENTER.

To see how SHIFT EXECUTE nullifies an operation that is not yet permanent, hold down the space bar until the cursor is positioned at the end of the last line on the screen. Now press D to enter delete mode. Press BACK SPACE a few times to delete some characters at the end of the last line. Now press SHIFT EXECUTE. Notice that the characters you deleted have returned, because SHIFT EXECUTE nullified the delete operation. Understand, this would not be possible had you pressed EXECUTE first, for EXECUTE would have made the deletions permanent.

To see how SHIFT EXECUTE can abort certain prompts, press the F key to invoke the **Find** command. **Find** is used to find any arbitrary sequence of characters you specify, but in this instance, let's assume you invoked the command by mistake. Notice the prompt line at the top of the screen:

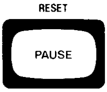
```
Find[1]: L<target>=>
```

Now press SHIFT EXECUTE and watch the prompt disappear. The **Find** operation has been canceled.

CTRL, pressed in conjunction with another key, generates a control code. To demonstrate this, press I to enter insert mode. Position the cursor below the last line on the screen and type:

```
THIS IS YET ANOTHER LINE. ENTER
```

Now hold down CTRL and press C. Notice that insert mode is exited and the new line has become permanent. Thus CTRL C has the same function as EXECUTE; in fact, EXECUTE generates the control code CTRL-C.



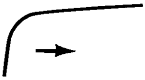
RESET (SHIFT PAUSE) allows you to boot another language/operating system without turning off your computer. Pressing RESET gives control to the Boot ROM after a few seconds, which reruns the self-test and then begins searching for a system to load. It's as if you turned your computer off, then on again.

If the Debugger is loaded, RESET causes the computer to enter it.

Note

Press CONTINUE to exit the Debugger.

The Debugger display is blank except for a small arrow in the upper-left corner of the screen:



If you would like to demonstrate this, press RESET, but be prepared to re-boot the Pascal system according to the instructions in Chapter 2. If the Debugger is loaded, you must press RESET, then type the following line to cause the computer to reboot:

```
sb ENTER
```

sb stands for "system boot."

STOP
CLR I/O

STOP immediately returns control to the Main Command Level, aborting any program that was running. It is a good way to exit an operation that you began by mistake, but be careful not to press STOP while a disc read or write operation is in progress.

If you rebooted your computer while trying out the RESET key, enter the Editor, press I, and type the following lines again:

```
THIS IS ONE LINE. ENTER
THIS IS ANOTHER LINE. ENTER
THIS IS YET ANOTHER LINE. ENTER
```

Press EXECUTE to make these lines permanent, then press STOP. Notice that we lied to you: the Editor is *not* immediately exited, but this is the only exception to the rule. Instead the following prompt appears on the screen:

```
Are you sure you want to STOP without updating?
     Type Yes  to STOP Without Update
     Type No   to Return To Editor
```

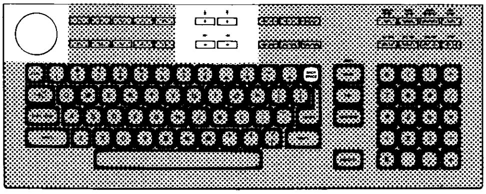
Since you have started a file in the Editor, the computer wants to confirm that you really do want to stop without updating, i.e., stop without saving this text on a disc. If you do not update, all of your work will be lost. Since we'll be using this text in subsequent demonstrations, press N. The command line of the Editor now reappears on the screen.

CLR I/O

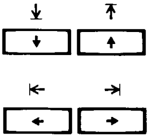
CLR I/O has the same function as STOP.

RECALL

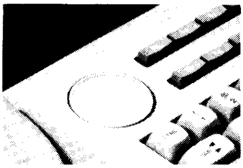
RECALL is used in the Debugger to recall the last command. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.



Cursor-Control Keys



The arrow keys move the cursor in the indicated direction. Try them out on the text you've typed, moving the cursor up and down, left and right. Notice that the cursor will not move anywhere on the screen, but only in the area of the text.



The knob is used for rapid movement through text. Turn the knob clockwise and watch the cursor move forward along your lines of text. Turn the knob counter-clockwise, and the cursor moves backward through the text. Hold down the SHIFT key and rotate the knob clockwise and the cursor moves rapidly down through lines of text. Hold down SHIFT and rotate the knob counter-clockwise and the cursor moves rapidly upward through lines of text.

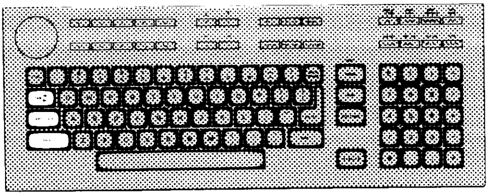
BACK SPACE moves the cursor backward one space. In insert mode, and when responding to prompts, it also erases characters as it backs up.

Use BACK SPACE to move backwards along one of the lines that you typed. Press I to enter insert mode and type a few characters. Then press BACK SPACE to erase all of the characters you typed. Press it once more, and the error message is generated at the top of the screen:

```
ERROR: Can't back up. <space> continues.
```

So you can't back up farther than you moved forward in insert mode. As indicated on the screen, press the space bar to return to insert mode, then press EXECUTE to exit.

Typewriter Keys

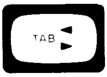


The keyboard has a full set of conventional typewriter keys, included a few special function keys described below.

CAPS LOCK changes the case of all unshifted typewriter keys. When the Pascal system is booted, all letters are typed in upper case, with SHIFT providing the lower-case letters. Press CAPS LOCK, and all letters are typed in lower case, with SHIFT providing the upper case letters.

Press I to enter insert mode, and type a few characters, pressing SHIFT occasionally to provide the alternate case. Now press CAPS LOCK, and continue typing. Notice the case change. Press SHIFT EXECUTE to exit insert mode and clear what you typed.

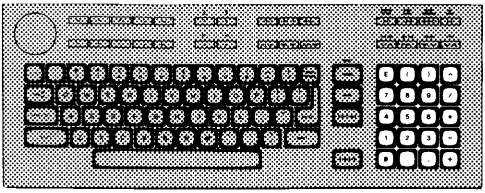
SHIFT pressed in conjunction with another typewriter key produces the alternate case for that character; what is the alternate case depends on the setting of CAPS LOCK. For non-typewriter keys, SHIFT provides access to the top-most function on the key.



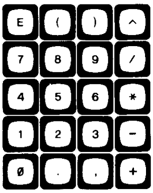
In the Editor, the TAB key moves the cursor ahead 8 spaces. Using the arrow keys, move the cursor to the beginning of one of the lines on the screen. Press TAB and watch the cursor jump forward.

Note

The TAB key is predefined to eight-space intervals; you cannot set it to a different value.



Numeric Keypad

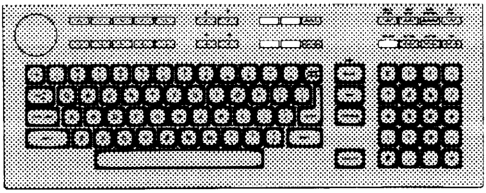


The keyboard has a numeric keypad to permit fast entry of numeric data and easy execution of arithmetic operations.

- * is provided for multiplication
- / is provided for division
- + is provided for addition
- - is provided for subtraction.

The Pascal Debugger subsystem can be used as a simple integer calculator. For details, consult the Debugger chapter in the *Pascal 3.0 Workstation System Manual.*

Editing Keys



The Pascal Editor can be completely operated with nothing more than typewriter keys. However, some special keyboard editing keys are implemented: use them if you find them more convenient.

INS LN

Pressing INS LN at the command level of the Editor is identical to pressing I –both put the Editor into insert mode.

INS CHR

INS CHR has the same function as INS LN.

DEL LN

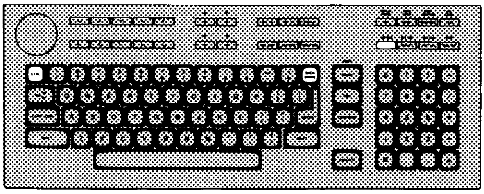
Pressing DEL LN at the command level of the Editor is identical to pressing D –both put the Editor into Delete mode.

DEL CHR

DEL CHR has the same function as DEL LN.

CLR LN

CLR LN erases the line containing the cursor while in insert mode in the Editor. Press I to enter insert mode, and type a few lines of characters, pressing ENTER each time you want to start a new line. Press CLR LN and notice that the line containing the cursor is removed. All but the first line typed may be cleared this way. Press SHIFT EXECUTE to exit insert mode.



Type-ahead Buffer Keys

CTRL CLR LN

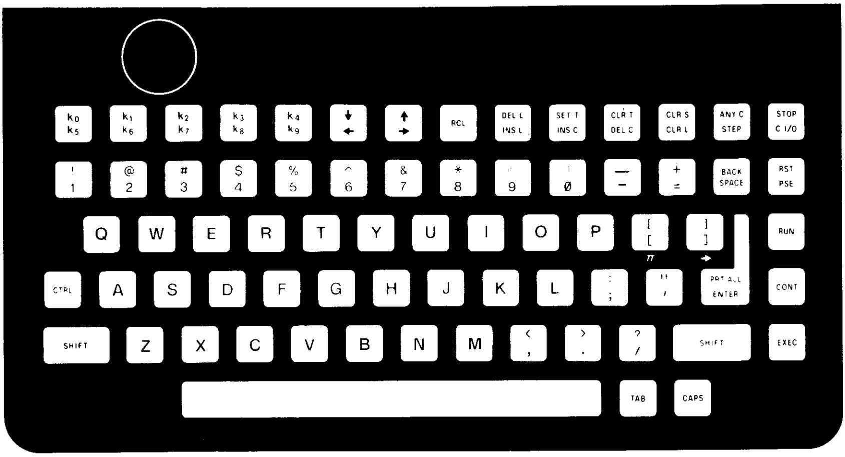
CTRL CLR LN removes *all* characters from the type-ahead buffer. See the Type-ahead buffer section earlier in this chapter for a demonstration.

CTRL BACK SPACE

CTRL BACK SPACE deletes the *last* character entered into the type-ahead buffer. See the Type-ahead buffer section earlier in this chapter for a demonstration.

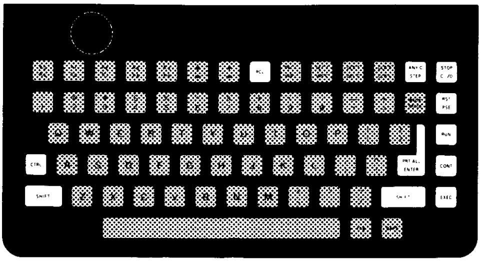
The HP 98203A Keyboard

This section describes and demonstrates all of the keys Pascal defines on the HP 98203A keyboard for the Model 216 and 220.

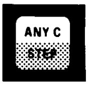


Note

The "cursor" referred to in the following demonstrations is the underline character that appears on the screen. The cursor marks the position where the next typed character will be displayed.



System-Control Keys



ANY C is used to generate any US ASCII character. To use it, first press ANY C. Then type any three digits from 000 through 255, representing the decimal equivalent of an ASCII character. The character will be generated; it may or may not be meaningful to the Pascal subsystem you're in. For instance, you can generate an asterisk (*) with ANY C while in the Filer, but the Filer ignores it because it does not represent a valid Filer command.

To see ANY C work, press I to enter the Editor's insert mode. Now press ANY C, followed by the three digits `065`. Notice the letter "A" is displayed on the screen, because 065 is the decimal equivalent (called the ASCII character code) of the letter "A". Experiment with other numbers, if you like. When finished, press SHIFT EXEC to exit insert mode and clear the screen.

If the Debugger subsystem is loaded, PSE suspends execution of whatever program is running. It, in effect, "pauses" the system.

CTRL PSE is the preferred way to enter the Debugger. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.

CONT is used to exit the Debugger subsystem, or to resume normal operation after pressing PSE. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.

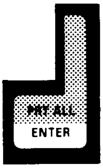
RUN loads and runs the most recently compiled program. If no program has been compiled, RUN behaves just like the **eXecute** command in the Main Command Level–it prompts you for the name of the program file you want to run.

To see this, make sure the computer is at the Main Command Level and press RUN. Since we have not compiled a program, the following prompt will appear:

```
Execute what file ?
```

Press ENTER to abort the prompt. Now press X to invoke the **eXecute** command in the command line. The same prompt appears. Press ENTER again to abort the prompt.

STEP is used in the Debugger for "stepping through" program execution, one line at a time. For more information, see the Debugger chapter in the *Pascal 3.0 Workstation System Manual.*



By far, the most frequently-used key is ENTER. Its function varies according to the context in which it is used. The most common uses include:

- Terminating your answer to a prompt.
- Aborting a prompt entered by mistake.
- In the Editor, moving the cursor to the beginning of the next line (a carriage return).

To demonstrate these uses, press F while in the Filer to get the Filecopy prompt:

```
Filecopy what file ?
```

Type:

```
ACCESS:EDITOR
```

Press ENTER to register your response. The computer now asks:

```
Filecopy to what?
```

Press ENTER with no answer to abort the prompt, since we really don't want to copy anything. Now exit the Filer and enter the Editor. Press I to enter insert mode in the Editor. Insert mode allows you to type in text, just as you would on a typewriter. Type the following lines, and notice the ENTER key is just like RETURN on a typewriter:

```
THIS IS ONE LINE. ENTER
THIS IS ANOTHER LINE. ENTER
```

To exit insert mode without keeping the lines you just typed, press SHIFT EXEC.

EXEC is used to make your actions permanent. To see what this means, press I to put the Editor in insert mode. Type the following lines again:

```
THIS IS ONE LINE. ENTER
THIS IS ANOTHER LINE. ENTER
```

Now press BACK SPACE a few times and notice that every time the cursor backs up, it deletes one letter. The lines are not yet permanent. Now, retype the portion of the line you erased, then press EXEC. Now when you press BACK SPACE, letters are not erased; they have become permanent. Leave this text on the screen for use in the upcoming demonstration.

SHIFT EXEC (i.e., hold down SHIFT and press EXEC) nullifies any operation that has not yet been made permanent with the EXEC key. It also aborts certain prompts that you enter inadvertently, in a way similar to ENTER.

To see how SHIFT EXEC nullifies an operation that is not yet permanent, hold down the space bar until the cursor is positioned at the end of the last line on the screen. Now press D to enter delete mode. Press BACK SPACE a few times to delete characters at the end of the last line. Now press SHIFT EXEC. Notice that the characters you deleted have returned, because SHIFT EXEC nullified the delete operation. Understand, this would not be possible had you pressed EXEC first, for EXEC would have made the deletions permanent.

To see how SHIFT EXEC can .abort certain prompts, press the F key to invoke the **Find** command. **Find** is used to find any arbitrary sequence of characters you specify, but in this instance, let's assume you invoked the command by mistake. Notice the prompt line at the top of the screen:

```
Find[1]: L<target>=>
```

Now press SHIFT EXEC and watch the prompt disappear. The **Find** operation has been canceled.

CTRL

CTRL, pressed in conjunction with another key, generates a control code. To demonstrate this, press I to enter insert mode. Position the cursor below the last line on the screen and type:

```
THIS IS YET ANOTHER LINE. ENTER
```

Now hold down CTRL and press C. Notice that insert mode is exited and the new line has become permanent. Thus CTRL C has the same function as EXEC; in fact, EXEC generates the control code CTRL-C.

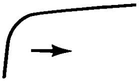
RST allows you to boot another language/operating system without turning off your computer. Pressing RST gives control to the Boot ROM after a few seconds, which reruns the self-test and then begins searching for a system to load. It's as if you turned your computer off, then on again.

If the Debugger is loaded, RST causes the computer to enter it.

Note

Press CONT to exit the Debugger.

The Debugger display is blank except for a small arrow in the upper-left corner of the screen:



If you would like to demonstrate this, press RST, but be prepared to re-boot the Pascal system according to the instructions in Chapter 2. If the Debugger is loaded, you must press RST, then type the following line to cause the computer to reboot:

```
sb ENTER
```

sb stands for "system boot."

STOP immediately returns control to the Main Command Level, aborting any program that was running. It is a good way to exit an operation that you began by mistake, but be careful not to press STOP while a disc read or write operation is in progress.

If you rebooted your computer while trying out the RST key, enter the Editor, press I, and type the following lines again:

```
THIS IS ONE LINE. ENTER
THIS IS ANOTHER LINE. ENTER
THIS IS YET ANOTHER LINE. ENTER
```

Press EXEC to make these lines permanent, then press STOP. Notice that we lied to you: the Editor is *not* immediately exited, but this is the only exception to the rule. Instead the following prompt appears on the screen:

```
Are you sure you want to STOP without updating?
     Type Yes  to STOP Without Update
     Type No   to Return To Editor
```

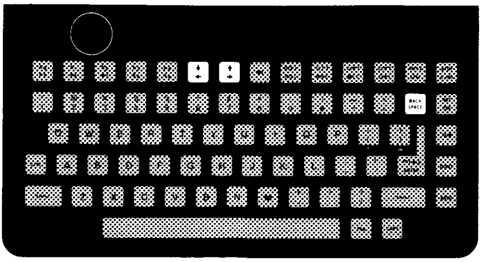
Since you have started a file in the Editor, the computer wants to confirm that you really do want to stop without updating, i.e., stop without saving this text on a disc. If you do not update, all of your work will be lost. Since we'll be using this text in subsequent demonstrations, press N. The command line of the Editor now reappears on the screen.

STOP
C I/O

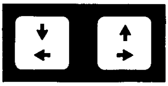
C I/O has the same function as STOP.

RCL

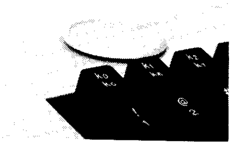
RCL is used in the Debugger to recall the last command. See the Debugger chapter of the *Pascal 3.0 Workstation System Manual* for details.



Cursor Control Keys



The arrow keys move the cursor in the indicated direction. Try them out on the text you've typed, moving the cursor up and down, left and right. Notice that the cursor will not move anywhere on the screen, but only in the area of the text.



The knob is used for rapid movement through text. Turn the knob clockwise and watch the cursor move forward along your lines of text. Turn the knob counter-clockwise, and the cursor moves backward through the text. Hold down the SHIFT key and rotate the knob clockwise and the cursor moves rapidly down through lines of text. Hold down SHIFT and rotate the knob counter-clockwise and the cursor moves rapidly upward through lines of text.

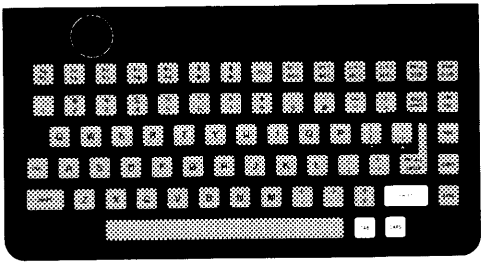
BACK SPACE moves the cursor backward one space. In insert mode, and when responding to prompts, it also erases characters as it backs up.

Use BACK SPACE to move backwards along one of the lines that you typed. Press I to enter insert mode and type a few characters. Then press BACK SPACE to erase all of the characters you typed. Press it once more, and the error message is generated at the top of the screen:

```
ERROR: Can't back up. <space> continues.
```

So you can't back up farther than you moved forward in insert mode. As indicated on the screen, press the space bar to return to insert mode, then press EXEC to exit.

Typewriter Keys



The keyboard has a full set of conventional typewriter keys, included a few special function keys described below.

CAPS changes the case of all unshifted typewriter keys. When the Pascal system is booted, all letters are typed in upper case, with SHIFT providing the lower-case letters. Press CAPS, and all letters are typed in lower case, with SHIFT providing the upper case letters.

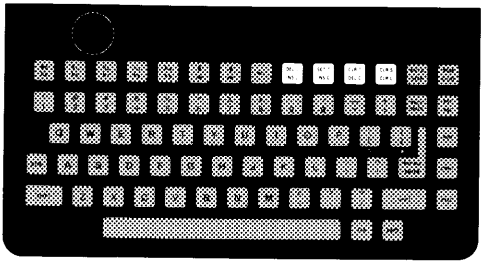
Press I to enter insert mode, and type a few characters, pressing SHIFT occasionally to provide the alternate case. Now press CAPS, and continue typing. Notice the case change. Press SHIFT EXEC to exit insert mode and clear what you typed.

SHIFT pressed in conjunction with another typewriter key produces the alternate case for that character; what is the alternate case depends on the setting of CAPS. For non-typewriter keys, SHIFT provides access to the top-most function on the key.

In the Editor, the TAB key moves the cursor ahead 8 spaces. Using the arrow keys, move the cursor to the beginning of one of the lines on the screen. Press TAB and watch the cursor jump forward.

Note

The TAB key is predefined to eight-space intervals; you cannot set it to a different value.



Editing Keys

The Pascal Editor can be completely operated with nothing more than typewriter keys. However, some special keyboard editing keys are implemented; use them if you find them more convenient.

Pressing INS L at the command level of the Editor is identical to pressing I—both put the Editor into insert mode.

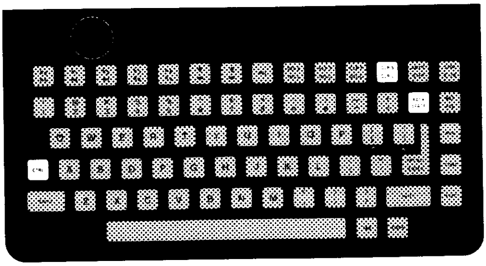
INS C has the same function as INS L.

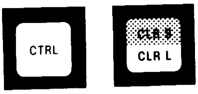
Pressing DEL L at the command level of the Editor is identical to pressing D—both put the Editor into Delete mode.

DEL C has the same function as DEL L.

CLR L erases the line containing the cursor while in insert mode in the Editor. Press I to enter insert mode, and type a few lines of characters, pressing ENTER each time you want to start a new line. Press CLR L and notice that the line containing the cursor is removed. All but the first line typed may be cleared this way. Press SHIFT EXEC to exit insert mode.

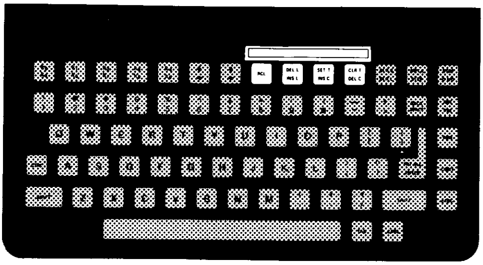
Type-ahead Buffer Keys





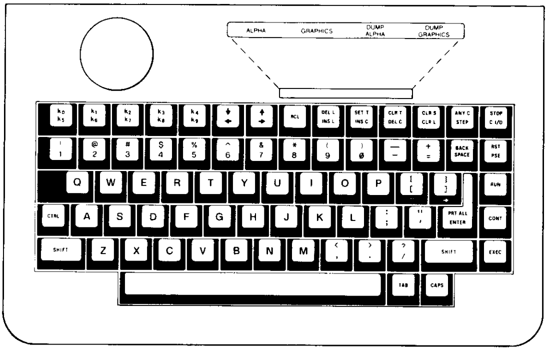
CTRL CLR L removes *all* characters from the type-ahead buffer. See the Type-ahead buffer section earlier in this chapter for a demonstration.

CTRL BACK SPACE deletes the *last* character entered into the type-ahead buffer. See the Type-ahead buffer section earlier in this chapter for a demonstration.



Keyboard Label Keys

The Pascal Keyboard Label was shipped in your computer's miscellaneous kit. Affix the label to the keyboard as shown below.



Affixing the Keyboard Label

To invoke one of the functions printed on the label, hold down (SHIFT) and press the key directly beneath the desired function. For example, to dump graphics, hold down (SHIFT) and press (DEL C).

The keyboard label keys are defined as follows:

Alpha
Graphics

The **Alpha** (shifted (RCL)) and **Graphics** (shifted (INS L)) keys allow you to turn the alpha and graphics display modes on and off. The **Alpha** key turns *on* the *alphanumeric* display if you press it once, and turns *off* the *graphics* display if you press it a second time. The **Graphics** key turns *on* the *graphics* display if you press it once, and turns *off* the *alphanumeric* display if you press it again.

To demonstrate these keys, enter the Filer and press V to invoke the **Vols** command. All on-line volumes will be listed on the screen. Press **GRAPHICS** (shifted INS L) once to turn on the graphics display. (Unfortunately, there's nothing in the graphics display, so there is no visible change. Take our word for it: the graphics display is now on.) Press **GRAPHICS** again to turn off the alphanumeric display. The text on the screen disappears.

Now press **ALPHA** (shifted RCL) to turn on the alphanumeric display again. The text reappears. Press **ALPHA** once more to turn off the graphics display. Again, you'll have to take our word for it that the empty graphics display has now been turned off. Leave the **Vols** display on the screen and go on to the next key demonstration.

DUMP ALPHA

The **DUMP ALPHA** key (shifted INS C) "dumps" whatever is in the alphanumeric display to your printer. Do not use **DUMP ALPHA** if you have no printer; it may cause your system to "hang" for a while, as the computer searches for a nonexistent printer.

If you do have a printer, make sure it is properly connected and turned on. Also make sure the "on-line" light is on (if your printer has one). Now press **DUMP ALPHA**, and the **Vols** display is printed on your printer.

DUMP GRAPHICS

The **DUMP GRAPHICS** key (shifted DEL C) operates just like **DUMP ALPHA**, except that it dumps whatever is in the graphics display to your printer. This key works properly only if you have a graphics printer.

The Main Command Level

Chapter
5

The Main Command Level is the highest level of the Pascal Workstation—your home base and port-of-entry into the rest of the system. Using an analogy to the Pascal programming language, the Main Command Level is like the main program that calls all of the subordinate procedures and functions. It really does nothing itself, but summons up the appropriate subprogram to carry out the requested task.

The command line of the Main Command Level looks like this:

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

Press (?), and the rest of the commands appear:

```
Command: Assembler Debugger Memvol Newsysvol Permanent Stream User What ?
```

We'll now examine some of the most important commands.

Primary Main Command Level Commands

Editor

The Editor subsystem is invoked by pressing E, and is stored on the ACCESS: volume under the file name EDITOR.

The Editor is used to create and edit programs and text. Specific Editor commands are discussed in Chapter 6.

Filer

The Filer subsystem is invoked by pressing F, and is stored on the ACCESS: volume under the file name FILER.

The Filer is used to manage interactions between the computer and its mass storage devices (e.g., disc drives, bubble memory, etc.). Specific Filer commands are discussed in Chapter 7.

Compiler

The Compiler subsystem is invoked by pressing C, and is stored on the CMP: volume under the file name COMPILER.

The Compiler is used to compile Pascal program text into loadable Series 200 object code. Specific operational details are provided in Chapter 8.

eXecute

The **eXecute** command is invoked by pressing X. It is used to run programs. The **eXecute** command is "built in" to the Main Command Level; no special volume must be on-line to use it.

In Chapter 3, you used **eXecute** to load and run the media initialization program stored in the file MEDIAINIT.CODE on the ACCESS: volume. Let's take a closer look at the behavior of the **eXecute** command.

Press X. The following prompt now appears:

```
Execute what file ?
```

The computer is asking for the name of the file containing the program you want to run. Remember that to completely specify a file, you must provide not only the *name* of the file, but its *location* (unit number or volume ID) as well. For example, if the program you want to run is in a file named NONSENSE on the ABSENT: volume, you would type:

```
ABSENT:NONSENSE (Return)
```

Go ahead and try this. Note that a **:** must always separate the volume ID (or unit number) from the file name.

The computer now responds with an error message:

```
Loading 'ABSENT:NONSENSE.CODE'
cannot open 'ABSENT:NONSENSE.CODE'
logical volume not found
```

The computer searched for the ABSENT: volume but could not find it. If you ever get this message while trying to run a program, check that you've spelled the volume ID correctly, and make sure the required volume is on-line. In this example, the latter problem applies, for there is no ABSENT: volume.

Notice that the computer appended the suffix, `.CODE`, to the file name. This is standard procedure. Because the Compiler creates files with names ending in `.CODE` when it compiles program text into executable code, the **eXecute** command assumes that most programs you want to run will be stored in a `.CODE` file. So you don't have to type the `.CODE` suffix every time; the computer will save you the trouble and append it automatically. However, what if you don't *want* to execute a `.CODE` file?

As an example, the Filer subsystem is nothing more than a program, but it is stored in a file named FILER, not in a file named FILER.CODE. Suppose you wanted to use **eXecute** to run the Filer, instead of invoking it with (F). How do you keep the **eXecute** command from appending `.CODE` to the file name?

Insert the ACCESS: volume (ACCESS: contains the Filer) into one of your disc drives. Press (X) again and answer the prompt with:

```
ACCESS:FILER (Return)
```

You get the message:

```
Loading 'ACCESS:FILER.CODE'
cannot open 'ACCESS:FILER.CODE'
file not found
```

Of course it couldn't find FILER.CODE; there is no such file name on the ACCESS: volume. What you want is the file named FILER. To prevent the computer from appending `.CODE` to the file name, you must type a period (`.`) after the file name. The period is not interpreted as part of the file name, but only serves to suppress the suffix. Type:

```
ACCESS:FILER. Return
```

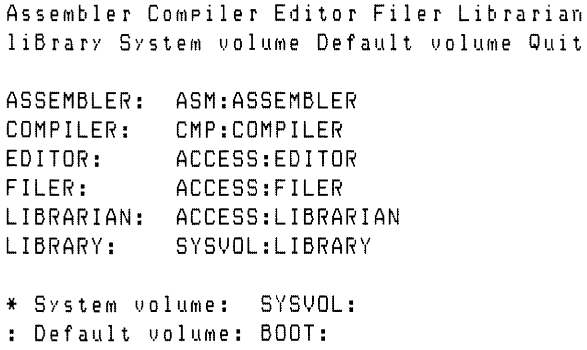
The Filer is loaded and run. Press Q to quit the Filer and return to the Main Command Level. Press any other key to clear the screen. Incidentally, you should watch for that last error message (`file not found`). If you run across it again, make sure you have spelled the file name correctly, that the file really does exist on the volume, and that the .CODE suffix is part of the actual file name.

What

To **eXecute** the Filer in the last example, you specified its volume ID and file name. Without this information, the computer has no idea where to find the Filer. How, then, does computer know where to find the Filer when you press the F key?

The computer keeps track of the volume IDs and file names of the Filer and all other subsystems in a table. So when you press F, for example, the computer looks up the Filer in this table, finds its file name and volume ID, and tries to retrieve it. If the information in the table is correct, it finds and loads the Filer. If it's not, it displays an error message.

You can look at and modify this table by invoking the **What** command. Press W now to see the table. It will look something like this, although each particular entry depends on how you have your system arranged:



```
Assembler Compiler Editor Filer Librarian
liBrary System volume Default volume Quit

ASSEMBLER:   ASM:ASSEMBLER
COMPILER:    CMP:COMPILER
EDITOR:      ACCESS:EDITOR
FILER:       ACCESS:FILER
LIBRARIAN:   ACCESS:LIBRARIAN
LIBRARY:     SYSVOL:LIBRARY

* System volume:  SYSVOL:
: Default volume: BOOT:
```

The two lines at the top of the screen are command lines; there is one command for each entry in the table. Each command allows you to change the volume ID and file name for the corresponding entry.

Press A to see how this works, but don't type anything. The ASSEMBLER entry goes blank, and the computer waits for you to type in the new volume ID and file name. Press Return, and the original entry is restored.

Each entry in the table gives the volume name and the file name where the computer *expects* to find that subsystem. If your Pascal system is on flexible discs, these volume IDs correspond to your disc labels–CMP: for the disc containing the Compiler; ACCESS: for the disc containing the Editor, Filer and Librarian; etc.

The two lines at the bottom give the settings for the default and system volumes.

The *default volume* is the volume ID the computer will "assume" if you leave off the volume ID when specifying a file. For example, remember when running the media initialization program in Chapter 3, you typed the following complete file specification when prompted with `Execute what file ?:`

```
    ACCESS:MEDIAINIT
```

It is tiresome to type the volume ID if you're accessing the same volume all the time, so set the default volume to the volume ID of the frequently-accessed volume. To set the default volume to ACCESS:, press D and type:

```
ACCESS: Return
```

Now, to see how the computer behaves when no volume is specified, press Q to return to the Main Command Level and press X to invoke the **eXecute** command. Now type only the file name (MEDIAINIT) in response to the prompt:

```
MEDIAINIT Return
```

The computer assumes MEDIAINIT must be on the default volume, and constructs the complete file specification using ACCESS: as the volume ID. The media initialization program is loaded and run. Press Return to abort it, and press W to return to the **What** command.

The *system volume* is used by the Pascal system to store temporary files, special files, the date that you last entered, and other information. Since the system volume is important to the operation of the Pascal Workstation, it should be on-line at all times. Setting the system volume is described in the section for the **Newsysvol** command later in this chapter, and in Part III of this book.

Both the system volume and the default volume have a special character associated with them. The system volume has an asterisk (*); the default volume has a colon (:). Each character is just a shorthand notation for that volume, and can be used in place of its volume ID. You'll see the convenience of this feature in Chapter 7.

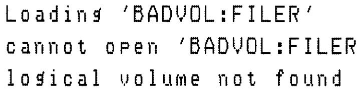
Before you leave the **What** command, change the volume ID of the Filer to see what happens when the information in the table becomes corrupted. But before you do this, write down the correct entry so you can restore it when you're finished.

Press F to change the FILER entry. Type:

```
BADVOL:FILER. Return
```

Note that you must still append the period to keep the suffix `.CODE` from being automatically appended. Now press Q to exit the **What** command, and press F to load the Filer.

What happened? The computer looked in the table, pulled out the entry for the Filer, looked for the BADVOL: volume and couldn't find it. It reports:



```
Loading 'BADVOL:FILER'
cannot open 'BADVOL:FILER'
logical volume not found
```

Press W, and change the Filer entry back to its original value. Press Q to return to the Main Command Level, and confirm that pressing F successfully loads the Filer again. If for some reason it doesn't, and you can't change the Filer entry back to its original value, simply reboot the Pascal system. The booting process sets all of the initial values in the table to their proper values.

Run

The **Run** command is invoked by pressing either R or RUN. **Run** works just like the **eXecute** command, unless there is a *workfile* present. Workfiles will be discussed in detail later, but for now think of it as a default file: one the computer "assumes" you want to access.

Suppose you just finished typing in a Pascal program and saved it as your workfile. To run this program, you can just press R, and the program will be compiled into executable code and then executed. This single step is easier and faster than saving your program text in a file, then compiling the text file and generating a code file, and finally using **eXecute** to run the code file.

If your workfile already contains compiled code, the compilation step is skipped and the workfile is immediately run. **Run** will be demonstrated in Part III.

User

The **User** command is invoked by pressing U. It simply re-runs the last program you ran. Programs, in this case, include the Pascal subsystems, such as the Filer and Editor.

You used the **User** command in Chapter 3 to re-start the media initialization program when you were ready to initialize another disc. It saved you from going back to the **eXecute** command each time and specifying which program you wanted to run. Since the program was just run, there was no need to re-load and re-eXecute it.

Permanent

Permanent is invoked by pressing P. It permanently loads a program into memory.

Up to now, every time you invoked the Filer or the Editor, it took several seconds to load the subsystem from the disc into memory. There could be only one subsystem in memory at a time, and every time you invoked a new subsystem, the old one was lost. It would be much better to have your most frequently-used subsystems *permanently* loaded into memory. The **Permanent** command does just that.

To understand the convenience of permanent-loading, try out this demonstration. With your ACCESS: volume on-line, press E to invoke the Editor. Note the time delay as the Editor is loaded from the volume into memory. Press Return, Q, and then E to quit the Editor, then press F to invoke the Filer. The Filer is loaded into memory, replacing the Editor. Quit the Filer, and invoke the Editor again. You'll probably agree that the waiting periods get rather tiresome, but this back-and-forth use of the Editor and Filer is quite common in practice.

Now press P, and the following prompt appears:

```
Load what code file?
```

The computer is asking the name of the file containing the program that you want to permanently load. Type:

```
ACCESS:EDITOR. Return
```

to permanently load the Editor (be sure to type the period after EDITOR).

Note

If your default volume is set to ACCESS: you can just type the file name; ACCESS: will be assumed.

Press P again and type this line to permanently load the Filer:

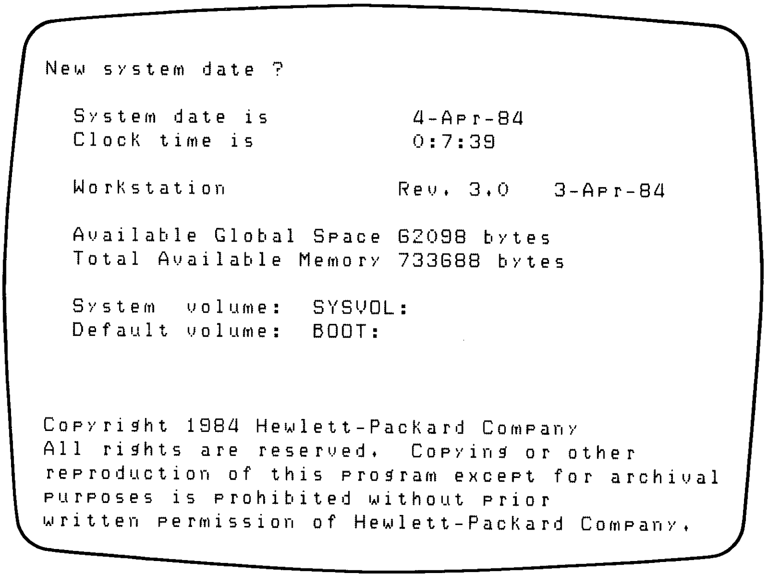
```
ACCESS:FILER. Return
```

Now invoke the Editor, quit it, invoke the Filer, quit it, etc. Notice how quick the response time is now. You can even remove the ACCESS: volume, because the subsystems are permanently loaded in memory, and need not be read from the disc each time they're invoked.

Version

The **Version** command is invoked by pressing V. It is used primarily to reset the time and date.

Pressing V will recall the Pascal system's initial display and repeat the time and date prompts. You are familiar with these, so let's look at the other information on the screen.



```
New system date ?

   System date is            4-Apr-84
   Clock time is             0:7:39

   Workstation              Rev. 3.0    3-Apr-84

   Available Global Space 62098 bytes
   Total Available Memory 733688 bytes

   System  volume:  SYSVOL:
   Default volume:  BOOT:



Copyright 1984 Hewlett-Packard Company
All rights are reserved.  Copying or other
reproduction of this program except for archival
purposes is prohibited without prior
written permission of Hewlett-Packard Company.
```

Initial Display

Below the time and date is a line (beginning with `Workstation`) that gives the version of the Pascal Workstation you're using, and the date this version was released. The current version is Rev 3.0.

Next, the amount of available memory in your computer is displayed. The amount of `Available Global Space` requires more knowledge of the Pascal system than is addressed in this book, so you are referred to the *Pascal 3.0 Workstation System Manual* if interested. The `Total Available Memory` is the amount of memory available for programming after the Pascal system's core programs and all permanently loaded programs have been loaded. Note that permanently loaded programs do consume memory, so if memory is in short supply, permanently load only the most essential subsystems.

Finally, the current settings for the system and default volumes are displayed, along with copyright information.

Press (Return) twice to skip past the date and time prompts and return to the Main Command Level.

Memvol

The **Memvol** command is invoked by pressing (M). It is used to create a volume, not on a disc, but in your computer's random access memory (RAM).

The advantage to using a memory volume is that it is faster than a disc volume: storing files to, and retrieving files from, a memory volume is virtually instantaneous.

The disadvantage of a memory volume is that, like RAM, it is vulnerable to power loss. If the power should fail, all files stored in a memory volume would be lost.

The best application for a memory volume is during a development cycle, when you are frequently modifying a file. The use of memory volumes will be demonstrated further in Chapter 7, and in Part III of this book.

To create a memory volume, press (M) to get the following prompt:

```
*** CREATING A MEMORY VOLUME ***

What unit number?
```

The computer is asking you to specify which unit number you would like to assign to the memory volume. Unit #50 is a good choice, so type:

```
#50: (Return)
```

Next, the computer asks how much memory (in increments of 512 byte blocks) you want to allocate to the memory volume:

```
How many 512 byte BLOCKS?
```

Your response here will depend on your particular requirements and the amount of memory in your computer. In the examples in this book, only a small memory volume (25K bytes) is needed, so type:

```
50 (Return)
```

Finally, the computer asks:

```
How many entries in directory?
```

Like a disc volume, a memory volume has a directory. The directory consumes memory space, so don't make the directory bigger than necessary. Eight directory entries is the minimum number you can have, so type:

8 Return

The computer now creates the memory volume, and reports:

```
#50: (RAM:) zeroed
```

The memory volume has been assigned to unit #50 and has RAM: as its volume ID. To confirm that the memory volume exists, press F to enter the Filer, and press V to invoke the **Volumes** command. There is now an entry for unit number 50 that looks like:

```
50 # RAM:
```

Press Q to return to the Main Command Level.

Newsysvol

The **Newsysvol** command is invoked by pressing N. It is used to assign a different volume as the system volume.

To see which volume is currently assigned as the system volume, press W to invoke the **What** command. The current system volume ID is given at near the bottom of the display. Note it and press Q to exit.

In this example, we will set the system volume to the RAM: volume just created with the **Memvol** command. Press N to get the following prompt:

```
What new system unit number?
```

We want to set the system volume to the memory volume, RAM:. The unit number of RAM: is 50, so type:

#50: Return

To confirm that the system volume is now RAM:, invoke the **What** command again, and look at the entry for the system volume. Leave the system volume as RAM: and return to the Main Command Level. You will use this setting in Chapter 7.

This completes your tour of the Main Command Level.

For More Information...

For details about these and other Main Command Level commands, refer to the *Pascal 3.0 Workstation System Manual.*

The Editor

Chapter 6

The Editor helps you create files. Its commands make it easy to type in a program or document, change it if necessary, and then store it in a file.

In this section, we discuss and demonstrate the more common editing commands.

When to Use the Editor

Whenever you want to type something–whether it be a Pascal program, an office memo, or a computer manual–think of the Editor. It is the only subsystem that will allow you to type freely; all of the others simply accept and execute commands.

Entering the Editor

You are already familiar with this procedure (it was given in Chapter 4), but we repeat it here to refresh your memory. To enter the Editor from the Main Command Level, follow these steps:

> **Note**
>
> If you have just permanently loaded the Editor by following the instructions for the **Permanent** command (in the preceding chapter), you do not need the ACCESS: volume as described in step 2.

1. Make sure the command line for the Main Command Level appears on the screen:

   ```
   Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
   ```

   Press Stop if it doesn't.
2. Insert your working copy of the ACCESS: volume into one of your flexible disc drives.
3. Now press the E key to load and run the Editor program.

4. The following display should now appear on the screen:

```
Editor  [Rev 3.0    3-Apr-84]

Copyright 1984 Hewlett-Packard Company.
         All rights reserved.


No workfile found.
File? (<ret> for new file, <stop> exits)
:
```

This display is the "front door" of the Editor; it is asking you if there is an existing file that you want to edit. Since you have none, simply press Return to indicate that you want to create a new file. The Editor's command line then appears on the screen:

```
Editor: Adjst Cpy Dlete Find Insrt Jmp Rplace Xchng Zap ?
```

You are now inside the Editor.

Primary Editing Commands

Insrt (Insert)

The **Insrt** command is invoked by pressing I. It allows you to insert text–i.e., type freely–inside the Editor.

The command line for **Insrt** shows what keys are active, as well as keys for accepting and escaping (aborting) everything typed during the insert session. The line is decoded as follows:

- `Text` tells you that all typewriter keys are active for inserting text.
- `<bs>, <clr ln>` tells you that you may use the Backspace key to simultaneously back up and delete typing errors, and use Clear line to erase the line containing the cursor (unless it was the first line inserted).
- `<sel> accepts, <esc> escapes>` tells you to press Select when you're finished typing to make your text permanent, or ESC to erase everything you've typed since entering insert mode.

To try it out, press I and type in the following letter exactly as shown:

```
Dear HP:

I just got my new Hewlett-Packard Series 200 Pascal
Workstation.  I hate typing, but the manual insists that I
try out the Editor, so here I am typing this note to you.

So far, I am

Enjoying
Tolerating
Loathing

this manual.  I find it

Too easy to follow.
Just about right.
Too hard to follow.

Please accept my heart-felt

Thanks
Disgust

for making my introduction to the Pascal system

An enjoyable experience.
An endurable experience.
A real nightmare.

                    Respectfully yours,
```

Now press Select to exit insert mode. Had you pressed ESC instead, the entire letter would have been erased.

Dlete (Delete)

The **Dlete** command is invoked by pressing D. It is the opposite of insert, removing every character that the cursor touches.

The command line for **Dlete** provides the following information:

- > is the direction indicator. It tells you which direction the cursor will move when the space bar is pressed. When the indicator is pointing to the right (>), the cursor will move forward when the space bar is pressed. When the indicator is pointing to the left (<), the cursor will move backward when the space bar is pressed. The direction of the indicator is changed by pressing > and < .
- <> tells you that the space bar may be used to move the cursor forward, wiping out characters as it goes.
- <Moving commands> tells you that all of the cursor control keys (the knob, the arrow keys, Backspace and Return) may be used to move the cursor.
- <sel> deletes, <esc> aborts tells you to press Select when you're finished to make your deletions permanent, or ESC to abort your deletions and return the text to its state before the delete operation was begun.

Try this out. Position the cursor somewhere in the list of words:

```
Enjoying
Tolerating
Loathing
```

Choose the word that most closely expresses your attitude and delete the other two. To delete a word, position the cursor under its first letter and press D. Then move the cursor forward to erase the word.

Also try moving the cursor back again, and notice that the word reappears. Your deletions are not permanent until you exit delete mode with the Select key. Now erase the word again, and press Select. The word is now permanently deleted.

Note

This is not quite true. There is a way to get it back, but we won't discuss it until the **Cpy** command section (coming up).

Next, erase the other word in the list that doesn't express your sentiments, but this time, press ESC to exit delete mode. Notice the word is *not* deleted. Press D, erase it again, and press Select this time to make the deletion permanent.

Continue deleting all inappropriate words in the other three lists, using the space bar to move the cursor. Experiment with the direction indicator, also. Press <, and notice that the cursor moves backward when you hold down the space bar. Press >, and the cursor moves forward again.

Next, delete the blank lines that separate your chosen words from the rest of the sentences, but leave the chosen words on separate lines. To do this, position the cursor on a blank line and press D to enter delete mode. Then press Return to move the cursor to the beginning of the following line, and press Select to complete the deletion.

If you looked charitably on this manual, your letter should look like this when you're through:

```
Dear HP:

I just got my new Hewlett-Packard Series 200 Pascal
Workstation.  I hate typing, but the manual insists that I
try out the Editor, so here I am typing this note to you.

So far, I am
Enjoying
this manual.  I find it
just about right.
Please accept my heart-felt
Thanks
for making my introduction to the Pascal system
An enjoyable experience.


                            Respectfully yours,
```

Xchng (Exchange)

The **Xchng** command is invoked by pressing X. It allows you to make corrections by typing new letters over old ones; i.e., by exchanging one letter for another.

The command line for **Xchng** shows what keys are active, as well as keys for accepting and aborting everything typed during the exchange session. The line is decoded as follows:

- `Text` tells you that all typewriter keys are active for exchanging text.
- `<bs>` tells you that you may use the Backspace key to simultaneously back up and delete typing errors.
- `<esc> aborts, <sel> accepts` tells you to press Select to make your changes permanent, or ESC to undo everything you've done since beginning the exchange.

In the letter, all of your chosen words begin with upper-case letters. This is not proper, so use the **Xchng** command to change the first letter of each to lower-case.

Position the cursor to the first letter of the first chosen word and press X. Now type the lower-case equivalent over the original. While you're at it, hold down the k key to replace all forward letters on the line with `k`s. Notice that you cannot replace letters past the end of the line. Now hold down Backspace and watch the original letters return. Also note that you cannot exchange letters previous to the letter where you began the exchange.

Finally, make sure the first letter of the word is lower-case, and press Select to make the change permanent. Repeat this procedure for the first letters of all chosen words (use Return to move the cursor down through lines of text). When you're through, your letter should look something like this, depending upon your choice of words:

```
Dear HP:

I just got my new Hewlett-Packard Series 200 Pascal
Workstation.  I hate typing, but the manual insists that I
try out the Editor, so here I am typing this note to you.

So far, I am
enjoying
this manual.  I find it
just about right.
Please accept my heart-felt
thanks
for making my introduction to the Pascal system
an enjoyable experience.


                              Respectfully yours,
```

Cpy (Copy)

The **Cpy** command is invoked by pressing C. It is used to copy other files or buffer contents (explained below) into your text. This feature makes it possible to copy and duplicate portions of text.

The command line for the **Cpy** command provides the following information:

- `Buffer` tells you to press B to copy the contents of the buffer beginning at the position of the cursor.
- `File` tells you to press F to copy the contents of a file beginning at the position of the cursor.
- `<esc>` tells you that the copy operation can be aborted by pressing ESC.

You've created no files yet, but let's do a dry run anyway to see how it works. You would first position the cursor to the point where you want the file copied. For instance, if you wanted to copy the file at the end of your letter, you would position the cursor there.

Next, press C, then F to indicate your desire to **Copy** a **File**. The command line changes to:

```
Copy:  File[marker,marker] ?
```

The computer is asking for the complete file specification of the file you want to copy, including the volume ID (or unit number) and the file name. If you had a file to copy, you would type in the file specification and press Return. Since you don't, just press Return to abort the operation.

The copy buffer operation is very useful for "undoing" an inadvertent deletion, and for moving and copying blocks of text. Before you try it out, you must understand the buffer.

The **buffer** is an area of memory where the text of your last insertion or deletion operation is stored. Every time you perform an insertion or deletion, the old contents of the buffer are replaced with the text that you just inserted or deleted.

To see this, position the cursor at the top of your letter, press D, and press the Return key several times to delete several lines of text. Delete the entire letter if you like. Press Select to make your deletions permanent. Everything you deleted is now stored in the buffer. Then, before you do anything else, press C and then B to **C**opy the **B**uffer. The deleted lines are restored.

The preceeding demonstration shows how to recover when you delete something by mistake. You must discover and correct your mistake, however, before another deletion or insertion is performed.

Now let's look at another use of copying the buffer: moving text.

Let's say, for some reason, you decide to make the first paragraph of your letter the last. How do you do this, save for retyping the whole paragraph at the end of the letter, and deleting the original paragraph at the beginning? Immediately the buffer should spring to mind.

If you delete the paragraph, you effectively copy it into the buffer. Then you can move the cursor to the desired position and copy the buffer back into its new position. Here's the procedure in detail:

First position the cursor to the very end of the letter and insert a couple of blank lines. To do this, press I to enter insert mode, and press Return twice to insert two blank lines. Then press Select to exit insert mode. This will separate the paragraph you are going to copy from the rest of the text.

Next, position the cursor to the first letter of the first word in the first paragraph ("I"). Press D, and then press Return until the paragraph is deleted. Press Select to accept the deletion.

Now position the cursor a few lines below the end of the letter. (You can move the cursor around without affecting the buffer; the buffer is only changed when I or D is pressed.) Press C B and the entire paragraph is copied.

Before your finished, copy the paragraph back into its original position by moving the cursor to the top (just above "So") and pressing C B again. Note that the buffer is unchanged by the last copy operation, allowing you to copy the same paragraph as many times as you wish.

Finish up by deleting the paragraph you copied at the bottom of the letter.

Set environment

The **Set environment** command is invoked by pressing S. It allows you to set several characteristics of the editor, including margins, paragraph indenting, line filling, etc.

When you press S, you are presented with the following four options:

- **Env** tells you that pressing E will allow you to set each editing characteristic individually.
- **Mrk** tells you that pressing M will allow you to set markers in your text.
- **Prog** tells you that pressing P will preset the editing characteristics to values suitable to typing in and editing Pascal programs.
- **Doc** tells you that pressing D will preset the editing characteristics to values suitable for typing in and editing letters, memos, manuals and other documents.

We will examine **Set Prog** and **Set Doc** here; for information on the other options, refer to the *Pascal 3.0 Workstation System Manual.*

Press S P (Set Prog) to get the following display:

```
>Environment: {options} <sel> or <sp> leaves
    Auto indent    True
    Filling        False
    Left margin    0
    Right margin   78
    Para margin    5
    Command ch     ^
    Token def      True
    Ignore case    False
    Zap markers
    2 bytes used, 728062 available
```

This "menu" shows how the suggested editing characteristics for a program-editing environment. While you're learning the Editor, it is best to just accept these defaults until you feel you need to change them. To accept the default settings, just press the space bar. The Editor is now set in an environment designed for entering and editing Pascal programs. You will use this environment in later chapters to enter and edit a Pascal program.

Now press S D (Set Doc) to get the following display:

```
>Environment: {options} <sel> or <sp> leaves
    Auto indent    False
    Filling        True
    Left margin    0
    Right margin   78
    Para margin    5
    Command ch     ^
    Token def      False
    Ignore case    False
    Zap markers
    2 bytes used, 728062 available
```

Notice that the values of several editing characteristics have been changed from the previous program-editing settings. This time, change the right margin setting from 78 to 60. To do this:

1. Press R to indicate you want to change the Right margin. Notice the cursor jumps to this location and the entry goes blank.
2. Type in your new value for the right margin:

```
    60
```

3. Press the space bar to enter the new value.

And again, press the space bar to leave.

Note

For a complete description of all editing environment characteristics, refer to the Editor chapter of the *Pascal 3.0 Workstation System Manual.*

Margin

The **Margin** command is invoked by pressing M. It is active only in the documentation-editing environment, and is used to "clean up" a paragraph left messy by several insertions and deletions. The appearance of a paragraph after the **Margin** command depends upon the settings of the editing characteristics.

Before you see how this works, you must understand the Editor's definition of a "paragraph." A paragraph is any block of text that has a blank line above it and a blank line below it. By this definition, then, the disheveled block of text lying between "so here I am writing this note." and "Respectfully yours," is a paragraph. Let's clean it up with the **Margin** command.

Simply position the cursor anywhere in the paragraph and press M. The paragraph is completely restructured. Notice also that the first paragraph is not indented properly, so position the cursor there and press M again.

If Something Goes Wrong...

If you receive the following error message, the editing environment is not set for documents.

```
ERROR: Wrong environment <space> continues
```

Press the space bar, then S D, and then the space bar again, and re-try the **Margin** command.

When you're finished, the letter should look something like this:

```
Dear HP:

     I just got my new Hewlett-Packard Series 200 Pascal
Workstation.  I hate typing, but the manual insists that I
try out the Editor, so here I am typing this note to you.

     So far, I am enjoying this manual.  I find it just
about right. Please accept my heart-felt thanks for making
my introduction to the Pascal system an enjoyable
experience.


                             Respectfully yours,
```

Exiting the Editor

Use the following procedure to exit the Editor:

1. Make sure the Editor's command line appears on the screen:

   ```
   Editor: Adjst Cpy Dlete Find Insrt Jmp Rplace Xchng Zap ?
   ```

   If it doesn't, press (Return), (Select) or (ESC).
2. Press (Q) to quit the Editor.
3. The following prompt now appears on the screen:

   ```
      >Quit:
            Update the workfile and leave
            Exit without updating
            Return to the editor without updating
            Write to a file name and return
   ```

   This is a list of all of the ways you can exit the editor. Each option is described below:

   - **Update the workfile and leave**. This option will save the text you created in the "workfile." The workfile is a file the Pascal system creates for you on the system volume. It is used as a temporary file for storing programs or documents while they are being developed. Workfiles are discussed in more detail in the next section.
   - **Exit without updating**. This option exits the editor without saving the text you created there. It should be used only if you want to discard the work in your last editing session.

- **Return to the Editor without updating**. This option simply returns you to the Editor, at the same point in your text where you exited it.
- **Write to a file name and return**. This option allows you to save your work in a file of your choosing.

4. In this demonstration, we will choose the last option. Press W to get the following prompt:

```
Name of output file (<ret> to return) -->
```

Insert an initialized discs into one of your flexible disc drives. Then store the file under the file name LETTER. To do this, type the unit number of the flexible disc drive containing your disc (you should know this from Chapter 3), followed by the file name LETTER. Press Return. For example, if you are storing the text on the disc in unit #3, you would type:

```
#3:LETTER Return
```

The text is then saved on the disc in the file named LETTER.TEXT. Notice the string of dots moving across the screen, indicating the file is being written to the disc.

The Editor automatically appended the suffix .TEXT to your file, so its full name on the disc is LETTER.TEXT. This suffix tells you that the file has been stored using the *text* format, which includes not only your words, but also the editing environment in force when the file was saved. Since you exited the Editor with the environment set in "Doc" mode, these settings will automatically be restored when you return LETTER.TEXT to the Editor for editing.

It's worth mentioning that you could have also saved this file using the ASCII file format, by specifying the file name as LETTER.ASC rather than as LETTER. The ASCII format saves your file as a string of ASCII characters; no environment information is saved.

5. After the file is written to the disc, the size of the file is displayed (in bytes), and you are asked:

```
Exit from or Return to the editor ?
```

You can press R to return to the Editor or E to exit to the Main Command Level. Press E.

You are now back at the Main Command Level. This completes your tour of the Editor.

For More Information...

To learn more about the Editor, refer to the Editor chapter of the *Pascal 3.0 Workstation System Manual.*

The Filer

Chapter 7

The Filer is the main connection between your computer and its disc drives. It allows you to store, retrieve, delete and copy files. Volume manipulating commands are well represented also, permitting you to list all the files in a volume, rename a volume, compact a volume and even destroy a volume.

When to Use the Filer

Use the Filer whenever you need the services of your disc drives. Or more generally, whenever you want to move programs, data or text from one place to another.

Entering the Filer

Follow this procedure to enter the Filer:

1. Make sure the command line for the Main Command Level appears on the screen:

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

2. Insert your working copy of the ACCESS: volume into one of your flexible disc drives.
3. Now press the F key to load and run the Filer subsystem.
4. The following command line should now appear at the top of the screen:

```
Filer: Change Get Ldir New Quit Remove Save Translate Vols What Access Udir ?
```

You are now inside the Filer.

Getting Ready for the Demonstrations

Prerequisites

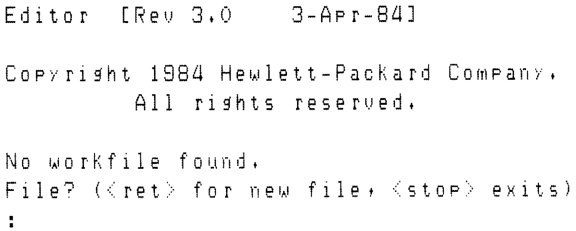
Before you proceed, make sure you understand the relationships between files, volumes and unit numbers, and are well acquainted with the unit number assignments for your system. Refer back to Chapter 3 if you need a refresher.

Introducing Workfiles

It's important to understand the how workfiles are used in the Pascal system.

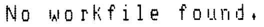
On the surface, workfiles are like any other file. One workfile is a text file, named WORK.TEXT, and the other is a code file, named WORK.CODE. Both are stored on the system volume. What makes the workfiles so special is the way the Pascal subsystems use them.

In the Editor, the initial display looked like this:



```
Editor  [Rev 3.0    3-Apr-84]

Copyright 1984 Hewlett-Packard Company.
          All rights reserved.

No workfile found.
File? (<ret> for new file, <stop> exits)
:
```

Notice the fourth line of this display says:



```
No workfile found.
```

The Editor looked first to see if there was a workfile (i.e., a file named WORK.TEXT on the system volume). Because it didn't find it, it asks you for the name of the file you want to edit. If it *had* found the workfile, it would have *automatically* loaded it. The Editor assumes you want to edit the workfile, if it exists.

The Compiler works much the same way. If it finds the workfile named WORK.TEXT, it assumes you want to compile it. If the compilation is successful, it updates the workfile WORK.CODE with the compiled code of WORK.TEXT.

So the workfiles are like the system "default" files; if they exist, the subsystems assume you want to use them. The advantages to using workfiles will become apparent as you work through this chapter, as well as in Part III, when you will use workfiles in a programming example.

Setting the System Volume

Many of the demonstrations in this chapter involve workfiles. Since workfiles are stored on the system volume, it's important to have the system volume set correctly before trying out our examples.

We will use the small memory volume you created in the Chapter 5 as the system volume. If you followed the instructions for the **Memvol** and **Newsysvol** commands in Chapter 5, then you have already created a memory volume at unit #50 and have assigned it as the system volume. Here's how to check:

Enter the Filer, then press V to invoke the **Volumes** command. If there is an entry for unit number 50 that looks like this, you have already created your memory volume:

```
    50 * RAM:
```

If there is no entry for unit number 50, go back to Chapter 5 and make a memory volume, using the instructions for the **Memvol** command. If the asterisk (*) does not appear between `50` and `RAM:`, then the memory volume is not assigned as the system volume. Set the memory volume to the system volume using the instructions for the **Newsysvol** command.

Primary Filer Commands

Get

The **Get** command is invoked by pressing G. It is used to associate a file name with the workfile. When you "get" a file, it is like *copying* it into the workfile, where it then becomes the "default" file for all Pascal subsystems. Try this exercise:

1. Find the disc containing the file LETTER.TEXT that you created in Chapter 6. Insert it into unit #3.
2. Press G to invoke the **Get** command. The computer responds with:

   ```
   Get what file?
   ```

3. Type the following response to assign the file LETTER.TEXT in unit #3 to the workfile WORK.TEXT:

   ```
   #3:LETTER
   ```

4. The computer finds the file LETTER.TEXT in unit #3 and reports:

   ```
   Source file loaded
   ```

5. Unfortunately, the last statement the computer made is not quite true. It leads you to believe that the source file, LETTER.TEXT, has been copied into the workfile, WORK.TEXT. You can see this is not true by listing the directory of the system volume:

   a. Press L to invoke the **Ldir** command. When the computer asks:

      ```
      List what directory?
      ```

      type the following to list the system volume (remember, the special symbol * represents the system volume):

      ```
      *   Return
      ```

   b. The computer displays the listing of the *empty* directory of the system volume RAM:

      ```
      RAM:                    Directory type= LIF level 1
      created  9-Apr-84 16.56.24 block size=256
       Storage order
      ...file name....     # blks     # bytes  last chng

      FILES shown=0 allocated=0 unallocated=8
      BLOCKS (256 bytes) used=0 unused=97 largest space=97
      ```

WORK.TEXT, the workfile, is not there.

6. The file LETTER.TEXT will not actually be copied into WORK.TEXT until the workfile is *updated*–one of the exit options of the Editor. Press Q to quit the Filer, and press E to enter the Editor.
7. Notice that the Editor didn't prompt you for the name of a file to edit; it simply read in LETTER.TEXT, which has been identified as the workfile. Press Q to quit the Editor, and then U to select "Update the workfile and leave" as your exit option.
8. Now press F to re-enter the Filer, and list the system volume again as you did in step 5. The directory now contains the updated workfile, WORK.TEXT:

```
RAM:               Directory type= LIF level 1
created  9-Apr-84 16.59.10 block size=256
Storage order
...file name....    # blks    # bytes  last chng

WORK.TEXT                8      2048  9-Apr-84
FILES shown=1 allocated=1 unallocated=7
BLOCKS (256 bytes) used=8 unused=89 largest space=89
```

Save

The **Save** command is invoked by pressing S. It is used to save the workfile WORK.TEXT into another, and usually more permanent, file.

Save is the opposite of **Get**. If you use **Get** to copy a file into WORK.TEXT, you can use **Save** to copy WORK.TEXT back into its original file. Try it with your current workfile:

Press S to invoke the **Save** command. The computer responds with:

```
Save as #3:LETTER.TEXT ? (Y/N)
```

The computer remembers that your current workfile was retrieved from the file LETTER.TEXT in unit #3, so it's asking if you want to save it back in the same file. Respond by typing Y.

The computer then responds with:

```
#3:LETTER.TEXT
exists ... Remove/Overwrite/Neither ? (R/O/N)
```

Since the file LETTER.TEXT already exists in the volume in unit #3, the computer wants to know what you want to do with the old file. You obviously don't want two files with the same name on the same volume, so your options are:

- Press R to first remove the old file, then write the new file.
- Press O to write the new file directly over the old one. Use this option only on SRM systems, or if the new version of the file is not larger than the old version.
- Press N to abandon the **Save** operation altogether.

Press R to remove the old file and write the new one.

Ldir

The **Ldir** command is invoked by pressing L. It is used to obtain a list of all files in a specified directory, including important information about each file.

Insert the ACCESS: volume into unit #3 and press L to get the following prompt:

```
List what directory?
```

Type:

```
#3:  Return
```

The directory of the ACCESS: volume is then displayed, and should resemble this:

```
ACCESS:               Directory type= LIF level 1
created  3-Apr-84 15. 7.33 block size=256
 Storage order
...file name....     # blks     # bytes  last chng

FILER                   226       57856  4-Feb-84
EDITOR                  228       58368  4-Feb-84
LIBRARIAN               218       55808  4-Feb-84
MEDIAINIT.CODE          136       34816  4-Feb-84
TAPEBKUP.CODE            70       17920  4-Feb-84
ETU.CODE                 86       22016  4-Feb-84
FILES shown=6 allocated=6 unallocated=2
BLOCKS (256 bytes) used=964 unused=89 largest space=89
```

There is a lot of information in the directory, so let's pick it apart, line by line:

First Line:

```
    ACCESS:                Directory type= LIF level 1
```

This tells you the name of the volume whose directory this is, namely ACCESS:. It also tells you the directory type, which may or may not interest you. If it does, refer to the *Pascal 3.0 Workstation System Manual.*

Second Line:

```
    created 3-Apr-84 15.  7.33 block size=256
```

This line tells you the date and time when the volume was created, namely April 4, 1984 at 33 seconds past 3:07 in the afternoon (your ACCESS: volume may have a different inception date). It also tells you that a **block** of disc storage is equal to 256 bytes. A block is merely a unit of disc storage space; file sizes are expressed in the number of blocks they occupy on the disc.

Third Line:

```
    Storage order
```

This line tells you that the files are listed in the order in which they are stored on the disc. The alternative is alphabetic order, discussed in a moment.

Fourth Line:

```
    ...file name....     # blks     # bytes    last chng
```

This is the heading for the list of files that follows. The `file name` is, of course, the name of the file. The `# blks` is the number of blocks of disc storage occupied by the file, a measure of its size. The `# bytes` is the number of bytes of disc storage occupied by the file. Since a block is 256 bytes, this number is just the previous column multiplied by 256. The `last chng` column tells when the file was last changed; i.e., read from, and written back to the disc.

Note

The dates displayed in the directory are read from the system time and system date that you set after booting the Pascal system. This is one good reason to keep the time and date current.

Lines 5 through 10

```
   FILER                  226       57856  3-Apr-84
   EDITOR                 228       58368  3-Apr-84
   LIBRARIAN              218       55808  3-Apr-84
   MEDIAINIT.CODE         136       34816  3-Apr-84
   TAPEBKUP.CODE           70       17920  3-Apr-84
   ETU.CODE                86       22016  3-Apr-84
```

These are the files on the ACCESS: volume listed in the order in which they are stored.

Line 11

```
   FILES shown=6 allocated=6 unallocated=2
```

This line tells you that six files are `shown` in this listing; that there are six entries `allocated` in the directory, and that two entries remain `unallocated`.

Recall when you initialized your discs, one of the prompts was for the number of directory entries. The number you entered was the maximum number of files that could be stored on that volume. Here, the listing is showing you how many of those directory entries have been filled by files, and how many are left before the directory (and hence the volume) is full. Understand that you can run out of directory entries but still have room left on your disc. Volume storage management will be discussed more in the **Krunch** command section of this chapter.

Line 12

```
   BLOCKS (256 bytes) used=964 unused=89 largest space=89
```

The preceding line told you how much *directory* space was allocated on the volume: this line describes how much *file storage* space remains.

The `used` field tells you how many 256-byte blocks of disc storage have been used by the files listed. `unused` tells you how many blocks remain before the disc runs out of file storage space. The `largest space` gives the largest contiguous "hole" in the unused storage space. If you try to write a file to the disc that is larger than the largest space, the file cannot fit in this hole and thus cannot be written. The **Krunch** command can be used to widen this hole, however, as described later.

One final note before we move on: you can list the files in alphabetic order by typing `[*]` after the unit number or volume ID. To list the ACCESS: disc in alphabetic order, press L and then type:

```
#3:[*]   Return
```

The alphabetical listing produced should resemble this:

```
ACCESS:            Directory type= LIF level 1
created  3-Apr-84 15. 7.33 block size=256
 Alphabetic order
...file name....    # blks    # bytes  last chng

EDITOR                  228      58368  4-Feb-84
ETU.CODE                 86      22016  4-Feb-84
FILER                   226      57856  4-Feb-84
LIBRARIAN               218      55808  4-Feb-84
MEDIAINIT.CODE          136      34816  4-Feb-84
TAPEBKUP.CODE            70      17920  4-Feb-84
FILES shown=6 allocated=6 unallocated=2
BLOCKS (256 bytes) used=964
```

Note

If a listing is too long to fit on the screen, the listing will pause after displaying the first few files. Press the space bar to see the remaining files.

Filecopy

The **Filecopy** command is invoked by pressing F. It is used to make copies of files (or entire volumes).

You used **Filecopy** to back up your Pascal system in Chapter 3. Refer there for procedures for copying entire volumes. In Part III of this manual, we will demonstrate how to use **Filecopy** to copy multiple individual files to a Winchester disc. Here we will demonstrate how to copy a single file.

In this example, we will copy the file LETTER.TEXT in unit #3 to the RAM: volume (unit #50).

Press **F** to invoke the **Filecopy** command. The computer displays the following prompt:

```
Filecopy what file ?
```

Type:

`#3:LETTER.TEXT` **Return**

The computer then asks:

```
Filecopy to what ?
```

Type:

`#50:$` **Return**

The `$` is a *wildcard*. It tells the computer to use the same file name for the new copy of the file. Thus, it is equivalent to typing `#50:LETTER.TEXT`, but is much more convenient.

The computer copies the file from unit #3 to unit #50, and gives the following message when completed:

```
V3:LETTER.TEXT                          ==> RAM:LETTER.TEXT
```

Change

The **Change** command is invoked by pressing **C**. It is used to change the name of a file or volume.

To see how it works, change the name of LETTER.TEXT in unit #50 to JUNK.ASC:

Press **C** to get the following prompt:

```
Change what file?
```

Type in the location and name of the file you want to change:

`#50:LETTER.TEXT` **Return**

The computer then asks:

```
Change to what?
```

Type:

```
JUNK.ASC Return
```

Note

Type in only the new file name; *do not* type in the unit number again. You are only changing the name of an existing file, not moving it to another volume. Thus, the location of renamed file is the same as the location of the original file.

The computer confirms the change with:

```
RAM:LETTER.TEXT                ==> RAM:JUNK.ASC
```

You may further confirm the change by listing the directory of the RAM: volume, if you wish. Just press L, then type:

```
#50: Return
```

Remove

The **Remove** command is invoked by pressing R. It is used to remove a file from a volume.

Use **Remove** to delete the file JUNK.ASC from the RAM: volume (unit #50). Press R to get the following prompt:

```
Remove what file?
```

Type the location and name of the file to be removed:

```
RAM:JUNK.ASC Return
```

The computer responds with:

```
RAM:JUNK.ASC removed
```

Confirm that JUNK.ASC is no longer on the RAM: volume by listing it as you did in the last demonstration.

Krunch

The **Krunch** command is invoked by pressing K. It is used to compact all files in a volume into one contiguous block, putting all unused storage space in one contiguous "hole" at the end.

After storing, deleting and updating files on a volume several times, the storage space becomes "fragmented": chopped into small, discontinuous segments. Eventually, you cannot write another file to the volume because there is not a single hole available that is large enough to contain it. The computer will display the message:

```
    No room on volume
```

The solution is to **Krunch** all of the files to the front of the volume, joining all of the free space into one large hole at the back.

To demonstrate the **Krunch** command, insert the ACCESS: volume into unit #3 and press K. The following prompt will appear:

```
    Crunch what directory ?
```

Type in the name of the volume to be compacted: in this case:

```
    ACCESS:  Return
```

The computer asks again:

```
    Crunch directory ACCESS ? (Y/N)
```

Yes, you're sure, so press Y. The operation begins, and the computer displays:

```
    Crunch of directory ACCESS in progress
    DO NOT DISTURB!!
```

There is a reason why the computer is so emphatic about this. If you were to open the disc drive door, remove the disc, or lose power during this operation, some, if not all, of your files could be lost.

When the crunch is completed, the computer reports:

```
    Crunch completed.
```

If you are ever refused when trying to write a file to a volume, write the file temporarily to a different volume, crunch the volume that refused you, then **Filecopy** the file from the other volume.

Note

Memory volumes, like most others, need crunching too.

Prefix-vol

The **Prefix-vol** command is invoked by pressing (P). It is used to change the prefix volume (default volume).

The prefix volume is another name for the default volume. The Filer calls it the prefix volume; the **What** and **Version** commands in the Main Command Level call it the default volume.

To "prefix" to a different volume (i.e., reset the default volume), use the **Prefix-vol** command while inside the Filer, or use the **What** command at the Main Command Level.

To use **Prefix-vol**, press (P) to get the following prompt:

```
Prefix to what directory ?
```

Insert the ACCESS: disc in unit #3: and type:

```
#3:  (Return)
```

The computer responds with:

```
Prefix is ACCESS:
```

To prefix to a *unit number* rather than to the volume residing in the unit, follow this same procedure, but *do not insert a disc into unit #3.* The prefix volume is then set to unit #3, regardless of what volume is present. The advantage of this is that you can swap discs in and out of unit #3 and never type the volume ID to access a file; whatever disc resides in unit #3 is effectively the default volume. If you are prefixed to a particular volume ID, however, you must change the prefix volume every time you swap discs (because you are prefixed to a single volume).

Vols

The **Volumes** command is invoked by pressing V. It is used to list all volumes that are on-line.

You have already used the **Volumes** command several times, but let's examine it more carefully now. Put discs in all of your disc drives and press V. The display will look something like this one, depending on your particular system configuration:

```
Volumes on-line
  1   CONSOLE:
  2   SYSTERM:
  3 * ACCESS:
  4 # V3:
  6   PRINTER:
Prefix is - ACCESS:
```

The left-hand column lists all unit numbers; the right-hand column lists each unit number's associated volume ID. The # between the columns indicates a *blocked* device; i.e., a device capable of storing files, such as a disc drive or a bubble memory card. The volume marked with an asterisk (*) is the system volume; the prefix (default) volume is given at the bottom.

Certain unit numbers are permanently assigned. These include:

- Unit #1, volume ID CONSOLE:. This is your computer's screen.
- Unit #2, volume ID SYSTERM:. This is your computer's keyboard.
- Unit #6, volume ID PRINTER:. This is your printer.

Note that all of these are unblocked devices; they cannot store files. Saying that they have a volume ID is rather strange, therefore, since we described volumes earlier as a collection of files. The Pascal Workstation uses this convention for the sake of consistency, so that all devices may be referenced similarly (by unit number or volume ID). Just think of unblocked volume IDs as simply identifiers that allow you to access the devices.

New

The **New** command is invoked by pressing N. It is used to clear the workfiles, WORK.TEXT and WORK.CODE.

If there wasn't some way of clearing the workfiles, you would have to access the same file over and over again. The Editor would always assume you wanted to edit WORK.TEXT, and would read it in automatically. The only way around this is to clear the workfile, and force the Editor to ask you for the name of the file you wish to edit.

To clear the workfiles, just press (N). If you haven't used **Save** to permanently store the workfile, you may get the following message:

```
Throw away current workfile ? (Y/N)
```

Answer with (Y), and the workfile is cleared.

To confirm that the workfile is gone, list the directory of the RAM: volume. Notice that WORK.TEXT has been removed.

Translate

The **Translate** command is invoked by pressing (T). It is used to translate one file type into another, and to print files on the printer.

To see how **Translate** works, we'll send LETTER.TEXT to the printer. Make sure the disc containing the file LETTER.TEXT is inserted into unit #3 and press (T) to get the following prompt:

```
Translate what file ?
```

Type:

```
#3:LETTER.TEXT (Return)
```

The computer then asks:

```
Translate to what ?
```

Recall from the **Volumes** command that the printer's unit number is #6:. Type:

```
#6: (Return)
```

The computer translates LETTER.TEXT into a format suitable for the printer.

Note

If your printer failed to print LETTER.TEXT, make sure it is turned on and properly connected to the computer. If it has an "on-line" light, make sure it is on. If the printer still doesn't work, refer to the "Special Configurations" chapter of the *Pascal 3.0 Workstation System Manual.*

This concludes our tour of the Filer.

Exiting the Filer

Use the following procedure to exit the Filer:

1. Make sure the Filer's command line appears on the screen:

   ```
   Filer: Change Get Ldir New Quit Remove Save Translate Vols What Access Udir ?
   ```

   If it doesn't, press Return or N.

2. Press Q to quit the Filer.

You are now back at the Main Command Level.

For More Information...

For details on these and other Filer commands, refer to the Filer chapter of the *Pascal 3.0 Workstation System Manual.*

The Compiler

Chapter 8

Computers are really very simple creatures. They have an extremely limited vocabulary and get very indignant when you talk to them in a language they cannot understand.

Pascal is a language that computers cannot understand. Your computer cannot directly execute Pascal programs created in the Editor. Programs must first be compiled (translated) into a sequence of machine language instructions. The machine language instructions are put in a separate file (a *code* file). The computer then executes the code file.

This translation process is performed by the Compiler.

When to Use the Compiler

After creating a Pascal program in the Editor, use the Compiler to compile the program before you run it. If you make changes to the program, be sure to recompile it, for the changes must be translated to the code file before they have an effect.

Getting Ready for Chapter 8

Before you can see how the Compiler works, you need a program to compile. Use the following procedure to create a simple Pascal program:

1. Press E to enter the Editor, and press Return to create a new file. If the Editor automatically reads in a workfile, exit the Editor, enter the Filer, and use the **New** command to clear the workfile. Then return to the Editor.
2. Press I to enter insert mode and type the following program that prints "HELLO" on the screen:

   ```
   PROGRAM TEST (INPUT,OUTPUT);
   BEGIN
     WRITELN ('HELLO')
   END.
   ```
3. Press Select to exit insert mode. Press Q to quit the Editor, and then press W to get the following prompt:

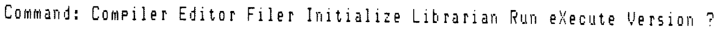
   ```
   Name of output file (<ret> to return) -->
   ```
4. Insert an initialized disc into unit #3. Type the following response to write the program into a file named TEST.TEXT in the volume in unit #3:

   `#3:TEST` Return
5. Press E to exit to the Main Command Level

Entering the Compiler

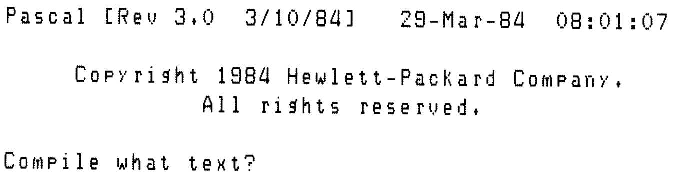
Follow this procedure to enter the Compiler:

1. Make sure the command line for the Main Command Level appears on the screen:



```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

2. Insert your working copy of the CMP: volume into one of your flexible disc drives.
3. Now press (C) to load and run the Compiler subsystem.
4. The following display should now appear on the screen:



```
Pascal [Rev 3.0  3/10/84]   29-Mar-84  08:01:07

          Copyright 1984 Hewlett-Packard Company.
                    All rights reserved.

Compile what text?
```

You are inside the Compiler. If you have only one flexible disc drive, remove the CMP: volume now and insert the disc containing the file TEST.TEXT.

Using the Compiler

Notice that the bottom line of the display is a prompt:

```
Compile what text?
```

The Compiler needs to know the name and location of the file containing the program you want to compile. To compile the TEST program that you just created, type:

```
#3:TEST Return
```

If Something Goes Wrong...

The Compiler may not find your file and will report:

```
not found, file?
```

Retype the file specification, making sure that you include the correct volume ID or unit number, and the exact file name, including the suffix if other than .TEXT. If you still have problems, press Return to exit the Compiler, and use the Filer's **Ldir** command to make sure the file is in the volume. Also check the file name.

The computer assumes that TEST is a text file, and looks for a file named TEST.TEXT in unit #3. It finds it, and asks the next question:

```
Printer listing (l/y/n/e) ?
```

A printer (program) listing shows the complete text of the program, with all lines numbered and all compiler errors marked. You may respond to this prompt in any one of the following ways:

- l - allows you to send the program listing to a file that you specify.
- y - sends the program listing to your printer.
- n - does not produce a program listing.
- e - sends a program listing to the printer *only* if compiler errors occur.

In this demonstration, we will send the listing to a file. Press L to get the following prompt:

```
What listing file?
```

Type the following response to send the listing to a file named TESTLIST.TEXT in unit #3:

```
#3:TESTLIST[25] Return
```

The [25] specifies the size of the listing file (in blocks). A full listing page requires approximately 25 blocks. The listing for this program will be less than one page, so 25 blocks is plenty of room.

There is one last step before the program is compiled. The *output* (final product) of the Compiler is a code file containing the machine language version of the program text. The Compiler must know the name of the *output file* where you would like the code put. It asks:

```
Output file (default is "#3:TEST.CODE") ?
```

The Compiler will, by default, put the code in a file named TEST.CODE in the volume in unit #3. This is a good choice, because it makes sense to have the code for TEST.TEXT in a file named TEST.CODE. Press Return to accept the default file name.

The Compiler now reads in TEST.TEXT and begins compiling it. Progress is reported at the bottom of the screen:

```
<    0>
TEST                [521258]
<    2>

4 lines, No errors.  No warnings.
```

The last line indicates no compiler errors were found. Had there been errors, the line number where the error occurred and the error type would have been reported. No code file would have been generated. Part III will demonstrate how the Compiler reacts to errors.

When compilation finishes without errors, the system immediately exits the Compiler and returns to the Main Command Level.

Press F to enter the Filer, and press L to invoke the **Ldir** command. The following prompt will appear:

```
List what directory?
```

Type the following response to list the directory of the volume in unit #3:

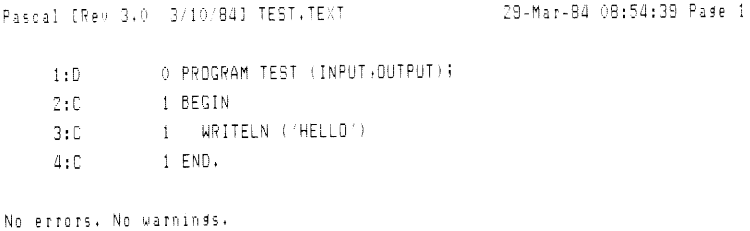
```
#3: Return
```

Notice the two new entries for TEST.CODE and TESTLIST.TEXT.

Quit the Filer and enter the Editor. When prompted for the file you wish to edit, type the following response to view the listing file for program TEST:

```
#3:TESTLIST Return
```

The listing looks like this:



```
Pascal [Rev 3.0  3/10/84] TEST.TEXT                29-Mar-84 08:54:39 Page 1

     1:D         0 PROGRAM TEST (INPUT,OUTPUT);
     2:C         1 BEGIN
     3:C         1   WRITELN ('HELLO')
     4:C         1 END.

No errors. No warnings.
```

For instructions on reading the listing, refer to "Interpreting the Compilation Listing" in the Compiler chapter of the *Pascal 3.0 Workstation System Manual.*

Press Q to quit the Editor, then E to exit without updating.

Running a Compiled Program

To run a program after compiling it, return to the Main Command Level and press R to invoke the **Run** command. Do this now, and notice that HELLO is printed on the screen. This is the output of program TEST. To run the program again, you can either press R to invoke **Run**, or press U to invoke the **User** restart command.

To run a program that is *not* the last one compiled, use **eXecute** to load and run the code file, as you did when initializing discs.

Compiling a Workfile

Compiling a workfile is a little different than compiling a conventional file. To see this, enter the Filer and press G to invoke the **Get** command. The following prompt will appear:

```
Get what file?
```

Type the following line to assign the code and text files for program TEST as your workfiles:

```
#3:TEST Return
```

The computer responds with:

```
Source and Code file loaded
```

Notice that both source (TEST.TEXT) and code (TEST.CODE) files were loaded with this single command. This is another advantage of giving both your text and code files the same file name, using the suffix (.TEXT or .CODE) to distinguish them.

Exit the Filer and enter the Compiler. Since you now have a workfile, the Compiler assumes it is the file you want to compile. Therefore, the Compiler skips directly to the "printer listing" prompt, and does not ask what text you want to compile.

Note

If a workfile exists, it is impossible to compile any other file. You must clear the workfile with the Filer's **New** command before you can again choose which file you want to compile.

Press (N) to generate no printer listing. Compilation then begins immediately. Notice that the "output file" prompt was also skipped. Because you are using workfiles, not only is the Compiler's *input* file assumed, but the *output* file as well.

So compiling workfiles saves you from responding to two Compiler prompts, which can be very helpful during long program development sessions. On the other hand, if you want to make your own choices about which file to compile and where to direct the output, workfiles should not be used.

Press any key to clear the screen.

Other Subsystems

Chapter 9

The Pascal system includes three other subsystems that will not be demonstrated in this manual. You may have noticed them in the Main Command Level's **What** command display. These subsystems–the Assembler, Librarian and Debugger–require a more advanced knowledge of programming, and thus exceed the scope of this book. We mention them briefly here, to provide a general idea of their functions, and refer you to the *Pascal 3.0 Workstation System Manual* for details.

The Assembler

In certain applications, the execution time of a program segment is critical. While the Pascal Compiler is quite proficient at compiling a source program into very efficient machine code, time-critical applications may require the superior skills of a human being.

The Assembler is included in the Pascal Workstation for this purpose. It allows you to write MC68000 Processor Assembly language programs to optimize critical sections of a program.

If your applications require assembly language optimization, refer to the Assembler chapter of the *Pascal 3.0 Workstation System Manual*, and to the *MC68000 User's Manual.*

The Librarian

The Pascal Language System allows you to create "libraries" of compiled programs. New programs that you write can "borrow" programs from these libraries. Wise use of libraries can save you the time and trouble of duplicating a subprogram in several different programs that require it.

The Librarian subsystem helps you create and manage program libraries. For details on the Librarian, refer to the Librarian chapter of the *Pascal 3.0 Workstation System Manual.*

The Debugger

The Debugger subsystem has a number of features that help you find errors in your programs. It allows you to "step" through program execution one statement at a time, trace program flow, check the values of program variables, etc.

The Debugger is also a good protection against inadvertently restarting the booting process by accidentally pressing (Reset). It serves as a simple integer calculator, as well.

For more information on the Debugger, refer to the Debugger chapter in the *Pascal 3.0 Workstation System Manual.*

Setting Up Your Environment

Chapter 10

When you get ready for a long drive in the car, you adjust the seat, align the mirrors, check the oil and tires, and generally prepare your travelling environment to be as safe and comfortable as possible. As you get ready for long programming sessions with the Pascal Workstation, it also makes sense to set up a *programming environment* that is safe and comfortable.

This chapter shows you how to:

- Copy part of the Pascal system to a Winchester disc (if you have one)
- Boot the Pascal system from a Winchester disc (if you have one)
- Permanently load the Editor and Filer
- Make a memory volume
- Create an ''Autostart'' file that automatically sets up many aspects of your programming environment every time you boot the system
- Set the system and default volumes

Setting Up Your Winchester (Hard) Disc

This section tells you how to copy part of the Pascal system to a Winchester (or other hard) disc. If you do not have a Winchester disc, skip this section.

Winchester Disc Considerations

Before you begin storing files on your Winchester disc, you should read the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual*. There you will learn how to connect multiple Winchester discs to your system, and how to change the way the Pascal system ``partitions`` your disc into volumes.

For the moment, however, finish reading this manual to gain a deeper understanding of how the Pascal subsystems work together. Although this section will show you how to copy a part of the Pascal system to a Winchester disc, understand that these instructions are for demonstration purposes only. You should not consider your disc fully operational until you have at least looked over the Special Configurations chapter.

Copying the Boot Files

You probably bought a Winchester disc to gain some independence from the constant disc swapping that occurs when using flexible discs. Copying the contents of the BOOT: volume to the first volume of your Winchester disc will allow you to boot the Pascal system directly from the Winchester disc.

Note

The 3.0L, 2.0 and 1.0 versions of the Boot ROM cannot boot from a Winchester disc. If your computer has one of these Boot ROMs, do not copy the BOOT: volume to the Winchester disc. You can, however, copy the Pascal subsystems to your Winchester, as described in the next section.

This procedure, like the rest of the book, assumes you have only one Winchester disc on-line.

1. The following line should appear at the top of the screen:

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

2. Insert the disc labeled ACCESS: into a flexible disc drive. Press the F key to load the Filer. Wait for the Filer's command line to appear at the top of the screen:

```
Filer: Change Get Ldir New Quit Remove Save Translate Vols What Access Udir ?
```

3. Remove the ACCESS: volume and insert the BOOT: volume.
4. Press (F) to invoke the **Filecopy** command. We will use the **Filecopy** command to copy all of the files from the BOOT: volume to the Winchester disc volume assigned to unit #11.
5. The following prompt now appears on the screen:

   ```
   Filecopy what file ?
   ```

   The computer is asking for the file specification of the *source* file (i.e., the file you want to copy). You could copy each file in the BOOT: volume separately, using several invocations of the **Filecopy** command, but it would be much more convenient to copy them all at once. Do this by using the = wildcard. Type:

   ```
   BOOT:= (Return)
   ```

   The = wildcard says to copy all of the files on the BOOT: volume, but do so one at a time. It's important to understand the distinction between this operation and copying an entire *volume* of files, as you did when making back-up copies on flexible discs. If you left off the wildcard and typed `BOOT:` as your response, the volume on unit #11 would be replaced by a copy of the BOOT: volume. What's wrong with that? Nothing, except that unit #11, which contains one megabyte or more of mass storage, would suddenly become the size of the BOOT: volume on the flexible disc, which contains slightly over 256K bytes of mass storage. Thus, a volume copy would render most of the storage capacity on volume #11 inaccessible!

   Remember this: **Never copy an entire volume from a small volume to a large volume. Instead, copy each file, one by one, using a wildcard.**
6. The computer now responds with the prompt:

   ```
   Filecopy to what ?
   ```

   This prompt is asking you to specify the *destination* file: the file where you want the copies put. You want to copy each file from the BOOT: volume to unit #11, and you want all of the new copies to have the same names as the originals. Type:

   ```
   #11:$ (Return)
   ```

   Here, the `$` wildcard is used to give all files copied to the destination volume the same names as the files on the source volume.

7. The copying process now commences, as each file in the BOOT: volume is read into your computer's memory, then copied to the volume assigned to unit #11 on the Winchester disc. The computer displays each file as it is copied. The screen should look something like this:

   ```
   BOOT:SYSTEM_P              ==> V11:SYSTEM_P
   BOOT:INITLIB               ==> V11:INITLIB
   BOOT:TABLE                 ==> V11:TABLE
   BOOT:STARTUP               ==> V11:STARTUP
   BOOT:SWVOL.CODE            ==> V11:SWVOL.CODE
   BOOT:AUTOSTART             ==> V11:AUTOSTART
   ```

   The left side of the display shows the volume ID and the file name of each file copied *from* the source volume BOOT:. The right side of the display shows the volume ID and the file name of each file copied *to* the destination volume on the Winchester disc.

8. When the Filer's command line reappears at the top of the screen, all files have been copied. Remove the BOOT: volume from the flexible disc drive and put it back in its disc box.

Copying the Pascal Subsystems

Now that you have copied the boot files to your Winchester disc, the next step is to copy some of the Pascal subsystems. In this section, you will copy the Editor, Filer and Compiler subsystems to unit #12 of the Winchester disc.

Note

If your Winchester disc has only one volume, copy the subsystems to unit #11.

This procedure assumes you still have the Filer loaded from the last procedure. If you do not, follow the first two steps of "Copying the Boot Files" and come right back.

1. Insert the ACCESS: volume into one of your flexible disc drives. You will copy the Editor and Filer from this volume.
2. Press `F` to invoke the Filer's **Filecopy** command. The computer responds with:

   ```
   Filecopy what file ?
   ```

In this situation, we want to copy some, but not all, of the files in the ACCESS: volume. The easiest way to do this is to use the ? wildcard, so type:

```
ACCESS:? Return
```

The ? wildcard works like the = wildcard, for it allows you to copy several files from the source volume, one at a time. The difference is that ? will prompt you before it copies a file, allowing you to select only those that you want. The = wildcard, if you recall, automatically copies *all* files in the volume, and does not allow you to choose.

3. The computer now asks:

   ```
   Filecopy to what ?
   ```

   Type the destination volume where you want the copies put, and use the $ wildcard to name the new files the same as the originals:

   ```
   #12:$ Return
   ```

4. The copying now commences, and the computer asks if you want to copy the first file in the ACCESS: volume:

   ```
   Filecopy ACCESS:FILER ? (Y/N)
   ```

   You will need the Filer for the demonstrations in this part of the manual, so press Y to copy it. The file is read from the ACCESS: volume and copied to the volume associated with unit #12. The computer tells you the copy operation is complete with:

   ```
   ACCESS:FILER                    ==> V12:FILER
   ```

5. The computer now asks if you want to copy the next file in the ACCESS: volume, namely the Editor:

   ```
   Filecopy ACCESS:EDITOR ? (Y/N)
   ```

   Again, press Y to copy the Editor. The computer copies it and then reports:

   ```
   ACCESS:EDITOR                   ==> V12:EDITOR
   ```

6. The remaining files in the ACCESS: volume are of no use right now, so press N each time the computer asks if you want to Filecopy them. When the Filer's command line returns to the top of the screen, all files in the ACCESS: volume have been copied or rejected.

7. Next, remove the ACCESS: volume and insert the CMP: volume. Since you will copy only one file from this volume (the Compiler), it is easiest to use the copy procedure described in Chapter 7. Press F to invoke **Filecopy** again. When the computer asks:

   ```
   Filecopy what file ?
   ```

   respond with:

   ```
   CMP:COMPILER Return
   ```

   When the computer prompts for the destination:

   ```
   Filecopy to what ?
   ```

   respond with:

   ```
   #12:$ Return
   ```

8. The computer reports the completion of the copy operation with:

   ```
   CMP:COMPILER                                  ==> V12:COMPILER
   ```

   Remove the CMP: volume and store it properly.

You have now copied all of the subsystems needed for the demonstrations in the remainder of this book.

Booting From Your Winchester Disc

If your computer has Boot ROM 4.0 or 3.0, your booting procedure is unchanged from the one used in Chapter 2. Reboot your system now. Simply turn your computer on (or press Reset if it is already on), and the Boot ROM will find the Pascal system's boot files on your Winchester disc and load them.

After a minute the computer may prompt you to:

```
Please put SYSVOL: in unit #3
  and press the X key...
```

You will remove this prompt later in this chapter when you create a new Autostart file. For now, just press X to continue booting. Answer the time and date prompts when they appear.

The Pascal system will also find the Editor, Filer and Compiler on unit #12 and update the **What** command's table accordingly. You will no longer need the flexible discs to boot, or to invoke the Editor, Filer and Compiler.

If your computer has Boot ROM 3.0L, 2.0 or 1.0, you will still need a flexible disc copy of your BOOT: volume. Simply insert the BOOT: volume into your flexible disc drive and turn your computer on (or press (Reset)). The computer must boot the Pascal system from the flexible disc. However, it can still use the Editor, Filer and Compiler stored on unit #12, so you will no longer need the ACCESS: or CMP: volumes.

Note

Flexible disc unit number assignments may change after you begin booting from a Winchester disc. Use the procedure for identifying your flexible discs provided in the "Know Thy System" section of Chapter 3 to update your System Configuration Table. We recommend you do this now.

Permanently Loading Subsystems

The next step to setting up your environment is to use the **Permanent** command to permanently load frequently-used subsystems into your computer. As demonstrated in Chapter 5, permanent-loading dramatically reduces subsystem access times, thus making program development that much easier.

The number of subsystems you should permanently load depends on how much memory your computer has. Permanent-loading displaces memory that is otherwise available for programs. If memory is scarce and you will be developing large programs, you may want to load only one or two subsystems, or perhaps none at all. Appendix C contains a listing of all Pascal system programs and how much memory each requires. You may want to use this to determine how many subsystems to permanently load.

Which subsystems you should load depends upon how you use the Pascal Workstation. After you use the system for a while, you'll know which programs you use most often and would make good candidates for permanent-loading.

In this example, we will permanently load the Editor and Filer. The Compiler, while used frequently in the demonstrations, requires a great deal of memory. It will just have to be placed on-line whenever it is needed.

To permanently load the Editor and Filer, use this procedure:

1. Return to the Main Command Level. Invoke the **Version** command by pressing (V). Make a note of the number of bytes of `Total Available Memory` displayed on the screen. This number will decrease as you permanently load programs.
2. Press (Return) twice to return the the Main Command Level. Press (P) to invoke the **Permanent** command.
3. The computer now asks:

   ```
   Load what code file?
   ```

   Make sure the Filer is on-line (either in the ACCESS: volume or in a Winchester disc volume). Type the complete file specification for the Filer, including its volume ID and file name. Don't forget to follow the file name with a period to suppress the automatic appending of the suffix. For example, if the Filer is still on the ACCESS: volume, you would type:

   `ACCESS:FILER.` (Return)
4. Press (V) to invoke the **Version** command again, and notice how the number of bytes of total available memory has decreased. The difference has been consumed by the Filer. Press (Return) twice.
5. Press (P) again and permanently load the Editor as you did the Filer in step 3. The file name for the Editor is EDITOR.
6. Finally, invoke the **Version** command again and note the amount of memory now available for programming. Press (Return) twice.

The Editor and Filer are now permanently loaded.

Making a RAM: Volume

The demonstrations to follow will use a RAM: (memory) volume for the system volume. RAM: volumes are very convenient for many applications, but like permanently loaded programs, they do consume memory. Thus, decisions about whether to use a RAM: volume and, if so, how big to make it are governed by the amount of memory in your computer and the size of the programs you'll be developing.

In this example, we use a RAM: system volume because it allows very rapid reading and updating of the workfiles. Since workfiles are used only temporarily, the risks involved with RAM: volumes (e.g., file loss due to power outage, etc.) are minimized.

To create a RAM: volume at unit #50, follow this procedure:

1. At the Main Command Level, press M to get the following prompt:

   ```
   *** CREATING A MEMORY VOLUME ***


   What unit number?
   ```

   Type the following line to associate the RAM: volume with unit #50:

   ```
   #50: Return
   ```

2. Next, the computer asks how much memory (in increments of 512-byte blocks) you want to allocate to the RAM: volume:

   ```
   How many 512 byte BLOCKS?
   ```

   We will create a very small RAM: volume of only 20 blocks. Type:

   ```
   20 Return
   ```

3. The computer now asks:

   ```
   How many entries in directory?
   ```

   Since the RAM: volume will only be used to store the workfiles, two directory entries is adequate. However, eight entries is the minimum number you can have, so type:

   ```
   8 Return
   ```

4. The computer now creates the RAM: volume, and reports:

   ```
   #50: (RAM:) zeroed
   ```

The memory volume has been assigned to unit #50 and has RAM: as its volume ID. To confirm that the memory volume exists, press F to enter the Filer, and press V to invoke the **Volumes** command. There is now an entry for unit number 50 that looks like:

```
50 # RAM:
```

Press Q to return to the Main Command Level.

Setting the System Volume

The next step in setting up your environment is to set the system volume.

One of the main functions of the system volume is to provide the Pascal system with a place to create the temporary files that it needs during compilation and other operations. It is also used to store the temporary workfiles that may be used to speed program development. Thus the system volume must be on-line most all the time, and must have quite a bit of free space where temporary files may be stored.

The system volume is automatically set when you boot the Pascal system. If you have no Winchester disc, the system volume will normally be set to the SYSVOL: volume that you inserted during the booting process. If you do have a Winchester disc, the system volume will usually be assigned to the first volume of the Winchester disc (unit #11). In general, the system volume is assigned to the mass storage device with the fastest access time, to allow temporary files to be written and removed quickly.

In this example, we want the RAM: volume to be the system volume, again because of its extremely fast access time. To change the system volume to RAM:, follow this procedure:

1. At the Main Command Level, press W to invoke the **What** command.
2. When the **What** command's table appears on the screen, press S to signal that you want to enter a new system volume. The cursor then jumps to the system volume entry, waiting for you to specify the new system volume.

3. Type:

   ```
   RAM: (Return)
   ```

4. Press (Q) to exit the **What** command.

The RAM: volume is now designated the system volume. Press the space bar (or any other key) to clear the screen.

Some System Volume Considerations

When choosing your system volume, it makes sense to select a volume that can be accessed quickly. Both compilation and movement of workfiles between subsystems will be faster if the system volume is fast.

If performance was the only consideration, the RAM: volume would certainly be the best candidate for the system volume. But reliability is important, and RAM: volumes are vulnerable to power loss. If you use a RAM: system volume for program development and do not occasionally copy the workfile to a disc volume, a power failure would erase all of your efforts.

Thus you have three choices:

1. Use RAM: as the system volume during program development and hope the power doesn't fail.
2. Use RAM: as the system volume and periodically save the workfile on a disc volume. If the power fails, you have only lost changes to the file that were made since you last saved the workfile.
3. Use a disc volume as the system volume. Access time will be slower, but all updates to the workfile are recorded on a disc.

You must decide which option makes the most sense for you. The second option is often a nice compromise between performance and security, but if you have a very fast disc, the last option may be your best bet. If you are developing a short program, or if your computer has powerfail protection, you may choose the first option.

Setting the Default Volume

Setting the default volume saves you from typing the volume ID (or unit number) every time you want to retrieve or store a file. Usually, most file activity involves one volume more than the others; it is this most frequently-accessed volume that should be designated the default volume.

If you will accessing one particular disc drive repeatedly, but will be swapping discs in and out of it a lot, it is probably a good idea to set this frequently-used disc drive (unit) as the default "volume." If you do this, any disc that resides in the disc drive automatically becomes the default volume. In this example, we will set flexible disc drive unit #3 as the default volume. Follow this procedure:

1. Press F to enter the Filer. Press P to invoke the **Prefix-vol** command.
2. The computer responds with:

   ```
   Prefix to what directory ?
   ```

   Make sure unit #3 is empty and type:

   ```
   #3: Return
   ```

   The computer responds with:

   ```
   Prefix is #3:
   ```

From now on, *any* flexible disc in unit #3 will be the default volume.

Creating A New Autostart File

At this point, you have set up the programming environment that will be used in the demonstrations to follow. As you become more familiar with the Pascal Workstation, you will find ways to customize this process to suit your particular needs. But whatever you do, you'll probably agree that you would rather not repeat this routine every time you turn your computer on and reboot the Pascal system.

You don't have to. Instead, you can create an **Autostart** file that will do everything for you. It works like this:

After the Pascal system is booted, it searches for a file on the system volume named AUTOSTART. If it finds one, it executes the commands in the file automatically.

The Autostart file is nothing but a "stream" of commands. The system executes this stream in sequence, just as if the commands were typed at the keyboard. Thus, to create an Autostart file to perform most of the tasks this chapter describes, you need only store your keystrokes in a file called AUTOSTART on the system volume that is assigned just after the Pascal system is booted.

There are several things you must keep track of when designing an Autostart file. You must know where you are in the system, where you are going, and how prompts are sequenced. The best way to handle this is to boot the Pascal system, then set up your environment by executing commands from the keyboard, just as you have done in this chapter. As you do this, write down every key you press. This sequence of keystrokes is exactly what you should store in your Autostart file.

Be aware, however, that some actions are difficult to recreate in an Autostart file. For example, actions that require inserting and removing discs at various points in the Autostart process are difficult to implement. For this reason, the default volume will not be set in the following Autostart file, for doing so would require pausing the command stream after the Filer and Editor have been permanently loaded, emptying unit #3, and restarting the command stream again.

Here's how to create an Autostart file that sets up the environment described earlier in the chapter, with the exception of setting the default volume to unit #3:

1. Boot the Pascal system again, using the directions in Chapter 2. This resets the system volume to its original value.
2. Make a note of the system volume setting for future reference. It is given just below the total available memory in the initial display. Enter the date and time.
3. Make sure the volume containing the Editor is on-line, and press [E] to enter the Editor. Press [Return] to create a new file, then press [I] to enter insert mode.
4. Now type the Autostart file exactly as shown. When you see a [Return] key in the following text, press [Return]. **Do not** press [Return] unless explicitly told to do so.

```
=A Remove BOOT: and insert ACCESS:, then press Return[Return]
[Return]
[Return]
PACCESS:FILER,[Return]
PACCESS:EDITOR,[Return]
M#50:[Return]
20[Return]
8[Return]
WSRAM:[Return]
QV
```

Note

The RAM: volume created in this Autostart file is too small to be of any practical use. We make it so small because, in the next chapter, we will demonstrate how a small RAM: volume can cause problems. You will then modify the Autostart file to make the RAM: volume larger. If, however, you do not want to try the demonstrations in the next chapter, make the RAM: volume larger now, at *least* 50 blocks. For a formula for determining RAM: volume size, see the Memvol section of the *Pascal 3.0 Workstation System Manual.*

Press the [Select] key to exit insert mode **immediately** after typing V. Since all keystrokes are significant in an Autostart file, you should not have any trailing spaces.

When finished, the Autostart file should look like this:

```
=A Remove BOOT: and insert ACCESS:, then press Return


PACCESS:FILER.
PACCESS:EDITOR.
M#50:
20
8
WSRAM:
QV
```

To illustrate the correlation between the Autostart file and keyboard commands, let's step through the file, line by line:

Line 1 This is a prompt line; it is not executed like a keyboard command but is instead displayed when "streaming" of the Autostart file begins. Prompts are used to make the Autostart file more interactive. In this case, the prompt reminds you when to remove the BOOT: volume and insert the ACCESS: volume so that the Filer and Editor can be permanently loaded. Execution of the commands in the file is suspended until Return is pressed. For more information on Autostart prompts, refer to the **Stream** command section in the *Pascal 3.0 Workstation System Manual.*

Lines 2 Since the commands in the Autostart file are executed immediately after the Pascal system is booted, the first command in the file must respond to the first prompt that appears after booting. Remember that the first prompt that appears after booting is the date prompt. The Return key on this line is a response to this prompt, accepting the existing date.

Line 3 The next prompt is the time prompt. This Return accepts the existing time and puts the system at the Main Command Level.

Line 4 This line invokes the Main Command Level's **Permanent** command to permanently load the Filer from the ACCESS: volume. `P` invokes the command, and `ACCESS:FILER.` Return is the response given to the **Permanent** command's prompt:

```
Load what code file?
```

Line 5 This line invokes the **Permanent** command to permanently load the Editor from the ACCESS: volume.

Line 6 This line invokes the **Memvol** command to create a RAM: volume. `M` invokes the command. `#50` Return is the response given to the first prompt in the **Memvol** command:

```
What unit number?
```

Line 7 The system is still in the middle of making a RAM: volume. This line, `20` Return, is the response given to the second prompt in the **Memvol** command:

```
How many 512 byte BLOCKS?
```

Line 8 This line, `8` Return, is the response given to the last prompt in the **Memvol** command:

```
How many entries in directory?
```

Line 9 This line invokes the **What** command to set the system volume to the RAM: volume just created. `W` invokes the command. `S` indicates to the **What** command that you want to change the entry for the system volume. `RAM:` Return enters RAM: as the new system volume.

Line 10 This line quits the **What** command and invokes the **Version** command. `Q` quits the **What** command. `V` invokes the **Version** command, allowing you to enter the correct values for the time and date.

Modifying the Autostart File for a Winchester Disc

If you have stored the Filer and Editor on a Winchester disc, you must change a few things in the Autostart file. Skip to the next section if you have no Winchester disc.

Since the Filer and Editor are stored on a Winchester disc volume, you don't need the prompt line to remind you to insert the ACCESS: volume. You must also substitute the volume ID of Winchester volume containing the Filer and Editor for the ACCESS: volume in lines 4 and 5. Change your Autostart file like this:

1. Position the cursor under the "=" on line 1. Press D to enter delete mode, and press Return to delete line 1. Press Select to exit delete mode.

2. Position the cursor under the "A" in ACCESS: in line 4. Press D to enter delete mode, and hold down the space bar until ACCESS is deleted (do not delete the :). Press Select to exit delete mode. Press I to enter insert mode and type the volume ID of the Winchester disc volume containing the Filer. For example, if the Filer is stored on unit #12, and you have not changed the volume ID assigned to this volume by MEDIAINIT, you would type V12 (or #12). Press Select to exit insert mode.
3. Position the cursor under the "A" in ACCESS on line 5. Press D to enter delete mode, and hold down the space bar until ACCESS is deleted (do not delete the :). Press Select to exit delete mode. Press I to enter insert mode and type the volume ID of the Winchester disc volume containing the Editor. For example, if the Editor is stored on unit #12, and you have not changed the volume ID assigned to this volume by MEDIAINIT, you would type V12 (or #12). Press Select to exit insert mode.

Your Autostart file should look something like this, assuming that the Editor and Filer are on V12: of your Winchester disc (Note: there are two blank lines at the top of the file):

```


PV12:FILER.
PV12:EDITOR.
M#50:
20
8
WSRAM:
QV
```

Storing an Autostart File

The Autostart file must be stored on the system volume that is assigned after booting, in a file named AUTOSTART. If you have not changed the system volume setting since you booted the Pascal system, use this procedure to save the Autostart file. If you *have* changed the system volume, either change it back to its original setting with the Filer's **Newsysvol** command, or reboot the Pascal system.

1. Press Q to exit the Editor.
2. When the editor presents your exiting options, press W to choose Write to a file name and return.

3. Make sure the original system volume is on-line. In particular, if the flexible disc volume SYSVOL: (or some other flexible disc volume) was assigned the system volume after booting, make sure this volume is inserted into one of your flexible disc drives.
4. The computer now asks:

   ```
   Name of output file (<ret> to return) -->
   ```

   Type the following line to store the Autostart file on the system volume in a file named AUTOSTART (don't forget the period after the file name):

   ```
   *AUTOSTART. Return
   ```

   The * is a symbol for the system volume.

Note

If an Autostart file already exists on the system volume, you may get a message asking if you want to rewrite it, overwrite it, purge it, or none of the above. Press R to rewrite it.

---

5. After the file is written, the following prompt will appear:

   ```
   Exit from or Return to the editor ?
   ```

   Press E to exit.

Booting with an Autostart File

To boot the Pascal system, simply use the procedure you learned in Chapter 2. The Autostart file will be found and "streamed." If something goes wrong, make sure you have stored the file using the file name AUTOSTART, on the system volume that is assigned after booting. Also check that the file is designed correctly, as described in the next section.

After booting the Pascal system, there is one "loose end" that the Autostart file didn't perform for you. The default volume must be set manually. To do this:

1. Answer the date and time prompts.
2. Press F to enter the Filer, and press P to get the following prompt:

   ```
   Prefix to what directory ?
   ```

3. Make sure that unit #3 is empty, and type the following response:

```
#3: Return
```

4. The computer reports:

```
Prefix is #3:
```

   Press Q to exit the Filer.

Confirming an Autostart File

If you would like to confirm that an Autostart file is doing what it's supposed to do, try a dry run from the keyboard. Just boot the Pascal system, and type all keystrokes in your Autostart file directly from the keyboard, ignoring prompts and prompt calls.

A Program Development Session

Chapter 11

Now that a comfortable environment is established, it's time to design, debug and execute a simple Pascal program. This chapter demonstrates how the components of the Pascal system work together to make program development easier.

In keeping with the spirit of Murphy's law, most every task we describe in this chapter is first performed incorrectly. We think it best to expose you to many of these common errors now, rather showing you a flawless example and leaving it to you to recover from errors when you encounter them on your own.

In this chapter, you will:

- Create a data file
- Create a simple program
- Respond to system, syntax and run-time errors that arise
- Run the compiled program
- Back up the program

Getting Ready for Chapter 11

If you have not already done it, set up the programming environment as described in Chapter 10. Don't forget to set the default "volume" to unit #3 (with disc removed); the Autostart file will not do this for you.

You will need one empty, initialized disc for storing the program, data and listing files you will create in this demonstration. Insert this disc into unit #3 to make it the default volume.

Also, have the disc labeled CMP: handy, unless you have copied the Compiler to a Winchester disc. The Compiler must be on-line before you compile a program.

Creating the Data File

In this chapter, you will create a program that reads a list of numbers from a data file and prints them on the screen. Begin by creating the data file.

The data file is nothing more than a list of integers. To create it, make sure you're at the Main Command Level and press E to enter the Editor. Press Return to create a new file. (If the Editor automatically reads in a workfile, use the Filer's **New** command to clear it.) Press I to enter insert mode, and type in the following list of numbers exactly as shown:

```
1
2
3
4
5
6
7
8
9
10
```

Press Select to exit insert mode. Press Q to quit the Editor and look over your exiting options.

You must decide whether using a workfile offers any advantage in this case. Since you will do nothing more with this data right now, the simplest exiting option is to press W to write the data directly to a file. While you could press U to update the workfile, then enter the Filer, use the **Save** command to store the workfile, and use **New** to clear the workfile, why take all of these steps when you can do it in one?

The program will expect to find its data in a file named DATA.TEXT in the default volume. To store the data there, press W to get the following prompt:

```
Name of output file (<ret> to return) -->
```

Make sure your new, initialized disc is in unit #3 and type the following response to store the data in the file DATA.TEXT in the default volume:

```
DATA Return
```

The computer confirms the save operation with something like:

```
Your file is 40 bytes long.
Exit from or Return to the editor?
```

Press E to exit from the Editor.

Creating the Program

Next, you will create the program that reads and prints the data file.

Press E to enter the Editor, and press Return to create a new file. Press I to enter insert mode and type in the following Pascal program exactly as shown. For those of you familiar with Pascal, this program contains intentional errors, so don't try to correct them.

```
PROGRAM COUNT(INPUT,OUTPUT)
VAR NUM:INTEGER;
    INFILE:TEXT;
  BEGIN
    RESET(INFILE,'DATA.TEXT');
    WHILE NOT EOF(INFILE) DO
      BEGIN
        READ(INFILE,NUM);
        WRITELN(NUM)
      END
  END.
```

Press Select to exit insert mode, then press Q to quit the Editor.

Again, you must decide whether to use the workfile. This is a program, and programs often contain errors. You will probably compile the program, find an error, edit the program to correct the error, compile the program again, find another error, etc. Since you'll be moving this file from one subsystem to another during this process of step-wise refinement, a workfile would be a definite asset.

Press U to update the workfile. The program you have just created is now stored in the file WORK.TEXT in the system volume.

Because the system volume is RAM:, there is always the risk of losing the program due to a power loss. To guard against this, enter the Filer and press S to save the contents of the workfile into a file in your default volume. The computer prompts:

```
Save as what file?
```

Respond by typing:

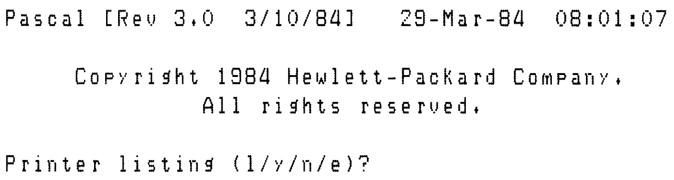
```
COUNT Return
```

to store the program in a file named COUNT.TEXT in the default volume (the suffix .TEXT is automatically appended). Now if there is a power loss, you can at least recover the original version of the program. As you make changes to the workfile, it's a good idea to periodically update the permanent disc file with the most current version.

Exit the Filer.

Compiling the Program

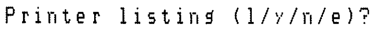
Before you can run the program, you must compile it. Find the disc labeled CMP: and insert it into one of your flexible disc drives. Press C to run the Compiler, and wait for the following display:



```
Pascal [Rev 3.0  3/10/84]   29-Mar-84  08:01:07

        Copyright 1984 Hewlett-Packard Company.
                 All rights reserved.

Printer listing (l/y/n/e)?
```

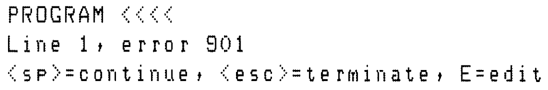
If you inserted the CMP: disc into unit #3, remove it and reinsert the disc containing the file COUNT.TEXT.

The workfile is now starting to pay off. Because a workfile exists, the Compiler assumes it contains the program you want to compile, and doesn't ask you for a file name. This saves you from having to type the file name all over again. The Compiler proceeds directly to the prompt:



```
Printer listing (l/y/n/e)?
```

Press N to skip the listing. The program is then compiled, and the following error message appears on the screen:



```
PROGRAM <<<<
Line 1, error 901
<sp>=continue, <esc>=terminate, E=edit
```

Note

If you created a larger RAM: volume when designing your Autostart file in Chapter 10, this message may not appear. If it doesn't, skip to the section called "A Syntax Error."

This message says that the error was detected in line 1 of the program, and that the error number is 901. By itself, this message doesn't say a lot. Get out the *Pascal 3.0 Workstation System Manual* and lift the tab labeled **Error Messages**. Find the section called "Pascal Compiler Syntax Errors" and look up error 901 toward the very end of this section. Error 901 says: "insufficient space to open ref file."

If you were to read the Compiler chapter of the *Pascal 3.0 Workstation System Manual*, you would discover that a ref file is one of the temporary files the Compiler creates while compiling a program. Since temporary files are stored on the system volume, RAM:, this message tells you that the system volume contains insufficient free space for writing temporary files. To correct this problem, the RAM: volume must be made larger.

While you might be inclined to use the **Memvol** command to make a new, larger RAM: volume at unit #50, the procedure is not quite so simple. First of all, because the RAM: volume is created in the Autostart file, the Autostart file must be modified to make any changes to the RAM: volume permanent. Otherwise, the Autostart file will create the same small RAM: volume every time you boot. Secondly, when you create a second RAM: volume at the same unit number as the first, the memory allocated to the first RAM: volume is not recovered. Thus, changing the size of a RAM: volume in this way is a waste of memory.

To change the size of the RAM: volume, you must edit the Autostart file and reboot the Pascal system. While you could do this now, a better plan is to change the system volume from RAM: to the volume in unit #3, finish the program development session, and change the Autostart file later. You will lose the rapid access time that a RAM: system volume provides, but since this example deals with such a small program, it won't slow you down too much.

Changing the System Volume

To change the system volume from RAM: to the flexible disc volume in unit #3, use the Main Command Level's **Newsysvol** command.

The bottom line of the display tells you to press the space bar to continue, so press it now. Then press N to invoke **Newsysvol**. The following prompt will appear:

```
What new system unit number?
```

Type:

```
#3: Return
```

When the Main Command Level's command line returns to the top of the screen, the new system volume has been set.

The volume in unit #3 is a reasonable choice for a system volume, for it does contain plenty of free space. Flexible discs, however, are rather slow to access, so if you have a free Winchester disc volume available, you may want to set the system volume there.

Compiling the Program Again

Since the last error was caused by your programming environment and had nothing to do with the syntax of your program, there is no need to edit the program. Insert the CMP: volume into one of your disc drives and press C to proceed directly to the Compiler.

If you inserted the CMP: disc into unit #3, wait for the following prompt to appear, then remove CMP: from the disc drive:

```
Compile what text?
```

Reinsert the disc containing the COUNT program into unit #3.

Now why did this prompt appear? You do, after all, have a workfile. But remember, you changed the system volume to the volume in unit #3. The workfile is still in the *old* system volume, RAM:. The computer searches the system volume in unit #3 for WORK.TEXT, and doesn't find it. Because there is no workfile, the Compiler doesn't know which program to compile, and asks for the name and location of the file. Since you're already in the middle of compiling, give the Compiler the file COUNT.TEXT that you saved in the default volume–you can create a new workfile at the next convenient opportunity.

Type the following response to compile the COUNT program:

COUNT Return

The suffix, .TEXT, is assumed. The computer then lets you select a printer listing option:

```
Printer listing (l/y/n/e)?
```

Press L to send the listing to a file. The computer then asks for the name of the file:

```
What listing file?
```

Type the following response to store the listing in the file named COUNT-LIST.TEXT in the default volume:

COUNTLIST[25] Return

The [25] tells the computer how much space to allocate for the listing file (in blocks). This file size specification is required. One listing page will occupy approximately 25 blocks. Since this listing will not exceed one page, 25 blocks is plenty.

If you had a workfile, the output file would automatically be WORK-.CODE. But since you don't, the Compiler prompts for the name of the output file where the compiled code should be stored:

```
Output file (default is "#3:COUNT.CODE") ?
```

The Compiler suggests an output file name of COUNT.CODE, stored in the default volume. This is a logical choice, so press (Return) to accept it.

A Syntax Error

The Compiler begins compiling the program and displays the following messages:

```
<    0>
PROGRAM COUNT(INPUT,OUTPUT)
  VAR <<<<
Line 2, error 14

COUNT            [59343G]
<    4>.
No codefile generated.

11 lines.  1 error.  No warnings.
```

This tells you that another error was detected. This time, it is error number 14, and it was found in line 2 of the program. Because an error was detected, no output (code) file was created.

Before you investigate the error, use the Editor to look at the listing file that was generated. Press (E) to enter the Editor. Since no workfile exists, the Editor asks for the name of the file you want to edit:

```
File? (<ret> for new file, <stop> exits)
:
```

Type the following response to retrieve the listing file, COUNTLIST.TEXT, from the default volume:

```
COUNTLIST (Return)
```

The file is then displayed:

```
Pascal [Rev 3.0  4/ 3/84] COUNT.TEXT   17-Apr-84 10:43:02 Page 1

     1:D        0 PROGRAM COUNT(INPUT,OUTPUT)
     2:D    -4  1 VAR NUM:INTEGER;
                    ^
>>>>>> Error at COUNT.TEXT/2:  14
     3:D  -668  1     INFILE:TEXT;
     4:C        1   BEGIN
     5:C        1     RESET(INFILE,'DATA.TEXT');
     6:C        1     WHILE NOT EOF(INFILE) DO
     7:C        2       BEGIN
     8:C        2         READLN(INFILE,NUM);
     9:C        2         WRITELN(NUM)
    10:C        2       END
    11:C        2   END.

1 error. See line 2. No warnings.
```

Notice the error message appearing immediately below line 2:

```
>>>>>> Error at COUNT.TEXT/2:  14
```

This message tells you that an error was detected in the file COUNT.TEXT at line 2, and that the number of the error is 14. A caret points to the location in line 2 where the error was detected (i.e., to the VAR declaration).

Look up error 14 in the "Pascal Compiler Syntax Errors" section of the *Pascal 3.0 Workstation System Manual.* This error number decodes to: "Expected a semicolon ";"." Apparently, the program is missing a semicolon in line 2.

Line 2 of the program ends with a semicolon as it should, but line 1 does not. The Compiler could not detect the error on line 1 until after it began reading line 2, which explains why the error was attributed to line 2.

Press (Q) to quit the Editor, followed by (E) to exit without updating.

Correcting the Syntax Error

Now press E to reenter the Editor, and type the following response to edit your program:

```
COUNT Return
```

The program is loaded and made available for editing.

To correct the error, hold down the space bar and position the cursor to the end of line 1. Press I to enter insert mode, and type the following to add a semicolon and exit insert mode:

```
; Select
```

When finished, the first line should look like this:

```
PROGRAM COUNT(INPUT,OUTPUT);
```

Press Q to exit the Editor. To avoid typing the file name COUNT each time you enter a new subsystem, press U to create a workfile in the new system volume. From now on, when you enter a new subsystem, the program will be loaded automatically.

The Third Compilation

Insert the CMP: volume into one of your disc drives and press C to run the Compiler. Wait for the following prompt to appear:

```
Printer listing (l/y/n/e)?
```

Note

If you inserted the CMP: volume into unit #3, the following prompt will appear:

```
Mount *WORK.TEXT and press <space>
```

The computer is asking for the system volume, containing the workfile, that you removed from unit #3. Replace the CMP: volume with the system volume containing the workfile, and press the space bar.

Press L to get a fresh listing file of the corrected program. When the computer asks:

```
What listing file?
```

type the following response again to overwrite the original listing:

```
COUNTLIST[25] Return
```

Compilation then gets underway, and the following messages are displayed:

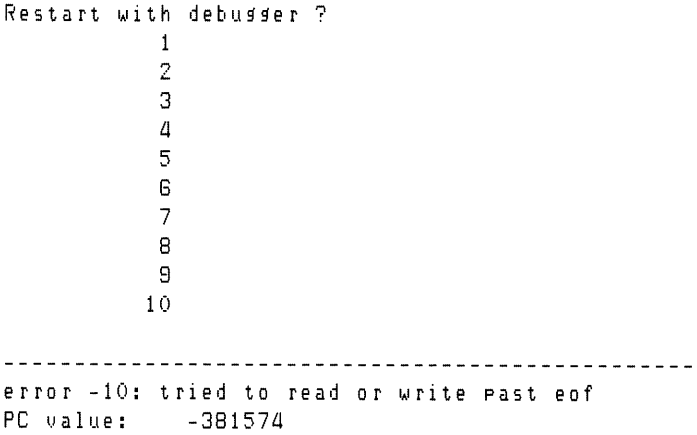
```
<    0>.
COUNT                  [5934361]
<    4>.

11 lines, No errors. No warnings.
```

No errors were detected: the code file WORK.CODE was created and stored in the system volume in unit #3. Press the space bar to clear the screen.

Running the Program

To run the program, press R at the Main Command Level to invoke the **Run** command. **Run** loads, compiles (if necessary), and then runs the workfile.

The following display appears on the screen:



```
Restart with debugger ?
           1
           2
           3
           4
           5
           6
           7
           8
           9
          10

-------------------------------------------------
error -10: tried to read or write past eof
PC value:    -381574
```

A Run-time Error

The numbers 1 through 10 in this display are the output from the program. But at the end of program execution, an error number -10 was reported. If you look on the first page of the Error Messages section of the *Pascal 3.0 Workstation System Manual*, you'll find that an error -10 indicates an I/O related error. The Pascal system has printed out a description of the error, namely that the program tried to read past the end of the data file.

This problem can be corrected by changing the READ statement in line 8 to a READLN statement. To do this, press N (No) to respond to the debugger prompt at the top of the screen, and press E to go back to the Editor.

Correcting the Run-time Error

The workfile is automatically read into the Editor. Press Return to move the cursor to the beginning of the line:

```
READ(INFILE,NUM);
```

Press the space bar to position the cursor under the left parentheses (. Press I to enter insert mode, and type:

```
LN Select
```

The line should now look like this:

```
READLN(INFILE,NUM);
```

Press Q to quit the Editor, and then U to update the workfile and leave.

The Final Compilation

Make sure the Compiler is on-line, then press C to load it. If you have only one flexible disc drive and must remove the system volume in order to load the Compiler, be sure to reinsert the system volume as you did earlier.

Again, because a workfile exists, you need only answer the printer listing prompts; the Compiler's input and output files are assumed to be the workfiles WORK.TEXT and WORK.CODE. When the prompt appears, press L, then type the following line to send the listing to the file COUNTLIST.TEXT in the default volume:

```
COUNTLIST[25] Return
```

Compilation proceeds without incident, and the code file is generated. The display looks like this:

```
<     0>.
COUNT              [59343B]
<     4>.

11 lines,  No errors.  No warnings.
```

Running the Program Again

Press R to load and run WORK.CODE, which contains the latest code version of program COUNT. The program runs successfully, and displays its output on the screen:

```
                    1
                    2
                    3
                    4
                    5
                    6
                    7
                    8
                    9
                   10
```

To rerun the program, press U to invoke the **User** restart command.

Saving the Finished Program

As it stands, the only copies of the finished program are stored in the workfiles. WORK.TEXT contains the uncompiled (text) version, and WORK.CODE contains the compiled (code) version. Since the workfiles are only temporary files, and now that program development is completed, you should save their contents into more permanent files.

Enter the Filer, and press S to invoke the **Save** command. The computer will ask:

```
Save as what file ?
```

Type the following response:

```
COUNT Return
```

Since the file COUNT.TEXT already exists on the default volume, the computer wants to know what to do with the old file before it saves the new one. It reports something like:

```
V3:COUNT.TEXT
exists ... Remove/Overwrite/Neither ? (R/O/N)
```

Press R to remove the old file and save the new corrected version. When finished, the computer displays:

```
V3:WORK.TEXT                            ==> V3:COUNT.TEXT
```

A nice feature of the **Save** command is that it will save *both* workfiles if they exist. Since WORK.CODE is also present in the system volume, **Save** copies it to the file COUNT.CODE in the default volume. COUNT.CODE does not already exist in the default volume, so the computer saves it immediately, rather than first prompting you as it did with COUNT.TEXT.

The computer reports:

```
V3:WORK.CODE                            ==> V3:COUNT.CODE
```

And then:

```
Source file saved & Code file saved
```

Once the workfiles are saved, you can clear the workfiles by pressing N (**New**). Do this now, and WORK.TEXT and WORK.CODE are removed from the volume in unit #3 (the system volume).

Exit the Filer, and press the space bar to clear the screen.

Backing Up Your Program

The last step of program development is to make a back-up copy of your completed program.

To make a back-up copy of the COUNT program, get out another initialized flexible disc and label it as your back-up disc. Follow one of the procedures below, depending on whether you have one or two flexible disc drives.

If You Have Two Flexible Disc Drives...

1. Leave the disc containing program COUNT in unit #3, making it the default volume.
2. Insert the back-up disc into your other flexible disc drive (in this example, we assume it is unit #4).
3. Enter the Filer, and press F to invoke the **Filecopy** command. The following prompt will appear:

   ```
   Filecopy what file?
   ```

4. Type the following response to indicate you want to copy the file COUNT.TEXT from the default volume.

   ```
   COUNT.TEXT Return
   ```

Note

There is no reason to back up COUNT.CODE, for you can always recompile COUNT.TEXT to produce it. Making a *back-up* copy of .CODE files is generally not necessary, but you will want to keep a *working* copy.

Notice that you must give both the file name and the suffix when specifying a file to the **Filecopy** command. **Filecopy** does not automatically append the suffix .TEXT as do some of the other commands; it uses the name exactly as typed.

5. The computer then asks:

   ```
   Filecopy to what?
   ```

   If your back-up disc is in unit #4, type:

   ```
   #4:$ Return
   ```

   Otherwise, substitute the unit number of the drive containing the back-up disc for #4: above. The $ wildcard is used to give the back-up copy the same name as the original.

The file COUNT.TEXT is now copied to the back-up disc. When the Filer's command line reappears at the top of the screen, remove the back-up disc and store it in a safe place, away from the original copy of the program.

Exit from the Filer, and skip to the section, "Changing the Autostart File."

If You Have One Flexible Disc Drive...

1. Leave the disc containing program COUNT in unit #3, making it the default volume.
2. Enter the Filer, and press (F) to invoke the **Filecopy** command. The following prompt will appear:

```
Filecopy what file?
```

3. Type the following response to indicate you want to copy the file COUNT.TEXT from the default volume.

```
COUNT.TEXT (Return)
```

Note

There is no reason to back up COUNT.CODE, for you can always recompile COUNT.TEXT to produce it. Making a *back-up* copy of .CODE files is generally not necessary, but you will want to keep a *working* copy.

Notice that you must give both the file name and the suffix when specifying a file to the **Filecopy** command. **Filecopy** does not automatically append the suffix .TEXT as do some of the other commands; it uses the name exactly as typed.

4. The computer then asks:

```
Filecopy to what?
```

Since you have only one flexible disc drive, type the following response:

```
#3:$ (Return)
```

The computer will prompt you at the appropriate time to exchange the disc containing COUNT for the back-up disc. The $ wildcard is used to give the back-up copy the same name as the original.

5. The computer reads COUNT.TEXT from the disc into memory, then prompts you to insert the back-up disc with:

   ```
   Please mount DESTINATION in unit #3
   'C' continues, <esc> aborts
   ```

   Remove the disc containing COUNT.TEXT, and insert the back-up disc. Press C to proceed with the copy operation.

The file COUNT.TEXT is now copied to the back-up disc. When the Filer's command line reappears at the top of the screen, remove the back-up disc and store it in a safe place, away from the original copy of the program.

Exit from the Filer.

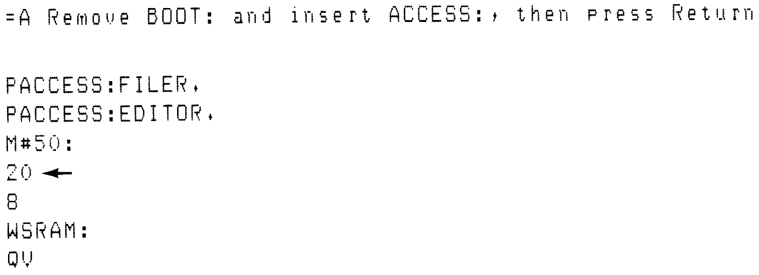
Changing the Autostart File

The last thing to do is create a larger RAM: volume in your Autostart file, one that is of more practical use. Recall that the present size causes errors during compilation.

Press E to enter the Editor. When asked for the file to be edited, type the volume ID (or unit number) of the original system volume, followed by `AUTOSTART.` (don't forget the period). Make sure the original system volume is on-line, then press Return. For example, if the system volume after booting the Pascal system was the SYSVOL: volume, you would insert the disc labeled SYSVOL: into one of your disc drives, and type the following line in response to the prompt:

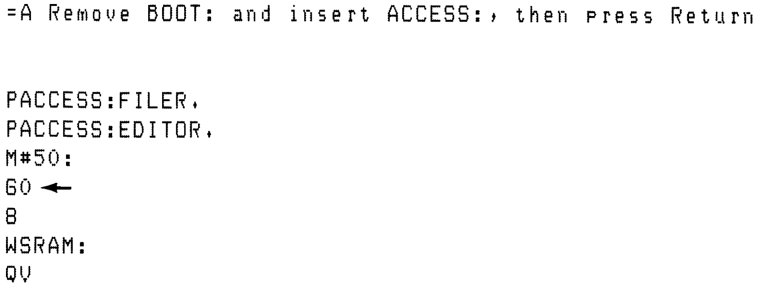
```
SYSVOL:AUTOSTART. Return
```

Change the RAM: volume size from 20 blocks to a larger size with the **eXchange** command. To do this, press Return to position the cursor to the line containing 20 (see the following illustration).



```
=A Remove BOOT: and insert ACCESS:, then press Return


PACCESS:FILER.
PACCESS:EDITOR.
M#50:
20 ←
8
WSRAM:
QV
```

Now press X, type the new size and press Select. In this example we have changed the size to 60 blocks. If you choose a size of 100 blocks or greater, use insert mode to add the last digit. Your file should now look something like this:



```
=A Remove BOOT: and insert ACCESS:, then press Return


PACCESS:FILER.
PACCESS:EDITOR.
M#50:
60 ←
8
WSRAM:
QV
```

Now, press Q to exit the Editor, and press S to store the new Autostart file back into the original system volume.

Press E to exit the Editor, and reboot the Pascal system according to directions in Chapter 2. The Autostart file will be streamed, and the new, larger RAM: volume will be established.

One last point: If you find that you constantly need to change the size of the RAM: volume for your various applications, it may be best to leave RAM: volume creation out of the Autostart file. This you can decide when you become more familiar with the system.

Index to Tasks

Task Reference

Appendix

A

General Instructions

If you are using this reference to get started with the Pascal system, read through the procedures in the order they are presented. Occasionally, you may have to skip ahead to a procedure, depending upon how you will be using the system.

To find the procedure for a particular task, refer to the index on the tab. If you have difficulty understanding how to do something, check the **Additional Information** heading and turn to one of the page references listed there.

Some blank reference pages are provided at the end of this appendix. Use them to document your own procedures.

A Typical Reference Page

Each reference page contains the following information:

Volumes on-line: Lists all volumes that *may* be required by the procedure. If you have permanently loaded some subsystems or copied them to a Winchester disc, you may not need all of the volumes listed here.

Subsystem: Gives the name of the subsystem that contains the command used in the procedure.

Command: Gives the primary command used in the procedure.

Description Provides a brief description of the procedure.

Procedure Gives step-by-step instructions for the task.

Additional Information Provides page references for further clarification of the task and related information.

Booting

Volumes on-line: BOOT:, SYSVOL:
Subsystem: None
Command: None

Description

Booting loads the kernel of the Pascal system from the BOOT: volume into RAM, and turns control over to the Command Interpreter (the Main Command Level).

Procedure

1. Turn off the computer . Turn on all external disc drives. If you have more than one Winchester (hard) disc drive, turn *off* all but one of them.
2. Insert the BOOT: volume into drive 0 (right-hand drive in the Model 226/236; left-hand drive in all external units).
3. If you have a second flexible disc drive, insert the SYSVOL: volume there.
4. Turn your computer on.
5. If you have only one flexible disc drive, the following prompt may appear:

   ```
   Please put SYSVOL in unit #3
     and press the X key
   ```

   If it does, remove the BOOT: volume, insert the SYSVOL: volume, and press X.
6. When the following prompt appears at the top of the screen, the Pascal system is booted and ready for use:

   ```
   New system date ?
   ```

   Remove the BOOT: and SYSVOL: volumes and store them properly.

Additional Information

Boot ROMs: 15
Booting: 16
Booting errors: 20
Flexible disc handling: 10, 12

Setting the Date and Time

Volumes on-line: None
Subsystem: Main Command Level
Command: **Version**

Description

System date and time prompts are displayed after the Pascal system is booted. They can be re-displayed at any time by invoking the **Version** command.

Procedure

1. Look for the following prompt at the top of the screen:

   ```
   New system date ?
   ```

   If the date prompt does not appear, press V to invoke the **Version** command.

2. If the date is correct, press Return. Otherwise, type the date in the form **dd-mmm-yy** where:

   - **dd** is one or two numbers representing the day
   - **mmm** is the first three letters of the month
   - **yy** is the last two digits of the year

3. Press (Return). The following prompt will appear:

   ```
   New system clock time ?
   ```

   Type the time in the form **hh-mm-ss** where

   - **hh** is one or two numbers representing the hour on a 24-hour clock
   - **mm** is one or two numbers representing the number of minutes past the hour
   - **ss** is one or two numbers representing the number of seconds past the minute (ignore if you wish - it will set to 00)

4. Press (Return).

Additional Information

Entering the date: 24
Entering the time: 25
Version command: 121

Loading Subsystems

Volumes on-line: See procedure below
Subsystem: Main Command Level
Command: See procedure below

Description

The Pascal system is composed of the Editor, Filer, Compiler, Assembler and Librarian subsystems. Each subsystem is entered by pressing the upper-case letter in the subsystem name as it appears in the Main Command Level's command lines. The command lines run across the top of the screen and look like this (press ? to get the second command line):

```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?

Command: Assembler Debugger Memvol Newsysvol Permanent Stream User What ?
```

The appropriate volume must be on-line when you load a subsystem (see the procedure below).

Procedure

To enter a subsystem from the Main Command Level, use the table below. Make sure the volume (disc) in the **Volume** column is on-line and press the key in the **Key** column.

Subsystem	Volume	Key
Compiler	CMP	C
Editor[1]	ACCESS:	E
Filer	ACCESS:	F
Librarian	ACCESS:	L
Assembler	ASM:	A

[1] After pressing E, press Return to create a new file or type the file specification of the file you want to edit and then press Return.

See the procedure, "Exiting From Subsystems" for exiting instructions. For the moment, you may press (Stop) to exit, but heed the cautions in Chapter 1.

Additional Information

Main Command Level: 4, 113
Compiler: 155, 189, 192, 196, 199, 256
Editor: 61, 114, 125
Filer: 63, 114, 139
Librarian: 164
Assembler: 163

Exiting From Subsystems

Volumes on-line: any
Subsystems: any
Command: **Quit**

Description

The Editor, Filer and Librarian subsystems are exited by pressing (Q), which corresponds to the **Quit** command in the command line for each of these subsystems. Each of these subsystems can be exited only while at the top-most level of the subsystem; i.e., the command line must be displayed at the top of the screen.

The Editor may present several exiting options after you press (Q). See the "Storing a File (Editor)" procedure for details.

The Compiler and Assembler are exited automatically after compilation or assembly is complete. Execution of these subsystems may be stopped by aborting one of their prompts (see the "Responding to Prompts" procedure).

All subsystems may be exited at any time by pressing (Stop). This should be used as a last resort, however. More graceful means are preferred.

Additional Information

Editor: 61, 114, 125
Filer: 63, 114, 139
Librarian: 164
Compiler: 155, 189, 192, 196, 199, 256
Assembler: 163

Invoking Commands

Volumes on-line: ACCESS:
Subsystems: Main Command Level, Editor, Filer, Librarian
Commands: any

Description

Most subsystems in the Pascal Workstation contain a set of commands. The active commands are listed in the command line at the top of the screen (pressing ? displays a second command line). Commands are invoked by pressing the upper-case letter in the command name as it appears in the command line.

Procedure

1. Enter the desired subsystem (see the "Loading Subsystems" procedure).
2. Find the command in the command line that will perform the desired task.
3. Press the key corresponding to the upper-case letter in the command name to invoke the command.

Additional Information

Command lines: 42
Invoking commands: 42

Exiting from Commands

Volumes on-line: any
Subsystems: any
Commands: any

Description

Some commands (primarily in the Editor) provide operating instructions at the top of the screen. Such instructions usually tell which key(s) to press to exit the command. Keys are represented by abbreviated labels enclosed in angle brackets < >. The key designations you see on the screen depend upon which keyboard you have. Common key designations include:

For the HP 46020A Keyboard:

- <sel> - press Select
- <esc> - press ESC
- <ret> - press Return

For the HP 98203B Keyboard:

- <exc> - press EXECUTE
- <sh-exc> - hold down SHIFT and press EXECUTE
- <ent> - press ENTER

For the HP 98203A Keyboard:

- <exc> - press EXEC
- <sh-exc> - hold down SHIFT and press EXEC
- <ent> - press ENTER

Procedure

1. To exit from a *command*, press the key(s) indicated in the command line.
2. If no clues are given in the command line, try pressing:
   - ESC if you have an HP 46020A keyboard
   - SHIFT EXECUTE if you have an HP 98203B keyboard
   - SHIFT EXEC if you have an HP 98203A keyboard

To exit from (abort) a *prompt*, see the "Responding to Prompts" procedure.

Additional Information

Responding to prompts: 45
Editor command lines: 126
Command lines: 42

Responding to Prompts

Volumes on-line: any
Subsystems: any
Commands: any

Description

After a command is invoked, it may present a series of prompts that you must answer before the operation is performed. There are several different types of prompts, classified by the response that is expected. Each type is described below:

Straight Questions

To respond, type your answer, and press Return. Abort the prompt by pressing Return without an answer.

Example: `Volume ID ?`

Yes/No Prompts

To respond, press Y for yes or N for no. Pressing N aborts the prompt.

Example: `Are you SURE you want to proceed ? (Y/N)`

Value Range Prompts

To respond, type a value that falls within the specified range, then press (Return). The range of acceptable values is enclosed within square brackets `[ ]`. Abort the prompt by pressing (Return) *unless* it also has a default value (as does the one below), in which case press (Stop).

Example: `Interleave factor? [1..15] (defaults to 1)`

Prompts with Default Values

To respond, press (Return) to accept the default value in parentheses, or type your own response and press (Return). Abort the prompt by pressing (Stop).

Example: `Number of directory entries (80) ?`

Additional Information

Responding to prompts: 45

Initializing (Formatting) Flexible Discs

Volumes on-line: ACCESS:
Subsystem: Main Command Level
Command: **eXecute**

Description

New flexible discs must be initialized (formatted) before they can be used. Initialization is performed by a program stored in the file MEDIAINIT-.CODE in the ACCESS: volume. The program is run by invoking the **eXecute** command from the Main Command Level.

CAUTION

ONLY NEW DISCS SHOULD BE INITIALIZED. IF YOU WANT TO RE-INITIALIZE A DISC FOR ANY REASON, BE SURE TO SAVE ITS CONTENTS ON ANOTHER DISC.

Procedure

1. Insert the ACCESS: volume into drive 0 (the drive where you inserted the BOOT: volume when booting). Press X to invoke the **eXecute** command.
2. Prompt: `Execute what file ?`

   Response: `ACCESS:MEDIAINIT` Return
3. Wait for the prompt in step 4 to appear on the screen, then remove the ACCESS: volume and insert the disc you want to initialize.
4. Prompt: `Volume ID ?`

   Response: `#3:` Return
5. Prompt: `Are you SURE you want to proceed? (Y/N)`

CAUTION

IF THE COMPUTER REPORTS:

```
Logical unit #3 - ACCESS:
```

IN THE SECOND LINE OF THIS DISPLAY, YOU ARE ABOUT TO INITIALIZE THE ACCESS: VOLUME. REMOVE THE ACCESS: DISC AND INSERT THE NEW DISC TO BE INITIALIZED.

Response: Press Y

6. The following prompt may or may not appear:

   ```
   Formatting option? (defaults to 0)
   ```

   If it does, refer to your disc drive manual for instructions on selecting the correct formatting option.

7. Prompt: `Interleave factor? [1..15] (defaults to 1)`

   Response: Press Return. (Note: Your prompt may contain different values.)

8. Wait about three minutes for the message: `Volume zeroing completed`. Remove the now initialized disc.

9. If you have another disc to initialize, insert the next disc and press U. Begin again at step 4.

Additional Information

Flexible disc initialization: 26

Initializing Winchester (Hard) Discs

Volumes on-line: ACCESS:
Subsystem: Main Command Level
Command: **eXecute**

Description

New Winchester (hard) discs must be initialized (formatted) before they can be used. Initialization is performed by a program stored in the file MEDIAINIT.CODE in the ACCESS: volume. The program is run by invoking the **eXecute** command from the Main Command Level.

CAUTION

ONLY NEW DISCS SHOULD BE INITIALIZED. IF YOU WANT TO RE-INITIALIZE A DISC FOR ANY REASON, BE SURE TO SAVE ITS CONTENTS ON ANOTHER DISC.

Procedure

1. **If you have more than one Winchester disc, turn off all but the ONE you will initialize, and reboot the Pascal system.**
2. Insert the ACCESS: volume into drive 0. Press X to invoke the **eXecute** command.
3. Prompt: `Execute what file ?`

   Response: `ACCESS:MEDIAINIT` Return
4. Wait for the prompt in step 5 to appear on the screen, then remove the ACCESS: volume.
5. Prompt: `Volume ID ?`

   Response: `#11:` Return
6. Prompt: `Are you SURE you want to proceed? (Y/N)`

CAUTION

IF THE COMPUTER REPORTS:

```
Logical unit #3 - ACCESS:
```

IN THE SECOND LINE OF THIS DISPLAY, YOU ARE ABOUT TO INITIALIZE THE ACCESS: VOLUME. REMOVE THE ACCESS: VOLUME. PRESS N TO ABORT THE PROCEDURE. PRESS U AND BEGIN AGAIN AT STEP 5.

Response: Press Y

7. The following prompt may or may not appear:

   Prompt: `Interleave factor? [1..15] (defaults to 1)`

   Response: Press Return

8. Wait up to *one hour* for the message: `Volume zeroing completed.` The disc is now initialized. Refer to page 35 if you have an "A" version of the HP 9133, 9134 or 1935 disc drives.

Note

If you have a second Winchester disc, refer to the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual* before using it.

Additional Information

Winchester disc initialization: 30

Specifying Files

Volumes on-line: any
Subsystems: any
Commands: any

Description

File specifications in the Pascal system consist of a **volume ID** or **unit number**, followed by a **file name**. The unit number is the unique number assigned to a particular drive. The volume ID is the name associated with a particular volume. File names may have suffixes to designate file type:

- The .CODE suffix indicates Pascal object code, the output of the Compiler, Assembler and Librarian.
- The .TEXT suffix indicates a special form of compacted text file. Includes editing environment.
- The .ASC suffix indicates a LIF ASCII text file.
- The .BAD suffix indicates a file covering a damaged area of a disc.
- The .SYSTM suffix indicates a boot image file.
- No suffix indicates a "data" file.

Procedure

To specify a file, type the unit number or volume ID associated with the device or volume containing the file, followed by the file name. Examples:

- `#3:TEST.TEXT` indicates a file named TEST.TEXT in the volume that resides in unit #3.
- `V11:TEST.ASC` indicates a file named TEST.ASC in the volume with volume ID V11:.
- `ACCESS:MEDIAINIT.CODE` indicates a file named MEDIAINIT.CODE in the volume with volume ID ACCESS:.

Additional Information

Specifying files: 37, 44

Finding Flexible Disc Drive Unit Number Assignments

Volumes on-line: ACCESS:
Subsystem: Filer
Command: **Volumes**

Description

Each flexible disc drive in your system is assigned a unique unit number. Use the unit number to select which disc drive you would like to access. Follow this procedure to determine which unit numbers have been assigned to your flexible disc drives.

Procedure

1. Insert the ACCESS: volume into any one of your flexible disc drives.
2. While at the Main Command Level, press F to enter the Filer.
3. Press V (**Volumes**) to list all on-line volumes on the screen.
4. Find `ACCESS:` in the right-hand column of the display. The corresponding number in the left-hand column is the unit number for the drive containing the ACCESS: volume.
5. Enter the device name, drive number, and unit number into the System Configuration Table provided at the end of this manual.
6. Insert the ACCESS: volume into another disc drive and begin again at step 3. Repeat this procedure until all drives are identified.

Additional Information

Identifying your flexible disc drives: 47

Finding Winchester Disc Unit Number Assignments

Volumes on-line: ACCESS:
Subsystem: Filer
Command: **Volumes**

Description

A Winchester (hard) disc may contain several volumes. Each volume is assigned a unique unit number. You may use the unit number to select which volume you would like to access. Follow this procedure to determine which unit numbers have been assigned to your Winchester disc. Like all procedures in this book, this one assumes you have only one Winchester disc. If you have others, refer to the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual.*

Procedure

1. If your Winchester disc is not initialized, refer to the "Initializing Winchester (Hard) Discs" procedure.
2. Insert the ACCESS: volume into any one of your flexible disc drives.
3. While at the Main Command Level, press F to enter the Filer.
4. Press V (**Volumes**) to list all on-line volumes on the screen.
5. All unit numbers listed in the left-hand column that fall within the range 11 through 40 are assigned to your Winchester disc. Each unit number corresponds to one volume on the disc. The right-hand column gives the volume ID (volume name) of each volume.
6. Enter the device name, and each unit number with its corresponding volume ID into the System Configuration Table provided at the end of this manual.

Additional Information

Identifying your Winchester disc: 50

Backing Up Your System

Volumes on-line: ACCESS:, all
Subsystem: Filer
Command: **Filecopy**

Description

Back-up copies of each Pascal system disc should be made immediately to protect your software investment. You will need one initialized disc for each Pascal system disc.

Procedure

1. Write-protect all of your Pascal system discs (see Chapter 3).
2. Insert the ACCESS: volume into unit #3. While at the Main Command Level, press F to enter the Filer. Wait for the Filer's command line to appear at the top of the screen.
3. If you have two flexible disc drives, insert a newly initialized disc into the other drive.
4. Press F to invoke the **Filecopy** command.
5. Prompt: `Filecopy what file ?`

   Response: `#3:` Return
6. Prompt: `Filecopy to what ?`

   Response:
   - **If you have two flexible disc drives,** type the unit number of the second disc drive that contains the newly initialized disc, and press Return. For example, if your second drive is assigned unit #4, you would type:

     `#4:` Return
   - **If you have one flexible disc drive,** type:

     `#3:` Return
7. If you have only one disc drive, wait for the following prompt, then remove the ACCESS: disc, insert a newly initialized disc into unit #3, and press C:

```
Please mount DESTINATION in unit #3
'C' continues, <esc> aborts
```

8. Prompt: `Destroy directory V3 ? (Y/N)`

   Response:

   - If the directory name shown above is the name of the Pascal system volume you are copying, press N to abort the operation. Start over, making sure you exchange discs in step 7 (single disc drive systems), or enter the unit numbers of the source and destination volumes correctly (multiple disc drive systems).
   - If the directory name is V3, V4, V7 or something similar, press Y to proceed.

9. When the Filer's command line reappears, remove the new copy and label it. Remove ACCESS: and insert the next Pascal system disc to be copied into unit #3. Begin again at step 3, and repeat this procedure until you have made copies of all Pascal system discs.

Additional Information

Backing up your system: 54

Copying Pascal System Files to a Winchester (Hard) Disc

Volumes on-line: BOOT:, ACCESS:
Subsystem: Filer
Command: **Filecopy**

Description

This procedure describes how to copy Pascal boot files, subsystems and utility programs to a Winchester (hard) disc. Before establishing your final Winchester disc configuration, however, you must read the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual.* This procedure assumes there was only one Winchester disc on-line when the Pascal system was booted.

Procedure

> **Note**
>
> If your computer has Boot ROM 3.0L, 2.0 or 1.0, you cannot boot Pascal from a Winchester disc.

1. Insert the ACCESS: volume into one of your disc drives. While at the Main Command Level, press F to load the Filer.
2. When the Filer's command line appears at the top of the screen, remove the ACCESS: volume and insert the BOOT: volume. Press F to invoke the **Filecopy** command.
3. Prompt: `Filecopy what file ?`
   Response: `BOOT:=` Return
4. Prompt: `Filecopy to what ?`
   Response: `#11:$` Return
5. Each file in the BOOT: volume is copied, one at a time, to the first volume of the Winchester disc.
6. Refer to the "Copying Multiple Files" procedure later in this appendix to *selectively* copy Pascal subsystems, utility programs, and libraries to your Winchester disc. At the very least, you will probably want to copy the Filer, Editor and Compiler. **Never use the "Copying an Entire Volume" procedure to copy a flexible disc volume to a Winchester disc.**

Additional Information

Permanently Loading Subsystems

Volumes on-line: any
Subsystem: Main Command Level
Command: **Permanent**

Description

Rapid movement between subsystems can be attained by permanently loading the most frequently-used subsystems into memory, using the Main Command Level's **Permanent** command. Refer to Appendix C for subsystem memory requirements and decide which subsystems to permanently load.

Procedure

1. Put the volume on-line that contains the subsystem you want to permanently load.
2. At the Main Command Level, press P to invoke the **Permanent** command.
3. Prompt: `Load what code file?`

   Response: Type the file specification for the subsystem you want to permanently load. If the file does not have the .CODE suffix (e.g., FILER, EDITOR, COMPILER), follow the file name with a period. For example, to permanently load the Filer, your response would be:

   ```
   ACCESS:FILER. Return
   ```
4. When the command line reappears at the top of the screen, the subsystem is permanently loaded.

Additional Information

Permanent command: 120, 171
Permanently loading subsystems: 171
Listing a directory: 144
Specifying a file: 37, 44
Subsystem memory requirements: 267

Making a Memory Volume

Volumes on-line: None
Subsystem: Main Command Level
Command: **Memvol**

Description

A memory volume with volume ID RAM: can be created to serve as a high-speed mass storage device. Since the RAM: volume displaces available program space, memory size is a consideration. The following procedure creates a RAM: volume at unit #50, with a size of 200 512-byte blocks and 8 directory entries. You may choose parameters to suit your own situation.

Procedure

1. At the Main Command Level, press M to invoke the **Memvol** command.
2. Prompt: `What unit number?`
   Response: `#50:` Return
3. Prompt: `How many 512 byte BLOCKS?`
   Response: `200` Return
4. Prompt: `How many entries in directory?`
   Response: `8` Return
5. The computer creates the RAM: volume and zeroes it.

Additional Information

Memvol command: 122
Making a RAM: volume: 173

Setting the System Volume

Volumes on-line: None
Subsystem: Main Command Level
Command: **What**

Description

The system volume is used for storing temporary system files during compilation, storing workfiles, storing the system date, etc. The system volume must usually have considerable free space, and should have a fast access time. The system volume need not be changed from its initial setting. However, if you will be using workfiles (discussed later) and have a memory volume, it may be convenient to change the system volume to RAM:.

Procedure

1. At the Main Command Level, press W to invoke the **What** command.
2. A table showing the file specifications of all subsystems appears on the screen. Press S to signal that you want to change the system volume entry (toward the bottom of the screen).
3. Type the volume ID or unit number of the new system volume and press Return. For example, to set the system volume to RAM:, type:

   ```
   RAM: Return
   ```
4. Press Q to exit from the **What** command.

Note

The system volume may be accessed using its volume ID (e.g., RAM:), its unit number (e.g., #50:), or by the special symbol *. For example, the file specification `*WORK.TEXT` indicates a file named WORK.TEXT in the system volume.

Additional Information

Setting the system volume: 118, 123, 174, 191
System volume considerations: 175
What command: 116, 174
Newsysvol command: 123, 191

Setting the Default Volume

Volumes on-line: None
Subsystem: Main Command Level
Command: **What**

Description

The default volume is the volume ID assumed if none is explicitly given when specifying a file. For example, if the default volume is ACCESS:, then the file specification MEDIAINIT.CODE is equivalent to ACCESS-:MEDIAINIT.CODE; the default volume ACCESS: is assumed in the former. The default volume should be set to the most frequently-accessed volume, to spare you from typing the volume ID every time you access a file.

Procedure

1. At the Main Command Level, press W to invoke the **What** command.
2. A table showing the file specifications of all subsystems appears on the screen. Press D to signal that you want to change the default volume entry at the bottom of the screen.
3. Type the volume ID or unit number of the new default volume and press Return. For example, to set the default volume to ACCESS:, type:

   ```
   ACCESS: Return
   ```

4. Press Q to exit from the **What** command.

Note

The default volume may be accessed using its volume ID (e.g., ACCESS:), its unit number (e.g., #3:), or by the special symbol **:**.

Note

You may set the default volume to a disc drive (unit) instead of to a specific volume by entering the unit number of an empty drive. *Any* volume you insert into the drive is then designated the default volume.

Additional Information

Setting the default volume: 117, 151, 176
What command: 116, 174
Prefix-vol command: 151, 176

Creating an Autostart File

Volumes on-line: ACCESS:
Subsystem: Editor
Command: Various Editing Commands

Description

An Autostart file will automatically set up your programming environment every time you boot the Pascal system. The Autostart file must be stored on the system volume assigned after the Pascal system is booted.

Procedure

The procedure for creating an Autostart file is lengthy and highly individual. Refer to Chapter 10 for instructions (see page reference below).

Additional Information

Creating a new Autostart file: 177, 204

Creating/Editing a File

Volumes on-line: ACCESS:
Subsystem: Editor
Command: Various Editing Commands

Description

Files are created and modified in the Editor subsystem. The Editor is placed into various modes of operation with the following commands:

- **Insert mode:** press I to type in text.
- **Delete mode:** press D to delete text.
- **Exchange mode:** press X to type new characters over old ones.
- **Copy File mode:** press C F to copy a file into the Editor.
- **Copy Buffer mode:** press C B to copy the buffer. The buffer contains the text of your last deletion or insertion.
- **Set Document:** press S D to set the editing parameters for document editing.
- **Set Program:** press S P to set the editing parameters for program editing.
- **Margin:** press M to clean up a paragraph (only works in the document editing environment).

The command line for each mode gives exiting options. Most modes are exited with Select to keep the changes made while in the mode, or ESC to abort the changes made while in the mode.

Procedure

1. With the ACCESS: volume on-line, press E to invoke the Editor.
2. Press Return to create a new file, or type the file specification of the file you want to edit.
3. Use the Editor's commands to insert and edit text.
4. Press Q to exit the Editor. Refer to the next procedure, "Storing a File (Editor)," for exiting options.

Additional Information

Editing commands: 126
Keyboard cursor control: 83, 97, 109

Storing a File (Editor)

Volumes on-line: ACCESS:, destination volume
Subsystem: Editor
Command: **Quit**

Description

The Editor is exited by pressing Q to invoke the **Quit** command. Several exiting options are then presented:

- **Update the workfile and leave.** Press U to write the edited file to the workfile WORK.TEXT in the system volume.
- **Exit without updating.** Press E to exit the Editor and discard the edited file.
- **Return to the Editor without updating.** Press R to return to the Editor without writing the file.
- **Write to a file name and return.** Press W to write the edited file to the file specification of your choice.
- **Save as file new file....** Press S to write the edited file using the same file specification that was used to retrieve it. The old version of the file is removed. This option appears only when you enter the Editor with an existing file.
- **Overwrite as file....** Press O to write the edited file directly over the old version of the file, keeping the same file name. This option appears only when you enter the Editor with an existing file. Use this only on SRM systems, or if the newly edited version of the file is not larger than the old version.

Procedure

1. Press Q to quit the Editor.
2. Select one of the exiting options above to store the edited file. Make sure the volume where you want to store the file is on-line.
3. Some options allow you to return to the Editor after storing the edited file. Press R to return to the Editor, or E to exit from the Editor.

Additional Information

Editing commands: 126
Exiting the Editor: 62, 136
Workfiles: 140, 142, 161, 187

Creating Workfiles (Editor)

Volumes on-line: ACCESS:, system volume
Subsystem: Editor
Command: **Quit** with Update

Description

An edited file can be stored into a file named WORK.TEXT in the system volume. WORK.TEXT is called a workfile. The workfile behaves like the "default" file. If a workfile exists, it will automatically be read into the Editor for editing, and will automatically be compiled when you enter the Compiler. This special treatment speeds program development by sparing you from typing file specifications as you move between subsystems. This procedure describes how to create a workfile in the Editor.

Procedure

1. Enter the Editor, edit your file, and press Q to exit the Editor.
2. Make sure the system volume is on-line and press U to update the workfile. The edited file is written into the file WORK.TEXT in the system volume.
3. If you wish, press E to re-enter the Editor. Notice how the Editor automatically reads in the workfile.

Additional Information

Workfiles: 140, 142, 161, 187
Exiting the Editor: 62, 136

Creating Workfiles (Filer)

Volumes on-line: ACCESS:, source volume, system volume
Subsystem: Filer
Command: **Get**

Description

An existing file can be made the workfile with the Filer's **Get** command. **Get** associates the file name you specify with the workfile.

Procedure

1. Enter the Filer and press G to invoke the **Get** command.
2. The following prompt may appear if a workfile already exists:

```
Throw away current workfile ? (Y/N)
```

If the workfile contains valuable information that you want to keep, press N and use the **Save** command to save it (see the "Storing Workfiles (Filer)" procedure). Otherwise, press Y to discard it.

3. Prompt: `Get what file?`

Response: Make sure the volume containing your file is on-line, and type the file specification for the file you wish to designate the workfile. Press Return. For example, if you wanted to designate a file named TEST.TEXT in the volume in unit #3 as the workfile, you would type:

```
#3:TEST Return
```

The suffix, .TEXT, is automatically appended by the **Get** command. To suppress the suffix, type a period after the file name.

Additional Information

Get command: 142, 161
Workfiles: 140, 142, 161, 187

Storing Workfiles (Filer)

Volumes on-line: ACCESS:, system volume, destination volume
Subsystem: Filer
Command: **Save**

Description

Workfiles can be copied from the system volume to another volume with the Filer's **Save** command. If possible, the **Save** command will save both WORK.TEXT and WORK.CODE at the same time.

Procedure

1. Enter the Filer and press S to invoke the **Save** command.
2. If the workfile was created with the **Get** command, the computer will ask if you want to save the workfile into the same file you retrieved it from:

   ```
   Save as ... (Y/N)
   ```

   Press Y if you do, otherwise press N.
3. If the workfile was created when exiting the Editor, or if you do not want to save the workfile with its original file name, the computer will ask for a file specification:

   ```
   Save as what file?
   ```

   Type the file specification for the new file and press Return. For example, if you want to store the workfile into a file named TEST-.TEXT in a volume named PROG:, you would type:

   ```
   PROG:TEST Return
   ```

   The suffix, .TEXT, is automatically appended by the **Save** command. To suppress the suffix, type a period after the file name.

Additional Information

Save command: 143, 188, 200
Workfiles: 140, 142, 161, 187

Clearing a Workfile

Volumes on-line: ACCESS:, system volume
Subsystem: Filer
Command: **New**

Description

In many cases, workfiles must be cleared before the subsystems will operate on another file. For example, as long as a workfile exists, you cannot edit or compile another file. The Filer's **New** command removes the workfile(s) from the system volume.

Procedure

1. Enter the Filer and press N to invoke the **New** command.
2. If the workfile has not been stored in another volume with the **Save** command, the computer will ask:

   ```
   Throw away current workfile ? (Y/N)
   ```

   Respond with Y to discard it, or press N and use **Save** to store it.
3. The workfile is now cleared.

Additional Information

New command: 152
Save command: 143, 188, 200
Workfiles: 140, 142, 161, 187

Copying a Single File

Volumes on-line: ACCESS:, source and destination volumes
Subsystem: Filer
Command: **Filecopy**

Description

The following procedure copies a single file from a source volume to a destination volume.

Procedure

1. Enter the Filer and press F to invoke the **Filecopy** command.
2. Prompt: `Filecopy what file ?`

   Response: Type the file specification of the file you want to copy and press Return. Make sure the volume containing the file is on-line.
3. Prompt: `Filecopy to what ?`

   Response:
   - To give the new copy of the file a new name, type the volume ID (or unit number) of the destination volume, followed by the new file name (Example: `#3:NEWNAME.ASC`). Press Return.
   - To give the new copy of the file the same name as the original, type the volume ID (or unit number) of the destination volume, followed by `$` (Example: `#3:$`). Press Return. The `$` is a wildcard that means "same name."
4. The file is copied. If the source and destination units are the same, you will be prompted at the appropriate time to insert the destination volume. Exchange discs and press C.

Additional Information

Filecopy command: 55, 58, 147, 166, 168, 202
Copying a single file: 148, 170
$ wildcard: 148, 167, 169, 202, 246, 247

Copying Multiple Files

Volumes on-line: ACCESS:, source and destination volumes
Subsystem: Filer
Command: **Filecopy**

Description

The following procedure copies several files from a source volume to a destination volume, allowing you to select which files will be copied and which will not. Each new copy will receive the same name as the original. To change the names of the destination files, refer to the discussion of wildcards in the *Pascal 3.0 Workstation System Manual.*

Procedure

1. Enter the Filer and press F to invoke the **Filecopy** command.
2. Prompt: `Filecopy what file ?`

   Response: Make sure the source volume is on-line, and type the volume ID (or unit number) of the source volume where the original files reside, followed by `?` (Example: `#3:?`). Press Return. The `?` is a wildcard that will cause the computer to prompt you before each file is copied. You can then confirm or reject each file.
3. Prompt: `Filecopy to what ?`

   Response: Type the volume ID (or unit number) of the destination volume, followed by `$` (Example: `V4:$`). Press Return. The `$` is a wildcard that means "same name."
4. File copying now commences. To copy a file, press Y when prompted. To reject a file, press N. If the source and destination units are the same, you will be prompted at the appropriate time to insert the destination volume: exchange discs and press C.

Additional Information

Filecopy command: 55, 58, 147, 166, 168, 202
Copying multiple files: 169
$ wildcard: 148, 167, 169, 202, 245, 247
? wildcard: 169, 250

Copying All Files in a Volume

Volumes on-line: ACCESS:, source and destination volumes
Subsystem: Filer
Command: **Filecopy**

Description

The following procedure copies all files, one at a time, from a source volume to a destination volume. Each new copy will receive the same name as the original. To change the names of the destination files, refer to the discussion of wildcards in the *Pascal 3.0 Workstation System Manual.*

Procedure

1. Enter the Filer and press F to invoke the **Filecopy** command.
2. Prompt: `Filecopy what file ?`

   Response: Type the volume ID (or unit number) of the source volume where the original copies reside, followed by `=` (Example: `#3:=`). Press Return. Make sure the source volume is on-line. The `=` is a wildcard that will cause the computer to read each file in the source volume, one at a time.
3. Prompt: `Filecopy to what ?`

   Response: Type the volume ID (or unit number) of the destination volume, followed by `$` (Example: `V4:$`). Press Return. The `$` is a wildcard that means "same name."
4. File copying now commences. Files are copied from the source volume to the destination volume, one at a time. If the source and destination units are the same, you will be prompted at the appropriate time to insert the destination volume. Exchange discs and press C.

Additional Information

Filecopy command: 55, 58, 147, 166, 168, 202
Copying all files in a volume: 166
$ wildcard: 148, 167, 169, 202, 245, 246
= wildcard: 167, 247, 250

Copying An Entire Volume

Volumes on-line: ACCESS:, source and destination volumes
Subsystem: Filer
Command: **Filecopy**

Description

The following procedure copies the entire source volume, all at once, to the destination volume. Both source and destination volumes will be identical.

Important

Do not use this procedure to copy a small source volume to a large destination volume. The destination volume will become the same size as the source, making much of its storage capacity inaccessible.

Procedure

1. Enter the Filer and press F to invoke the **Filecopy** command.
2. Prompt: `Filecopy what file ?`

   Response: Type the volume ID (or unit number) of the source volume (Example: `#3:`). Press Return. Make sure the source volume is on-line.
3. Prompt: `Filecopy to what ?`

   Response: Type the volume ID (or unit number) of the destination volume (Example: `V4:`). Press Return.
4. Volume copying now commences. If the source and destination units are the same, you will be prompted at the appropriate time to insert the destination volume. Exchange discs and press C.

Additional Information

Filecopy command: 55, 58, 147, 166, 168, 202
Copying an entire volume: 54, 57

Removing a Single File

Volumes on-line: ACCESS:, source volume
Subsystem: Filer
Command: **Remove**

Description

A file can be removed from a volume with the Filer's **Remove** command.

Procedure

1. Enter the Filer and press R to invoke the **Remove** command.
2. Prompt: `Remove what file?`

   Response: Make sure the volume containing the file to be removed is on-line, then type the *complete* file specification and press Return (Example: `#3:TEST.TEXT`).
3. The file is removed.

Additional Information

Remove command: 149
File specifications: 37, 44

Removing Multiple Files

Volumes on-line: ACCESS:, source volume
Subsystem: Filer
Command: **Remove**

Description

Multiple files can be removed from a volume with the Filer's **Remove** command, and the wildcards ? and =.

Procedure

1. Enter the Filer and press R to invoke the **Remove** command. Make sure the volume containing the file to be removed is on-line.
2. Prompt: `Remove what file?`

   Response:
   - To remove *all* files from a volume, type the volume ID (or unit number) of the volume, followed by = (Example: `V3:=`). Press Return.
   - To *choose* which files in the volume are to be removed, type the volume ID (or unit number) of the volume, followed by ? (Example: `#3:?`). Press Return.
3. The files in the volume will be listed on the screen one at a time (if you used ?) or all at once (if you used =). If removing all files, press Y to proceed with the remove, or N to abort. If choosing which files to remove, press Y to remove a file, or N to keep a file. After choosing which files will be removed, review the list of files on the screen and press Y to proceed with the remove, or N to abort the operation.

Additional Information

= wildcard: 167, 247
? wildcard: 169
Remove command: 149

Changing a File Name

Volumes on-line: ACCESS:, source volume
Subsystem: Filer
Command: **Change**

Description

The following procedure changes the name of a file in the source volume.

Procedure

1. Enter the Filer and press C to invoke the **Change** command.
2. Prompt: `Change what file ?`

   Response: Type the file specification of the file whose name you want to change and press Return. For example, to change the name of the file FRED.TEXT in the volume in unit #3, you would type:

   ```
   #3:FRED.TEXT Return
   ```

4. Prompt: `Change to what ?`

   Response: Type the new name of the file and press Return. Do not type the volume ID (or unit number) again. For example, to change the file to GEORGE.TEXT, you would type:

   ```
   GEORGE.TEXT Return
   ```

5. The file's name has now been changed.

Additional Information

Change command: 148

Changing a Volume Name

Volumes on-line: ACCESS:, source volume
Subsystem: Filer
Command: **Change**

Description

The following procedure changes the name (volume ID) of a volume.

Procedure

1. Enter the Filer and press C to invoke the **Change** command.
2. Prompt: `Change what file ?`

   Response: Type the volume ID or unit number of the volume whose name you want to change and press Return. For example, to change the name of the volume V3:, you would type:

   `V3:` Return
3. Prompt: `Change to what ?`

   Response: Type the new name (volume ID) of the volume (up to six letters). Press Return. For example, to change the volume to MEMOS:, you would type:

   `MEMOS:` Return
4. The volume's name has now been changed.

Additional Information

Change command: 148

Listing a Directory

Volumes on-line: ACCESS:, source volume
Subsystem: Filer
Command: **Ldir**

Description

The following procedure lists the directory of the source volume, providing a variety of information about each file in the volume.

Procedure

1. Enter the Filer and press L to invoke the **Ldir** command. Make sure the volume whose directory you want to list is on-line.
2. Prompt: `List what directory ?`

   Response: Type the volume ID (or unit number) of the volume whose directory you want to list. Press Return. For example, to list the directory of the volume in unit #3, you would type:

   `#3:` Return
3. All files in the directory are listed on the screen. If the directory is too long to fit on the screen, the computer will pause. Press the space bar to view the rest of the listing.
4. To list the files in alphabetical order, type `[*]` following the volume specification (Example: `#3:[*]`).

Additional Information

Ldir command: 144, 159
Interpreting a directory listing: 145

Listing All Volumes On-line

Volumes on-line: ACCESS:, any
Subsystem: Filer
Command: **Volumes**

Description

The Filer's **Volumes** command lists all on-line volumes on the screen, along with their associated unit numbers.

Procedure

1. Enter the Filer and press V to invoke the **Volumes** command.
2. All on-line volumes are listed.
   - The left-hand column gives the unit number for each volume
   - The right-hand column gives the volume ID of each volume.
   - A # between the unit number and volume ID indicates a blocked volume (one capable of storing files).
   - A * between the unit number and volume ID indicates the system volume.
   - Unblocked units are also listed: unit #1 (CONSOLE:) is assigned to the screen; unit #2 (SYSTERM:) is assigned to the keyboard; unit #6 (PRINTER:) is assigned to the printer.
   - The current prefix (default) volume is given at the bottom of the display.

Additional Information

Vols command: 48, 50, 152
Volumes: 37
Unit numbers: 28, 39
System volume: 118, 141, 174, 191
Default (Prefix) volume: 117, 151, 176

Compacting Volume Space

Volumes on-line: ACCESS:, source volume
Subsystem: Filer
Command: **Krunch**

Description

As files are stored to, and deleted from, a volume, free space may become fragmented. When this happens, there may not be a single contiguous group of free blocks large enough to contain a file. An error message, `No room on vol`, will be reported when you try to store a file in such a volume. The solution is to use the Filer's **Krunch** command to compact all free space into one contiguous "hole" at the end of the volume. It is good practice to back up a disc before invoking **Krunch**, for if the power were to fail during the process, files on the disc may be lost.

Procedure

1. Enter the Filer and press (K) to invoke the **Krunch** command. Make sure the volume you want to crunch is on-line.
2. Prompt: `Crunch what directory ?`

   Response: Type the volume ID (or unit number) of the volume you want to crunch. Press (Return). For example, if you want to crunch the volume in unit #3, type:

   `#3:` (Return)
3. Prompt: `Crunch directory ... ? (Y/N)`

   Response: Press (Y) if the correct volume is given in the prompt; press (N) if not.
4. The volume is then crunched. Do not try to abort the crunch operation. If you do, some, if not all, of the files on the volume may be lost.
5. The crunch operation is finished when the following prompt is displayed:

```
Crunch completed.
```

Additional Information

Krunch command: 150
"No room on vol" message: 150

Compiling a Pascal Program

Volumes on-line: CMP:, source volume
Subsystem: Compiler
Command: **Compiler**

Description

The following procedure describes how to compile a Pascal program.

Procedure

1. Make sure the CMP: volume is on-line and press C from the Main Command Level to load and run the Compiler.
2. Prompt: `Compile what text?`

   Response: Type the file specification of the file containing the program you want to compile. Press **Return**. For example, if the program resides in a file named PROG-.TEXT in the *default* volume, you would type:

   `PROG` **Return**

   The Compiler automatically appends the suffix, .TEXT. To suppress the suffix, type a period after the file name. This prompt will not appear if a workfile exists; the computer assumes you want to compile the workfile and skips to the next prompt.
3. Prompt: `Printer listing (l/y/n/e) ?`

   Response: Press:

   - L to send the program listing to a file. You must then give the file specification of the listing file.
   - Y to send the program listing to the printer.
   - N to produce no program listing. Any errors will be displayed on the screen.
   - E to send all reported errors to the printer *only*.

4. Prompt: `What listing file?`

   Response: This prompt appears only if you selected the "L" option in the previous prompt. Type the file specification of the file where you want the program listing put, followed by `[x]`, where x is the size of the listing file (in blocks). For example, to create a listing file named LIST.TEXT in the volume V3: that is 25 blocks long, type:

   ```
   V3:LIST[25] Return
   ```

   The suffix, .TEXT, is automatically appended. To suppress the suffix, type a period after the file name.

5. Prompt: `Output file (default is "...CODE") ?`

   Response: Press Return to send the compiler output to the default code file. Otherwise, type the file specification of the file where you want the output placed. This prompt does not appear if a workfile exists; the code is automatically put into the file WORK.CODE in the system volume.

6. Compilation is now performed.

Additional Information

Using the Compiler: 155, 189, 192, 196, 199

Running Programs

Volumes on-line: source volume
Subsystem: Main Command Level
Commands: **Run**, **eXecute**, **User**

Description

The Main Command Level's **Run**, **eXecute** and **User** commands can all be used to run a program under different circumstances.

Procedures

eXecute

To load and run any compiled program that is stored in a file, press X to invoke the **eXecute** command. The following prompt will appear:

```
Execute what file ?
```

Type the file specification of the file containing the program, and press Return. For example, to run a program stored in a file named PROG-.CODE in unit #3, you would type:

```
#3:PROG Return
```

The suffix, .CODE, is automatically appended. If the file does not have a .CODE suffix, type a period after the file name.

Run

If an uncompiled workfile exists, press R to invoke the **Run** command. The file WORK.TEXT will be compiled, loaded and run. If the workfile WORK.CODE exists, the compilation step is skipped and the workfile is immediately run. If no workfile exists, **Run** behaves just like **eXecute**.

User

To re-run the last program that was run, press U to invoke the **User** restart command. Pascal subsystems are programs also, and can be re-entered by pressing U.

Additional Information

eXecute command: 27, 31, 114
Run command: 119, 197, 200
User command: 30, 119

Printing a File

Volumes on-line: ACCESS:, source volume
Subsystem: Filer
Command: **Translate**

Description

This procedure describes how to print a file on the printer.

Procedure

1. Enter the Filer and press T to invoke the **Translate** command.
2. Make sure the volume containing the file you want to print is on-line. Make sure the printer is connected, turned on, and on-line.
3. Prompt: `Translate what file ?`

   Response: Type the file specification of the file you want to print and press Return. For example, if you want to print the file LETTER.TEXT in the volume NOTES:, you would type:

   ```
   NOTES:LETTER.TEXT Return
   ```

4. Prompt: `Translate to what ?`

   Response: `#6:` Return

   #6: is the unit number of the printer. If you prefer, you may use the volume ID PRINTER: in place of unit #6.

5. The file is printed on the printer. If this doesn't work, refer to the Special Configurations chapter of the *Pascal 3.0 Workstation System Manual.*

Additional Information

Translate command: 153

Volumes on-line:
Subsystem:
Command:

Description

Procedure

Additional Information

Glossary

Appendix B

block A block is a 512-byte unit of storage area on a WS1.0 volume and a 256-byte sector on a LIF volume. The Pascal system allocates storage space for files on the WS1.0 and LIF volumes in block increments.

boot device The peripheral where the Boot ROM found and loaded the Pascal operating system. The Boot ROM has a search pattern which allows booting from just about any drive in any HP mass storage product, including the Shared Resource Manager.

control character Any ASCII character whose value is either 127 or in the range of 0 thru 31. Use of control characters in the Editor and Filer is discouraged, because they may have undesirable effects.

cursor The underline (_) symbol on the screen. The cursor functions as a reference point for Editor commands which manipulate text and as a reference for prompts in other Pascal subsystems.

directory Contains information about the files on a volume. This information includes the volume name and the following information about each file on the medium: the file name, the file size (in number of blocks), the date of last modification to the file, its starting block address, and the file type (which reflects the file's attributes). Directory information can be seen by using the Filer's List Directory and Extended Directory commands. The directory is initialized with the Filer's Zero command.

dollar sign This character "$" is used in the Filer as a convenience in specifying file names. When used in place of a destination file name, it means that the file is to have the same name as the source file.

environment The conditions or parameters which affect how text in the Editor is Adjusted, Inserted, and Margined. These parameters may be changed with the Editor's **Set** command.

file A discrete collection of information designated by a file name and residing on a mass storage medium.

file name An entry in a directory which identifies a particular file.

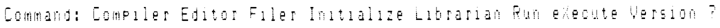
file specification Completely identifies a file and may include both a volume specification and a file name. A volume specification can be one of many items, but it is always part of a file specification. If a volume ID is given, it must be separated from the file name by a colon (:). If not, the default volume is assumed.

file types Several file types are recognized by the Pascal System. Files generally (but not always) have a suffix as part of the file name which indicates their type. The file type is established at the time of the file's creation and cannot be changed just by changing the suffix. The types and their associated suffixes are:

- TEXT files - (suffix is .TEXT) Contain ASCII characters and Editor environment information.
- ASCII files - (suffix is .ASC) Are similar to TEXT files. The format is slightly different and there is no Editor environment information.
- CODE files - (suffix is .CODE) Contain code generated by the Pascal Assembler, Compiler or Librarian.
- Data files - (no specific suffix) Are files which can be created by any subsystem but are used primarily as INPUT and OUPUT files in Pascal programs. They do not have suffixes.
- System files - (suffix is .SYSTM) Are files created with the Librarian's Boot command. They are loadable by the boot ROM.
- Bad files - (suffix is .BAD) are a type of file created by the user to isolate unreliable or worn-out areas on a mass storage medium. Once created, BAD files will not be moved by subsequent crunches of the volume.

Librarian A Pascal subsystem designed to manage object modules. It can link or just collect object modules together into object files. The Librarian is the file named LIBRARIAN in the operating system and is accessed by pressing (L) from the Main Command Level.

Main Command Level The level from which all the subsystems of the Pascal System are entered. The prompt displayed at this level looks like:



```
Command: Compiler Editor Filer Initialize Librarian Run eXecute Version ?
```

mouse A small, rodent-like input device, consisting of a roller ball and buttons. Rolling the device on any surface generates two-dimensional movement information that is transmitted through its tail to the computer. Pushing the buttons also generates information that is sent to the computer. The mice available with Series 200 equipment are connected to the computer through the HP Human-Interface Link (HP-HIL).

on-line Any object (device, volume or file) currently accessible by the Pascal System.

peripheral An I/O device such as a printer or disc.

prompt Generally, any request for information from the system. The different Pascal subsystems have primary prompts (the Editor Prompt, Filer Prompt, etc.) and many subsystem commands have prompts of their own which are displayed at the top of the screen when the command is entered.

string A contiguous series of non-control ASCII characters.

system volume or system unit The Pascal system distinguishes one mass storage unit to be used for special purposes. This "system volume" is where the date and any AUTOSTART file are found at boot time. It is where the system looks first for system files such as the Compiler and Editor, where workfiles are stored, and where an intermediate file is stored during interpretation of a Stream (command) file.

text file A file created and/or used by the Editor which contains ASCII or selected foreign characters. The Editor automatically appends `.TEXT` to a file name unless it either already contains a suffix or the last character in the file name is a period. A text file may be of type TEXT, ASCII or DATA.

unit An entry in the Unit Table.

unit number An integer in the range from 1 through 50 representing the volume having the corresponding entry in the unit table.

volume A volume refers to any I/O device such as a printer, keyboard, screen, or mass storage device. The name of a mass storage volume is found in its directory; the name of an unblocked device is found in its Unit Table entry. There may be several volumes on one physical storage medium. Hard discs typically contain multiple volumes, but flexible discs generally have only a single volume. The volume may be mounted (in a disc drive) or not. The syntax of a volume name depends on its type (for example, LIF volume names may contain 6 characters, WS1.0 may contain 7).

wildcard Both of the characters = and ? can be used in the Filer as wildcards in place of parts of a file specification.

workfile If the workfile exists, it is the automatic file used by the Editor, Compiler, Assembler, Debugger and the Run command. It is designated when quitting the Editor using the Update option or the Filer's Get command.

Pascal System Components

Appendix C

Subsystem Memory Requirements

The table below shows the approximate amount of memory consumed by each subsystem when it is permanently loaded (P-loaded). Additional memory may be required when a subsystem is run, proportional to the size of the file it is operating on.

Note

K bytes = 1 024 bytes.

Subsystem Name	Memory Consumed by P-loading (K bytes)
Assembler	67
Compiler	199
Editor	52
Filer	48
Librarian	48

To perform this calculation for other programs, follow this procedure:

1. At the Main Command Level, press (V) to invoke the **Version** command.
2. Write down the `Total Available Memory` as given on the screen.
3. Press (Return) twice to return to the Main Command Level, and use the **Permanent** command to permanently load the program.
4. Press (V) to invoke the **Version** command again.
5. Subtract the current `Total Available Memory` from the value you wrote down in step 2. This is the number of bytes consumed by permanently loading the program. To convert this number to K bytes, divide by 1 024.

Volume Contents

The lists below show how the subsystems, utility programs and libraries are distributed among the Pascal system volumes.

BOOT: Volume Files

```
SYSTEM_P
INITLIB
TABLE
STARTUP
SWVOL.CODE
AUTOSTART
```

SYSVOL: Volume Files

```
LIBRARY
```

ACCESS: Volume Files

```
FILER
EDITOR
LIBRARIAN
MEDIAINIT.CODE
TAPEBKUP.CODE
ETU.CODE
```

CMP: Volume Files

```
COMPILER
```

ASM: Volume Files

```
ASSEMBLER
DEBUGGER
REVASM
```

LIB: Volume Files

```
GRAPHICS
IO
```

CONFIG: Volume Files

```
CTABLE.TEXT
CTABLE3.0.CODE
CTABLE1.0.CODE
DISC_INTF
DATA_COMM
GPIO
RS232
SRM
F9885
BUBBLE
EPROMS
INTERFACE
EDRIVER
SEGMENTER
HPHIL
MOUSE
```

FLTLIB: Volume Files

```
FGRAPHICS
```

Subject Index

System Configuration Table

Instructions: Use a pencil to fill in this table. Make one entry for every assigned unit in your system. See the "Know Thy System" section in Chapter 3 for further information.

Supplement

USING YOUR DISC DRIVE WITH YOUR COMPUTER

Supplement to manual P/N 09122-90000 dated June, 1984

Introduction

For your convenience, this supplement provides information to help you get started using your disc drive with your computer. Information available to date is included in this supplement. As further system information becomes available, we will update this supplement. Revisions of this document may be ordered using Hewlett Packard part number 09122-90012.

This supplement helps you configure your disc drive, format discs, and make copies of your discs. Don't let the terminology scare you. Configuration is simply a way to let your computer know which disc drive it is talking to, where the disc drive is on the HP-IB bus, and which drive you want the computer to access.

Formatting (or initializing) is the process that prepares your disc to receive and store data. The formatting process checks your disc for defects. Formatting also creates a directory. The directory holds the name and location of each file on the disc, similar to the way your address book holds the names and addresses of all your friends.

An important thing to remember about formatting is that it is system dependent. What this means to you is that if a disc is formatted on one computer system, the disc may not necessarily work on another computer system.

Printed in U.S.A. 8/1/84

CAUTION

Formatting will destroy any data already stored on the disc.

Copying means that you make a duplicate copy of a disc. Like phonograph records, flexible discs wear out. Also, flexible discs can be damaged by accidents or careless handling. Since your valuable data and programs can be lost when a disc wears out or is damaged, it is recommended that you make an extra copy of your important discs.

Read only the portion of this supplement that refers specifically to your computer.

HP Touchscreen PC

The following section describes the use of the HP 9122D and HP 9121D with the HP Touchscreen PC. (The HP 9122S and HP 9121S are not described due to the fact that these drives are add-on drives. This means that you can connect an HP 9122S or HP 9121S to your HP Touchscreen PC only if you already have another flexible disc drive connected to your HP Touchscreen PC. Please consult the HP Touchscreen PC manual, "More About Connecting Printers, Plotters and Disc Drives," for information on installing an add-on drive.)

Configuration

Complete the configuration as follows:

1. Make sure the address switch on the back of your disc drive is set at 0. Figure 1 illustrates the appearance of the address switch when the address is set at 0.
2. Load P.A.M. (Personal Applications Manager) and the operating system in one of the following ways:
   A. If you are using an interconnect power cord from your HP Touchscreen PC to your disc drive, insert the SYSTEM_MSTR disc into the left flexible disc drive. Turn on your HP Touchscreen PC.
   B. If your disc drive has a separate power cord plugged into a wall socket, first turn on your disc drive. Then insert the SYSTEM_MSTR disc into the left flexible disc drive. Turn on your HP Touchscreen PC.

	Position of 4 small switches			
Address	Left	Middle Left	Middle Right	Right
0	Up	Down	Down	Down
1	Up	Down	Down	Up
2	UP	Down	UP	Down
3	Up	Down	Up	Up
4	Up	UP	Down	Down
5	Up	Up	Down	Up
6	Up	Up	Up	Down
7	Up	Up	Up	Up

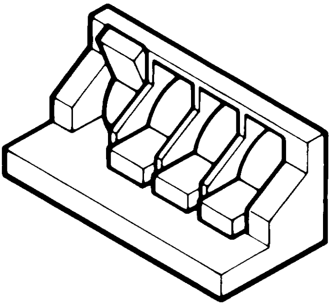


Figure 1: Address setting of 0

3. A screen appears labeled, "Personal Applications Manager (P.A.M.)." When this screen appears, touch:

   EASY CONFIG
   SYS_MASTER-A

   This block should now be highlighted.
4. Next, touch **START APPLIC**.
5. A new screen appears with illustrations of computer products. The screen displays the message, *Select device to be configured and press NEXT STEP*. Touch the **DISC DRIVE** illustration so that this illustration is highlighted. Then touch **NEXT STEP**.
6. Another screen appears with illustrations of disc drives. Touch the illustration that contains the name of your disc drive, for example HP 9122D.
7. Make sure the illustration you touched is highlighted.
8. Touch **MAIN SCREEN**.
9. Touch **EXIT**.

Formatting Flexible Discs

Before a flexible disc can be used for the first time, it must be formatted. The following steps format your flexible discs:

1. Make sure the SYSTEM_MSTR disc is write protected. Then, insert this disc in the left flexible disc drive.
2. When P.A.M. appears on your screen, load the FORMAT utility by touching:

   FORMAT
   SYS_MASTER-A
3. Touch **START APPLIC**

4. Insert a blank disc in the right drive (drive B).

5. Select the disc you wish to format. Since you wish to format the blank disc that you inserted in the right drive, touch **DRIVE B**.

6. The screen displays, *Type the disc label (11 characters or less) and press Return*. If you wish to label your disc so that the computer can read the label, you may do so now by typing in the name you wish to give the disc and pressing the Return key. If you do not wish to label the disc, touch **NO DISC LABEL**.

7. **If you have an HP 9121D**, the HP Touchscreen PC formats your discs in a single-sided format. If you have an HP 9121D, you can skip the rest of this step and go to step 8.

   If you have an HP 9122D, you now have a choice. Discs may be formatted using single-sided format or double-sided format. The **HP Touchscreen PC formats your discs in a double-sided format, unless you tell the HP Touchscreen PC that you wish to format single-sided**. Select a single-sided format if:

   A. you are using single-sided media; or

   B. you want to format a disc so that you can use the disc in either a single-sided or a double-sided disc drive.

   If you have an HP 9122D and you want to choose single-sided formatting:

   A. Touch **FORMAT OPTIONS**.

   B. The "Format Options" menu appears. Touch **SINGLE-SIDED** on this menu. An asterisk appears in the **SINGLE-SIDED** block to indicate that this option has been selected.

   C. Touch **MAIN MENU** to return to the main formatting screen.

8. You can copy the operating system (MS-DOS) and P.A.M. at this time. (If you want to be able to boot your computer from the flexible disc you are formatting, you need to copy the operating system to the disc.) If you want to copy the operating system to the new disc, make sure the SYSTEM_MSTR disc is in drive A and touch the **COPY SYSTEM** block. An asterisk (*) in this block indicates that the operating system will be copied during the formatting process.

9. Touch **START FORMAT**. When you touch **START FORMAT**, the screen may display the message, "*This disc has files. Do you want to destroy them? Type Y or N; press Return.*" Remember that formatting destroys any data already stored on the disc. If you

8. When the copying is complete, touch **EXIT SELECT**. Then touch **MAIN MENU**. Finally, touch **EXIT MAIN** to return to P.A.M.

Points to Remember When Copying Discs

1. APPLICATION programs are copied from their MASTER discs via the INSTALL utility.
2. Most other files that are not APPLICATION program files can be copied using the COPY/BACKUP utility.
3. Write protect all MASTER discs to guard against accidental erasure.

Series 200 Basic 3.0 Operating System

The following section describes the most commonly used BASIC commands as they apply to the HP 9121D and HP 9122D disc drives. Additionally, we list and define other frequently used BASIC commands.

Mass Storage Unit Specifier

Before you begin using BASIC 3.0 commands, you need to understand the Mass Storage Unit Specifier (MSUS). MSUS is what the computer uses to identify your disc drive. For example, the MSUS of an HP 9122D might appear as follows:

":HP9122,700,0"

Note that the MSUS is composed of three parts, separated by commas:

1)	A device type	:HP 9122
2)	A device selector	700
3)	A unit number	0

The device type is simply the name of the disc drive you are using, such as the HP 9122. If you are using an HP 9121D, the device type is HP8290X or HP9121. **The device type is optional with the BASIC 3.0 operating system**. For example, you may type your MSUS as ":,700,0", leaving out the HP 9122 device type.

The device selector refers to the address of your disc drive. The first number is 7 as long as you are using the internal HP-IB connection. The last two numbers are the address of your disc drive. These numbers may vary from 00 to 07, depending on the address setting. In this example, the disc drive address is 00.

The unit number refers to the drive you wish to access. In this example, the unit number of 0 means that you wish the computer to access the left drive (unit 0) of the HP 9122D. If you wish the computer to access the right drive, the unit number is 1.

Booting Your System

Boot your system using the following steps:

1. Be sure the address switch on the back of your disc drive is set to "0."
2. Turn on your disc drive, but be sure your computer is not turned on.
3. Insert the BASIC 3.0 System disc in the left disc drive.
4. Turn on the your computer. Your computer automatically loads the BASIC 3.0 operating system. When the prompt "*BASIC Ready 3.0*" appears on the screen, the operating system is loaded. Loading of the operating system takes approximately 50 seconds.
5. Remove the BASIC 3.0 System Disc and insert the BASIC 3.0 Driver's disc into a flexible disc drive.
6. Type **LOAD BIN "HPIB"** and press Enter.
7. When the prompt "*BASIC HPIB 3.0*" appears, type **LOAD BIN "CS80"** and press Enter.

   Loading time is approximately 20 seconds.
8. The system is now ready to use with BASIC 3.0.

Following are the disc drive commands most commonly used with BASIC 3.0. All commands have the same basic format. You type the command, followed by the MSUS of the disc drive to which the command should be directed.

Mass Storage Specifier

The "mass storage is" (MSI) command is used to direct all your disc drive commands to your most frequently used disc. If you use the MSI command, you do NOT have to specify an MSUS with every disc drive command. (The exception to this rule is the initialize command, which always requires the specification of an MSUS).

Boot your system according to the directions above. Make sure your disc drive is turned on. The MSI command appears similar to the following example:

MSI":HP9122,700,0" and press ENTER

Once you have typed this MSI command, subsequent disc drive commands will be directed automatically to the left drive of an HP 9122D.

Catalog

The CAT command displays the directory of all files on the disc. In addition, the command displays the device MSUS in the upper right corner of the screen. The default MSUS for the HP 9122D appears as :CS80,700,0 (if the address is set at 00 and the disc is in the left drive). The default MSUS for the HP 9121D appears as :HP8290X,700,0. For example, if you wish to display the directory for the disc that is in the left drive of your HP 9122D, type:

CAT":HP9122,700,0" and press ENTER.

If you used the MSI command to specify the left drive of your HP 9122D as the default drive, you can simply type:

CAT

Disc Initializing

Place the disc you wish to initialize in either the right or left drive.

HP 9121D

If you have an HP 9121D, initialize discs using a command similar to the following command:

INITIALIZE ":HP9121,700,0" or INITIALIZE ":,700,0"

This command tells the computer that you wish to initialize a disc that is in the left drive of an HP 9121 with an address setting of 0. If you wish to initialize a disc that is in the right drive, type:

```
INITIALIZE ":HP9121,700,1" or INITIALIZE ":,700,1"
```

Initializing takes about two minutes, during which the disc access light is lit.

HP 9122D

If you have an HP 9122D, you have several formatting options from which to choose. The following table illustrates the choices.

Format Option	Bytes/ Sector	Double-Sided or Single-Sided Formatting	Kbytes of Storage[1]
0	256	Double-Sided	630K
1	256	Double-Sided	630K
2[2]	512	Double-Sided	710K
3	1,024	Double-Sided	788K
4	256	Single-Sided	270K

[1] Kbyte is assumed to be 1,000 bytes.

[2] Note: This formatting option is not presently supported by BASIC 3.0. Do NOT select a format option of 2.

You must remember three important things when selecting a format option.

1. You can format double-sided ONLY on double-sided discs in a double-sided disc drive (e.g., HP 9122D).
2. A disc formatted double-sided can only be used in a double-sided disc drive (e.g., HP 9122D).
3. A disc formatted single-sided can be used in both a single-sided and a double-sided disc drive (e.g., HP 9121D and HP 9122D).

You may initialize a disc using a command similar to the following command:

```
INITIALIZE ":HP9122,700,0",0,0
             └──────────┘ │ └ format option [optional]
                  │       └── interleave factor [optional]
                  └────────── MSUS
```

An interleave factor of zero specifies the default interleave.

The above command tells the computer that you wish to initialize a disc that is in the left drive of an HP 9122D with an address setting of 00.

Initializing takes approximately two minutes, during which time the disc access light is lit.

Backup

To make backup copies of discs, place the disc to be copied in the left drive of your HP 9121D or 9122D. Place an initialized disc in the right drive. Type the following command:

```
    COPY ":,700,0" TO ":,700,1"
```

This tells the computer that you wish to copy the disc that is in the left drive (drive 0) to the disc that is in the right drive (drive 1).

You may also copy files from a disc, using a command similar to the following:

```
    COPY "Filename:,700,0" TO "Filename:,700,1"
                               or
    COPY "Filename:CS80,700,0" TO "Filename:CS80,700,1"
```

where "Filename" is the name of a file on your disc that you wish to copy.

Most Used Mass Storage Commands

The following commands are probably the commands you will use most often when communicating with the disc drive. These commands operate as described in your BASIC Programming Techniques manual.

CAT	Reads the directory of files on the disc.
COPY	Copies a volume or file.
CREATE	Creates a data file.
ENTER	Reads data from a data file.
INITIALIZE	Checks the disc for defects, establishes a volume label on the disc, and creates a directory.
LOAD	Reads programs from the disc.
LOAD BIN	Reads binary programs from the disc.

OUTPUT	Writes data to a data file.
PURGE	Deletes files from the directory.
RE-STORE	Rewrites a program to the disc, and then purges the old revision from the directory.
STORE	Writes programs to the disc.

Series 200 Pascal 3.0 Workstation System

The following sections explains how to initialize discs and make backup copies of discs using Pascal 3.0 Workstation System.

Disc Initialization

Use the following steps to initialize a disc:

1. Turn the computer system on.
2. Insert the **Boot**: disc in either drive.
3. When the screen says, *Please put SYSVOL in unit # 3 and press the X key,"* remove the **Boot**: disc. Insert the **Sysvol**: disc in the left drive, and press the X key.
4. When the screen displays, *New system date?*, type the date and press Enter.
5. When the screen displays, *New system clock time?*, type the time and press Enter.
6. Next, the following command line appears on the screen:

   Command: Compiler Editor Filer Initialize Librarian Run eXecute Version?

   When the command line appears, remove the **Sysvol**: disc and insert the **Access**: disc.
7. Type "X" for eXecute.
8. When the screen displays, Execute what file?, type:

   ```
   ACCESS:MEDIAINIT
   ```

   Press Enter.
9. The screen then displays, *Volume ID?*. Insert the disc you want to initialize into a drive. Type #3, if the disc you wish to initialize is in the left drive. Type #4, if the disc you wish to initialize is in the right drive. (Your unit number may vary. Check your computer user's manual.)

10. Remove the **Access**: disc. This is a precautionary step just to make sure that you do not accidentally initialize the **Access**: disc.
11. When the screen displays, *Are you sure you want to proceed Y/N*, type Y if you wish to continue with the initialization procedure. Type N if you wish to stop the initialization procedure.
12. **If you have an HP 9121,** proceed to step 13. You will not see the display described in step 12 on your screen.

    If you have an HP 9122, the screen now displays, *Formatting option? (defaults to 0)*. You have five choices, as follows:

Format Option	Bytes/ Sector	Double-Sided or Single-Sided Formatting	Kbytes of Storage[1]
0	256	Double-Sided	630K
1	256	Double-Sided	630K
2	512	Double-Sided	710K
3	1,024	Double-Sided	788K
4	256	Single-Sided	270K

[1] Kbyte is assumed to be 1,000 bytes.

You must remember three important things when selecting a format option.

A. You can format double-sided only on double-sided discs in a double-sided disc drive (e.g., HP 9122D).

B. A disc formatted double-sided can only be used in a double-sided disc drive (e.g., HP 9122D).

C. A disc formatted single-sided can be used in both a single-sided and a double-sided disc drive (e.g., HP 9121D and HP 9122D).

   Press ENTER if you wish to select the default option of 0. Otherwise, type the number of the format option that you wish to select, and press Enter.

13. The screen now displays, *Interleave factor? (defaults to 2)*. Performance may vary with different interleave factors.

    Press ENTER if you wish to select the default interleave of 2. Otherwise, type the number of the interleave factor that you wish to select, and press Enter.

14. The screen now displays, *Medium initialization in progress.* Initialization takes approximately three minutes and the disc access light is lit during this entire period.
15. At the end of the initialization process, the screen displays:

    Medium initialization in progress
    Medium initialization completed

    About ten seconds later, the screen displays:

    Volume zeroing in progress
    Volume zeroing completed
16. The disc has been successfully initialized.

Copying

Use the following steps to make a copy of all the files on a disc:

1. Once you have booted the computer, insert the **Access**: disc into either the right or left drive.
2. When the command line appears (Command: Compiler Editor Filer . . .), type F for Filer.
3. When the filer line appears (Filer: Change Get . . .), remove the **Access**: disc. Place the disc that you wish to copy in the left drive. Place an initialized disc in the right drive.
4. Type F for Filecopy.
5. When the screen displays, *Filecopy what file?*, type #3: and press Enter. This tells the computer that you wish to copy all the files and the volume name from the disc that is in the left drive.
6. When the screen displays, *Filecopy to what?*, type #4: and press Enter. This tells the computer that you wish the copy to go TO the disc that is in the right drive.
7. The screen now displays *Reading* . . . and the left disc access light is lit.
8. When the screen displays *Destroy Directory V4? Y/N*, type Y if you wish to proceed with the copying. Type N if you wish to stop the copying process.
9. The screen now displays *Writing* . . .. The disc access light is lit alternately on the left and right drives. The copying process takes only a few minutes.
10. When copying is complete, the filer line (Filer: Change Get . . .) again appears on the screen.
11. Type Q for Quit and press Enter.

Use the following steps when you want to make copies of some files on a disc, but do not want to copy all the files on the disc:

1. Once you have booted the computer, insert the **Access**: disc into either the right or left drive.
2. When the command line appears (Command: Compiler Editor Filer . . .), type F for Filer.
3. When the filer line appears (Filer: Change Get . . .), remove the Access: disc. Place the disc that you wish to copy in the left drive. Place an initialized disc in the right drive.
4. Type F for Filecopy.
5. When the screen displays, *Filecopy what file?*, type **#3:filename**, and press Enter. This tells the computer that you wish to copy "filename" from the disc that is in the left drive.
6. When the screen displays, *Filecopy to what?*, type **#4:filename**, and press Enter. This tells the computer that you wish to copy "filename" to the disc that is in the right drive.
7. The screen now displays *Reading* . . . and the left disc access light is lit.
8. The screen now displays *Writing* . . .. The disc access light is lit first on the left and then on the right drive. The copying process takes only a few minutes.
9. When copying is complete, the filer line (Filer: Change Get . . .) again appears on the screen.
10. Type Q for Quit if you are finished copying. Repeat steps 4 through 9 if you wish to copy more files.

USING YOUR DISC DRIVE WITH YOUR COMPUTER

Supplement to manual P/N 09133-90040 dated August 1, 1984

Introduction

For your convenience, this supplement provides information to help you get started using your disc drive with your computer. Information available to date is included in this supplement. As further system information becomes available, we will update this supplement. Revisions of this document may be ordered using Hewlett-Packard part number 09133-90041.

This supplement helps you configure your disc drive, format discs, and make copies of your discs. Don't let the terminology scare you. Configuration is simply a way to let your computer know which disc drive it is talking to, where the disc drive is on the bus, and which drive you want the computer to use.

Formatting (or initializing) is the process that prepares your disc to receive and store data. The formatting process checks your disc for any damage that may have occurred during shipment and also creates a directory. The directory holds the name and location of each file on the disc, similar to the way your address book holds the names and addresses of your friends.

An important thing to remember about formatting is that it is system dependent. This means that if a disc is formatted on one computer system, the disc may not work on another computer system.

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NOTE

All discs, including fixed discs, must be formatted before they can be used. Formatting takes approximately 2-3 minutes per megabyte. Formatting is an excellent investment of time because it not only prepares your disk to receive and store data, but also checks the disc for any damage it might have sustained during shipment.

CAUTION

Formatting destroys any data already stored on the disc.

Copying means that you make a duplicate copy of a disc. Like phonograph records, flexible discs wear out. Also, flexible discs can be damaged by accidents or careless handling. Since your valuable data and programs can be lost when a disc wears out or is damaged, it is recommended that you make an extra copy of your important discs.

Read only the portion of this supplement that refers specifically to your computer.

HP Touchscreen PC

The following section describes the use of the HP 9133D with the HP Touchscreen PC. (The HP 9134D is not described. Due to the fact that the HP 9134D has no flexible drive, it is only supported as an add-on drive. This means that you can connect an HP 9134D to your HP Touchscreen PC only if you already have a flexible drive connected to your HP Touchscreen PC. Please consult the HP Touchscreen PC manual, "More About Connecting Printers, Plotters and Disc Drives," for information on installing an add-on drive.)

Configuration

Complete the configuration as follows:

1. Make sure the address wheel on the back of your disc drive is set at 9, and the configuration switch is set at 0. If you need help, please refer to Chapter 1 of the HP 9133D/9134D Operator's Manual.
2. Load P.A.M. (Personal Applications Manager) and the operating system, as follows:

A. Turn on your disc drive.

B. Insert the SYSTEM_MSTR disc into the flexible disc drive.

C. Turn on your HP Touchscreen PC.

3. A screen appears labeled, "Personal Applications Manager (P.A.M.)." When this screen appears, touch:

   EASY CONFIG
   SYS_MASTER-A

   This block should now be highlighted.

4. Next, touch **START APPLIC.**
5. A new screen appears with illustrations of computer products. The screen displays the message, *Select device to be configured and press NEXT STEP*. Touch the **DISC DRIVE** illustration so that this illustration is highlighted. Then touch **NEXT STEP.**
6. Another screen appears with illustrations of disc drives. Touch the illustration labeled 9133D. (Do not touch the illustration labeled 9133XV).
7. Make sure the picture labeled 9133D is highlighted.
8. Touch **MAIN SCREEN.**
9. Touch **EXIT.**

Formatting the Fixed Disc

Before the fixed disc can be used for the first time, it must be formatted.

The following steps format your fixed disc:

1. Make sure the SYSTEM_MSTR disc is write protected. Then, insert the disc in the flexible disc drive.
2. When P.A.M. appears on your screen, load the FORMAT utility by touching:

   FORMAT
   SYS_MASTER-A

3. Touch **START APPLIC**
4. Select the disc you wish to format. Since you wish to format the fixed disc, touch **DRIVE B.**
5. The screen displays, *Type the disc label (11 characters or less) and press Return.* If you wish to label your disc so that the computer can read the label, you may do so now by typing in the name

you wish to give the disc and pressing the Return key. If you do not wish to label the disc, touch **NO DISC LABEL**.

6. You want to copy the operating system (MS-DOS) and P.A.M. to the fixed disc at this time, so that you can begin booting from the fixed disc. Therefore, touch the **COPY SYSTEM** block. An asterisk (*) in the **COPY SYSTEM** block indicates that the operating system will be copied to the fixed disc during the formatting process.
7. Touch **START FORMAT**. When you touch **START FORMAT**, the screen may display the message, *"This disc has files. Do you want to destroy them? Type Y or N; press Return."* Remember that formatting destroys any data already stored on the disc. If you wish to destroy the data already contained on the disc, type Y and press Return. The formatting process begins. If you do NOT want to destroy the information already on the disc, type N and press return.

NOTE

After you type Y, indicating that you wish to begin formatting, a 20-second selftest is performed on your fixed disc drive. If you decide that you do not want to format the fixed disc, TURN OFF THE DISC DRIVE during the 20-second selftest. If you turn off the disc drive during the 20-second selftest, you will not lose any data already stored on your disc. If you turn off the disc drive after the 20-second selftest, you will lose data.

---

8. If you are copying the operating system, the HP Touchscreen PC first reads all operating system files. When all the files have been read and are ready for transfer, a message appears on the screen, *"All system files have been read. Insert disc(s) to be formatted."* Since you are formatting the fixed disc, simply press Return.
9. The *"Formatting"* screen appears, and the disc that you selected for formatting is highlighted.

NOTE

Formatting takes approximately 2-3 minutes per megabyte or approximately 30 minutes for the 15 megabyte fixed disc. Formatting is an excellent investment of time because it not only prepares your disc to receive and store data, but also checks the disc for any damage it might have sustained during shipment.

After your disc is formatted, the highlight is removed and the screen displays the message, *Press Start Over or Exit Format.*

10. Touch **EXIT FORMAT** on the screen to return to P.A.M.

Configuration for Normal Operation

Normally you will be operating off the fixed disc. This means that your computer boots from the fixed disc, and all your applications and files are stored on the fixed disc. Not only will the overall system performance be better, but it is also more convenient to have your operating system and all applications and files in one location.

When you set your address wheel at 9, you told your HP Touchscreen PC that you wanted to boot from the flexible disc. Since you have now copied your operating system and P.A.M. to the fixed disc, you want to begin booting and operating from the fixed disc.

In order to begin booting from the fixed disc, turn off your disc drive and your computer. Reset the address wheel to 0. The fixed disc now becomes your primary disc drive (drive A).

Turn on your disc drive and wait for the disc drive to complete the 30-second selftest. Turn on your computer. Your computer should now boot from the fixed disc. If the operating system does not boot from the fixed disc, repeat the directions under "Configuration" and "Disc Formatting". If you still cannot boot from the fixed disc, contact your dealer or Hewlett-Packard sales office.

Installing Applications

Hewlett-Packard distributes all APPLICATION programs on flexible discs labeled "MASTER." While you can use your MASTER discs just as they are, we strongly recommend that you install them onto a new working disc, such as the fixed disc. Store your MASTER discs in a safe location so that you can make new working discs if something happens to the current working discs.

APPLICATION programs are always installed from the MASTER disc via the INSTALL utility.

Use the following steps to install your APPLICATION programs:

1. Make sure the address wheel on the back of your disc drive is set at "0."
2. The INSTALL utility is on your APPLIC_MSTR disc. Therefore, insert the APPLLIC_MSTR disc in the flexible disc drive and touch:

   REREAD DISCS.
3. Touch **INSTALL**
4. Touch **START APPLIC**
5. After the program loads, touch **INSTALL APPLIC**
6. The screen prompt states, *"Select the correct discs below. Press show applics."* Since you are going to install applications from flexible discs (drive B) to the fixed disc (drive A), select a source disc of drive "B" and a destination disc of drive "A."
7. Remove the INSTALL utility disc from the flexible disc drive, and insert the MASTER disc you wish to copy.
8. Touch **SHOW APPLIC** in order to list the application programs available for copying. Touch each application program that you wish to copy.
9. When you have selected all the applications programs that you wish to copy, touch **START INSTALL.**
10. When the installation is complete, touch **EXIT SELECT**. Repeat directions 7, 8 and 9 for each application disc you want to install. Touch **EXIT INSTALL** in order to return to P.A.M.

Points to Remember When Copying Discs

1. APPLICATION programs are copied from their MASTER discs via the INSTALL utility.
2. Most other files that are not APPLICATION program files can be copied using the COPY/BACKUP utility.
3. Write protect all MASTER discs to guard against accidental erasure. See Chapter 1 for information on how to write protect flexible discs.

Series 200

First, make sure the address wheel on your HP 9133D is set at an address between 0 and 7. Also, set the configuration switch according to the following directions.

Use of the Configuration Switch

The configuration switch allows you to partition your fixed disc into more than one volume. Each volume must be initialized separately.

CAUTION

If you change the configuration switch after you have initialized the fixed disc, data may be lost. You should change the configuration switch only when you are initializing the fixed disc.

The configuration switch allows you to partition your fixed disc into multiple volumes for use with Series 200 computers. To set the switch, complete the following steps:

1) Turn off your disc drive.
2) Insert a small screwdriver into the slot on the configuration switch.
3) Rotate the switch to the desired setting.
4) Turn on your disc drive.

The configuration switch has possible settings from 0 through 9. The following chart details the meaning of each setting.

Configuration Setting	Number of Volumes	Size of Volumes 256 bytes/sector	 1024 bytes/sector (Option 001)
0	One	14.84 Mbyte/volume	16.64 Mbyte/volume
1	One	14.84 Mbyte/volume	16.64 Mbyte/volume
2	Two	7.37 Mbyte/volume	8.23 Mbyte/volume
3	Three	4.91 Mbyte/volume	5.47 Mbyte/volume
4	Four	3.64 Mbyte/volume	4.03 Mbyte/volume
5	One	12.29 Mbyte/volume	13.76 Mbyte/volume
	One	2.51 Mbyte/volume	2.76 Mbyte/volume
6	Six	2.41 Mbyte/volume	3.65 Mbyte/volume
7	One	9.83 Mbyte/volume	11.00 Mbyte/volume
	Two	2.46 Mbyte/volume	2.70 Mbyte/volume
8	Eight	1.77 Mbyte/volume	1.93 Mbyte/volume
9	One	7.32 Mbyte/volume	8.18 Mbyte/volume
	Three	2.46 Mbyte/volume	2.70 Mbyte/volume

BASIC 3.0

The following section describes the most commonly used BASIC commands as they apply to the HP 9133D. If you connect an HP 9134D to your Series 200 computer, the same commands may be used. However, please note that you cannot boot from your HP 9134D until you have installed the BASIC operating system on the fixed disc of the HP 9134D.

Mass Storage Unit Specifier

Before you begin using BASIC 3.0 commands, you need to understand the Mass Storage Unit Specifier (MSUS). MSUS is what the computer uses to identify your disc drive. For example, the MSUS of an HP 9133D might appear as follows:

```
":HP9133,700,1"
```

Note that the MSUS is composed of three parts, separated by commas:

1)	A device type	:HP9133
2)	A device selector	700
3)	A unit number	1

The device type is simply the name of the disc drive you are using, such as the HP 9133. **The device type is optional with the BASIC 3.0 operating system**. For example, you may type your MSUS as ":,700,0", leaving out the HP 9133 device type.

The device selector refers to the address of your disc drive. The first number is 7 as long as you are using the internal HP-IB connection. The last two numbers are the address of your disc drive. These numbers may vary from 00 to 07, depending on the address setting. In this example, the disc drive address is 00, and the configuration switch is also set at 0.

The unit number refers to the drive you wish to access. In this example, the unit number of 1 means that you wish the computer to access the flexible disc drive of the HP 9133D. If you wish the computer to access the fixed disc drive of the HP 9133D, the unit number is 0.

Booting Your System

Boot your system using the following steps:

1. Be sure the address wheel on your HP 9133D is set at an address between 0 and 7.
2. Turn on your disc drive, but make sure your computer is not turned on.
3. Insert the BASIC 3.0 System disc in the flexible disc drive.
4. Turn on your computer. Your computer automatically loads the BASIC 3.0 operating system. When the prompt *"BASIC Ready 3.0"* appears on the screen, the operating system is loaded. Loading of the operating system takes approximately 50 seconds.
5. Remove the BASIC 3.0 System Disc and insert the BASIC 3.0 Driver's disc into the flexible disc drive.
6. Type **LOAD BIN "HPIB"** and press Enter.
7. When the prompt *"BASIC HPIB 3.0"* appears, type **LOAD BIN "CS80"** and press Enter.

   Loading time is approximately 20 seconds.
8. The system is now ready to use with BASIC 3.0.

Following are the disc drive commands most commonly used with BASIC 3.0. All commands have the same basic format. You type the command, followed by the MSUS of the disc drive to which the command should be directed.

Disc Initializing

If you are initializing a flexible disc, you have several formatting options from which to choose. Table 1 illustrates the choices.

Format Option	Bytes/ Sector	Double-Sided or Single-Sided Formatting	Kbytes of Storage
0	256	Double-Sided	630K
1	256	Double-Sided	630K
2*	512	Double-Sided	710K
3	1,024	Double-Sided	788K
4	256	Single-Sided	270K

*Note: This formatting option is not presently supported. Do NOT select a format option of 2.

Table 1: Flexible Disc Formatting Options

You must remember three important things when selecting a format option.

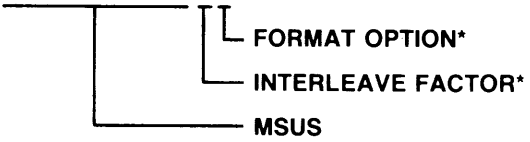
1. You can format double-sided ONLY on double-sided flexible discs in a double-sided disc drive (e.g., HP 9133D).
2. A flexible disc formatted double-sided can only be used in a double-sided disc drive (e.g., HP 9133D).
3. A flexible disc formatted single-sided can be used in both a single-sided and a double-sided disc drive.

Please see Chapter 1, Single-Sided Versus Double-Sided, for further information on this subject.

When you initialize a flexible disc, the default interleave factor is 2. For most flexible disc applications, we suggest an interleave factor of 2.

Initialize the flexible disc, using a command similar to the following command:

```
INITIALIZE ":HP9133,700,1",2,0
```



* optional

** optional (If you do not specify an interleave factor, a default interleave of 2 is used.)

When you initialize the fixed disc, you have a choice to make regarding interleave factors. Interleave factor affects performance. Therefore, the minimum interleave factor you should select is 3. Table 2 details recommended interleave factors:

Series 200	Recommended interleave (256 byte sectors)
With Disc Interface 98625A and DMA 98620B	3
With DMA 98620B only	4
With no DMA	7

Table 2: Recommended Interleave Factors for the Fixed Disc

Initialize the fixed disc, using a command similar to the following command:

```
INITIALIZE ":HP9133,700,0,0",3
           ____________ T T
                      | | L INTERLEAVE FACTOR*
                      | |__ VOLUME ID**
                      |____ MSUS
```

* The selection of an interleave factor is optional. If you do not specify an interleave factor, a default interleave of 3 is used.

** If your volume configuration switch is set on 0 or 1, you do not have to specify a volume ID. However, if your configuration switch is set on 2 through 9, you must specify a volume ID because each volume of your fixed disc must be initialized separately. Volumes on your fixed disc are numbered consecutively from 0. For example, if your fixed disc is partitioned into four volumes, the volume ID's are 0, 1, 2 and 3.

The above initialize command tells the computer that you wish to initialize the fixed disc of the HP 9133 with an address setting of 00.

NOTE

Initialization takes approximately 2-3 minutes per megabyte or approximately 30 minutes for the 15 megabyte fixed disc. Initializing is an excellent investment of time because it not only prepares your disc to receive and store data, but also checks the disc for any damage it might have sustained during shipment.

Mass Storage Specifier

The mass storage is (MSI) command is used to direct all your disc drive commands to your most frequently used disc. If you use the MSI command, you do NOT have to specify an MSUS with every disc drive command. (The exception to this rule is the initialize command, which always requires the specification of an MSUS).

Boot your system according to the directions above. Make sure your disc drive is turned on. The MSI command appears similar to the following example:

MSI ":HP9133,700,0" and press ENTER

Once you have typed this MSI command, subsequent disc drive commands will be directed automatically to the fixed disc drive of the HP 9133D.

Catalog

The CAT command displays the directory of all files on the disc. In addition, the command displays the device MSUS in the upper right corner of the screen. The default MSUS for the HP 9133 appears as :CS80,700 (if the address is set at 00).

For example, if you wish to display the directory for the fixed disc, type:

CAT ":HP9133,700,0" and press ENTER.

If you used the MSI command to specify the fixed disc drive as the default drive, you can simply type:

CAT

Copying

To copy files from flexible discs onto the fixed disc, place the disc that you wish to copy in the flexible drive of your HP 9133D. Copy the individual files from the disc, using a command similar to the following:

```
COPY "Filename:,700,1" to "Filename:,700,0"
                              or
COPY "Filename:HP9133,700,1" to "Filename:HP9133,700,0"
```

where "filename" is the name of the file you wish to copy.

Most Used Mass Storage Commands

The following commands are probably the commands you will use most often when communicating with the disc drive. These commands operate as described in your Series 200 documentation.

CAT	Reads the directory of files on the disc.
COPY	Copies a volume or file.
CREATE	Creates a data file.
ENTER	Reads data from a data file.
GET	Reads an ASCII file into memory as a program.
INITIALIZE	Checks the disc for defects, establishes a volume label on the disc, and creates a directory.

LOAD	Reads programs from the disc.
OUTPUT	Writes data to a data file.
PURGE	Deletes files from the directory.
RE-STORE	Rewrites a program to the disc, and then purges the old revision from the directory.
SAVE	Creates an ASCII file and copies BASIC program files from memory into the file.
STORE	Writes programs to the disc.

Pascal 3.0

The following section explains how to initialize discs and make backup copies of discs using Pascal 3.0 Workstation System. Before you begin using Pascal 3.0 commands, set the configuration switch on your disc drive according to the directions in Chapter 4 of your HP 9133D operator's manual.

Disc Initialization

Use the following steps to initialize a disc:

1. Turn the computer system on.
2. Insert the **Boot**: disc in the flexible disc drive.
3. When the screen says, *Please put SYSVOL in unit #3 and press the X key,"* remove the **Boot**: disc. Insert the **Sysvol**: disc in the flexible disc drive, and press the X key.
4. When the screen displays, *New system date?*, type the date and press Enter.
5. When the screen displays, *New system clock time?*, type the time and press Enter.
6. Next, the following command line appears on the screen:

   Command: Compiler Editor Filer Initialize Librarian Run eXecute Version?

   When the command line appears, remove the **Sysvol**: disc and insert the **Access**: disc.
7. Type "X" for eXecute.
8. When the screen displays, *Execute what file?*, type:

   ```
   ACCESS:MEDIAINIT
   ```

   Press Enter.

9. The screen then displays, *Volume ID?*. If you wish to initialize the fixed disc, type #11. (Volume ID's on the fixed disc vary from #11 to #18, depending on the setting of the configuration switch.) If you wish to initialize a flexible disc, type #3.

10. Remove the **Access**: disc. If you wish to initialize a flexible disc, insert the flexible disc into the flexible disc drive.

11. When the screen displays, *Are you sure you want to proceed Y/N*, type Y if you wish to continue with the initialization procedure. Type N if you wish to stop the initialization procedure.

12. If you are initializing the fixed disc, proceed to step 13. You will not see the display described in step 12.

    If you are initializing the flexible disc, the screen now displays, *Formatting option? (defaults to 0)*. You have five choices, as described in Table 3:

Format Option	Bytes/ Sector	Double-Sided or Single-Sided Formatting	Kbytes of Storage
*1	256	Double-Sided	630K
2	512	Double-Sided	710K
3	1,024	Double-Sided	788K
*4	256	Single-Sided	270K

* Denotes best performance options

Table 3: Flexible Disc Formatting Options

You must remember three important things when selecting a format option.

A. You can format double-sided only on double-sided flexible discs in a double-sided disc drive (e.g., HP 9133D).

B. A flexible disc formatted double-sided can only be used in a double-sided disc drive (e.g., HP 9133D).

C. A flexible disc formatted single-sided can be used in both a single-sided and a double-sided disc drive.

Please see Chapter 1, Single-Sided Versus Double-Sided, for further information on this subject.

Press ENTER if you wish to select the default option of 0. Otherwise, type the number of the format option that you wish to select, and press ENTER.

13. The screen now displays, *Interleave factor? (defaults to 2)*. If you are formatting a flexible disc, the recommended interleave factor is 2. If you are formatting a fixed disc, the minimum interleave factor is 3. Table 4 details the recommended interleave factors.

Series 200	**Recommended Interleave (256 byte sectors)**
With Disc Interface 98625A and DMA 98620B	3
With DMA 98620B Only	4
With no DMA	7

Table 4: Recommended Fixed Disc Interleave Factors

14. The screen now displays, *Medium initialization in progress.*

NOTE

Initialization takes approximately 2-3 minutes per megabyte or approximately 30 minutes for the 15 megabyte fixed disc. Initialization is an excellent investment of time because it not only prepares your disc to receive and store data, but also checks the disc for any damage it might have sustained during shipment.

15. At the end of the initialization process, another line is added to the display on your screen. The screen now displays:

    Medium initialization in progress
    Medium initialization completed

    About ten seconds later, the screen displays:

    Volume zeroing in progress
    Volume zeroing completed

16. The disc has been successfully initialized.

Copying

Use the following steps to copy all the files on a flexible disc to the fixed disc.

1. Once you have booted the computer, insert the **Access**: disc into the flexible disc drive.

2. When the command line appears (Command: Compiler Editor Filer . . .), type F for Filer.
3. When the filer line appears (Filer: Change Get . . .), remove the **Access**: disc. Place the disc that you wish to copy in the flexible disc drive.
4. Type F for Filecopy.
5. When the screen displays, *Filecopy what file?*, type **#3:**= and press Enter. This tells the computer that you wish to copy all the files from the disc that is in the flexible disc drive.
6. When the screen displays, *Filecopy to what?*, **type #11:$** and press Enter. This tells the computer that you wish the copy to go TO the fixed disc.
7. The screen now displays *Reading* . . . and the flexible disc access light is lit.
8. The screen now displays *Writing* . . .. The disc access light is lit alternately on the flexible and fixed disc drives. The copying process takes only a few minutes.
9. When copying is complete, the filer line (Filer: Change Get . . .) again appears on the screen.
10. Type Q for Quit and press Enter.
11. Refer to the Filer section of your Pascal manual for additional information.

Use the following steps when you want to make copies of some files on a disc, but do not want to copy all the files on the disc:

1. Once you have booted the computer, insert the **Access**: disc into the flexible disc drive.
2. When the command line appears (Command: Compiler Editor Filer. . .) type F for Filer.
3. When the filer line appears (Filer: Change Get . . .) on the screen, remove the **Access**: disc. Place the disc that you wish to copy in the flexible disc drive.
4. Type F for Filecopy.
5. When the screen displays, *Filecopy what file?*, type **#3:filename**, and press Enter. (Filename is the name of the file to be copied.) This tells the computer that you wish to copy "filename" from the disc that is in the flexible disc drive.
6. When the screen displays, *Filecopy to what?*, type **#11:filename**, and press Enter. This tells the computer that you wish to copy the file to the fixed disc.

7. The screen now displays *Reading* . . . and the flexible disc access light is lit.
8. The screen now displays *Writing* . . .. The Disc access light is lit alternately on the flexible and fixed disc drives. The copying process takes only a few minutes.
9. When copying is complete, the filer line (Filer: Change Get . . .) again appears on the screen.
10. Type Q for Quit if you are finished copying. Repeat steps 4 through 9 if you wish to copy more files, or your may refer to the Filer section of your Pascal manual for additional information.

Manual Comment Card

If you have any comments or questions regarding this manual, write them on this comment card and place it in the mail. Include page numbers with your comments wherever possible. If there is a revision number, (found on the Printing History page), include it on the comment card. Also include a return address so that we can respond as soon as possible.

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