

# **FRANKLIN**

# **ACE 80 CPU CARD™**

## **User Reference Manual**



Prepared by the Documentation Department,  
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The ACE 80 CPU card was designed by:

Winthrop L. Saville	software design
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## ***A Word About Compatibility***

The **CP/M** operating system used by the ACE 80 CPU card is the PCPI **CP/M** version 2.2, also known as the “general” **CP/M** or “E/T” **CP/M**. When you buy **CP/M** application programs or peripheral devices with which **CP/M** drivers are supplied, check with your dealer or the manufacturer to be sure they are compatible.

# A Computer For Your Computer

The Franklin ACE 80 CPU is a plug-in peripheral card for your Franklin ACE computer. With it installed, you can run programs that use the **CP/M** operating system. The card is actually a computer for your computer.

Using the **CP/M** diskette and the **CP/M** utility diskette, you'll be able to put your ACE 80 CPU in complete and automatic control of your ACE computer.

The ACE 80 CPU communicates with the outside world in a variety of ways. If you have an 80 column video card in your ACE computer, the ACE 80 CPU automatically activates it so that you can use **CP/M** control keys to create and edit text. If you don't, a feature of your ACE 80 CPU called **SoftVIDEO** allows you to select several types of display in formats wider than the 40 columns built into the ACE.

In order to get your ACE 80 CPU up and running, first check to see that you have everything you need.

## What You've Got

➤ Your Franklin ACE 80 CPU package contains:

- \* The ACE 80 CPU card
- \* A **CP/M** diskette
- \* A **CP/M** utility diskette
- \* A **CBASIC** compiler diskette
- \* A **CBASIC** manual
- \* This manual

## Installing the ACE 80 CPU Card

➤ Read this section carefully. Even though there are very few ways things can go wrong, a mistake in installation could cause some expensive damage to both the ACE 80 CPU card and the computer.

Before you do anything else, turn off the power to your ACE and unplug the power cord.

Pop the lid off the computer. You'll see eight slots at the rear, numbered from 0 to 7. This is where you install the cards which control your disk drives, printers, and other optional equipment. To install your ACE 80 CPU, you might have to move some other cards around.

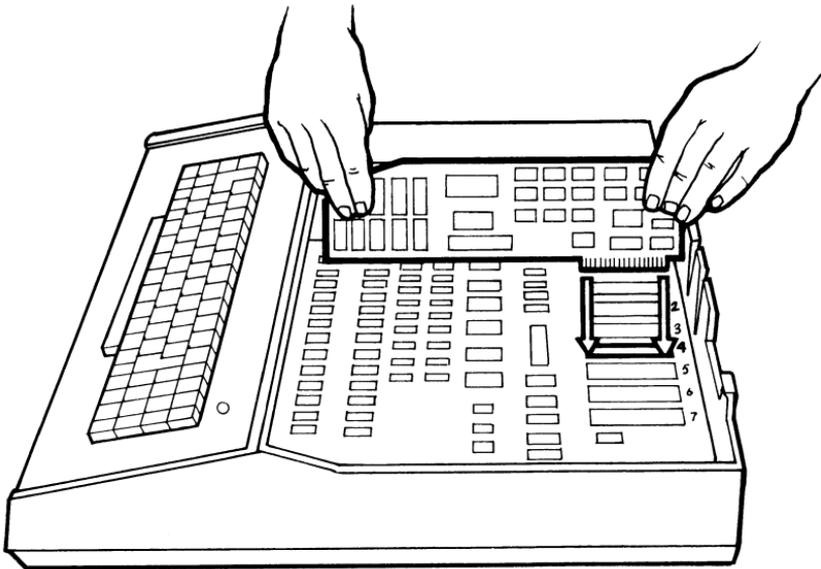
➤ The ACE 80 CPU always looks in particular slots for particular kinds of devices. If it can't find what you (or your program) have told it to look for, it assumes the device isn't hooked up and you get no results.

The ACE 80 CPU expects cards to be assigned to slots, according to the following table:

SLOT	FUNCTION
0	Memory expansion card (not used by <b>CP/M</b> ). <b>DO NOT PLUG YOUR ACE 80 CPU CARD HERE!</b>
1	Printer interface card
2	Other cards for input or output (an extra printer or modem)
3	80 column card or extra console
4	Disk controller card for a fifth and sixth drive ( <b>CP/M</b> designates these drives as E and F)
5	Disk controller card for a third and fourth drive ( <b>CP/M</b> designates these drives as C and D)
6	Disk controller card for the first two drives ( <b>CP/M</b> designates these drives as A and B) You need this card here for the ACE to operate. You can't put the ACE 80 CPU in this slot
7	No assigned purpose

You can't put your ACE 80 CPU in slot 0 or 6. However, it will operate from any other slot without a hitch as long as the slot isn't assigned to another card you need to use. If you don't have more than four drives, a good choice is slot 4.

Take a look at your ACE 80 CPU card. Two little plastic tabs protrude from one edge. The larger one has many little gold-plated electrical contacts.



Point the tabs downward. Position the gold-plated tab over the slot you've chosen. To ensure proper seating of the card, gently rock it a little toward the front and rear as you push it into the slot. (Once the card is all the way in the slot, the little tab on the front supports the card's front end and prevents excessive back-and-forth movement.)

If you have any other peripheral cards in the back of your ACE, set them up according to the table.

## **Working With CP/M And Your ACE 80 CPU**

Whenever you use a computer—whether you're playing the latest game on the Micro Hit Parade or doing financial management—you're asking the computer to process information. It's a big job. Just as you have your own way of handling paper work, that is, where to put things you're working on, where to get new material, how to set priorities and so on, so the computer has its own system that it uses to figure out what to do and in what order. Furthermore, just as others are more interested in what you produce than in how you produce it, so the computer's internal system of organization is largely invisible to you.

All of these organizing and combining rules are known as an operating system. **DOS** is one such system, supplied with every ACE that has a disk system. **CP/M** is another that works on the ACE thanks to your ACE 80 CPU card. Why do you need another operating system? Remember that the ACE 80 CPU card is a computer for your computer. The ACE itself is based on a microprocessor called the 6502. The 6502 uses the operating system **DOS** to organize its work. The ACE 80 CPU card is a separate computer with its own memory built around a different microprocessor: the Zilog Z-80. The Z-80 uses the operating system **CP/M**. (By the way, **CP/M** stands for Control Program/Microprocessor.)

Like **DOS**, **CP/M** is one of the most widely used microcomputer operating systems. It also is highly transferable: a program written on one **CP/M** microcomputer can easily be run on another **CP/M** machine. Since many microcomputer manufacturers use the **CP/M** system, a tremendous number of

application programs written for these machines are available. With **CP/M**, your ACE gives you the capability to run all of these programs just as if they had been written specifically for the ACE.

Besides enabling the computer to run programs written for the **CP/M** system, **CP/M** provides you and the computer with control over the disk drives. It also contains a collection of programs that help you update, sort through, and rearrange the data files you create as you do word processing, financial management, data base management, or any other application of your ACE's **CP/M** abilities.

To get **CP/M** to work for you, you've got to command it to do exactly what you want done. Computers are very literal; you have to use commands that the system understands, and you have to type them accurately.

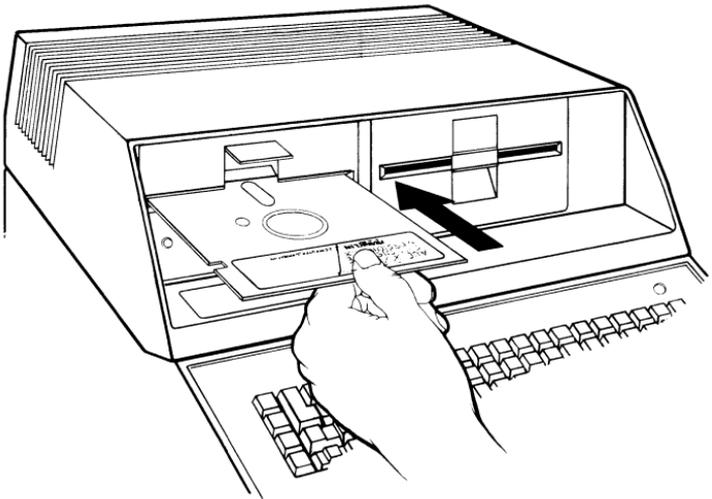
You'll never actually learn to operate the system, however, unless you sit down at the computer and try each operation as it's described. Just reading the guide won't teach you the system. You've got to get hands-on experience with it. Practice each operation as it's described, and you'll come away with a good understanding of what **CP/M** is and how to use it.

## **Giving CP/M A Boot**

**CP/M** uses a different terminology than **DOS** when it refers to the disk drives. The drive referred to as A by **CP/M** is the one attached to the "DRIVE 1" plug of the disk controller card installed in peripheral slot 6. The **DOS** operating system would refer to the same drive as D1. Similarly, drive B for **CP/M** is the one attached to the "DRIVE 2" plug of the disk controller. It would be referred to by **DOS** as D2.

The first step in using **CP/M** is to power up your ACE with **CP/M** in it. Here's how:

1. Open the door of disk drive A. Put your finger under the latch in the middle of the front of the disk drive and lift up.
2. Grasp the **CP/M** system diskette on the label side and hold it flat, label up, with the label toward you and the elongated hole in the diskette cover away from you.
3. Slide the diskette gently into the horizontal slot of the disk drive until it stops. The diskette should go all the way in, but don't force it after it stops.
4. Push the disk drive door down until it snaps shut.



Now turn on the power switch of your ACE. The disk drive should start to make a noise as it reads information on the diskette. On your monitor you should see the following:

## Loading Drivers

Then you'll see:

```
CP/M Ver 2.2  
(C) Digital Research, Inc.  
PCPI Ver 1.0  
(C) Personal Computer Products, Inc.
```

```
A>
```

The **A>** symbol at the left side of the screen is called the “**CP/M** prompt.” Whenever it appears, your system is ready to receive commands. It also means that your computer will direct information to and from the diskette in drive A unless instructed otherwise.

The blinking square beside the **CP/M** prompt is called a “cursor.” It marks the place where the next character will appear.

What just happened is called “booting” a diskette, or a disk “boot.” In the early days of personal computers (a few years ago), you had to type in a series of complex commands to start up a program stored on a diskette. The commands were cumbersome and hard to remember. Now, happily, the disk boot occurs automatically when you turn on the power switch.

## Restarting The System — A Warm Boot

Sometimes the operating system “hangs”—it just becomes paralyzed and won’t respond to any keyboard command. This happens because the system doesn’t understand or can’t perform some combination of commands you’ve given it.

To restart the system, you can boot it again if you turn off the power switch, wait four or five seconds, and then turn it on again (called a “cold” boot). To perform a “warm” boot, press the **BREAK** key or type **CTRL C** (hold down the **CTRL** key as if it were a shift key while you type **C**). The **BREAK** key and **CTRL C** perform exactly the same function. Usually this will do the trick. If the system still hangs after a warm boot, you have no choice but to perform a cold boot to restart it.

If you change diskettes in a disk drive and plan to have the computer write data to the new diskette, be sure to type **BREAK** or **CTRL C** after you insert the new diskette. If you don’t, **CP/M** will expect to find the original and get confused when it finds something different. The result is usually an error message on your display monitor to let you know that something has gone wrong.

You can also type **BREAK** or **CTRL C** to interrupt most commands and return the **CP/M** prompt to the screen.

One other alternative to achieve the same end is to press the **RESET** button.

## Referring To Diskettes

When you want the computer to direct information to or from a particular diskette, you'll find that **CP/M** identifies that diskette by the disk drive it's in. A letter followed by a colon indicates which disk drive contains the diskette. A message or command containing the characters **A:** refers to the diskette in drive A, and one containing the characters **B:** refers to the diskette in drive B.

## Changing The Default Drive If You Have A Two Drive System

In systems with more than one disk drive, **CP/M** assigns one drive to the computer as the "default" drive. This means that all commands apply to that disk drive unless another disk drive is specified in the command. If you have only one disk drive, all commands automatically apply to that drive, and you don't have to worry about default drives.

To tell which disk drive is the default drive, just check the letter before the prompt arrow. That is, **A>** indicates that drive A is the default drive; **B>** indicates that drive B is the default drive, and so forth.

To change the disk drive assignment, remove the **CP/M** diskette from drive A, insert it in drive B, and type **[B]:**, the letter of the drive you wish to be assigned. Then press the **[RETURN]** key. (Pressing the **[RETURN]** key tells the computer to execute the command you've typed in.) Go ahead and change the assignment to drive B by typing **[B]:[RETURN]**. Now switch the **CP/M** diskette from B to A and change the assignment back to drive A by typing **[A]:** followed by **[RETURN]**.

## Correcting Typing Errors

At some point, you're sure to make a mistake while typing a command. **CP/M** gives you three ways to correct it. All must be used before you press the **RETURN** key. Use the backspace (back arrow) key to erase characters one at a time, then retype the correct characters in their place. If you've typed complete gibberish, type **CTRL X** to wipe out everything back to the **CP/M** prompt, then retype it correctly and press **RETURN**. You can also type **CTRL U** if you want to cancel the line but leave the text showing on the screen. **CTRL U** will put a pound sign (#) in the text string. **CP/M** will ignore everything from its prompt to the #. It will process text from # to **RETURN**.

## Formatting Blank Diskettes

Before you can use a diskette with **CP/M** or any program that uses **CP/M**, you must first put some special information on that diskette that allows the computer to store data on it using **CP/M** as opposed to some other operating system. This is called "formatting" the diskette. Even if you've formatted a blank diskette for **DOS** or some other operating system, you've got to reformat it to use it with **CP/M**.

To format a diskette for **CP/M**, insert the **CP/M** diskette in drive A and boot the system. Then type **COPYFRMT A .** Remember to press the **RETURN** key to execute the command. After the disk drive whirs a bit, the following message appears:

— Copy and Format Diskettes —  
 — Version x.x (a date) —

A = Format Diskette  
 B = Copy Diskettes  
 C = Copy System

Enter option (X to return to CP/M):

This display is called the **COPYFRMT** menu. Type **A** to format the diskette. On your screen you'll see

— Format Diskettes —

Enter Drive:

You have to tell your ACE which diskette to format. If you have only one disk drive, answer **A** to the Enter Drive prompt, then insert the blank diskette into drive A. If you have a two drive system, type **B** **:**, to indicate drive B. **CP/M** replies:

Insert disk into drive B:  
 Press SPACE when ready  
 (any other key ABORTS):

Insert a blank diskette into drive B, close the drive door, and press the space bar on the keyboard. The disk drives whir and grind again and then **CP/M** prints the word Formatting. . . Then it prints the word Verifying. . . When the formatting is completed, the **COPYFRMT** menu returns to the screen. You can now repeat the formatting operation, perform another **COPYFRMT** operation, or exit the **COPYFRMT** program by typing **X** in order to do something else with **CP/M**.

Repeat the formatting operation until you have at least four blank, formatted diskettes. You'll need them to practice the procedures described in the next section. Be sure to label the formatted blank diskettes so that you can distinguish them from other diskettes.

When you're through formatting, type X to exit the **COPYFRMT** program. You'll see the **CP/M** prompt return to the screen.

## **Making Backup Copies Of Diskettes**

Operating without backup diskettes is asking for trouble. It can be dangerous to your emotional stability. Diskettes are deceptively fragile. Just when you think everything is going well, they'll get worn out or scratched. There is no feeling like the one that comes over you when you discover that your only copy of an irreplaceable data base or program won't run because the diskette is damaged. To play it safe, you should always make backup copies of your program and data diskettes for everyday use and then store the originals in a safe place. Make two copies of your **CP/M** diskette and **CP/M** utility diskette.

To start the copy procedure, insert your **CP/M** diskette into drive A, boot the system, and type **COPYFRMT** RETURN . **CP/M** prints the **COPYFRMT** menu again and asks you to enter an option. Type B to copy the diskette. **CP/M** responds with:

— Copy diskettes —

Enter SOURCE drive:

Type **A** since the diskette you want to copy (your **CP/M** diskette) is in drive A. Then **CP/M** replies:

```
Enter DESTINATION drive
```

Type **B** for drive B (or **A** again if you have a single-drive system). Then **CP/M** prints this message:

```
Place SOURCE diskette in Drive A
Place DESTINATION diskette in Drive B
Press SPACE when ready
(any other key ABORTS)
```

Since the **CP/M** diskette you want to copy is already in drive A, leave it where it is. (If you were making a copy of some other diskette, you'd take the **CP/M** diskette out and put that diskette in drive A.) Place a blank, formatted diskette in drive B, then press the space bar. As the disk drives whirl and grind, **CP/M** prints a series of messages on the screen showing you the progress of the copying procedure. You'll know that copying is complete when the **COPYFRMT** menu returns to the screen.

(If you have a single disk drive, insert the **CP/M** diskette, boot the system, and type **COPYFRMT**. Then follow the directions on the screen to swap the **CP/M** diskette and the formatted blank diskette back and forth in the disk drive until the copying is complete.)

Now type **B** and repeat the operation with another blank, formatted diskette. Be sure to label the backup copies when they're finished.

Repeat the operation to copy the **CP/M** utility diskette. (Type **COPYFRMT** **RETURN** , type **B** to copy diskettes, type **A**

for the SOURCE drive, type  for the DESTINATION drive, place the original diskette in drive A and a blank, formatted diskette in drive B, and press the space bar.)

When you've finished, insert the **CP/M** backup diskette into drive A and then type . This terminates the **COPYFRMT** program and returns the prompt arrow to the screen.

Store your original **CP/M** diskette and **CP/M** utility diskette in a safe, dry, temperate, non-magnetic place for safekeeping. You should do the same thing for any other diskettes you have.

It's a good idea always to keep at least two backup copies of your **CP/M** diskette on hand. That way, if you ever have a problem with the computer that's not immediately identifiable, you can use the second backup diskette to test the operating system without risking your original **CP/M** diskette.

It's also a good idea to put write-protect tabs over the write-enable notches on the edges of your **CP/M** and utility diskettes. Once they are made, you won't have need to write to them again. The tabs help prevent unpleasant surprises.

## **Copying The CP/M System**

Suppose you have some programs on a diskette that you use regularly. It's very possible these programs might be stored on a diskette that had no copy of the **CP/M** system. The diskette might very well have no copy of the program called **DRIVERS** either. Without both **CP/M** and **DRIVERS** on your diskette, you'd have to boot your **CP/M** diskette, swap your program diskette for your **CP/M** diskette, and then perform a warm boot.

It would be nice to be able to run your programs without having to bother loading the **CP/M** diskette each time. You can do this by copying the **CP/M** system program and the **DRIVERS** program onto the diskette along with your other programs.

When you format a diskette for **CP/M**, you prepare it to receive the **CP/M** system, but the system itself isn't actually copied onto the disk at that time. The formatted diskette can store programs, but it can only run those programs with the help of some other diskette that contains the **CP/M** system and **DRIVERS** programs. If you copy the **CP/M** system and **DRIVERS** programs on to the program diskette, however, you can boot and run the programs on the diskette without bothering with the **CP/M** diskette each time.

The **CP/M** system is a special program. It's almost as invisible as it is essential. If you were to look at a list of all the programs on the **CP/M** diskette, you wouldn't find the **CP/M** system among them.

The **DRIVERS** file is different. It's stored as a regular file and would appear on any such list. It contains a set of subroutines which let **CP/M** control the various devices installed in your system. For example, if you add a hard disk to your ACE, you will need to modify the drivers file by adding to it a subroutine which lets **CP/M** control the new device. You'll see how to do that later.

Use the "copy system" option of the **COPYFRMT** command to add the **CP/M** system to a diskette. You can use it either with formatted, blank diskettes or with diskettes that already contain files.

Boot a backup copy of your **CP/M** diskette in drive A, type **COPYFRMT** and press the **RETURN** key. You'll get the

**COPYFRMT** menu. Select option **C** and the following should appear:

— Copy system tracks —  
Enter SOURCE DRIVE:

Type **A**. **COPYFRMT** replies:

Enter DESTINATION Drive:

If you have only one drive, type **A** for the DESTINATION as well as the SOURCE drive, then follow the prompts that appear on the screen to insert first one diskette and then the other until the copying is complete.

If you have two or more disk drives, type **B**. You'll get this message:

Place SOURCE diskette in Drive A:  
Place DESTINATION diskette in Drive B:  
Press SPACE when ready  
(any other key ABORTS):

Since your **CP/M** diskette is in drive A already, you can simply place the diskette to receive the **CP/M** system in drive B. Then press the space bar. **CP/M** prints a series of progress reports as it reads and writes the various tracks of the **CP/M** system. Finally the **COPYFRMT** menu returns to the screen. This signals that copying is complete and **COPYFRMT** is ready to perform another task. Don't remove either diskette from its drive yet.

Press **X** to exit the **COPYFRMT** program. When the **CP/M** prompt arrow reappears, type

PIP B: = A:DRIVERS

and press **RETURN**. This command copies the **DRIVERS** file to the diskette in drive B. To verify that the **DRIVERS** file was copied, type DIR B:. You'll see the name \_\_\_\_\_ appear on your display screen.

Now you can boot your file diskette and run the programs on it at will.

## **File Names**

**H**ow do you tell **CP/M** what information you want the computer to process? With **CP/M**, all information on a diskette is stored in files, and each file must have a unique name.

To see what some of these file names look like, insert one of the backup copies of the **CP/M** diskette you made into drive A and boot the system. When the \_\_\_\_\_ prompt appears, type DIR and press **RETURN**. This asks the computer to display a list (called a directory) of the files on the diskette in drive A. You should see:

The listing at the bottom of the display shows all of the files on the **CP/M** diskette.

The conventions for identifying files in **CP/M** are simple. Each file is identified according to three basic components: a disk drive, the file's name, and what type of file it is.

Together, they take the following form:

### **A : FILENAME. TYP**

The letter and colon identify the disk drive in use. You may omit the drive identifier when referring to files on the diskette in this drive, called the default drive.

The second component is a one- to eight-character file name. The file name may consist of any combination of letters and numerals (but not blank spaces) as long as it does not exceed eight total characters. A few symbols such as + and - may also be used, but it's best to avoid using symbols because many are not permissible. The following symbols may not be used in file names:

< > . , ; : = ? \* [ ]

**CP/M** doesn't distinguish between upper case and lower case letters in file names. You can type them either way, but file names are always recorded on the diskette in upper case.

The third component is an optional identifier containing zero to three letters that is separated from the file name by a period. It is called the file name extension and it is used primarily to designate the type of file. There are several standard file types that have a special meaning to **CP/M**. Some pertain to certain

computer languages and others to applications programs available for use with **CP/M**. (The most important file type is **.COM**. Any file with this identifier is a program or a command.) In order to avoid confusion later, it's best to identify files according to standard file types. The following are examples:

**.ASM** Assembly-language source code

**.BAK** A backup, or copy, of a file

**.BAS** A **BASIC** program source file

**.COM** A command or program

**.DAT** A data file

**.DOC** A text or document file

**.TXT** A text or document file

**.\$\$\$** A temporary file

Often you can use an "ambiguous" file name to refer to a group of files. An ambiguous file name is one containing one or more "wildcard" characters. The **?** and **\*** are **CP/M** wildcards. You can substitute the character **?** for any other single character. You can substitute the character **\*** for an entire file name, a file type, or a group of characters of any length. For example, let's say that you have the following files on a diskette:

**SAMPLE.TXT**

**SAM-01.TXT**

**SAM-02.TXT**

**SAM-03.TXT**

**SAMSON.COM**

**SAMONE.BAS**

**SAMTWO.BAS**

**SAME.BAS**

You can type the ambiguous name **SAM???.TXT** and refer to the first four files. Or you can type the ambiguous name **\*.TXT** and accomplish the same result. To refer to all files of type **.BAS**, you can type **\*.BAS**. If you type **????.BAS**, **CP/M** takes this as reference to all files of type **.BAS** with names having four or fewer characters.

By typing **\*.\*** you can refer to all the files on a diskette. This expression is handy for many **CP/M** operations.

## **Video Displays**

Now that you've learned the essentials of copying diskettes, let's take a break from **CP/M** for a minute so that you can learn how to find your way around the video screen.

If you already have an 80 column video card in your ACE, the ACE 80 CPU automatically works with it to bring up an 80 column display.

If you don't, an ACE 80 CPU feature called **SoftVIDEO** produces two different types of wide displays. To see **SoftVIDEO's** capabilities, disconnect your 80 column card, if you have one. Turn off the power to the ACE and video monitor and pop the top off your ACE. Take the 80 column card out of slot 3. Disconnect the video cable from the 80 column card and connect it to the video jack at the rear of the ACE.

Make sure the other peripheral cards are correctly installed. Replace the top of the ACE, turn on the power, and boot a copy of your **CP/M** diskette.

You'll see the same message you saw when you booted up. After the `A>` prompt, type:

This is a long sentence to test the  
automatic scrolling feature.

As you type the word "automatic," you'll see characters march off the left side of the screen. Type some more. As you enter the 80th character, the screen will shift right and the cursor will display at the first character position of the next line. Don't type `RETURN` or you'll get an error. Type `CTRL X` to cancel the demonstration line.

With the automatic scrolling feature, you have, in effect, an 80 column display, even though you can only see 40 columns of it at a time.

## 70 Column Graphics

**SoftVIDEO** also offers a 70 column wide display called “High Resolution Graphics Mode” which “draws” letters, numbers, and punctuation using your ACE’s high-resolution graphics capability. To see 70 column graphics, look for the `70` prompt and type:

70 COLUMN

and then press `RETURN`.

The screen should clear and a somewhat narrower version of the `70` should appear. To see what letters look like in 70 columns, type `DIR`.

To see upper and lower case, after the next prompt, type in:

This sentence shows what upper and  
lower case looks like.

Don’t type `RETURN`. Type `CTRL X` to erase the sentence.

# Elementary CP/M Commands

You already know some **CP/M** commands: those for changing the default drive, formatting blank diskettes, and copying diskettes. In addition to these, you'll find several other **CP/M** commands useful for managing the files you create yourself or while you are using applications program. Three — the **DIR**, **REN** and **ERA** commands — are resident in the **CP/M** system itself. This means that they're loaded into the computer's memory whenever you boot the system. When you issue these commands, **CP/M** executes them immediately.

The others are stored as files on the **CP/M** diskette. These are called "transient" commands because they must go from the diskette into the computer before they can work. These transient commands are in fact performed by program files having the extension **.COM**. To have **CP/M** execute a **.COM** file, simply type in its name as though it were a regular command; that is, don't type in the **.COM** extension.

## **DIR — Display The Names Of The Files On A Diskette**

When you want to find out what files are on a diskette, use the **DIR** command. The command has the general format:

**DIR X:FILENAME.TYP**

Typing **DIR** and pressing **RETURN** gives you a general listing of the diskette in the default drive. **DIR X:** where **X** is the letter of a disk drive gives you a general directory of the diskette in the drive you specify. It does not change the default drive. Typing **DIR FILENAME.TYP** where the name of a file replaces **FILENAME** and its extension replaces **TYP** tells you whether a specified file is on the diskette in the default drive. If you use an ambiguous file name, **CP/M** prints out the names of all of the files on the diskette that are included by the ambiguous file name. **DIR X: FILENAME.TYP** gives you the same information with one exception: by changing **X** to the letter of a disk drive, you can find out whether or not a file or files are on a diskette located somewhere other than the default drive.

Let's see how this command works.

Insert a backup copy of your **CP/M** diskette in drive A and a blank, formatted diskette in drive B. Boot the system. When the **A:** prompt appears, type **DIR** and press the **RETURN** key. Again, it doesn't matter whether you use upper or lower case letters in **CP/M** commands. You'll see

```

DIR A:
A: DRVET.G          PIP          COM
A: ED              COM: ASM          COM
A: STAT           COM: DUMP         COM
A: ADCWPER        COM: COPYFRMT    COM
A: SUBSTAT        COM: XSUB          COM
A: GET            COM: LOAD          COM
A: BUMP           COM: TOC COLUMN    COM

```

These are the files on the **CP/M** diskette. The letter that precedes each line tells you which disk drive the diskette is in. A file name follows, separated from its file type by spaces. Other file names and types are listed in a column parallel to the first.

Now type DIR B:  . You'll get the message NO FILE. This is because the diskette in drive B is blank. It contains no files.

Type each of the following commands and see what happens:

```
DIR *.COM
```

```
DIR *.TXT
```

```
DIR PIP.COM
```

The first command gives you a directory of all **COM**-type files on the diskette in drive A. The second gives you a directory of all **TXT**-type files on the diskette (none). The third tells you whether the file **PIP.COM** is located on the diskette (yes).

## **TYPE — Display Contents Of A File**

The **TYPE** command shows what's in a particular file. It has the general format:

**TYPE X:FILENAME1.TYP,FILENAME2.TYP**

For example, to see a file named **ACEHIGH.TXT** located in drive B, you'd type:

```
TYPE B:ACEHIGH.TXT
```

The **TYPE** command works for files containing text and data (characters and numbers). It won't work for files containing computer programs.

You can't use ambiguous file names with the **TYPE** command; however, you can display multiple files with one command if you type a comma between each pair of file identifiers, as in this example:

```
TYPE MONTH.DAT,WEEK.DAT,BOOK.TXT
```

To see how the **TYPE** command works, you'll have to use something different from your **CP/M** system diskette because all the files on it contain computer programs. Try using a file produced by one of your application programs (such as a wordprocessor or electronic spreadsheet). Insert the file diskette into drive B and type **TYPE B:** followed by the name of the file you wish to display, and then press **[RETURN]**. **CP/M** will respond by displaying lines of text from the file on the screen.

If the display starts scrolling off the top of the screen, you can get it to pause by pressing the **[PAUSE]** key. Then when you want it to continue, press the **[PAUSE]** key again. If you wish to

terminate the display without finishing the entire file, just press the **BREAK** key.

You can also use the **TYPE** command to print out a file's contents on a printer. First type **CTRL P** to switch on your printer, and then use the **TYPE** command. (See the section later in this guide on "Controlling Output To The Printer And Screen" for more details.)

## **REN — Rename A File**

When you want to change the name of a file without changing the file's contents, use the **REN** command. It has the general format:

**REN X:NEWNAME.TYP = X:OLDNAME. TYP**

The new name for the file goes to the left of the equal sign and the old name of the file goes to the right. If you do not specify a disk drive, **CP/M** will assume the file is on the diskette in the default drive.

The letters specifying disk drives and extensions must be the same on each side of the equal sign since you're not transferring a file from one diskette to another, only renaming a file. Also, **CP/M** doesn't accept ambiguous file names in the **REN** command.

To try out this command, be sure that you have a backup copy of your **CP/M** diskette in drive A, then type **REN STATUS.COM = STAT.COM**. This changes the name of the **STAT** file to **STATUS**. The file's contents remain the same; only the name is different. To confirm that the name has been changed, type **DIR** (for a listing of the files on the **CP/M** diskette) and see for yourself. **STAT.COM** no longer exists, and **STATUS.COM** is in its place. To change the name back, type **REN STAT.COM = STATUS.COM**. Now type **DIR** again to confirm that **STATUS** is back to its original name (**STAT**).

## **ERA — Erase A File**

When you want to erase a file from a diskette, use the **ERA** command. It has the general format:

**ERA X:FILENAME.TYP**

Before you use it, however, use **DIR** to see what's on diskette, just for safety's sake. Be sure that you have the correct file and diskette before you use this powerful — and irreversible! — command. When you're sure you have the right file and diskette, type **ERA** followed by a space and the file's complete identifier, e.g., **EMPTY.FIL**.

**CP/M** issues no message to confirm that a file has been erased. When the prompt reappears, type **DIR** to confirm that **CP/M** deleted the intended file.

**WARNING:** The **ERA** command deletes files PERMANENTLY, without checking for verification. Use this powerful command very carefully.

To see how this command works, first you need to put something on a diskette that you can erase safely. Type **SAVE 0 EMPTY.FIL**. And then press **[RETURN]**. This simply puts a blank file named **EMPTY** whose type is **FIL** on your **CP/M** diskette.

Now use the **DIR** command. You should see **EMPTY.FIL** somewhere at the bottom of the directory. Type **ERA EMPTY.FIL**. When the prompt returns to the screen, ask for another directory (i.e., type **DIR**) to confirm that **CP/M** deleted the file from your backup **CP/M** diskette.

## **STAT — Query Files**

How do you find out the amount of storage space left on a diskette? How much space does a particular file take up? How do you find out whether a file or diskette is “write-protected?”

When you want to get this type of information about the files stored on your diskettes, use the **STAT** command. **STAT** actually contains a whole family of **STAT** commands. With them, you can find out a wide variety of information about files, entire diskettes, and how peripheral devices relate to your computer.

The **STAT** command can do many things, but there are three forms that you’ll use most often:

(1) **STAT**

(2) **STAT x:**

(3) **STAT x:filename.typ**

### **Displaying The Amount of Space Available On A Diskette**

(1) **STAT**

(2) **STAT x:**

When you want to find out how much space is left on a diskette, use one of these forms of the **STAT** command. Form 1 displays the amount of unused storage available on the diskette in the default drive. Form 2 does the same thing for whatever disk drive you specify in the command.

To try out this procedure, put a backup copy of your **CP/M** diskette in drive A, type **STAT**, and then press the **RETURN** key. **CP/M** displays the following message:

```
A>STAT
```

```
A: R W. SPACE. 19K
```

There is enough space to store approximately 19K characters (letters, numerals, symbols and spaces). To give you some idea of what this means, this page would contain about 2000 characters if it were full of text.

## ***Displaying Space Used by a File***

### **(3) *STAT x:Filename***

When you want to find out how much space a specific file takes up, use Form 3 of the **STAT** command. This form also tells you whether the file has any special attribute assigned, such as "read-only." If you use an ambiguous file name, the command displays the same type of information for all files described by the ambiguous file name.

To try out this form of the command, with the **CP/M** diskette booted in drive A, type **STAT \*.\***. You'll get the following display:

STAT A: \*

Recs	Bytes	Ext	Acc
40	5K	1	R W A: 70COLUMNS
252	32K	1	R W A: ADOSXFER
64	8K	1	R W A: ASM.COM
94	12K	1	R W A: COPYFRM
38	5K	1	R W A: DDT.COM
102	13K	1	R W A: DRIVERS
33	5K	1	R W A: DUMP.ASM
4	1K	1	R W A: DUMP.COM
52	7K	1	R W A: ED.COM
14	2K	1	R W A: LOAD.COM
58	8K	1	R W A: PIP.COM
41	6K	1	R W A: STAT.COM
10	2K	1	R W A: SUBMIT.COM
6	1K	1	R W A: XSUB.COM

You probably only need to consult two columns from this display—the *Bytes* column and the *Acc* column. The *Recs* column tells you the actual number of characters contained in each file. The *Acc* column tells you what kind of access is allowed to each file—R/O (read-only) or R/W (read-write). Parentheses around a file name at the right side of the display means that the file name isn't listed in the **DIR** command.

If you want to learn more about the significance of the other columns—and how **CP/M** stores data in sequential and random access files—you should consult one of the many handbooks on **CP/M** that are currently available.

## Assigning "READ-ONLY" And "READ-WRITE" Status To Files

To protect valuable files from being accidentally erased or modified, it is a good idea to "write-protect" them. You can do this by assigning them "read-only" status. This allows the computer to read them but not write to, re name or erase them.

To assign "read-only" status to a file, type **STAT** followed by the file identifier and the expression **\$R/O**. For example, to assign read-only status to a file named **ACESPADE.TXT** in drive B, you'd type:

```
STAT B:ACESPADE.TXT $R/O
```

To remove read-only status from a file, and the expression **\$R/W**. This restores the file to its original "read-write" state so that the computer can write to, re name and erase it. To remove read-only status from **ACESPADE.TXT**, for example, you'd type:

```
STAT B:ACESPADE.TXT $R/W
```

Confirm these changes by typing Form 3 of the **STAT** command described above: **STAT B:ACESPADE.TXT**.

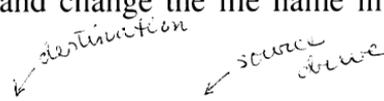
## PIP — Copying Files

What do you do when you want to copy some files onto another diskette without copying the whole diskette? Let's say you have a file of text from a word processor and you want to make a copy for someone else. Or you have a data file from a financial management program and you want to make a duplicate copy for safekeeping. Or you have several files on different diskettes that you would like to assemble on one diskette for convenience.

When you want to copy files or move them around from diskette to diskette, use the **PIP** command. **PIP** is a powerful general-purpose file transfer program. The initials **PIP** stand for "Peripheral Interchange Program." Like **STAT**, **PIP** is a transient command that incorporates a whole family of commands. Most of the time you'll use it to perform simple file transfers from one diskette to another, but you can also use it to transfer files from one peripheral device to another.

You use **PIP** together with a "command line" that specifies a task or tasks you want to perform. You can type the command line as part of the **PIP** command, or you can simply type **PIP**, press **RETURN**, and let the program prompt you for one or more command lines.

Let's say you want to copy a file from a diskette on drive A to a diskette on drive B and change the file name in the process. You type:


  
**PIP B:NAME2 = A:NAME1**

Or, let's say you want to create a new file on a diskette in drive B by combining copies of two different files on a diskette in drive A. You type:

PIP B:NAME3 = A:NAME1,A:NAME2

In **PIP** command lines, the expression to the left of the equal sign is the destination file or device and the one to the right is the source file(s) or device(s). The drive indicators are optional, depending on what you want **PIP** to do.

When you need to make only one file transfer, type PIP followed by a command line and **RETURN**. **PIP** executes the command immediately and then returns the **CP/M** prompt arrow to the screen.

When you want to make a series of file transfers in sequence, it's best simply to type PIP and press **RETURN**. **PIP** then prompts you for a command line with its own prompt character, an asterisk (\*). When you type in a command line and press **RETURN**, **PIP** executes that command and then prompts you for another one. **PIP** keeps prompting you for command lines until you press **RETURN** without entering a command.

## Copying Files

**PIP** makes copies of files; it does not actually move them. Whether you use **PIP** to duplicate all the files on a diskette or only a single file, the original remains intact.

The procedures for copying files follow the general forms of the **PIP** command line: you type the destination drive and file name on the left side of the equal sign and the source drive(s) and file name(s) on the right. There are some special wrinkles that can save you time and effort. Although this may sound like a lot to remember at first, once you start to use these shorthand commands you'll probably find it easy to pick them up.

## Copying Single Files

When you want to copy to or from a diskette in the default drive, you can omit the default drive name from the **PIP** command line. For example, let's say that drive A is the default drive and you want to copy **FILE1** onto the diskette in drive A from the diskette in drive B. You could type:

```
PIP FILE1 = B:FILE1
```

If the original file and copy file both are in the default drive, you can omit the drive name from the command entirely. For example, to make a backup copy of **FILE1.TXT** in the default drive, you could type:

```
PIP FILE1.BAK = FILE1. TXT
```

Keep in mind that you can't have two files with exactly the same file name on the same diskette. Something in the file names must be different.

When you want to make a copy file with the same name as the original, you can use this abbreviated form:

**B: = A:Original**

For example, to make a copy of **FILE1** with the same name on the diskette in drive B, you could type:

```
PIP B: = A:FILE1
```

This works only if the copy file is in a different disk drive from the original. You can't have two files with the same name on the same diskette, remember?

## Copying Multiple Files

When you want to copy several files at a time, you can usually save some work by using ambiguous file names.

Suppose the diskette in drive A contains the following files:

**FILE1.TXT**  
**FILE2.TXT**  
**FILE3.TXT**  
**FILE99.TXT**  
**FILE4.COM**

To copy the three files named **FILE1.TXT**, **FILE2.TXT**, and **FILE3.TXT**, for example, you could type three different **PIP** command lines with one file name on each line. Or, you could type:

```
PIP B: = A:FILE?.TXT
```

This copies the three files specified. It doesn't copy the file **FILE99.TXT**, because the symbol **?** can only substitute for a single character.

What if you want to copy all four of the files ending in **.TXT**? To do this you could type:

```
PIP B: = A:FILE*.TXT
```

This works because the symbol **\*** can substitute for any number of characters. Or, you could type

```
PIP B: = A: *.TXT
```

This copies all the files of type **.TXT**.

## Copying All Files

Copying “all files” on a diskette is not the same as copying an entire diskette. A diskette can contain the **CP/M** system as well as files, and **PIP** can’t copy the **CP/M** system.

The easiest way to copy all files from drive A to drive B is to type the command

```
PIP B: = A:*. *
```

In practice, when you are copying all files, it is recommended that you type

```
PIP Y: = X:*. * [V]
```

The **V** is an optional feature that you can add to such **PIP** commands. Set off by square brackets, the **V** makes **PIP** verify that the data has been written correctly to the destination diskette. The copy process takes much longer with the **[V]** option, so use it only if the file is valuable. It is by far the best command to use to guarantee file safety, however.

## Converting DOS Files To CP/M And Vice Versa

In the life of every computer user there comes a time when files created under one operating system would be useful on another. Let’s say you have some data files created on a **DOS** system and you’re using **CP/M**. Or you have some **CP/M** text files that someone else would like to use on a **DOS** system. Wouldn’t it be nice to convert them from one system to another?

You can! With the **ADOSXFER** program, you can convert files created under **DOS** to **CP/M** and vice versa.

The **ADOSXFER** program is a **CP/M** transient command.

Get your **CP/M** system diskette, a diskette containing the **CP/M** file you want to convert, and another diskette that has been formatted for **DOS**. (The **DOS** diskette must be formatted under **DOS**. It may or may not contain files, but it must have enough unused space to hold your converted file.) Put your **CP/M** system diskette in drive A and the diskette with the **CP/M** file to be converted in drive B. (If you have only one disk drive, start with the **CP/M** diskette in that drive and then follow the diskette swapping instructions that appear on the screen.)

Type **ADOSXFER**. You'll get the following menu:

```
--- CP M and DOS x.x Transfer ---
```

```
--- ACE # Version x.x Date ---
```

```
A = Transfer CP M to DOS x.x
```

```
B = Transfer DOS x.x to CP M
```

```
C = Display DOS x.x Directory
```

```
Enter option (X to exit):
```

Type **A** to convert from **CP/M** to **DOS** format. The program replies:

```
--- Transfer CP M to DOS x.x ---
```

```
Enter CP M source file (RET):
```

Enter the name of a **CP/M** file that you wish to convert, followed by **RETURN**. Be sure to specify the drive before the file name; for example, B:SRCE.TXT. The program replies:

```
Enter DOS filename: >
```

Now give the **DOS** version of the file a name. Be sure to specify the **CP/M** drive letter before the **DOS** file name. For example, to name the **DOS** file **DEST** and copy it to the diskette in Drive A, type A:DEST. You'll see the following menu:

```
A - Floating Point BASIC
B - Binary
T - Text
I - Integer BASIC
```

```
Enter type of file:
```

Most of your files are probably text files. If the file you wish to convert is a text file, type **T**. Otherwise, type the letter that indicates the type of **DOS** file you are creating. The program replies:

```
Should bit 7 in ASCII be
(O/U normally 0)
```

This sounds very mysterious, but all you have to do is type **1** if you want your **CP/M** source file to remain a text file under **DOS**. This question is only asked when you specify file type **T**. Next the program asks:

```
Do you want to convert an ASCII
(O or N, normally O)
```

If for some reason your file has line feed commands imbedded in it and you want to preserve these in the converted file, type N. Unless you have some special reason for wanting line feeds, type Y.

Place the diskette into the drive.  
Press the SPACE bar when ready.  
ADOSXFER BY ADOSXFER

Remove your **CP/M** diskette from drive A and place the **DOS**-formatted diskette to receive the converted file in the drive. Then press the space bar. After a few moments **ADOSXFER** starts printing out your file on the screen as it's being converted. When the **ADOSXFER** menu returns to the screen, the file conversion is complete.

To see if your new file was actually converted, type C to display the **DOS** directory. The program asks you to specify a disk drive and to place the **DOS** diskette in that drive. Since yours is already in drive A, type A and then press the space bar. You'll see the **DOS** diskette directory on the screen. A final message says:

End of Directory Press any Key:

You may press any key to terminate the directory.

The procedure for converting files in the opposite direction—from **DOS** format to **CP/M** format—is very similar. When you enter option B (Transfer DOS x.x to CP/M), the program sends you a series of menus and requests for additional information. This time it asks if you wish to add line feeds to the file - normally you'll say Y. The program prints out the converted file just as it did before. When the conversion is complete, the **ADOSXFER** menu returns to the screen.

It's usually a good idea to check the directory to be sure the converted file was added to it. To use the **CP/M DIR** command, you must first leave the **ADOSXFER** program. Type **[X]** and the **CP/M** prompt arrow should return to the screen. Then type **DIR A:** and **[RETURN]** to see your converted file listed in the **CP/M** file directory.

## **Controlling Output To The Printer And Screen**

Sometimes you'll want to print out information that is displayed on the screen. Many applications programs have their own provisions to print reports, but you can also do it with **CP/M**.

To send output to the printer, type **[CTRL] [P]** when you see the **A>** prompt. This turns on the printer (assuming you have a printer properly connected to your computer and the power switch turned on) and causes all output going to the screen to go to the printer also. **[CTRL] [P]** works like a switch: type it once to turn the printer on; type it again to turn the printer off.

If you type **[CTRL] [P]** and nothing happens, check to see if your printer is correctly plugged into the power source, connected to the computer, and turned on.

When you have a long listing appearing on the screen or printer, you can make it stop temporarily by pressing the **[PAUSE]** key or typing **[CTRL] [S]**. Everything on the screen or printer freezes until you tell it to begin again. To start the computer and display again, type **[PAUSE]** or **[CTRL] [S]** again.

To interrupt a listing on the screen or printer permanently, type **[BREAK]** or **[CTRL] [C]**. This will cancel the listing and return the **CP/M** prompt to the screen.

## Error Messages

Nobody's perfect. Sooner or later it's a good idea to get familiar with the error messages that can appear and their meanings. These don't always mean you have made a mistake. Rather, they give you useful information about what the computer is encountering as it tries to execute your command.

A question mark following any sequence of characters means that **CP/M** looked on the diskette for a **.COM** file name and couldn't find it. Check to be sure that you typed the file name correctly, then check the directory of the diskette to see if the file you thought was there really is.

### FILE NOT FOUND

This means that no file in the directory matched what you specified in your command. It may appear if you omitted the colon from a drive specifier or command. If you type **DIR** and receive this message, it means that there are no files at all on this diskette. Again, be sure that you typed the names correctly.

```

C:\>copy a:xxx\Dir\* Trk xxxx Sec xx
C:\>copy a:xxx\Dir\* Trk xxxx Sec xx

```

This message means that **CP/M** can't read or write the diskette that you specified in your command.

### DISK NOT READY

**CP/M** cannot find a diskette in the drive (A: or B:) that you specified, or the diskette has not been formatted. This message might also mean that the drive door is not properly closed. To recover, type any key. **CP/M** will automatically reboot the system.

If the words **BAD SECTOR** immediately follow the message, it means that the diskette is worn or damaged (has a “bad sector”). It might also mean that the disk drive controller card or drive itself is malfunctioning, or that the diskette is improperly formatted. Then too, the diskette might be missing from the drive. To recover, press the **BREAK** key or type **CTRL C**. This will re-boot the system.

If the word **SELECT** appears, then you’ve tried to select a disk drive that does not exist, e.g., you entered **B:** on a one-drive system. To recover, you must “cold boot” the machine (turn the power off, wait a few seconds, then turn the power back on).

If the abbreviation **R/O** appears, you may have forgotten to type **PAUSE** or **CTRL C** when you switched the diskettes in a disk drive. Or you may have told **CP/M** to make the file “read-only” (not allow anything to be added to or deleted from that file). To recover, type **BREAK** or **CTRL C** to re-boot.

### RENAMING

You tried to rename a file with a name that you’ve already used on the diskette. Since you can’t have two files with the same name, try using a different name.

## INVALID ASSIGNMENT

Check to see if you misspelled a name or tried to specify a disk drive that doesn't exist. This message only appears when you're using the **STAT** command.

## INVALID FORMAT

You've made a typing error or tried to use a command format that isn't allowed. The string of characters following the message ends where the invalid format occurred. Check to see if you have the correct form of the command and check your typing for errors.

## ***A Synopsis Of CP/M Commands And Programs***

Here's a list of the commands and programs on your **CP/M** diskette, just for review and reference purposes. Some of them haven't been mentioned earlier because they operate without your having to do anything. Others are used primarily by programmers. If you want to learn more about these, consult one of the many handbooks on **CP/M**.

**ADOSXFER** is the utility program that converts **CP/M** files to **DOS** format and **DOS** files to **CP/M** format. When you type **ADOSXFER**, it gives you a menu of functions to choose from.

**ASM** is a transient command that executes **CP/M's** assembly language assembler program, turning assembly language source files into machine code files.

**BREAK** or **CTRL C** is the control command that restarts the **CP/M** operating system without destroying the information contained in the computer's memory. This procedure is called performing a warm boot. You must press the **BREAK** key or type **CTRL C** whenever you insert a different diskette into a drive you've been using; otherwise **CP/M** expects to find the original diskette. You may also use it to interrupt a command program and return to the **CP/M** command mode.

**CONFIGSV** is a utility program which alters the **DRIVERS** file to handle external terminals, wide printers, and other peripheral devices.

**COPYFRMT** is the utility program that formats diskettes, copies diskettes, and copies the **CP/M** system onto diskettes. When you type **COPYFRMT** you may choose any one of these three functions from the menu provided.

**CP/M** is the operating system. It and the **DRIVERS** program make the diskette boot and display information on the screen. It is the only program on the diskette whose name does not appear in the directory of the diskette when you use the **DIR** command. It resides on a special track on the diskette and can be copied to other diskettes with the **COPYFRMT** command.

**CTRL P** is the control command that switches the printer on and off. Typing **CTRL P** sends all output to the printer as well as the display screen. When you type **CTRL P** again, it stops the output to the printer.

**CTRL U** and **CTRL X** cancel the current command line. **CTRL U** leaves the cancelled line showing on the display. **CTRL X** erases the cancelled line. Both are useful when you make a typing error in a long command line and want to start over.

**DIR** is the resident command that displays the names of files on a diskette. When you type **DIR** and specify a disk drive, **DIR** displays the names of the files on the diskette in that drive.

**DDT** is a transient command that helps you “de-bug” programs written in assembly language. It loads, alters, and tests programs.

**DLDRVR** is a utility program used by the **INSTALL** program. It cannot be run by itself.

**DRIVERS** enables your computer to use the various peripheral devices connected to it. **DRIVERS** operates automatically when you boot the **CP/M** diskette.

**DUMP** is another transient command that helps you program in assembly language. It displays the contents of any disk file in hexadecimal notation, listing 16 bytes at a time.

**ED** is a transient command that activates the editor program designed primarily to make relatively simple corrections and changes during programming.

**ERA** is a resident command for erasing files. When you type **ERA** followed by a file name, it erases the file completely and permanently. When you enter an ambiguous file name with **ERA**, the command erases all files included in the ambiguous name.

**HIRESIO.DVR** is the part of **DRIVERS** which provides 70 column displays.

**INSTALL** is a utility program which puts edited versions of **SFTVIDEO.DVR** and **HIRESIO.DVR** or new driver programs into **DRIVERS**.

**LOAD** is a transient command for assembly language programmers. It converts a program in hexadecimal format into a command file that can be executed.

**PAUSE** or **CTRL S** is the control command that temporarily freezes information on the screen or printer. Press the **PAUSE** key or type **CTRL S** once to stop the printing and screen display. Press **PAUSE** or type **CTRL S** again to resume the printing and screen display.

**PCPICPM** is a copy of the **CP/M** system used by the **INSTALL** program.

**PIP** is **CP/M's** file transfer program. It's a transient command. Type **PIP** followed by a command line telling what source file is to be copied to what destination. **PIP** executes the command line and returns the **CP/M** prompt to the screen. When you type **PIP** alone, it prompts you for command lines until you press **RETURN** without entering a command line.

**REN** is the resident command for renaming files. When you type **REN** followed by an expression containing the new file name, an = sign, and the old file name, **REN** substitutes the new file name for the old one. The new file name always goes to the left of the = sign.

**SAVE** is a resident **CP/M** command that is used primarily in programming. It stores the contents of the computer's memory in a diskette file.

**SFTVIDEO.DVR** is a part of **DRIVERS** that controls automatic scrolling and column width.

**STAT** is a transient command that displays information about the storage space occupied by files and any special attributes assigned to them. You can use it to find out the space left on a diskette, the status of an individual file, or the status of multiple files on a diskette.

**SUBMIT** is a transient command that allows you to put a sequence of **CP/M** commands into a file and then execute the entire sequence by typing **SUBMIT**, followed by the name of the file. The file must contain one **CP/M** command on each line, starting with the command to be executed first. The file name must end in **.SUB**.

**TYPE** is a resident command that enables you to display the contents of a file on the screen. When you type **TYPE** followed by the name of a file, it displays the contents of the file from beginning to end on the screen. If you type **CTRL** **P** first, **TYPE** also prints the file on the printer.

**USER** is a transient command used primarily with the multi-user version of **CP/M** called **MP/M**. It changes the assignment of storage areas assigned to different users in a multi-user computer system.

***XSUB*** is a transient command that extends the capabilities of the ***SUBMIT*** procedure. It enables you to call and give commands to the ***PIP*** and ***DDT*** programs while the ***SUBMIT*** command executes the program. To use it, type ***XSUB*** on a line in the ***.SUB*** file at some point above the lines in which you invoke and give instructions to ***PIP*** or ***DDT***.

# For The Advanced User

This guide is written primarily for persons who intend to use **CP/M** to run application programs. However, **CP/M** also has a multitude of capabilities to help programmers and other advanced users. Some of these features are outlined below. There are also a number of good technical books on the subject. To understand fully the tremendous variety of technical tasks the **CP/M** system can perform, or the way that **CP/M** is organized, advanced users should consult one or more such technical handbooks.

## **ASM**

**Description:** A transient command that executes **CP/M's** assembly language assembler program, turning assembly language source files into machine code files.

**Formats:** (1) ASM filename  
(2) ASM filename. shp

In format 2, the s stands for the letter of the drive containing the source file. The h stands either for a letter identifying the drive to receive a **.HEX** file or Z to tell **ASM** to skip the step of creating the **.HEX** file. The p stands for the letter of the drive to receive the **.PRN** file created by **ASM**, or X to send the **.PRN** file to the terminal display, or Z to tell **ASM** to skip the step of creating the **.PRN** file.

## **DUMP**

**Description:** A transient command that displays the contents of a disk file in hexadecimal notation, listing 16 bytes at a time.

**Format:** DUMP filename

## **ED**

**Description:** A utility program that makes it possible to make corrections and changes to programs. The **ED** program creates an edit buffer file and allows you to modify the text in this buffer. When you terminate **ED** with the command **E**, **ED** updates the source file and creates a backup file of the original source file.

**Format:** ED filename

This command merely activates the **ED** program. There are a large number of subcommands within **ED** to append characters and strings, find specified strings, move the cursor around in the file, delete material and perform other editing functions. See one of the technical handbooks for full directions on using **ED**.

## **LOAD**

**Description:** A transient command that converts a program in hexadecimal format into a command file that can be executed.

**Format:** LOAD filename

## SAVE

**Description:** A resident command that stores the contents of the computer's memory (such as a program you have entered from the keyboard) in a diskette file.

**Format:** SAVE p filename

The p stands for the number of 256-byte "pages" to be saved. For directions on how to calculate the number of pages, see one of the good technical handbooks on **CP/M**.

## SUBMIT

**Description:** A transient command that allows you to put a sequence of **CP/M** commands into a file and then execute the entire sequence with a single command—**SUBMIT** followed by the name of the file. The file must contain one **CP/M** command on each line, starting with the command to be executed first. The file name must end in **.SUB**.

**Format:** SUBMIT filename. SUB

To use the command, first type the sequence of **CP/M** commands you desire, putting one command on each line. Then store the sequence in a diskette file with the **SAVE** command, giving the file a name ending with **.SUB**. To execute the sequence, use the format above.

## **XSUB**

**Description:** A transient command that extends the capabilities of the **SUBMIT** procedure. It enables you to call and give commands to the **PIP** and **DDT** programs while the **SUBMIT** command executes the program.

**Format:** XSUB

To use the command, type **XSUB** as the first line of your **.SUB** file. Then you can put **PIP** or **DDT** commands on any other lines in the file. Execute the file with the **SUBMIT** command.

## **Additional Uses Of The PIP Program**

In addition to transferring files (explained earlier), **PIP** can also be used to copy entire diskettes, copy portions of files, and copy to devices.

When you use **PIP** to copy an entire diskette, it “packs” the information in the files more compactly than when you use the **COPYFRMT** command. This makes it possible for programs such as a word processor or **BASIC** language compiler to access the files more quickly. Of course, if the original diskette contains the **CP/M** system tracks, **PIP** will not copy them.

### **To copy an entire diskette:**

Two methods may be used. The first is safer but slightly slower. Put a diskette containing the **PIP** program in drive A and the diskette to be copied in drive B. The **PIP** diskette must

contain enough unused space to hold the files on the diskette to be copied. Type `PIP A:=B: *.*` to copy your files from drive B to drive A. Remove the original diskette from drive B and insert a blank formatted diskette. Type `PIP B:=A: *.* [V]` to copy your files from drive A to drive B. Use the **DIR** command to verify that the files have been copied, then erase the files from the **PIP** diskette in drive A.

The second method is faster but more dangerous. Put your **CP/M** diskette in drive A and a formatted blank diskette in drive B, and perform a warm boot. Type `PIP` and `[RETURN]` to load a copy of the **PIP** program into the computer's memory. Then remove your **CP/M** diskette from drive A and insert the diskette to be copied. Type the command line `B:=A: *.*[RTN]` or, if you prefer, `B:=A: *.* [V]` to copy the files from drive A to drive B. Then remove your original diskette from drive A and reinsert your **CP/M** diskette. Then—and only then—terminate **PIP** by pressing the `[RETURN]` key.

A warning: DON'T TYPE `[RETURN]`, `[BREAK]` OR `[CTRL C]` UNTIL YOUR **CP/M** DISKETTE IS BACK IN DRIVE A OR YOU WILL DESTROY PART OF YOUR FILES!

To be safe, always be sure to have a backup copy of your files before you use this method.

### To copy a portion of a file:

First, type `PIP` and `[RETURN]`. (Don't try to use **PIP** as a one-line command to copy part of a file—it won't work properly.) When the **PIP** command prompt appears, use an `[S]` parameter in the **PIP** command line to specify a starting string of characters to be copied and a `[CTRL Z]` to indicate the end of the starting string. Use a `[Q]` parameter in the **PIP** command line to specify a stopping string and another `[CTRL Z]` to indicate the

end of the stopping string. The following are examples of command lines to copy part of a file:

```
*PARTFILE.TXT = ORIGINAL.TXT (SThree blind
mice [CTRL] [Z] ) [QSee how they run [CTRL] [Z] ]
```

(Copies part of a file from the words “Three blind mice” up to but not including “See how they run.”)

```
*PARTFILE.TXT = ORIGINAL.TXT (QSee how they
run [CTRL] [Z] )
```

(Copies part of a file from the beginning up to but not including the words “See how they run.”)

```
*PARTFILE.TXT = ORIGINAL.TXT (See how they run
[CTRL] [Z] )
```

(Copies part of a file from the words “See how they run” to the end.)

### Copying to devices:

You can use **PIP** to transfer files from diskettes to peripheral input-output devices—such as a printer, terminal, cassette recorder, or another computer via a modem. You can also use it to transfer data from a peripheral device to a file or to transfer data from one peripheral device to another. To use **PIP** with devices, simply substitute a device name for a file name in the **PIP** command.

**CP/M** recognizes “logical” device names as well as “physical” device names. The logical device names allowed in **PIP** expressions are:

**CON**: for “console” or terminal, including keyboard and display (input/output devices)

**RDR**: for input-only devices (such as a card reader or separate keyboard)

**PUN**: for output-only devices (such as a card punch)

**LST**: for “listing” output-only devices (usually your printer).

Thus, the command **PIP CON:=ACEFILE.TXT** would send a copy of the file **ACEFILE.TXT** in the default drive to the console device (usually your video monitor).

The command **PIP LST:=ACEFILE.TXT** would send a copy of the file to the **LST**: device (usually your printer).

The command **PIP ACEFILE.TXT** would copy data from the **RDR**: device (perhaps a cassette recorder) into the file **ACEFILE.TXT** in the default drive.

The physical device names that can be used with **PIP** are as follows:

**TTY**: for a teletype or modem used as a console or terminal, reader, punch or list device

**CRT**: for a cathode ray tube or modem used as a console or terminal, or a list device

PTR: for a cassette recorder, paper tape or card reader used as a reader device

PTP: for a cassette recorder, paper tape or card punch used as an output (punch) device

LPT: for a (line) printer used as a list device

UC1: for a user-defined console or terminal

UR1: for a user-defined reader

UR2: for a second user-defined reader

UP1: for a user-defined output (punch) device

UP2: for a second user-defined output (punch) device

UL1: for a user-defined listing device

## Customizing CP/M

Suppose you have a 14-inch-wide printer that can handle 132 column output, and you want to use it all the time. Or, let's say you have an external terminal attached to your ACE computer that processes information a little differently from a video card.

Using your ACE 80 CPU, you can make changes in your setup to accommodate these differences. However, you have to alter the **DRIVERS** program, the set of instructions enabling your ACE to use its peripheral devices.

Fortunately, that's easy to do with two programs on the utility diskette, **CONFIGSV.COM** and **INSTALL.COM**. They provide you with substantial guidance, but they are written in a format wider than 40 columns. Make sure your ACE is displaying either 70 or 80 columns before you start to use them.

This procedure is going to modify the **DRIVERS** file on a utility diskette, so you don't want to use either your utility master or backup. Make a fresh copy and use it. Since you will be writing to the utility diskette, don't put a write-protect tab on until after the procedure is complete. You'll get **BIOS** errors if the disk is write protected. First, put the utility diskette in drive A and type **CTRL C**. After the prompt, type:

CONFIGSV

and then type **RETURN** The display looks like this:

Type **A** (You won't need to type **RETURN**.) The display now looks like this:

If you need to make any changes, type the letter of any of the options and the screen tells you what to do.

Here's a little more explanation of the letters:

A has been preset by Franklin. You won't need to change it.

B lets you define the rubout character. The ACE can use this to delete the character entered before it.

C lets you adjust the volume of the "click" sound your ACE produces as you type. Adjusting the volume to 0 produces no added sound at all, while a 10 produces a relatively vigorous "click."

D has been preset by Franklin. You won't need to change it.

E turns off automatic scrolling. If you change this, you can still type the full length of the screen, but you won't be able to see what you're typing.

F adjusts the screen width. You can change it to 40, 80, 132, 180, 220, or 255 columns.

Some of these items (rubout character, for instance) apply to 40 column, 70 column and 80 column screens and you can't change any of them for one screen width without changing it for all three. Also, the changes you make at this point won't take effect until you complete the procedure and re-boot.

When you've made the changes you want, type A. **CONFIGSV** returns to its original display.

If you have an 80 column card, type B. Type X to return to the original **CONFIGSV** display.

If you're using an external terminal, type C and select the option corresponding to your terminal.

When you're done, type **[D]** from the main **CONFIGSV** display and wait for directions. Then type **[X]** to return to **CP/M**. After the **A** prompt, type **INSTALL**.

The **INSTALL** display gives you many options, but you only have to use three.

Don't be alarmed when you see **INSTALL** display the line **DRIVERS** on the screen. This is a little misleading; what it's really saying is that **INSTALL** hasn't put any new drivers into your **DRIVERS** program yet.

First, type **[A]**. After the new display appears, type **SFTVIDEO.DVR** and **[RETURN]**. The line **NO DISPLAY** is replaced by **SOFTVIDEO** and some other identifiers. If you want 70 column capability, then type **[A]** again, followed by **HIRESIO.DVR** (that's with the letters I and O, not the numeral 10) and **[RETURN]**. **HIRES 70 COLUMN** shows up on the same line as **SOFTVIDEO**.

At this point, type **[B]**. **INSTALL** asks you to name the new **DRIVERS** file. Type **DRIVERS**, all in capital letters, and hit **[RETURN]** if you want the new drivers file to replace the one currently on the utility diskette. If you want the new file on a diskette in another drive, type in the drive designator first, followed by a colon; for example:

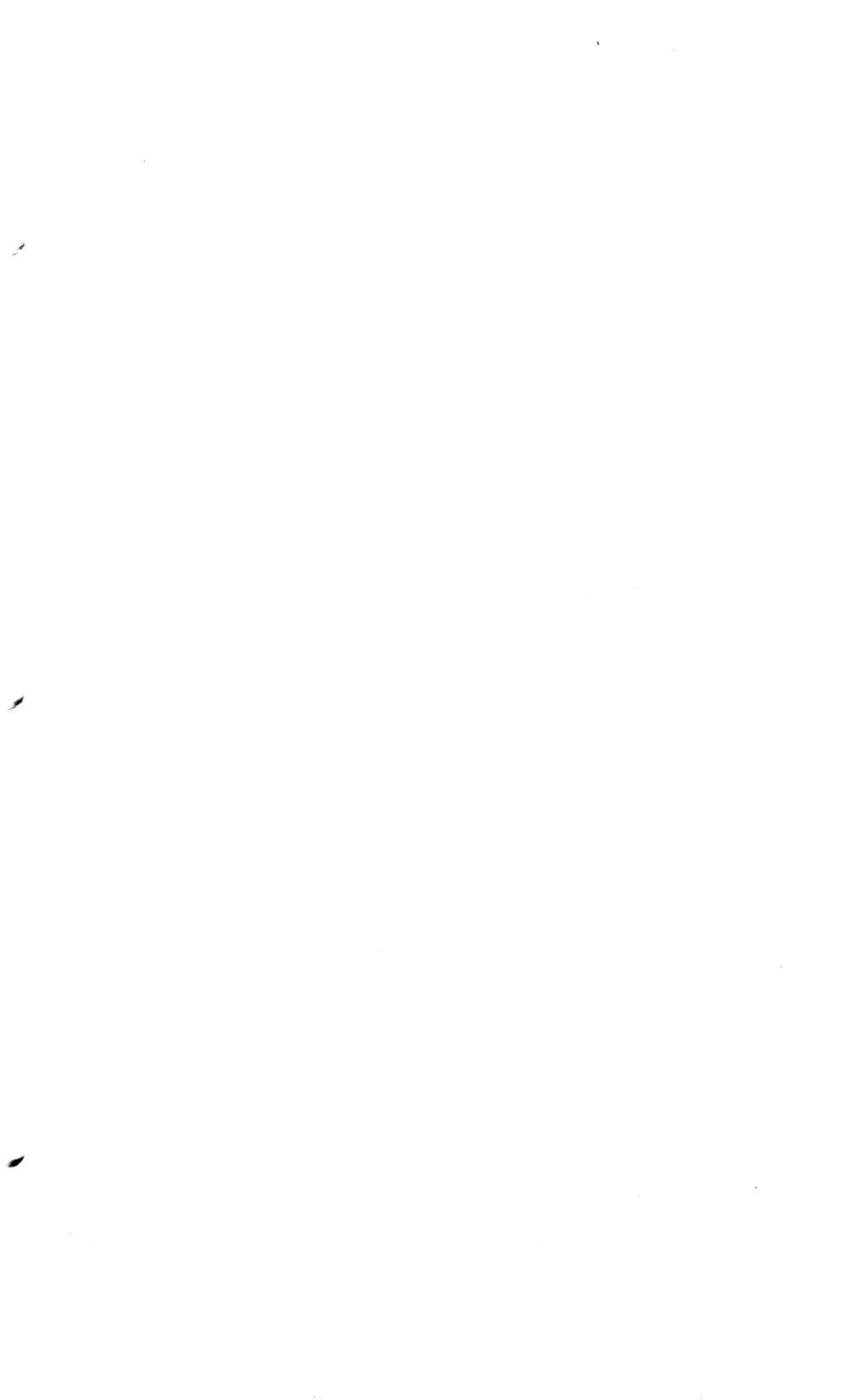
**B:DRIVERS [RETURN]**

Then type **C**. **INSTALL** displays:

Type **A**. **INSTALL** responds with:

**INSTALL** puts a copy of the **CP/M** operating system and an altered version of **DRIVERS** on the diskette that you insert. If the diskette already has **CP/M** and **DRIVERS** on it, the new versions will replace the old ones. Boot up with the new diskette, and your system's peripheral devices will perform as you like.

The new diskette has plenty of space for programs from the **CP/M** diskette, utility diskette, or other sources. You can even put the new **CP/M** and **DRIVERS** on a copy of the **CP/M** diskette, if you want.





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