

A BRIEF OUTLINE OF CP/M AND CP/M COMMANDS

Eli Freedman
ABC Br, IBD

These notes are necessarily sketchy. Not every CP/M utility is mentioned; of those that are, not every ramification is covered.

CP/M stands for Control Program for Microcomputers. It is a collection of computer programs for the Intel 8080 and the Zilog Z80 chips. CP/M handles all of the sometimes intricate and always tedious details of input/output (I/O), including communication among processor, disks, console, and printer, including disk-file maintenance.

For the North Star Advantage, CP/M is furnished on a 5-1/4 inch floppy disk where the system occupies the first 3 tracks; these are called the system tracks. When you press the red button on the back of an Advantage and then the RETURN key, the CP/M system is loaded into the computer. This operation is called "booting" the computer; note that it is not done with the foot! When the computer is booted, CP/M loads itself into the computer's core memory. It occupies approximately 6000 (decimal) bytes at (or near) the top of the memory, and also the first 256 (decimal) bytes starting at 0.

There are two kinds of "booting":

Name	Alternate Name	How Accomplished	Why
cold	hard	turn machine on press red button special program	start-up resume after crash
warm	soft	press ^C	read disk directory

After booting, the screen displays A>, meaning that you are "logged in" on drive A. If you type B:, the screen shows B>, meaning that the logged drive is now B. WordStar and many other programs require that you know which drive is the logged one.

The principal components of CP/M are the Basic Input/Output System (BIOS), the Basic Disk Operating System (BDOS), and the Console Command Processor (CCP). These programs are all located in the "high memory" part of CP/M. The largest amount of the computer's random-access memory lies between the two parts of CP/M and is referred to as the Transient Program Area (TPA). All of the TPA is available to the user; some CP/M programs also use it.

CP/M has two kinds of commands, built-in and transient. The built-in commands (ERA, TYPE, SAVE, REN, and DIR) are in the CCP, and do not change anything in the TPA. Also, they do not show up in the directory listing of the disk. The transient commands do show up in the directory (unless you go to the extra trouble of hiding them--it can be done) and they are loaded into the TPA for execution.

FILE NAMES. Almost all CP/M commands work on file names. A file name is 1 to 8 letters or numbers, plus an optional extension, which is a period and 1 to 3 letters or numbers. Some special characters can be used in file names. The drive letter may appear in front of the name, followed by a colon. If the drive letter is not used explicitly, the logged drive is assumed by default.

Examples: MYFILE.EXT URFILE B:afile.for A:CPNOTES.TXT

Note that A:MYFILE is different from B:MYFILE; likewise, MYFILE.TXT is not the same as MYFILE.BAK.

Certain extensions have special meanings:

.FOR	A FORTRAN source file.
.BAS	A BASIC language file.
.REL	Relocatable code produced by various compilers.
.ASM	Assembly language source file.
.HEX	The output from certain assemblers.
.PRN	A print listing produced by some compilers.
.COM	A command file (executable program).
.SUB	A SUBMIT file (similar to a CCL procedure).
.BAK	A backup file; produced by WordStar and some other programs.
.MAC	A file for the Microsoft M80 macro assembler.

These uses are required in most cases. For example: the Microsoft FORTRAN compiler will not compile a program without a .FOR extension; you cannot execute a program that does not have a .COM extension. I recommend that you use extensions only to designate the kind of file; don't rely on the extension alone (except for

WILD-CARD DESIGNATORS. In many cases one wants to refer to a class of files, not just one. This is done with the "wild-card designators," * and ?. The ? matches any letter; the * means "any."

Examples:

*.FOR means any file with the extension FOR.

AB??????.* means any file whose name starts with AB and has any extension.

AB??????.TXT means any file whose name starts with AB and has extension TXT.

SOME SPECIAL CONTROL CODES. Control codes are generated by holding down the key marked CNTRL (or CONTROL) while pressing another. In text, the up arrow, ^, is used to designate the CNTRL key. In CP/M, certain control codes have special meanings:

^C Interrupt a command or program (may not always work); perform a "soft boot" (read the directory on each disk drive).

^S Stop/start the screen display.

^P Start/stop the printer; when "on", any text that appears on the screen will also be printed.

^X Erase command line, return to col. 1

BUILT-IN COMMANDS.

DIR [A:URFILE.EXT]

Display the directory for a file or a disk.

Examples: DIR

Shows the directory for the logged disk.

DIR B:

Shows the directory for disk B no matter which disk is the logged one.

DIR A:*.COM

Shows the directory for all files on the disk on drive A that have the extension COM.

DIR B:MYFILE.*

Shows the directory for all files on drive B that have the name MYFILE, no matter what their extension is.

REN NEWFILE.EX2=OLDFILE.EXT1

Rename a file. The old file name is replaced by the new file name in the directory; the contents of the file are not disturbed.

ERA FILENAME

Erase the name of the file from the directory. The contents of the file are not disturbed, and can be retrieved by special programs.

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Examples: ERA B:*.BAK

Erases on all files on drive B with the extension BAK.

ERA A:MYFILE.TXT

Erases only MYFILE.TXT on drive A.

ERA *.*

Careful! This command will erase on files on the logged disk.

SOME CP/M TRANSIENT PROGRAMS

All programs that run under CP/M have the extension .COM. The program is executed by typing the name without the extension. Generally either lower- or upper-case letters may be used, but there are exceptions (e.g., in FORMAT).

STAT

Display size and attributes of a file or files or a disk; also, change the designations of I/O units. STAT by itself merely tells you how much space is left on the logged drive. STAT B: tells you how much space is left on the disk on drive B:.

STAT A:*. * tells you the name of every file on the disk now on drive A:, and its attributes. There are two attributes: R/W, meaning both reading and writing are permitted; and R/O, meaning the file is read-only.

STAT B:*.COM gives this information for every .COM file on drive B:. STAT also permits you to change device assignments; see the references.

COPY

Copy the contents of one disk onto another entirely, including the system tracks. COPY is self-guiding; just type the command and follow the instructions. Note that COPY refers to the drives by number, not by letter.

FORMAT

A new disk cannot be used until it has been formatted. For CP/M systems, this means that all of the tracks are filled with the format character (E5 HEX). This is accomplished by typing FORMAT

and then following the directions that appear. A disk does not have to be formatted if the very next thing you do to it is to COPY something onto it, since this automatically initializes the disk.

PIP

Copy one or more files to other files; the new files do not have to be on the same drive, but they may be.

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Examples: PIP B:NEWFILE.EX2 = A:OLDFILE.EX1
PIP NEWFILE = B:OLDFILE
PIP A:*. * = B:*. * Copies every file from B: to A;
the names remain the same, except for the change in drive designation.

PIP B:=A:*.FOR Copies every FORTRAN file on drive A:
onto drive B:

PIP can be invoked alone; it then responds *. You then name files two by two (i.e., new and old) for copying. Terminate with a CR.

SUBMIT FILE.SUB PAR1 PAR2 PAR3 ...

A great program that permits you to operate in almost a batch mode. The quantities PAR_i replace dummy arguments. You build up a sequence of CP/M commands in a file whose extension must be you place the dummy arguments, \$1, \$2, etc. When the file is then submitted, CP/M will make the substitutions, print the command, and then execute it.

Example: Suppose you create a file TEST.SUB whose contents are

PIP \$1:\$2.TXT=B:\$3.TXT

Then you type

SUBMIT TEST A GOOD BAD

The screen will show the complete command

PIP A:GOOD.TXT=B:BAD.TXT

and then the program will execute.

SAVE n FILENAME

This command transfers $n*256$ bytes from memory starting at 256 (decimal) to the named file on disk. It is used after working with DDT (see references). Also, some communication packages

(e.g., CMOD) transfer data from an external computer to your computer's memory; SAVE is then used to store the data on a disk.

SYSGEN

It is very convenient to be able to boot your computer from every disk you use. This means that every disk must have a CP/M system on it. (I also recommend that every disk have PIP, FORMAT, and COPY on it.)

There are two ways in which you can put a CP/M system on a disk. You can use COPY, which copies everything from one disk to another, track for track. This method has the disadvantage that you then have to remove all of the files that were also copied.

SOME REFERENCES

In my opinion, the best reference on CP/M is:

Rodnay Zaks, "The CP/M Handbook," Sybex; 1980.

J. N. Fernandez & R. Ashley, "Using CP/M," John Wiley; 1980 is written in a "programmed learning" style that I found infuriating. It is a good self-teaching text, but a poor reference book.

CP/M is a product of Digital Research. This company supplies Manuals with the system when you buy it. They have a well-deserved reputation for denseness and incomprehensibility.

An interesting book is

Jack D. Dennon, "CP/M Revealed," Hayden; 1982. It gives some of the details of how CP/M does its stuff.

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