THE COMMODORE LOGBOOK

by Mike Heck

CP/M on your Pet

What would be your reaction if you were offered a way to multiply the applications available for your Commodore system ten-fold, have access to many high-level languages such as business Basic, Fortran, and Cobol, plus have expanded user memory and a number of advanced hardware interfaces...all at the same time? You would probably assume that this pushes things too far—especially on a microcomputer.

However, these capabilities can be a reality by using a simple hardware add-on for the Pet or CBM, which allows use of CP/M.

Let's examine CP/M and how its power can be applied to Commodore equipment. One of the problems with microcomputers—in fact any computer—is that each is governed by a unique set of commands. Yet at the lowest level, every computer must perform the same tasks: get data from the keyboard, print information and handle disk activity. These tasks are usually handled by a "manager" referred to as an operating system.

On the standard Pet, a combination of Basic and DOS (Disk Operating System) initiate these activities. If you're just using Pet programs, everything's functional, but what happens if you want to apply a program designed for another system? For the most part—tough luck. Without extensive modifications, an alien program will rarely run on a different system than it was designed for.

Fortunately, in the early days of microcomputers, this problem of incompatibility was addressed, and CP/M was born. CP/M is popular because all the hardware dependent parts of CP/M are put in one part of the program. A developer can change just those portions of CP/M involving specific hardware—without touching the main application. Since no modifications are required to the main program, it can be used by any system capable of running CP/M.

In the seven years that CP/M has been around, thousands of programs have been created to run under it, written by more than 100 companies. Applications range from languages including business Basic, Fortran, Cobol and Pascal, and development utilities like assemblers, to accounts payable/receivable, data bases, planning and word processing applications.

Two CP/M hardware requirements are not met by standard Commodore equipment. CP/M was originally designed around an 8080 microprocessor. Since the Pet contains a 6502—whose instruction set is not compatible—a different microprocessor must be added. The system must also have at least 48K of user memory.

The way to comply with these needs is through a hardware add-on that provides a Z80 microprocessor and additional user memory (RAM). Two hardware devices that give Pet/CBM systems CP/M capability are the Z-RAM card from Madison Computer (distributed by Computer Marketing Services, Cherry Hill, NJ) and the Softbox from Small Systems Engineering, Ltd. (London, England).

Physically, Z-Ram is a separate card containing two Z80 microprocessors, a 6502 processor and 64K of additional RAM. The card is designed to fit inside the top of the Pet enclosure, directly under the monitor. Four mounting screws make installation a snap.

Z-RAM is designed to work with either a 40-column Pet or 80-column 8032 system. The advantage of using the 8032 is that most CP/M programs were originally designed to support 80-column terminals.

The only electrical connections involve unplugging the power cable to the main Pet motherboard, and connecting this cable to the Z-RAM. Another cable brings power from the card back to the Pet. The final connection involves removing the 6502 microprocessor from the Pet's main logic board and attaching a 40-conductor cable from the Z-RAM card to the 6502 socket.

Even without firing up CP/M, the Z-RAM permits use of the additional 64K RAM from the normal Pet. Under CP/M you have the full 64K RAM work space also.

In using this extra RAM from the Pet, you can split memory to accommodate three programs simultaneously. The first bank contains 26K RAM, the second and third 32K RAM. This is advantageous for large programs since the wait induced by going to the disk to bring in the next part of the program is eliminated.

Z-RAM supports printers either through the standard Commodore IEEE-488 interface or through Madison Computer's McTERM standard RS-232 serial port.

To use CP/M with Z-RAM, just boot the supplied CP/M disk. After a brief wait—CP/M is a short program—the opening message will be displayed along with the CP/M ready
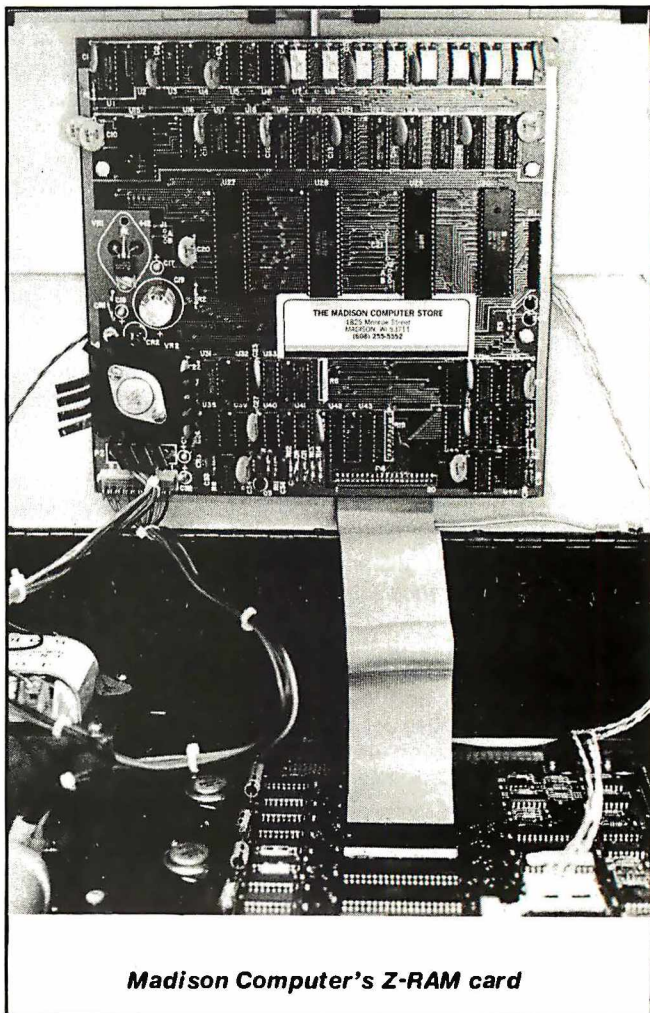
Madison Computer's Z-RAM card
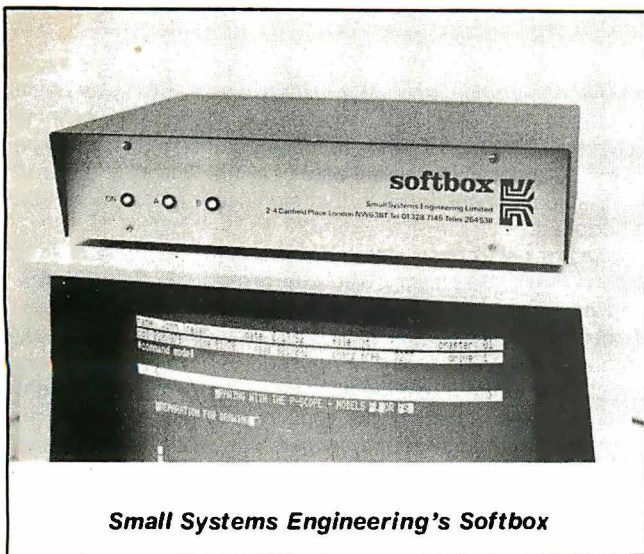
Small Systems Engineering's Softbox

prompt. Another side note: CP/M is not the most efficient with disk space. Using Commodore's 8050 disk with a total of 500K bytes on a diskette will yield a more effective operating environment.

The Softbox takes a slightly different approach to the hardware, but still provides a good CP/M implementation. Electronics are enclosed in an out-board box that can be placed anywhere near the Pet. The Softbox is attached via a standard Pet interface cable daisy-chained off any CBM peripheral. A power cord goes to an AC outlet, and that's it. The Softbox has three indicators on the front panel for power and the disk drive in operation.

Internally, the Softbox contains 64K bytes of RAM and a Z-80 microprocessor. Interfaces for the optional RS-232 and Corvus hard disk drive can also be purchased. CP/M for the Softbox is supplied on many Commodore formatted disks, but the larger the disk capacity, the better.

Booting from the CP/M system disk with the Softbox powered up will automatically execute CP/M.

A number of new conventions are contained within CP/M. These are standard for all CP/M based systems—not just the Commodore implementations mentioned here. Rather than naming the disk drive units 0 and 1, which are standard with Commodore, CP/M names disks A: and B: for the first two units.

The CP/M system prompt will be A> or whatever drive you select. From this point, you can get a directory of the programs on the disk, inquire about specific information regarding a file or the disk, perform housekeeping duties such as file transfer and disk formatting, and, of course, run specific programs.

A CP/M directory will look quite different from a standard CBM disk catalog:

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A>DIR
A: FORMAT   COM : COPY        COM : MBASIC COM
A: PIP      COM : STAT        COM : ED     COM
A: ASM      COM : DOWNLOAD    COM : WS     COM
A: PR MENU  BAS : PR PGR      BAS :
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The standard CP/M disk supplied with both Z-RAM and the Softbox contains the support programs to perform the functions mentioned above. In addition, the standard Microsoft Basic language is included.

Looking at the directory, you can determine the type of each file by the suffix, i.e. COM, BAS, etc. A COM file is a command file, which requires you to just type the file name after the prompt and it will be executed immediately. More specifically, TYPE lists a file to the screen. STAT gives available disk space, and PIP is a file transfer utility for transferring programs from one disk to another. These are all standard CP/M utilities included with any CP/M system.

To switch drives, type B: after the prompt and the prompt will change to B>, indicating that B: is now the logged drive. If

you now do a directory, or DIR, the contents of the disk in drive B: will be displayed.

CP/M also has a great printer option at the system level. If you type Control-P, the printer is automatically selected, so everything on the screen is also printed. A second Control-P turns off the printer. This sure beats having to open a printer channel and enter the other commands necessary to use a printer under Pet Basic.

A BAS file is a Basic program that requires the loading of the Microsoft Basic language first. Once that's accomplished— by typing MBasic—you can type RUN FILENAME and the program will be loaded and executed.

Once the hardware's out of the way, CP/M operates the same on any system. The real power of CP/M, again, is in the number of applications available, and the transportability of those programs.

Since each computer operating under CP/M seems to have a different disk format, the remaining hurdle is making CP/M programs run on Pet systems. Unless you have an IBM-compatible 8-in. disk drive on your Pet (most CP/M programs were first distributed on that format), purchase programs already on the properly formatted CBM disk.

If you can't find the program on CBM disks, another option is to use one of the many available CP/M communication programs to transfer the CP/M applications from one computer system to another. This process involves communicating, either over phone lines or directly, between a CP/M host system and the Pet.

Once files are transferred from the host system to the Pet, they are saved on CBM disks. Though this may seem like extra effort—in some cases it is—the work usually pays dividends through access to an expansive base of CP/M programs. In the same way, learning about CP/M will also pay off due to its simple, direct operation, expanded capabilities such as hard disks and networking, and the high-quality software available. □