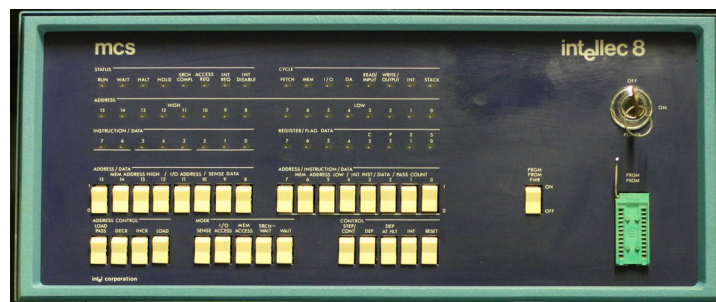


The CP/M Operating System

Prof. Dr. Bruce Nikkel, Bern University of Applied Sciences

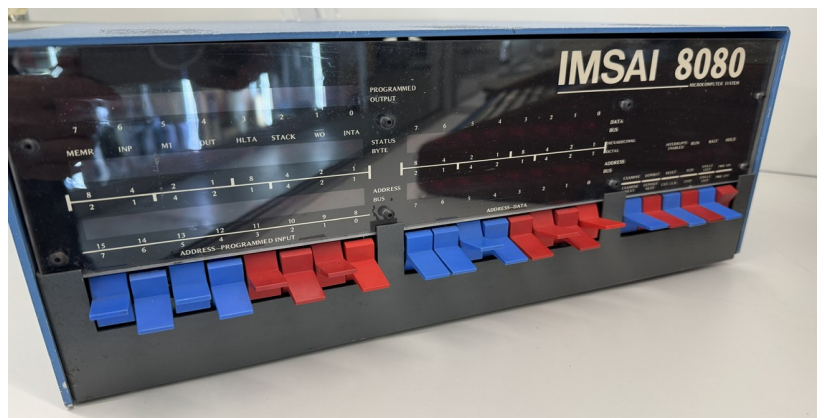
This is part one of a multi-part series on the CP/M operating system. In 1973, Californian Gary Kildall developed the PL/M programming language for Intel's 8-bit MCS microcomputers. The first microcomputers loaded programs into memory from paper tape over a serial interface, typically using the ASR 33 Teletype machine as the input device (or as the output device for saving programs). IBM had recently developed the floppy disk drive, but disk operating software was needed to load and save programs using the Shugart floppy disk interface (see my previous articles on 8-inch floppies). In 1974, Kildall created CP/M or Control Program for Microcomputers, as an operating system to provide easy access to floppies and other I/O devices from within programs or from a command line interface.



Kildall and his wife formed a company called Digital Research Incorporated (DRI) to sell CP/M to the growing microcomputer market.

|| DIGITAL RESEARCH

In 1976, the IMSAI 8080 was the first commercial success story for CP/M and led DRI to create a hardware abstraction layer as part of CP/M version 1.3. This was a separate BIOS (Basic I/O System) component in CP/M which any microcomputer or drive interface manufacturer could provide, allowing CP/M compatibility. This was a significant step. Until this time the operating system was associated with floppy drive controllers, but this abstraction started to shift the focus of the OS more to the microcomputer system in general. Creating the BIOS made CP/M 1.3 popular in the fast growing microcomputer market of the late 1970s.



In 1979, CP/M version 2.0 was developed with new features to adapt with changes in market demands. A disk parameter block provided a more flexible disk geometry, allowing the use of hard disks with much larger capacity. Up to 16 attached logical drives, each with up to 8MB of storage, were supported. The original CP/M filesystem was flat and had no sub-directories, but version 2.0 introduced the concept of user numbers (0-15) which gave an isolated directory for each user number. A 'USER' command would switch the user number and provide access to files in that user's directory. File operations were applied only within the directory of the specified user. A bug-fixed version 2.2 became a popular CP/M standard for many years.



The Multi-Programming monitor control program for microcomputers, or MP/M 1.0, was also developed in 1979. The goal of MP/M was to facilitate multiple concurrent users of a single microcomputer, similar to time-sharing minicomputer systems like UNIX. MP/M provided multi-terminal support, multi-tasking, I/O and CPU concurrency, inter-process communication (IPC), and was CP/M 2.0 upward compatible. A major update, MP/M II, was released in 1981 which added file locking and sharing, and increased the supported storage size. In subsequent years a number of versions and variations of MP/M were released.

```
64K CP/M Version 2.2 (SIMH ALTAIR 8800, BIOS V1.27, 2 HD, 02-May-2009)

A>dir
A: SPEED      COM : CPU      COM : MBASIC  COM : ELIZA   BAS
A: DUMP        COM : ED       COM : DDTZ    COM : OTHELLO COM
A: PIP         COM : STAT     COM : SUBMIT  COM : XSUB    COM
A: DIF         COM
A>
```

CP/M Version 3, also known as CP/M Plus, introduced support for hardware memory bank switching, with up to 16 banks of 64K memory. The maximum file size was increased to 32MB, and file timestamps (creation and last modified) were introduced. This was the last major version of the original CP/M before Digital Research began a series of renaming and re-branding of their operating system in a desperate attempt to compete with DOS from IBM and Microsoft. By the mid-1980s CP/M's dominance had come to an end. The extensive drama of negotiations and competitive tactics between DRI and Microsoft is not covered in this article.

