

CP/M Plus — a great leap forward?

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There are only three important versions of CP/M — 1.4, 2.2 and 3.1 — compared with five for MSDOS along with numerous intermediate revisions. Up to version 1.3, Gary Kildall had written separate versions for each new machine. Thereafter, CP/M was supplied in two parts — the major part which interfaces with software and allows programs to run on any CP/M machine and a smaller part which the manufacturer tailors to his/her hardware.

In version 2.2 the proliferation of disc sizes was catered for by allowing the disc parameters to be altered to suit the disc in use. At heart CP/M believes all data is being stored on IBM 8" discs; part of the BDOS (Basic Disc Operating System) holds the parameters of the actual disc(s) being used and converts files to and from the format of the disc.

Version 2.2 could also recognise the ‘user areas’ which had been incorporated into MP/M — the multi-user version of CP/M — and, though it could not use them, it could show which user areas were in use, display their contents and retrieve files from them.

Version 3.1 (or Plus) was to have been the great leap forward with a parallel version for 16-bit machines. It brought bank-switching, password protection and a range of newer and updated utilities.

CP/M always grabs the bottom 256 bytes of the workspace and locates the remaining essential routines at the top of the workspace. The less important ones are held in the program area and overwritten while a program is running.

Since the Z80 chip on which all the better CP/M programs was based is limited to 64K workspace (or memory, or TPA), the most CP/M 2.2 could allow for programs was around 48K. A few manufacturers squeezed 56K out of it by, for example, using text-based video arrays but the Amstrad DD1 only allows 39K because of the extra space needed for a graphical video RAM. This is entirely comparable with the 640K out of 1024K which a basic PC offers. The space between 640K and 1024K on a PC is taken up with exactly the same things as the space between 39K and 64K on the DD1.

Digital Research’s solution in CP/M 3 was to introduce bank-switching. Nearly all the things which used to be stored in the upper portion of the workspace, together with a copy of the routines which normally run in the program area, are placed in separate 16K banks (the space between 64K and 128K on your 6128) and exchanged with one of the four 16K banks which make up the Z80’s workspace. Only 3K is needed to handle the essential routines which allow this to happen — hence, the 61K that appears when you load CP/M 3.1.

Because CP/M 3.1 stores the routines which occupy the program area in one of the banks, these can be ‘instantly’ recalled when a program terminates. This means you never have to reboot from a floppy or hard disc on exiting a program as in CP/M 2.2 and, as a bonus, there is normally no opportunity for boot viruses to infect a CP/M 3.1 boot (or system) disc as they can on other machines.

Password protection, along with date and time stamping, could not be implemented on CP/M 2.2 format discs. So Digital Research supplied a separate program (INITDIR.COM) for creating CP/M 3.1 format discs from CP/M 2.2 format discs. In these, every fourth directory entry holds the passwords, etc. so reducing the number of directory entries by a quarter and making it impossible for CP/M 2.2 or AMSDOS to read the directory properly.

There is no need to use 3.1 format discs if you don't need passwords or date/time stamps; you can use 2.2/AMSDOS format discs (as created by DISCKIT) but, if you mix formats, CP/M 3.1 does not warn you that copying from a 3.1 to a 2.2 format disc loses your passwords etc.

The resident commands **ERA**, **DIR**, **REN**, **TYPE** and **USER** remain the same in 2.2 and 3.1 but **SAVE** (2.2) is relegated to **SAVE.COM** in 3.1 while **DIRS** (DIRectory of System files) comes in. 2.2 users had to use **STAT.COM** to locate System files — that is, files marked for common use under MP/M. 3.1 users can mark files for common use in all user areas and operate from any user area, not just user 0 as in CP/M 2.2.

However, most of these resident commands acquired transient (or .COM) versions in 3.1. **ERASE.COM** allows conditional erasing; **RENAME.COM** allows multiple renaming; **TYPE.COM** allows a 'nopage' mode — you don't have to press RETURN at the end of each screenful so

```
TYPE EXAMPLE.TXT[nopage]CONTROL-P
```

will send EXAMPLE.TXT to the printer without page breaks.

DIR.COM, **SET.COM**, **SHOW.COM** and **DEVICE.COM** take over and expand the facilities available from **STAT.COM** in CP/M 2.2. **DIR.COM** has sixteen parameters to allow complex searching for files; for example,

```
DIR LOST.TXT[user=all,drive=all]
```

will find LOST.TXT wherever it is as long as it is on one of the discs in a drive — perfect for hard disc users!

SET.COM and **SHOW.COM** allow read only files, passwords, date and time stamps and disc labels to be set and displayed; **DEVICE.COM** handles the peripherals — out go **PUN:** and **RDR:**, in comes **AUX:** for the CPC (**CEN:** and **PAR:** for the PCW) — **CON:** and **LST:** remain.

PIP gains one important function apart from the ability to protect and copy password protected files — the archive switch — important because it can be used on CP/M 2.2/AMSDOS discs as well as CP/M 3.1 discs. With the archive switch set, you can backup a disc and when you next back it up only the files which have changed will be copied thus speeding up the whole process of backing up files.

SUBMIT.COM incorporates **XSUB.COM** (which is a separate program in 2.2) and, instead of using **SETUP.COM** to modify your system disc as you have to in CP/M 2.2, CP/M 3.1 allows you to modify your setup using .SUB files. **PROFILE.SUB** is the first file CP/M 3.1 looks for after being loaded and should contain the necessary configuration information.

Virtually everything can be configured in CP/M 3.1 — the screen, keyboard, disc drives, joystick, printer, serial interface — and the date and time can be set. CP/M 3.1 incorporates a system clock which must be set either from a Dk'tronics Real Time Clock or using **DATE.COM** if date/time stamps are to be used.

SETDEF.COM allows a degree of configuration but Amstrad made this easier by supplying their own utilities — **LANGUAGE**, **PALETTE**, **SETKEYS**, **SETLST**, **SETSIO** etc. — which

allow you to configure your 6128 extensively. They also built an extended disc parameter block into their implementation of CP/M 3.1, making it so much easier for people to develop programs to read PCW or 3.5" discs. More on that next issue!

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