WELCOME TO 16-BIT — DOS AND WINDOWS

Welcome to the first column of a new addition to the Hands On section. 16-bit replaces the old Windows 3.1 column. Its brief has been extended to embrace that other 16-bit PC operating system, DOS. We've made this change of emphasis because, for the past few years, DOS has been woefully ignored as everyone points and clicks and drags and drops with their new, super-duper, 32-bit GUI. And yet DOS hasn't gone away: scrape a little off the Windows 98 desktop and underneath you'll find that familiar, stark C:\> prompt.

Yes, there are still some computer activities that cannot be performed without resorting to "the dark half", as I'm wont to refer to DOS. If you try installing a new hard disk, I'm very sorry, but you'll have to get your hands dirty and use the DOS utility from hell — FDISK. There must be a legion of Windows 98 users who shy away from the MS-DOS prompt, simply because it is too intimidating. You'll have to take my word for it, but really, it isn't. It will be the aim of this column to shed light on the dark half and to show you ways of configuring it and making better use of it. And a word of reassurance for all our steadfast Windows 3.1x users — don't worry, it's not going away. I'll still be devoting column inches to the doyen of PC GUIs. But for a short while I'll be rectifying the shortfall in DOS coverage by spending more time on DOS and less on Windows 3.1x. One thing won't be changing, however, and that is the column's usual dependence on its readers to provide feedback and problems to solve.

Roger Gann

Prompt response

Don't be scared of DOS, urges Roger Gann — it's not as intimidating as you might think. You *can* make better use of it.

There is still some debate over whether Windows 9x is a true operating system or whether it's just Windows 4 riding atop DOS 7, just as Windows 3.1x sat on top of MS-DOS 6.2 [Fig 1]. Windows NT 4.0 has the familiar DOS command-prompt capability, but it's virtually impossible to extract this functionality and serve it up as a stripped-down command-line-only version. You can perform this stunt with Windows 9x, however. I guess it depends on what you mean by "operating system".

Up and running

There's no question that the Windows GUI functions on top of a lower-level operating system that looks and behaves pretty much like DOS. However, even though this subordinate part of the OS looks like DOS, its system files are very different from those in all previous DOS releases. Also, while Windows 9x is dependent on DOS (which, let us not forget, stands for Disk Operating System) to load its key files, once they are loaded most of the original DOS code, particularly the disk device drivers and memory management stuff, is discarded in favour of 32-bit protected mode versions. So, while Windows 9x is dependent on DOS to get it up and running, once it is up, it largely ignores it.

Until the final release of MS-DOS (v6.22) DOS loaded the IO.SYS and MSDOS.SYS files at boot time (and the DriveSpace driver, if you were using disk compression). These files were hidden system files and consisted of executable code. Now, in Windows 9x, IO.SYS and MSDOS.SYS still exist but the latter is a text-based configuration file.

Under Windows 95, the IO.SYS file is a monolithic replacement for four DOS files: IO.SYS, MSDOS.SYS, CONFIG.SYS, and AUTOEXEC.BAT. The new IO.SYS has all the instructions the operating system needs to initially interact with your hardware. It also loads some default CONFIG.SYS and AUTOEXEC.BAT commands and it controls much of the remaining boot sequence.

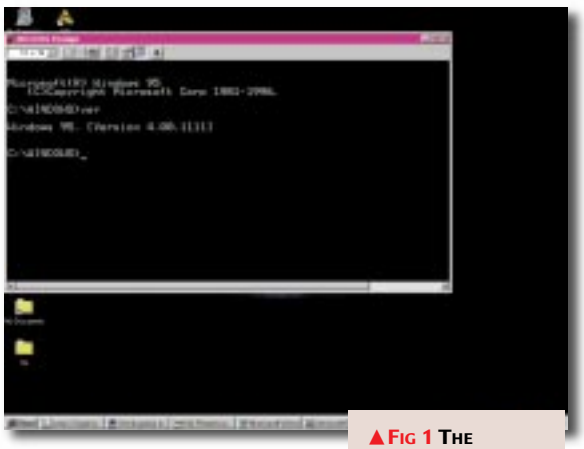
IO.SYS loads first, followed by MSDOS.SYS. This text file contains settings for several boot options, including the GUI status, network support and the boot menu — the one that pops up when you hit F8.

Incidentally, I notice that under Windows 98 you don't get much of a prompt to hit the F8 key, as the usual clue — the "Starting Windows 95" notice — just isn't displayed under Windows 98. After loading MSDOS.SYS, IO.SYS then loads the system's Registry files, USER.DAT and SYSTEM.DAT from the \WINDOWS directory.

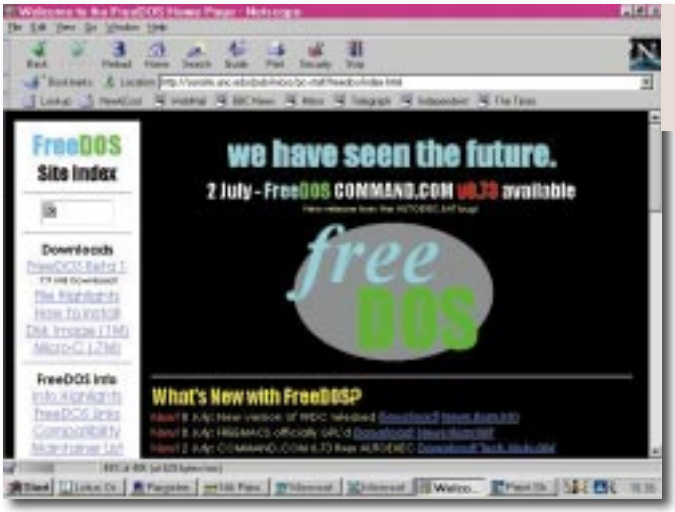
Legacy option

The next step in Windows 95's boot sequence is to load COMMAND.COM, CONFIG.SYS, and AUTOEXEC.BAT. Note that booting Windows 95 without loading CONFIG.SYS and AUTOEXEC.BAT is preferable because the default 32-bit drivers will be faster and consume no conventional memory.

So why include this legacy option? Purely to ensure backwards compatibility



▲ Fig 1 The Windows GUI relies on a DOS base



◀FIG 2 FREEDOS IS A CLONE OF MS-DOS 3.3

with older hardware and software. For example, to install Windows 98 on a virgin hard disk you'd need to boot with a DOS disk that had the necessary device drivers to make the CD drive accessible. Some older programs look for these start-up files to make sure they have the right settings, and when they can't find them, they complain.

For example, some legacy software requires 20 "file handles"; the default FILES setting in Windows 95 is 60. Such programs might parse the CONFIG.SYS file for the existence of a FILES command. To keep a program like this happy, add this line to your CONFIG.SYS file:

```
FILES=60
```

It won't actually change anything, but it will keep one program happy!

Another reason for having these start-up files is that if you frequently restart in MS-DOS mode none of the internal, protected mode drivers will be available to you unless you've loaded them in CONFIG.SYS or AUTOEXEC.BAT. You can also use the DOSSTART.BAT batch file here and this is something I'll be looking at in subsequent columns.

DOS into Linux does go

Chris Bidmead [Hands On Unix] can't have it all his own way with Linux. Believe it or not, there are DOS equivalents of Linux out there. FreeDOS and DR-DOS may not be the equivalent in terms of power or functionality but are nevertheless free. Both are (or will be) close clones of MS-DOS. The former is totally free and the latter is free for evaluation purposes.

DR-DOS will be familiar to many *PCW* readers of old. Its roots hark back to good old CP/M 86. Having lost out to Microsoft as the OS of choice for the IBM PC, CP/M 86 later resurfaced on the original Amstrad PC1512 front-ended by GEM (an early GUI). Encouraged by success and the poor reception that MS-DOS 4.0 received (Microsoft made the mistake of letting IBM have a say in developing it), Digital Research released DR-DOS 5.0 which offered many advantages over the weak alternative from Microsoft. Its success spurred Microsoft on. Being keen not to repeat the mistake, it launched MS-DOS 5, a much better OS.

But DOS was becoming less important as Windows became the dominant operating environment, and despite offering stiff competition to MS-DOS, DR-DOS slowly faded away. Digital Research was bought by Novell, which released Novell DOS 7, but that didn't halt its decline. Eventually it was sold to Caldera, a Novell off-shoot, and was renamed OpenDOS, although just recently it assumed its original moniker.

Caldera has further refined the OS. It is Year 2000 compliant and the kernel will correct the system date even if your BIOS doesn't support the Year 2000. It also features a genuine multitasking kernel. As before, the OS is ROM-able and is suitable for embedded devices such as PDAs and set-top boxes. A DOS-based internet browser, Caldera DR-WebSpyder, was recently released. So things *are* happening with DR-DOS.

You can download a copy of DR-DOS and DR-WebSpyder from Caldera's ftp site at <ftp.caldera.com>. Follow the links on the ftp site to /pub/drdos. The full set is a 6Mb download. Caldera's web site can be found at <www.caldera.com/dos/index.html> [Fig 2].

FreeDOS is a very different kettle of fish. This is a straight clone of MS-DOS 3.3 written by volunteers and academics (a bit like Linux). Why MS-DOS 3.3? Simply because DOS remained fundamentally unchanged from that version forward. It's a 16-bit single-tasking OS based around the DOS-C kernel written by Pat Villani and includes the usual utilities and command.com shell.

Another interesting thing about the FreeDOS project is that it is largely written in MICRO-C, a freeware C compiler, which encourages developers from all over the world to chip in with suggestions and code samples, *à la* Linux.

The project is still at the late beta stage so doesn't guarantee 100 percent DOS compatibility at present, but it can run WordPerfect 5.1 and Doom. It cannot, however, run Windows. Its *raison d'être* is that there are users out there who either don't need the power of a modern 32-bit operating system, or lack the necessary computer hardware to run them on. And it is free, under the terms of the GNU General Public Licence.

▼FIG 3 DR-DOS IS A DOS EQUIVALENT OF LINUX

You can download it from the SunSite ftp site at <ftp://sunsite.unc.edu/pub/micro/PC-stuff/freedos>. The complete suite is an 8Mb download. The web site is at <http://sunsite.unc.edu/pub/micro/pc-stuff/freedos/index.html> [Fig 3].

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