

# Oiling the wheels

**You needn't be a computer whizz to get the best performance from your machine.**

**Eleanor Turton-Hill shows you the easy way to get things running smoothly and efficiently.**

If you want to get the best performance from your PC, it helps to keep an eye on various aspects of your system setup. The memory in your system should be configured for the best possible results, depending on what applications you use. Also, your hard disk needs to be regularly cleaned to ensure that it is operating to best effect. I've listed here the most important maintenance tasks and configuration checks to help you keep your computer running smoothly.

You don't have to be a computer wizard to use any of the utilities mentioned here. They're all available under Windows 3.1 and DOS 6.0 (and above).

## Cleaning up your hard disk

The hard disk is very important when it comes to getting the most out of your system. Most people think of the hard disk as merely a storage area for data and applications; but it is actually the most common cause of bottlenecks. Learning to maintain your hard disk is a very effective way to improve performance.

Under Windows, the hard disk is not just a passive storage area. It acts as a swap space for data, too, which Windows continually moves in and out of memory depending on system requirements. In order for this process to work efficiently, your hard disk needs to be regularly checked for the following:

1. Amount of free disk space.
2. Positive surface scan.
3. Amount of disk fragmentation.
4. Appropriate swap file type and size.

The easiest way of freeing up space on your hard disk is to regularly delete those data files or applications which are no longer needed. You can use File Man-

ager to search for files of a certain type using "View by File Type" or the "Search" command.

Look out for graphics files in particular, as these are hungry for disk space and can easily be created and later forgotten. Take a look at the help files on your system, too — those with a .hlp extension. They can also clog up your hard disk if you're not careful. If you're reasonably confident with the applications you use, it is probably worth deleting some of these files from your system.

Next, look for temporary files. These are files with the extension ".tmp" or ".swp" and begin with a tilde (~). These must be deleted using DOS when Windows is not running. Most temporary files are stored in the TEMP directory, which is generally identified in your autoexec.bat file with the line SET TEMP = C:\temp.

## Lost allocation units

The way in which files are stored on disk is complex and can easily go wrong. At the start of the disk there's a File Allocation

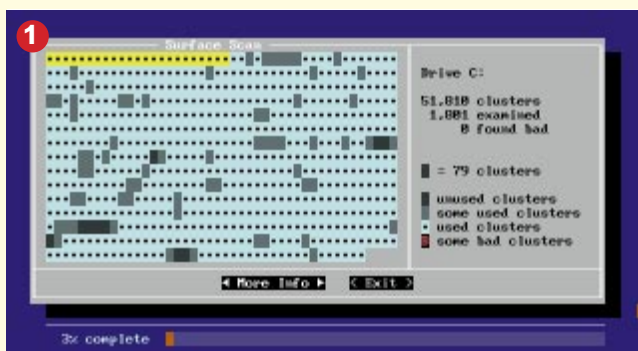
Table, or FAT, which holds information about all the files on the hard disk.

Without the FAT, MSDOS would be unable to access the data, even though the files themselves may be in perfect condition. This is rather like a library book being filed in the wrong place: no matter how accurate the index, you will never be able to find it.

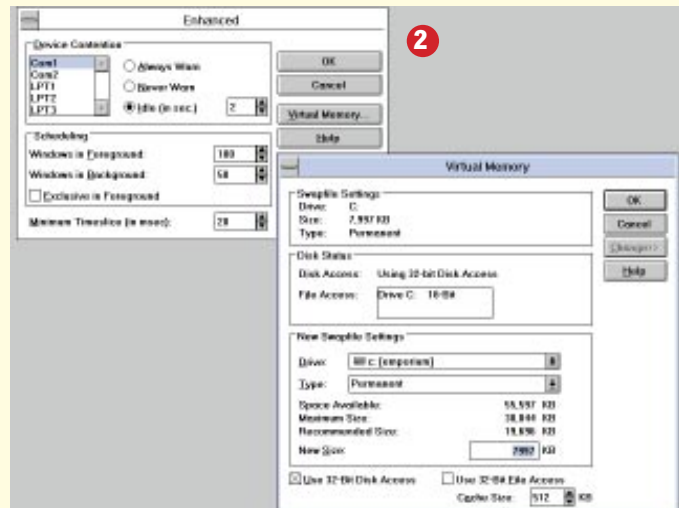
Every now and then, something goes wrong and DOS loses track of some files. This can be caused by an error in your application software, or by accidentally turning off your machine while a program is running.

Two facilities are supplied with MSDOS version 6.0 and upwards, which help you to keep up the maintenance on your hard disk. The first is "Scandisk", which recovers and removes files which have become lost. The second is "Defrag", which improves hard disk performance by defragmenting files or moving them into continuous blocks.

Scandisk can help you to recover data, or "lost allocation units", on the disk which



**Fig 1** Scandisk examines the hard disk surface for bad clusters



**Fig 2** The virtual memory dialogue box allows you to change your swap file settings. When they are set in place, you are forced to restart Windows

have become disorganised. It can also check for physical faults on the magnetic surface of disks. Several different problems may be found with the way that data is organised on the hard disk. Scandisk gives you on-screen advice about the problems it detects. Just type "scandisk" at the C: prompt, and the screen shown in Fig 1 (page ???) will appear.

Before DOS version 6.0, this kind of maintenance was carried out by a command called "chkdsk" (check disk). This is still included in DOS, but is not as sophisticated as SCANDISK when it comes to recovering data.

### Virtual memory

Okay, we all know what memory is. But what on earth is virtual memory? Put simply, the virtual memory option in Windows allows you to use an area of your hard disk as if it were an extension of RAM. This is called the swap file. You only get this facility if you are running Windows in Enhanced mode.

When Windows is first installed, the setup program looks at your hard disk and recommends the best way for you to use the Virtual Memory option. If the swap file is incorrectly set up, your system performance can deteriorate dramatically. Many new users do not get round to discovering the Windows swap file until their systems inexplicably grind to a halt. The swap file facility is particularly useful if your software is very demanding and your system is short of RAM.

To check on your current swap file setup, go into the Control Panel and double click on the "386 Enhanced" icon. Then click on the "Virtual memory" button (see Fig 2, page ???). A dialogue box will appear, displaying the size of your current swap file, and should also tell you whether it is temporary or permanent.

Permanent and temporary swap files access your hard disk in different ways. Temporary swap files are built up from fragmented bits of spare disk space. In order for Windows to use a temporary swap file, it must pass data on to DOS each time it reads or writes.

## Standard and Enhanced modes

One of the great revelations about Windows when it first appeared was its ability to run more than one application simultaneously; a phenomenon now commonly known as "multitasking". Only one application can use the processor at any given time however, so multitasking is achieved by manipulating memory in various creative ways.

This differs in the way it works depending on whether you are running Windows in Standard or Enhanced mode. You can tell which mode you're in by going to the Control Panel and checking for the "386 Enhanced" icon. If it's not there, you're in Standard mode; if it is, you're in Enhanced mode. If you've got less than 2Mb of RAM, then you must run Windows in standard mode.

Some applications also require this. In Standard mode, Windows applications are multitasking but DOS applications are single-tasking.

DOS applications run in full-screen mode and monopolise the processor, whereas multiple Windows applications can process information at the same time. This means that when you load a DOS application, all other processes must be suspended. Windows manages this by swapping the current application out of memory and writing a "swap file" to the disk. The only piece of code left behind is the Task Switcher which sits around waiting for when you want to Alt+Tab or Ctrl+Esc. When you do this, Windows is restored and the DOS program is moved to a separate application swap file.

These days, most people run Windows in Enhanced mode, allowing both DOS and Windows applications to multitask. If you've got a 286, you cannot run Windows in this mode — and it doesn't matter how much RAM you've got, either.

Enhanced mode uses the special characteristics of the 386 and 486 processors to create a "virtual machine" for each DOS application that you run from Windows. This virtual machine is effectively a simulation of an 8086 processor and inherits the memory configuration which you've got set up on your machine.

If your conventional memory is badly configured, then each virtual machine created by Windows will be badly configured too, thus duplicating performance problems each time you run another DOS application.

Permanent swap files work much more efficiently because they are made up of contiguous (that is, uninterrupted) disk space, which means that Windows "knows" the address of disk sectors and does not have to communicate via DOS.

You may find that although you have plenty of spare disk space, it is not all located in one block, and therefore, Windows will not allow you to use it as permanent virtual memory. If this is the case, you need to defragment your disk using Norton, or the defrag command in DOS 6.0 (see Fig 3, below). This will make your free disk space available, by putting it all into one contiguous block.

Some software, CAD in particular, recommends an optimum swap file size, but if your applications are not particularly demanding you should stick to the Windows recommended size.

### Defragmenting your hard disk

Your hard disk should work perfectly well if you never use the Defrag command, but its performance will slowly deteriorate.

If you want to keep your hard disk healthy, you should use defrag about once a month. Any more, and the increased fragmentation will start to have a dramatic effect on system performance.

As a user, you would not be aware of fragmentation happening. Although the file is stored in several areas on the hard disk, it is still treated as one file. The data is still safe, but the disk drive has to make more movements to get hold of the file. This makes data access noticeably slower.

Before defragmenting your hard disk, you must first remove the swap file via the Windows Control Panel. Then simply type the command "defrag" at the C: prompt and select the full optimisation option. This should keep your hard disk in good working order and will also improve your system performance.



Fig 3 The row of crosses shown here represents the Windows swap file. This should be removed before starting the defragmentation process

### PCW Contacts

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