HOW HEALTHY IS YOUR COMPUTER?

Get a PC health report

Before trying to extend your PC's life, first find out how much life there is left in it. You can get a full System Diagnostics Report (also known as System Health Report) in Windows without downloading any extra software.

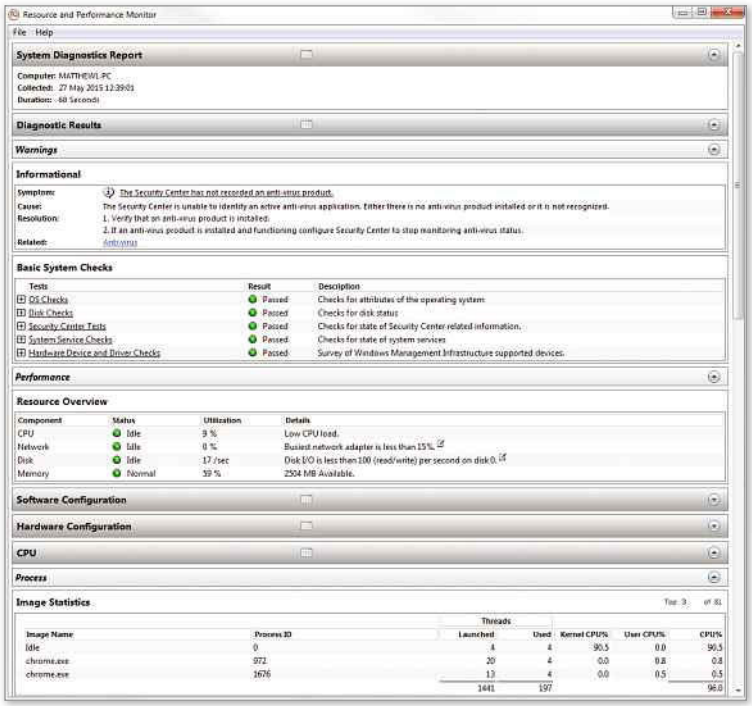
The process is slightly different in each OS. In Windows XP, Vista or 7, open the Run box (press Win+R) and type perfmon /report (include the space before the slash), then click OK or press Enter. The 'Performance and Resource Monitor' opens and spends 60 seconds collecting data about your system's health and status. The System Diagnostics Report then opens automatically.

In Windows 8/8.1, open Performance Monitor by typing perfmon into Start and pressing Enter. Click Data Collector Sets on the left, then System. Right-click the System Diagnostics folder and click Start. A minute later, your System Diagnostics Report will be available to view in the **Reports\System\System Diagnostics** folder. This process is more cumbersome than in previous versions of Windows, but it automatically saves all your reports in this folder. In Windows XP, Vista and 7, you have to save the report yourself by clicking File, then Save As.

Whichever OS you're running, the report contains 'Warnings' at the top. If your PC is ready for the knacker's yard, here's where you'll see the bad news. The rest of the report divides your PC's health diagnosis into sections, including Hardware Configuration, Disk (hard drive) and Memory. Click the small arrows at the right of the window to open each section and view a wealth of information (see screenshot above right), including the system specifications you'll need to know if you're hoping to upgrade to Windows 10.

Pay particular attention to the CPU section (where you'll find checks and ratings for your PC's processor) and the Disk section (where you can discover any 'hot files' that are weighing down your hard drive).

Windows 7 has a bug that prevents your antivirus being recognised by your report (under 'Informational', below 'Warnings'). It'll tell you your antivirus isn't enabled, even if it is. To solve this, download the free Microsoft Hotfix (www.snipca.com/16678).



Discover potentially fatal PC errors and check components like your processor (CPU) and hard drive (Disk) in the System Diagnostics Report

Take your PC's temperature

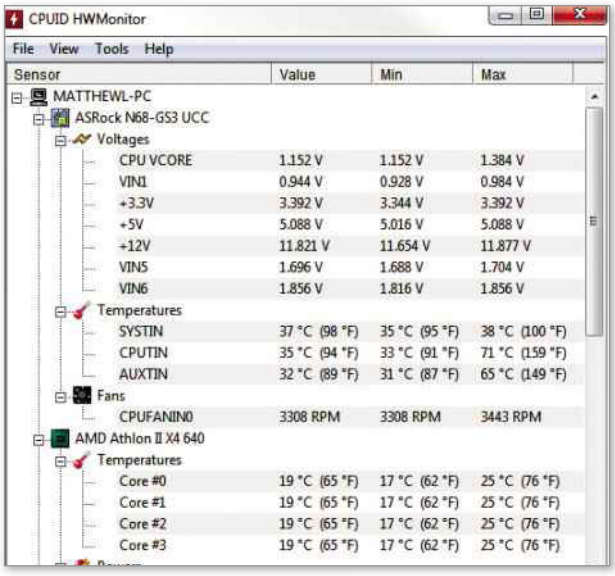
You may be happy that summer's here, but your PC probably isn't. Hot components age faster. Last year, UK science group National Instruments (www.snipca.com/16680) found that an increase of 5 degrees Celsius (°C) can take up to two years off a hard drive's life expectancy.

To check your PC's core temperature, as well as the temperature of components such as the hard drive, graphics card and processor, run the free portable version of HWMonitor (www.snipca.com/16677). It also measures your fan speed, so you can see how hard the fan is having to work to keep your PC's components cool.

Download the ZIP and extract its contents, then click the 32bit or 64bit program file to run the appropriate program for your PC's configuration. In the window that opens, you'll see a table of temperatures, voltages and other measurements.

Don't be alarmed if the figures look a lot higher than room temperature (about 23°C). Most of your PC's heat is generated by its own components, which is why the fan whirrs when you're running lots of processes. You should only be concerned if your processor (CPU, listed as 'CPUTIN' under the 'Temperatures' heading) is hotter than 75°C (see screenshot left).

To cool things down, avoid running lots of processes at once, and don't add to the problem by sticking your PC next to a sun-facing window or warm radiator. If you use a laptop, mount it on a USB-powered laptop stand with a fan in the base. You can get one for under £10 from Amazon (www.snipca.com/16674).



Use HWMonitor to check that your processor and other components aren't overheating

USE FREE SOFTWARE TO EXTEND YOUR PC'S LIFESPAN

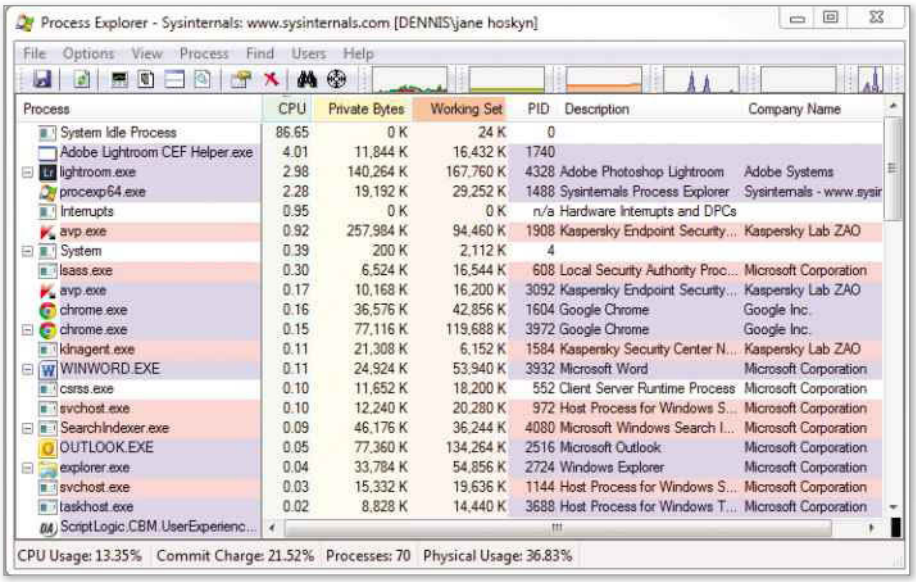
See your PC's hidden workload

If your processor is over-heating, it's probably because too many programs and processes are running at the same time. Computer processors are like people – make them work too hard, and they'll burn out.

First, cut the number of processes that run automatically when you start Windows. Our favourite free tool for doing this is Autoruns (www.snipca.com/16681). On page 48 we offer Secret Tips for getting the best out of it, including new automatic integration with VirusTotal (see box below).

Next, weed out the hidden processes that don't appear in Task Manager, but grind away behind the scenes, slowly wearing out your processor. Some of these are system processes and DLLs that Microsoft doesn't want you to meddle with, and others are deliberately hidden by software-makers who use special code to make them invisible, usually to prevent you stopping or deleting them by accident (here's how they do it: www.snipca.com/16700). That's useful in a way, but it means you're not really in control of your processor's workload.

The quickest way to see all these processes is to run Process Explorer (www.snipca.com/16697) – which, like Autoruns, is a free, portable tool made by Microsoft-owned company Sysinternals. You need to run Process Explorer as administrator to see all running processes. Click Download Process Explorer, save the ZIP and extract the EXE file, then right-click it and click 'Run as administrator'.



Quickly see the hidden processes that are wearing out your processor with Process Explorer

A table of running processes will open instantly (far quicker than Task Manager opens, anyway). It's a colourful affair, with system services coloured pink and your own processes in blue. Red processes only appear for a moment, because Process Explorer identifies them as suspicious and stops them automatically. You can customise your colours by clicking Options at the top of the window and selecting 'Configure Colors'. To quickly see which processes are making your PC work hardest, click the CPU column heading twice.

Click View at the top of the window and then Show Lower Pane to see each process's hidden components, including DLLs.

Stop and search running processes

Process Explorer gives you plenty of information about all your PC's running processes. Right-click and click Properties to see detailed information about the item's CPU and memory usage. You can even see how hard all these processes are making your graphics card (GPU) work: click View at the top of the program window and select System Information.

To run an instant search of a process in

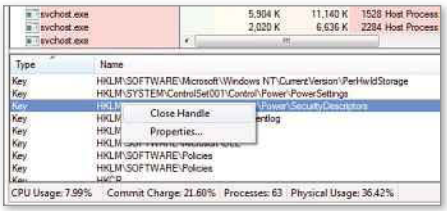
WHY PORTABLE PROGRAMS ARE GOOD FOR YOUR PC

Most of the third-party tools we mention in this feature are portable. Some, such as HWMonitor and Process Hacker (see page 53), also have installable versions. Installable software has the advantage of updating automatically and can be set to run when you start Windows, but it also fills your hard drive and Registry with files that build up over the years and can hasten your computer's demise.

System-monitoring tools and PC health-checkers are not the kind of tools you need to run every day. Run the portable version of HWMonitor, for example, and then delete it from your PC. When you want to run it (or any other portable tool) again at some later date, simply download the latest version.

Always use the latest version of any portable tool, because old versions may be unsafe. Upload a portable program file to the free online malware-checker VirusTotal (https://www.virustotal.com), for a safety check before you run it. If the scan result says 'Detection ration: 0/57', the file is safe to run.

Portable programs can even help your old Windows XP PC live longer. You mustn't go online using XP, of course, because Microsoft no longer keeps it safe. However, you can run a portable program on an XP PC, after downloading it using a Windows 7 or 8/8.1 PC and then transferring the program file to a USB stick. Scan both the program file and the USB stick for malware first.



Select Close Handle in Process Explorer to close a process that's 'in use'

Google, right-click it and click Search Online. You can now do this in Task Manager in Windows 8/8.1, but Process Explorer is faster. Click Check VirusTotal in the right-click menu to run it through the VirusTotal database.

To stop any process, including processes you can't stop or even see in Task Manager, right-click it and click Kill Process.

If you see a Windows error message saying the file or folder is 'in use' and therefore can't be stopped or deleted, Process Explorer can help you there, too. Click Find at the top of the window, then 'Find a Handle or DLL'. Type the name of the file or folder that Windows won't let you stop, and Process Explorer will tell you which process is locking the file. To remove the lock, click the stubborn process and find the troublesome DLL in the window at the bottom (make sure Show Lower Pane is ticked in the View menu). Right-click the DLL and then click Close Handle.

Stop rootkits killing your PC

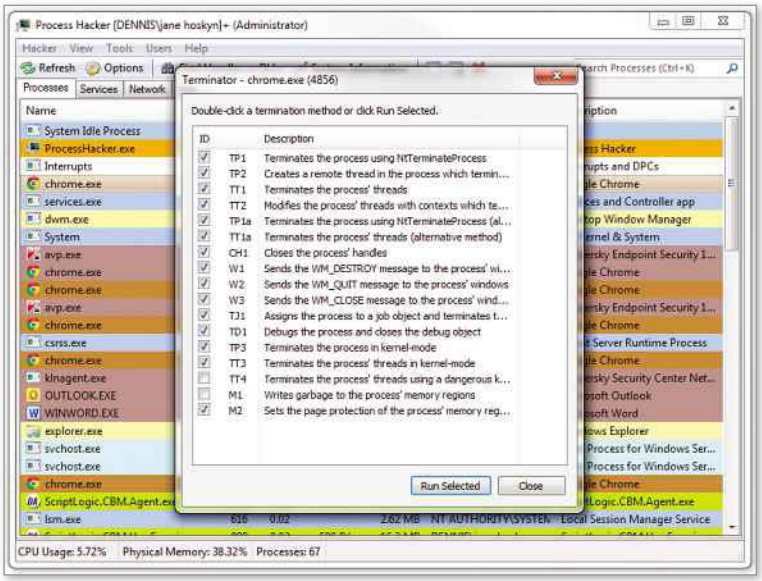
If you can't manage to kill a process in Process Explorer, even after tracking down and unlocking DLLs, it may be a rootkit. Rootkits are malicious processes designed to run undetected by security tools and resist any attempts to stop or delete them. If a rootkit has infected your PC, it will send your processor to an early grave.

To root out rootkits, use the new version of Process Hacker (www.snipca.com/16701). This free, open-source tool sounds and looks like Process Explorer, and acts like it up to a point, but it's more complicated (there's a lot more colour-coding, for a start) and can remove processes that won't budge in any other program.

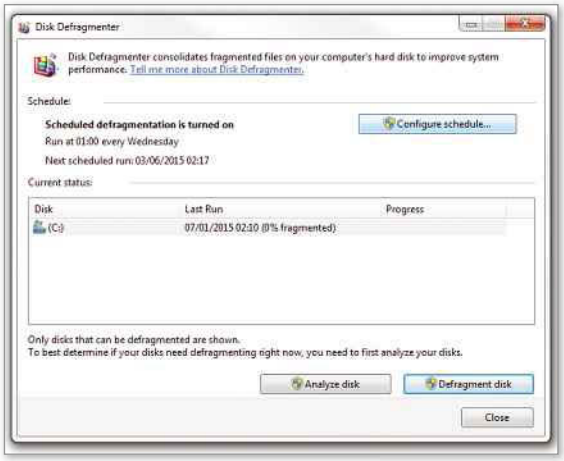
Process Hacker works in all versions of Windows from XP to 8.1, and comes in portable and installable versions. To get the portable program, click 'Binaries (portable)', save the ZIP, extract its contents and click the 'x86' folder if your PC is 32bit or 'x64' if it's 64bit. (The fact that the numbers don't tally is an annoying Windows quirk. Here's how to find out which version you've got: www.snipca.com/16702.) Run the program file ('ProcessHacker.exe') as administrator.

Click View, then untick Update Automatically to stop the processes constantly changing in the window. Now you can investigate each one in your own time. The right-click menu is much bigger than in Process Explorer, with options to search on several virus databases and even run a process in a virtual machine. For an array of file-killing options, click Miscellaneous in the right-click menu and then click Terminator.

Also use AdwCleaner (www.snipca.com/16710) and Malwarebytes Anti-Malware Free (www.snipca.com/16711) for quick, automatic malware scans that help you stop dodgy processes from working your processor, memory and OS to death.



Kill processes that other software can't stop using Process Hacker's Terminator tool



Use Windows' Disk Defragmenter tool to set or change an automatic defrag

Defrag automatically – even in Windows XP

Remember defragging? Defragmenting, as it's properly and tongue-twistingly called, used to be an essential part of PC maintenance. In Windows XP and earlier, you had to defrag your hard drive to clear the digital junk that got left behind after you deleted files or moved them around. It was like hovering the floor after tidying a room.

Windows 7 and 8/8.1 now defrag automatically (unless you've got an SSD – we'll come to that in a minute). The defrag is usually set to run in the middle of the night every Wednesday (see screenshot above). You can change the schedule in the Disk Defragmenter tool. Type defragmenter into Start and press Enter, then click 'Configure schedule'. To run a manual defrag at any time, click 'Defragment disk'.

You can set an automatic defrag in Windows XP, too, but it takes a bit more legwork. Go to Scheduled Tasks in the Control Panel, click Browse and type %systemroot%\system32\defrag.exe under 'File name', then click Open. Select Weekly, then choose your defrag day, enter your Windows login details if prompted and then save the scheduled defrag to your hard drive.

Don't attempt to defrag an SSD (solid-state drive). It'll do more harm than good. If you decide to extend your PC's life by installing an SSD, Windows will automatically switch off the scheduled defrag.

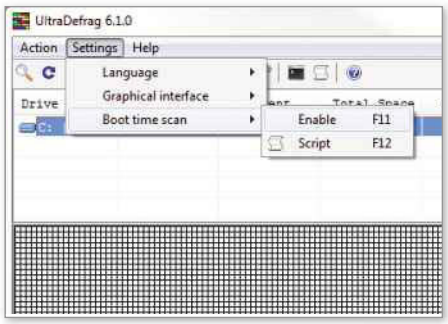
Get a better boot defrag than Windows

A boot defrag tidies up your PC's digital data while the OS is starting, so it's more thorough than a normal defrag. Windows 7 and 8/8.1 runs a boot defrag automatically every time you switch on your PC – but it's not very good.

When a boot defrag is done properly, it's too intensive to run every day. Switch off the Windows boot defrag, then use a third-party tool to run a proper boot defrag no more often than once a fortnight.

To disable the Windows boot defrag, you'll need to edit the Registry. Type regedit into Start (Windows 7 or 8/8.1) and press Enter, then navigate to **HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Dfrg\BootOptimizeFunction** and change the 'Y' (yes, enabled) to 'N' (no, disabled).

Then download the installable version of UltraDefrag (www.snipca.com/16714). UltraDefrag is open-source and properly free, and never nags you to upgrade to a 'pro' version – unlike the better-known Defraggler (www.snipca.com/16713).



Set UltraDefrag to run when you boot Windows to keep your hard drive working well

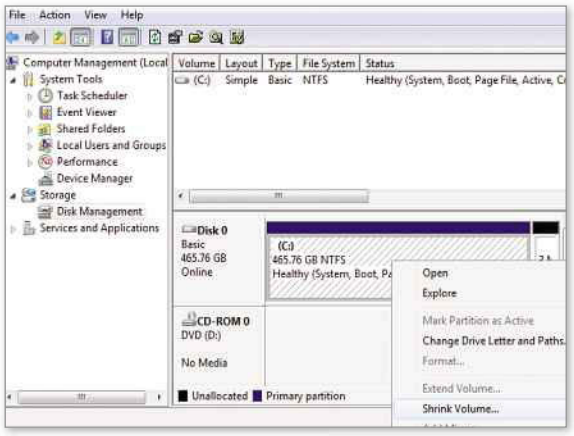
UltraDefrag has a portable version too, but portable programs can't run automatically when you start your PC, so they can't support boot defragging. UltraDefrag's installer contains some tick boxes, but they're not for adware, just program components such as 'Context menu handler' and, crucially, 'Boot'. In the program window, click Settings and then 'Boot time scan' to set up your defrag.

You can run UltraDefrag from the command line for minimal impact on your processor and OS. Switch on a boot defrag using the command 'boot-on', and then switch it off with 'boot-off'. There's a list of all available commands on the excellent UltraDefrag Handbook (www.snipca.com/16715). For tips on running programs from the command line using Command Prompt, see Microsoft's website (www.snipca.com/16716).

Double your hard drive's life with a partition

The most dramatic ways to improve your PC's lifespan depend on what state the hard drive is in.

If it's a mess – making horrible noises (like these: www.snipca.com/16718) and corrupting your files – then wipe it or replace it. Our cover feature in Issue 444 explained how to wipe your hard drive and re-install Windows. On the next page we'll offer tips on upgrading to a new drive.



Use the built-in Computer Management tool to shrink and partition your hard drive

If, on the other hand, your hard drive is still in good nick and you want to ensure it lasts as long as possible, partition it. This means you divide the single drive into multiple partitions (or 'volumes') that work separately from each other. If you keep your OS and programs on one partition, and move all your space-hogging personal files (videos, photos, documents and so on) on to another partition, your OS will boot and work much faster as a result. This, in turn, frees up your processor and memory to work better, move faster and live longer.

You can also set up an emergency partition that contains a stripped-down copy of Windows, a few security tools and your licence information. Then, if your system conks out unexpectedly, you can use the emergency partition to salvage your computer.

First, back up all your important data. The partitioning process shouldn't delete any files, but backing up is a good habit to get into when working with your hard drive. Next, type computer into Start (Windows 7 and 8/8.1) and click Computer Management in the results. Click Disk Management on the left to see a list of your existing drives (including 'C:', where your OS should always be) and any existing partitions.

Right-click a drive that contains free storage space, select Shrink Volume and wait a minute for the wizard to open, then enter roughly the amount of space you want to free up for the new partition. The cleared space should then show up in the Disk Management window as Unallocated Space (with the black bar across the top). Right-click it, select New Simple Volume and click through the remaining steps of the wizard. The steps are explained in full on Microsoft's site (www.snipca.com/16719).

MAXIMISE YOUR LAPTOP'S LIVES

You laptop has three 'lives': the lifespan of the computer itself, the lifespan of the battery before it has to be replaced, and the somewhat shorter 'life' of the battery before it runs down and needs plugging in. Here's how to keep them all going.

BATTERY LIFE

Your laptop's display gobbles up a disproportionate amount of battery life, so reduce screen brightness and set the display to turn off after a few minutes. Disable Bluetooth and, if not needed, Wi-Fi.

BATTERY LIFESPAN

Treat the battery well, and you can get hundreds or even thousands of charges from it (www.snipca.com/16720). Avoid letting it run down to 0 per cent, and calibrate it every couple of months (see more tips at www.snipca.com/16738).

LAPTOP LIFESPAN

Laptops are harder to upgrade than desktops, and their portability can be their downfall – hard drives tend not to survive being dropped on the kitchen floor. That said, you can extend a laptop's lifespan using the software tips in this feature and by keeping it well ventilated.

FIVE HARDWARE UPGRADES WORTH PAYING FOR

1 Install an SSD

Cost: £50–£100
Years added to your PC's life: 5+

SSDs (solid-state drives) are getting plenty of attention, not least in the pages of *Computeractive* (see Issue 443 for a step-by-step guide to fitting one). The fuss is deserved, because an SSD is the best – and best value-for-money – hardware upgrade you can give your PC.

SSDs replace mechanical hard drives like the one that's gradually falling to bits inside your computer. Mechanical hard drives are extremely fragile but SSDs are built to last (they really are 'solid'), and they're much, much faster. They also help your processor survive longer by making it work less hard.

Optimise your new SSD, even in XP, by running Corsair's SSD Toolbox

You can get a decent SSD for under £50 (www.snipca.com/16724), but it won't have much storage space (200GB if you're lucky). High-capacity SSDs are disproportionately expensive (£300 for a 1TB drive? No thanks), but you don't need one of those. Instead, install a relatively low-capacity SSD as your main hard drive for your OS and programs, and keep your personal data (photos and so on) on external hard drives. You can buy a 2TB external drive for around £60 (www.snipca.com/16731).

SSDs are easy to install in Windows 7 or later, and not impossible to fit in an old XP or Vista computer. You'll need to disable Windows defrag tools and use a Trim tool to optimise the drive. Trim is built into Windows 7 and 8/8.1; in XP and Vista you'll need a third-party Trim tool such as Corsair's free SSD Toolbox (www.snipca.com/16727).

Before you go anywhere near your hard drive, or try any of these upgrades, back up all your data – so you may want to buy in more than one of these external drives.

2 New processor

Cost: £40–£100
Years added: 5+

A dual-core Intel processor can make your PC work like new for under £50

Processors vary widely in price. It's not a simple matter of getting what you pay for – it depends how you use your PC. If you're a congenital multi-tasker and love editing video, a cheap processor is a false economy. Conversely, the latest eight-core, 4GHz, 8MB-cache processor is a total waste of money if you only use your PC for emails.

'Core', 'GHz', 'MB-cache'? It's needlessly confusing. Higher numbers basically mean more power. Old processors had one core; new processors have two ('dual-core', from £50) or four ('quad-core', £100–£200). Processors for show-offs have eight cores or even 12, but diminishing returns set in after four. Dual-core is enough for most of us, and quad-core if you're that video-loving multi-tasker.

The GHz number is the clock speed. Between 2 and 3GHz is fine for most uses. The cache size matters if, again, you use lots of programs at once; go for 3MB or more. We've narrowed down the selection on Amazon to give you an idea (www.snipca.com/16736).

Find your PC's user manual on free website Manuals Online

3 New optical drive

Cost: £10–£40
Years added: 3+

Does your PC's DVD/CD (optical) drive still work? You may not know or care, but that drive will suddenly be invaluable when you need to re-install Windows or other software from a disc.

Optical drives are cheap (www.snipca.com/16732) and easy to replace. If you can, spend a few extra pounds on a drive that lets you watch and record (write) to Blu-ray as well as DVD and CD, and does so quickly (24x). That way, you can use your PC as a TV recorder and Blu-ray player just by adding a Scart cable.

4 More RAM

Cost: £20–£40
Years added: 1+

RAM memory is an inexpensive upgrade that only really makes a difference to your PC's speed and lifespan if its RAM was on the measly side to begin with. Check your System Diagnostics Report (page 51) to see how much you've got. If it's under 1GB, install a new 4GB stick of RAM (DDR3 or DDR4 for best results). There's a selection on Amazon (www.snipca.com/16737).

5 New graphics card

Cost: £40–80
Years added: 3+

Don't blame your processor if your PC struggles to play videos smoothly. You probably just need a new graphics card (GPU). Newer PCI 3.0 cards are backwards-compatible. Check your PC's power connections (6-pin or 8-pin) before you buy.

As with all the upgrades we've mentioned, don't shell out until you've checked your PC's user manual. If you've lost it, find a free copy at Manuals Online (www.manualsonline.com). ca