



A new PC for £100

While there has never been a better time to buy a new PC, it's also cheaper than ever to teach it some new tricks with a hardware upgrade. Jason Whittaker shows you how to stretch your PC – not your wallet

One reason the PC has stood the test of time is that it can be upgraded easily. With regular product launches, the prices of existing components fall, so the extra memory and larger hard drive that were prohibitively expensive when you bought your PC become more affordable over time.

Even PCs that are only a year old can benefit from an upgrade. Windows XP always runs better with extra memory, so you will see an immediate performance boost simply by

installing another RAM module. Likewise, in an age of digital music, photography and video, you can never have too much hard disk space.

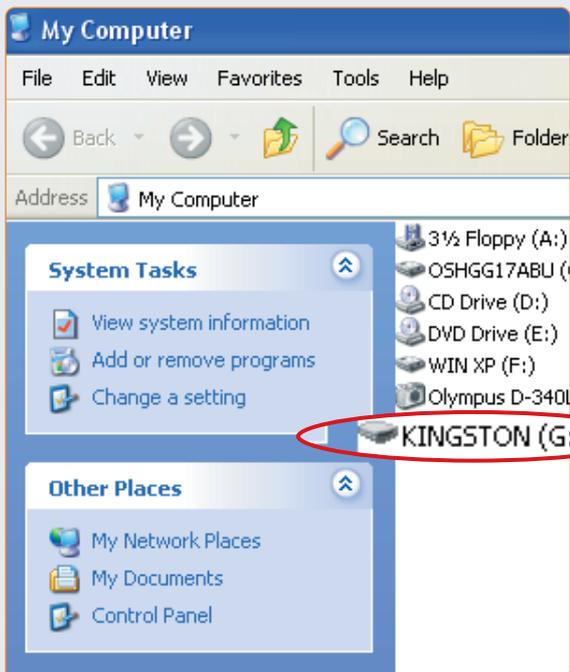
We have focused on upgrades in areas from general performance to improved comfort. You may be happy with the speed of your processor but wish to add more memory and a network card, for example. In addition, we suggest the best types of upgrade for different PC users to help you choose the best improvements – all for up to £100 plus VAT.

Backup for £100

With extra storage, the next requirement is to keep your data safe, or perhaps to transfer it between computers (at work and home, for example). With the rise in popularity of USB thumb drives, and the fall in prices, moving data has never been more convenient. Large

drives are still expensive, however, so the best deal for backup remains a CD rewriter such as the *PC Advisor* Top 10 drive from MSI. At only £30 ex VAT, this still leaves cash to spare for a 128MB Disgo USB Personal Storage drive.

1 Connect the USB drive One of the simpler upgrades, just how easy it is to connect a thumb drive to your PC depends on your operating system. If you're using Windows 2000 or XP, simply plugging the device into a free USB port should show up an extra drive in Explorer. Earlier versions of Windows require you to install software drivers before attaching the device



2 Install the CD drive Similar to a hard drive, our CD rewriter can be attached as a slave device to another optical drive (a DVD, for example). If this is the case, you will need to consult the drive's manual to set any necessary jumpers, then connect the IDE and power cables to the drive.

If the CD writer is replacing your old drive and you want to listen to music on your PC, make sure you connect a 4-pin cable between the drive and a similar socket on your sound card, or on the motherboard, labelled 'CD in'



Where to buy

- 128MB Disgo USB Personal Storage
www.mydisgo.com; £57.99 ex VAT
- MSI CR52-A2 CD drive
0870 755 4747; £30 ex VAT

Networking for £100

If you have more than one computer, networking them is one of the most effective upgrades you can perform. You can rule out wireless altogether on a £100 budget. While the prices of cards and access points have fallen, networking even two computers would stretch to nearly twice this limited amount.

For fast ethernet - 100Mbps (megabits per second) - the prices are now so low that you could connect a small office within this price range. NetGear offers a

home networking kit, including a switch and two 10/100 cards, for £29 ex VAT.

But let's go for something a little more ambitious and assume you wish to network your computers to enable them to share broadband access. NetGear also provides a 4-port ADSL router and modem for just under £79, while two PCI network cards cost £10 each. If you already have a modem, a cable/DSL router alone costs £37 ex VAT.

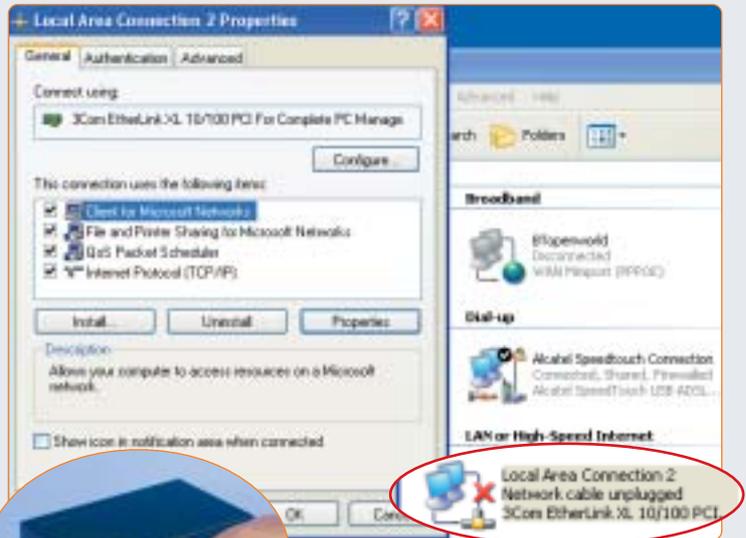
1 Install the cards After opening the case, locate a free PCI slot, and taking care to discharge any static electricity before you begin working. Carefully insert a network card into the slot before screwing it in place

2 Install the drivers and set up the network When you boot into Windows, it will detect a new network card and install drivers. You may need your Windows CD or a driver disk that came with the card. In Windows XP, you can use the Set Up A Home Or Small Office Network wizard, located under Network Tasks in the My Network Places folder. If you wish to configure manually in an older version of Windows, go to Networks in Control Panel and provide a workgroup name for your PCs, then install the TCP/IP protocol if you cannot see it displayed.

After the protocol is installed, you need to set an IP address and subnet mask by clicking on the Properties button. The subnet mask (usually 255.255.255.0) is the same for every computer but the IP address will be slightly different - 10.0.0.1, 10.0.0.2 and so on.

Make sure the File and/or Printer sharing services are installed if you wish to transfer files between PCs. Access network settings by right-clicking the icon for your network in Network Connections and selecting Properties.

3 Connect to your router When the cards are in place for both your PCs, plug in the Linksys router and then connect an appropriate cable (category 5, available from Belkin) from the network card at the back of your computer to the router



Where to buy

- **Netgear ADSL Router**
www.netgear.co.uk; £79.99 ex VAT
- **Netgear FA311 10/100 Network card**
www.netgear.co.uk; £8.49 ex VAT
- **5 metre Category 5 cables**
www.belkin.co.uk; £4.99 ex VAT

To upgrade or not to upgrade?

Before you decide to change or add components to your PC, you need to determine what you want and make a realistic assessment of your PC. If you have a first-generation Pentium, for example, and want to get into video-editing, the cost will soon rise above £100 and you still won't have sufficient performance. In the long run it is cheaper to buy a new PC, perhaps saving money by keeping your monitor and input devices.

Even with older Pentiums, it may be possible to achieve a great deal by going for a motherboard kit - which comes with processor and RAM - while keeping your hard drive, CD drives and sound card.

This also has the advantage of providing you with new standards such as USB 2.0 and even FireWire, so you can take advantage of the latest peripherals. Before you follow this route, though, make sure the case of your current PC can accommodate modern ATX boards.

At the same time, you may be generally happy with your word processing and email performance, but need to upgrade your hard drive to make more space for documents.

You may also wish to upgrade a second machine that you don't use very often. A fairly simple overhaul could transform it into a handy file server or backup PC, or make it more valuable for a friend or a member of the family. The important thing is to be clear about your budget. You will resent spending several hundred pounds on a backup computer that is rarely used.

Similarly, if you are yearning for the latest and greatest, best performance is going to cost you. But if your PC is more than two years old you will probably be pleasantly surprised by what you can achieve for a very modest outlay. Retailers such as Computer Exchange (www.cex.co.uk) provide previously owned and nearly new components that may help to stretch your budget even further.

System overhaul

So, you've committed yourself to overhauling your PC for £100, but what's the best upgrade for you?

• More performance from an older Pentium or Pentium II

While you can add extra components such as more memory, you won't be able to use the latest processors or even faster DDR RAM. Your best bet is to go for a motherboard kit (see *Better performance for £100* on page 171). This requires some confidence because it is the most difficult upgrade listed here, but it has the advantage of providing you with new technologies such as USB 2.0 and may even include extras such as onboard sound and networking.

• A better gaming experience

Nothing pushes a PC as much as a new game release. We recommend the Leadtek WinFast board (see *Better gaming for £100* on page 174) which will be able to handle DirectX 9.0 games. Even cheaper, the Radeon 7500 cards offer excellent performance for most titles on the market today, which leaves you enough cash for...

• **Better multimedia** Radeon 7500 cards are available for less than £40 ex VAT. Combine one of these with a DVD drive such as a Pioneer or Samsung 16-speed DVD drive - both of which cost less than £30 ex VAT - and a £35 SoundBlaster Live 5.1 sound card, and you have the basis for a great multimedia centre.

If you want surround sound you will need speakers, which will increase the cost of your upgrade by about half again. Alternatively, you could omit the video card and just go for Creative Inspire 5.1 5100 speakers which, at £45 ex VAT, will only slightly stretch your budget.

If you have a suitable sound setup, another option is to transform your PC into a home media centre using a system such as Showshifter from www.showshifter.com. This includes a Hauppauge WinTV card and software, turning your computer into a digital PVR (personal video recorder) for between £69 and £78 ex VAT.

• **Using an old PC as a file server** Rather than have a second PC fail to earn its keep, why not use it for backup file storage? Networking for £100 (see page 166) concentrates on constructing a router for shared internet access, but there are cheaper kits such as the NetGear FS105 bundle

for £29 ex VAT. This leaves £70 for extra storage, which will easily buy you an 80GB hard drive from Maxtor or Seagate.

• Better convenience and comfort

Often overlooked when upgrading, input and output devices are probably the most important components of your PC because you spend the most time working with them.

Any decent monitor upgrade is going to cost you more than £100, but *Peripherals for £100* on page 172 discusses the tempting prospect of going wireless with your keyboard and mouse, or combining new input devices with a multifunction printer-scanner-copier.

Before you begin

Upgrading can be a very rewarding experience but if things go wrong it is also one of the most frustrating. Here is a checklist of the things you need and the potential problems:

• **Backup** If you have a problem while upgrading your PC may, in the worst instance, stop working and you will be unable to get to your data. The first step, then, is to back up your system or at least any important files before you begin work.

• **Equipment** The good news is that the modular nature of PCs means most items simply slot into place and your only essential piece of equipment is a Philips-head screwdriver.

Other useful bits and pieces include tweezers (for retrieving screws from awkward corners), scissors (manufacturers often tie together items such as power cables inside the PC, meaning they will not reach new components) and an antistatic wriststrap - which brings us on to the worst problem when upgrading...

• **Static** Delicate components such as memory and a CPU can be damaged by static electricity. Even worse, you may not be aware of the damage until you try to switch on your PC. To discharge static while you are installing components, wear an antistatic wriststrap, or touch the metal case of your PC while it is earthed but switched off.

• **Time** The process of upgrading has become much less time-consuming

Better performance for £100

The key to better performance is a faster processor and more memory. The only problem is that incompatibility between different types of processor and RAM sockets could make it difficult for new components to work with your existing motherboard.

The solution? Try one of the Ready 2 Install upgrade options from Watford Electronics. The Athlon XP1800

kit comes with motherboard, XP100 CPU and fan and 256MB DDR memory - all for £99 ex VAT.

After this kind of major surgery you should notice immediate performance gains, particularly if your old PC was a PII, PIII or equivalent. If your motherboard is compatible with newer CPUs, you may not need to replace it and can spend the extra money on memory.

1 Install the processor It is best to attach memory and the CPU before you install the motherboard. Fitting the processor is easy - just ensure that its pins are aligned with the holes on the motherboard and don't force it into the socket. Next, connect the heatsink and fan. Again, these have to be aligned with the flat surface of the socket on one side of the CPU and clipped into place. Some heatsinks require considerable force



2 Connect the memory Like the processor, memory is fairly simple to install. It's only awkward when you need to manoeuvre it in the case which is why it is better to connect it at this stage. Most motherboards typically have long, black Dimm slots for memory and most of them require RAM to be inserted in the correct order - into slot 0 or 1 first. To install the memory, pull back the handles at either end of the slot, align the Dimm with the bumps inside the slot and gently but firmly push it into place. As the RAM slides in, the slot handles will move back into place

3 Install the motherboard Unlike RAM and the processor, installing a motherboard can be a tricky operation. The motherboard cannot come directly into contact with the PC case or it will short circuit. So attach the supplied metal or plastic clips to the motherboard before installing it in the PC case itself and connecting the power supply



Where to buy

- **Ready 2 Install Athlon XP1800 Motherboard Kit**
Watford Electronics: 0870 220 0700; www.watford.co.uk; £99 ex VAT

but conflicts between components still arise and you may encounter unexpected problems such as having to remove a hard drive or power supply to get to RAM slots. Hasty work can also damage your computer so allow yourself plenty of time.

• **Warranty** Upgrading your PC will almost certainly invalidate the warranty. While this is probably less

of a problem with older computers, check the terms and conditions of the warranty before you begin work. You can, of course, return your machine to the manufacturer to be upgraded but this will increase the cost.

Cheap and cheerful

In the various sections of this workshop, we list the procedures for

fairly substantial upgrades, each of which will work out at about £100. There are also plenty of small improvements you can make, which in most cases are far cheaper than even this moderate budget.

If you have ever looked longingly at the latest range of USB 2.0 peripherals, such as external hard drives, scanners and cameras, but

More storage for £100

Digital cameras, video and MP3 all mean larger file sizes and less hard drive space, with the result that your once spacious 10GB hard drive is suddenly not so impressive.

Thankfully, £100 gets you a lot of upgrade for your money - such as a 120GB Seagate Barracuda Plus from Dabs Direct - and you can even keep your old drive.

1 Install the drivers This is an optional step but it could be necessary. If your PC is an older model, its Bios may not recognise hard drives above a certain capacity - 32GB is a familiar limit. Most hard drives come with a driver disk that enables an older Bios to use the additional space, or the driver can be downloaded from the manufacturer's website. Depending on the hard drive or motherboard, you may need to install this driver before or after connecting your new device

2 Set the jumpers If you wish to run your new drive alongside the old one - which has the advantage of saving your OS settings as well as providing even more space - you will need to set the old drive as Master and the new drive as Slave. To adjust these settings using jumpers, consult the manual that came with your drive



3 Connect the cables Most IDE ribbon cables that connect hard drives have two sockets to link a Master and Slave device to the motherboard. If yours doesn't, you can get an upgrade IDE cable. You may wish to purchase a new ribbon cable in any case, particularly if you are replacing your old drive with a faster one.

Once your hard drive is in place and screwed into its cage in the PC case, attach the two sockets to each drive, ensuring that the coloured strips on each end of the ribbon are connected to pin 1 in the drive. With the IDE cable connected, attach a power cable - the opaque, white plastic plug

Where to buy

- Seagate Barracuda Plus 120
www.dabs.com/seagate; £81 ex VAT

you don't have the appropriate ports, try Adaptec's USB2Connect card (www.adaptec.co.uk) which costs just over £40.

If you don't have a FireWire port you may prefer Adaptec's DuoConnect card. Or perhaps you are happy with your USB 1.1 connections but don't have enough of them. Direct retailers such as Dabs and high street outlets such as PC World sell USB hubs for not much more than £10.

For performance, the most effective upgrade you can make, particularly with Windows XP, is simply to install more RAM. 512MB will be sufficient for this hungry operating system to work comfortably, but increasing the memory to 1GB will certainly boost speed. Memory prices are continually fluctuating, but expect to pay between £40 and 50 for 512MB of high-speed DDR RAM.

If you start adding extra drives or faster video cards to your system, you can expect your PC to get hot pretty quickly. Case fans are an extremely cheap but effective addition that will help cool your computer. Most cases have an extra slot to house the fan - simply connect a cable from the power supply to get things going. A funky-looking blue LED silent fan costs less than £5 from Cooler Master (www.coolermaster.co.uk).

Your case may indeed appreciate an overhaul. Perhaps it doesn't have enough space or you would like easier access to USB ports at the front. A range of well-priced cases is available from AOpen (www.aopen.com.tw).

Bear in mind that if you add more components, an old, low-Watt power supply may not be able to cope. A 300W PSU costs around £20 from

direct suppliers such as Dabs or Simply, while higher power 400W devices cost approximately double.

As good as new

Whichever route you decide to take when upgrading, hopefully this article will have started you thinking creatively of ways in which you can improve your old PC without breaking the bank. We have suggested a number of ideas to transform your old computer so that it feels as good as new on a tight budget, but we also recommend that you mix and match our suggestions to find the specification that's right for you.

With a little forethought, upgrading can be effective and satisfying in a number of ways - knowing that you have better performance or extra features for minimum cost and, of course, the improved confidence that comes from a job well done.

Peripherals for £100

Most of the upgrades in this workshop concentrate on improvements inside the box, but how much can you get for £100 in terms of peripherals?

The HP PSC1205 is a multifunction flatbed scanner and colour inkjet that costs less than £80, while the Logitech Optical Wheel Mouse and Deluxe Access Keyboard are under £25.

This would take you up to £100, but we recommend the optical mouse over a conventional ball mouse as it won't clog up with detritus from your desk. And while

keyboards are generally neglected devices, the amount of time you spend tapping away makes them much more important in terms of comfort.

Finally, if you are happy with your current scanner and printer you could free yourself from your PC by ditching your old keyboard and mouse and going for a wireless combination such as the MS Wireless Deskset SE (shown below). This isn't cheap but it is simply the best input device out there, with looks to challenge anything made by Apple.

Where to buy

- **HP PSC1205**
0870 547 4747; www.hp.com; £79 ex VAT
- **Logitech Optical Pilot Wheel Mouse**
020 7309 0127; www.logitech.com; £12.76 ex VAT
- **Logitech Deluxe Access Keyboard**
020 7309 0127; www.logitech.com; £12.36 ex VAT
- **MS Wireless Deskset SE**
0870 601 0100; www.microsoft.com; £66 ex VAT



Better gaming for £100

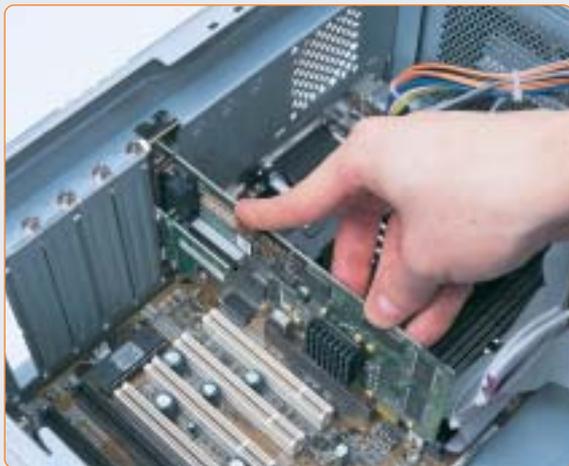
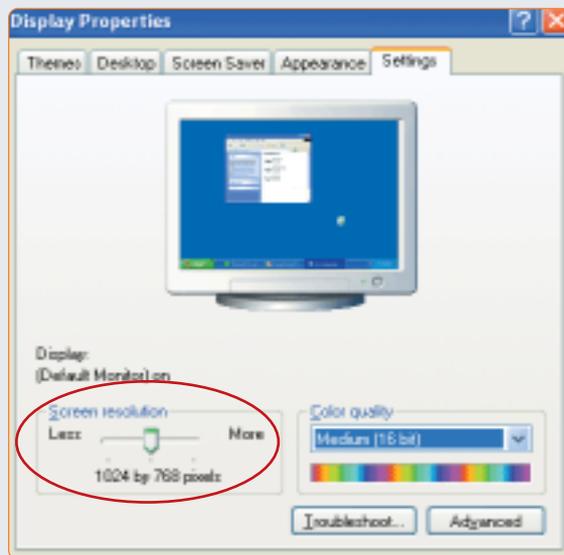
One area where a PC quickly shows its age is video gaming. The speed of innovation means that staying on the cutting edge will cost a great deal more than £100.

However, the same rapid turnover in video card technologies means last year's hot technology is this year's bargain. A two-to-three-year-old PC can benefit from upgrading to a card such as the Leadtek WinFast

in our Top 10 (see page 270), which is cheap enough to leave cash over for a brand new joystick and gamepad.

Be warned, however, that to achieve their best results, even budget cards require a fast processor and the latest AGP (advanced graphics port) slots, so you may need to upgrade your processor and motherboard for the best results.

1 Preparation Before installing your new card, set the video properties for Windows to minimum VGA settings - typically 640x480 resolution and 256 colours at a refresh rate of 60Hz - by going to Settings, Control Panel, Display and clicking on the Settings tab. Move the slider to the left until the desired setting is reached. A new card should easily be able to handle much higher settings but you need to ensure it can boot into Windows before you begin changing settings



2 Install the video card The Leadtek WinFast fits into the single brown AGP slot on your motherboard, where your current video card should be. If your graphics are onboard, you may need to consult your manual to change a jumper, or Bios settings to disable graphics. Remove the old card - or with onboard graphics, the backing plate to the AGP slot - and guide your new video card into the slot. Screw the metal plate at the end of the board into the case. When you boot up, Windows will prompt you to install drivers from the supplied CD

3 Connect the game controllers Many of the latest joysticks are USB devices so connection is extremely simple for Windows 2000 and XP - simply plug them into the appropriate ports. For older versions of Windows, you may need to install drivers before connecting these devices

Where to buy

- **Leadtek WinFast A340-TDH128**
0870 443 0880; £63 ex VAT
- **Logitech Extreme Digital 3D Joystick**
020 7309 0127; www.logitech.com; £25.52 ex VAT
- **Logitech Precision USB Gamepad**
020 7309 0127; www.logitech.com; £12.99 ex VAT

