ILLUSTRATION GAVIN REECE

Part exchange

Is your PC getting a bit long in the tooth? Does it struggle with Office 2000 and can it cope with the latest games? You have two basic choices – upgrade or chuck it out and get a new machine. Upgrading is often the better option. You may not need to replace all your components to have a PC with enough power to run any applications you want. So it makes sense to replace only those parts of the machine that need attention, saving yourself a good deal of money in the process.

To see how much we could do to an old PC, we took a PII 233, reviewed in *PCW* in August 1997, with an FX motherboard, 64MB of RAM on 72-pin SIMMS, and a 4.3GB hard drive and looked for ways to improve its key components. It had a Matrox Millennium graphics card with 8MB of RAM, 12x CD-ROM drive and 33.6Kbit/sec modem, all of which could also be replaced. The only component we agreed to keep was the 17in Iiyama aperture grille monitor.

We knew that some people would want to spend more than others, so we set five price points: £100, £200, £300, £400 and £500. We then threw three *PCW* writers, Adele Dyer, Riyad Emeran and Will Head, into the mix to see what solutions they would come up with.

All prices are from the October issue of *PCW*, so by the time you read this you might be able to get the components for less. Unless otherwise stated all products are from Dabs Direct at www.dabs.com and all prices are ex VAT.

If you're being driven mad trying to navigate the upgrading course, here's *PCW*'s version of *Top Gear* to help you add value to your PC whatever your budget.

Adele's Choice

There are some fundamental problems with the machine we chose. It has a slow processor by today's standards, and the RAM could also do with an upgrade, but upgrading these would involve both a change of motherboard and spending a great deal of money. So the changes you could make at this price are less speed-orientated and aimed more at improving the overall performance of the machine.

The hard disk is relatively small at 4.3GB and for just £95 you could easily buy a 13GB drive to replace it. However, this machine also has no form of removable storage and so another good option would be a 250MB internal ATAPI Zip drive for £106.

However I did not opt for either of these options in the end. Instead I decided to buy a self-memory modem, which will store incoming faxes and voice messages even when I do not have my PC switched on. There are several good ones on the market: Pace had the excellent 56 Solo, but as Pace has now gone to the great modem manufacturer in the sky, my next choice is the 56K Professional Message Modem from 3Com. It has 4MB of memory, a remote retrieval facility and is easy to use.

Riyad's Choice

With a configuration such as this PC's, the first thing you have to change is the motherboard. The old 440FX-based motherboards provide no upgrade potential and don't support AGP, UDMA33/66 standards or SDRAM. With these kinds of limitations, the sooner you can upgrade the system backbone the better. But if you only have £100 to play with, you won't be able to upgrade to a BX board and still afford memory. Worry not, the answer is at hand, because for a mere £55 you can buy a TMC Super Socket 7 motherboard with 1MB of cache on board. This little beauty has both SIMM and DIMM sockets so you can carry on using your existing memory, but you'll have the option to upgrade to SDRAM later. Obviously your 233MHz Pentium II won't fit in this board, so you'll need to replace the CPU, and for the incredible price of only £42 you can get a 450MHz AMD K6-2 processor.

▲The AMD K6-2 Processor will shift you up a few gears

With this new setup you'll see significant performance increases over the old configuration, and the upgrade path is greatly improved. With the inclusion of an AGP slot your next purchase could be a decent 3D graphics card to complement the 3DNow! instructions embedded on the CPU.

▲The 3Com 56K Professional Message Modem will keep your PC in a receptive mood

Will's Choice

£100 isn't much to play with, just upgrading the operating system to Windows 98 would leave you with only £41 and this is before even touching the hardware. There is another way however – the Linux way. Since Linux is free to reproduce and distribute you can pick up a copy of Redhat 6.0 with no manuals or support for £2.98, leaving you with £97.02 to spend. Linux is also a far more efficient operating system, so you should find that with this configuration the machine should fly.

Linux was made to network, and does it very well, so the obvious option would be to spend the rest of the money on the tools needed to connect the machine up to others. To start with you'll have to get some network cards. For a basic startup network, I opted for two 3Com RJ45 PCI cards coming in at £25 each. You'll also need a hub to connect the cards together and 3Com's TP4 four-port hub at £28 is enough to get us started. Finally you'll need something to link it all together – two 5m cables at £7 each brings the grand total for our network starter kit to £94.98.

PCW DETAILS

ADELE's CHOICE

3Com 56K Professional Message Modem
Price *£116.32 (£99 ex VAT)*

RIYAD'S CHOICE

TMC TI5VG+
Price *£64.63 (£55 ex VAT)*
AMD K6-2 450
Price *£49.35 (£42 ex VAT)*

WILL'S CHOICE

3Com RJ45 PCI Card
Price *£29.37 (£25 ex VAT)*
3Com TP4 4x 10MB Hub
Price *£32.90 (£28 ex VAT)*
5m RJ45 Cable
Price *£8.22 (£7 ex VAT)*
Redhat 6.0 CD
Price *£3.50 (£2.98 ex VAT)*
Contact *Aquila Vision 01274 775117*
www.aquila-vision.co.uk

Adele's Choice

For £200, you could start to replace core components. Personally, I spend a lot of time on the internet and find modem dial-up connections a pain in the proverbial neck. So for my £200 I would sort myself out with a decent ISDN connection.

▼THE BILLION PIPAC PCI COULD TERMINALLY IMPROVE YOUR PC

BT has two tariffs for ISDN: Home Highway is for residential customers and Business Highway, funnily enough, is for business users. Both connect at 128Kbit/sec. The conversion charge for both Home Highway and Business Highway, that is from an ordinary phone line to ISDN, is £99. However at the time of writing BT had a half-price offer on both services, bringing the prices for both down to £49. Line rental for the services is charged in many different ways. Monthly line rental for Home Highway is £40 inc VAT per month, which includes £15 of calls. Business Highway charges rental quarterly at £133.75, which includes £57.50 worth of calls.

In addition you will need a decent terminal adaptor (TA). While TAs were quite expensive a few years ago, you can now pick up a good one for less than £50. In our August group test of comms hardware, the Editor's Choice for TAs went to the Billion BIPAC PCI which costs just £29. It has all the functionality you will need and is easy to install.

PCW DETAILS

ADELE's CHOICE

BT Home/Business Highway
Price *Home Highway conversion charge £116.33 (£99 ex VAT), offer price £57.58 (£49 ex VAT), line rental £40 (£34.04 ex VAT) per month*
Business Highway conversion charge £116.33 (£99 ex VAT), offer price £57.58 (£49 ex VAT), £157.16 (£133.75 ex VAT) quarterly rental
Contact *BT www. bt.com*
Billion BIPAC PCI
Price *£35 (£29 ex VAT)*
Contact *Eurotech 01189 810011*
www.billion.com.tw

RIYAD'S CHOICE

SuperMicro BX Board
Price *£79 (£68 ex VAT)*
128MB SDRAM
Price *£78.73 (£67 ex VAT)*
Voodoo3 3000
Price *£88.13 (£75 ex VAT)*

WILL'S CHOICE

Abit BM6 Socket 370 Motherboard
Price *£69.32 (£59 ex VAT)*
433MHz Celeron Processor
Price *£77.55 (£66 ex VAT)*
128MB PC66 SDRAM
Price *£81.07 (£69 ex VAT)*

Riyad's Choice

With £200 you could stick to the Slot 1 form factor and hang onto the 233MHz Pentium II until you can afford something faster. Going for a 440BX motherboard gives you masses of upgrade potential, with the option to fit a Pentium III 600 or something even faster later on. For £68 you can buy a SuperMicro P6SBA motherboard, giving you access to an AGP slot, DIMM slots for fast SDRAM memory and support for UDMA33 hard disks. With lots of money left to play with you can fill one of the three DIMM sockets with 128MB of PC100 SDRAM for only £67. As well as providing twice the amount of memory, you'll get better overall performance from the faster RAM technology.

Even though the 233MHz Pentium II only runs with an FSB of 66MHz, the PC100 adds to your future-proofing. With the last £75 you can fill the AGP slot on the new motherboard with a 3dfx Voodoo3 3000 graphics card. This will improve the 3D performance of the machine and allow you to play some of the latest games you've been missing out on.

Will's Choice

For £200 it is possible to give the computer a considerable performance boost by upgrading the processor. However, due to the restrictions of the FX motherboard, it will also be necessary to replace the motherboard and memory with newer components as well. While £200 won't even cover the cost of the top-end processors available, there are plenty of reasonable low-cost components on the market. Of the offerings available from AMD, Cyrix and Intel, Intel's Celeron chip seems to offer the best solution, providing good performance for this price.

▲SOLD ON CELERON – QUITE A FEW BANGS FOR YOUR BUCKS

The Celeron processor means a Socket 370 motherboard, and again there are a lot of choices in this area. Abit produces a large array of Socket 370 motherboards, including the BP6 which will support two Celerons in a parallel configuration. Its BM6 model, based on Intel's BX chipset, provides a good solution for the money at £59. While 64MB of RAM would be OK, more is always better so I decided to sacrifice a little processor power and go for 128MB at £69. This meant there was enough cash left to purchase a 433MHz Celeron, costing £66, putting the total upgrade price at £194.

Adele's Choice

If there is one thing no PC user can do without it is storage. New applications are ever more bloated, and if you have spent the last two years trying out the software on *PCW*'s cover CD, the chances are you could do with a little extra room. Neither should you forget some kind of backup disk, such as a Zip or Jaz drive, or even a tape drive.

▲ENJOY THE SLUMP IN THE PRICE OF HARD DISK DRIVES WHILE YOU CAN

Hard disk prices are incredibly low and a 10GB drive is not going to break the bank. We found a 10.2GB Quantum Fireball for just £88.

The same goes for removable storage. An internal 250MB Zip drive can now be bought for as little as £106, so there is no excuse for not backing up at least your documents.

Finally you could add in a CD-RW drive or DVD drive. Creative's DVD Encore comes with an MPEG card to take care of MPEG decompression, although you may prefer to wait for DVD until you have a faster processor. However, if you want to share data with friends and colleagues, a CD-RW is the best answer, as everyone has a CD drive, but not everyone has a Zip drive.

PCW DETAILS

ADELE's CHOICE

Iomega Zip – internal 250MB
Price *£124.55 (£106 ex VAT)*
CD-RW – HP SureStore 7570i CD-RW
Price *£122.20 (£104 ex VAT)*
Hard drive – Quantum Fireball CX – 10.2GB
Price *£103.40 (£88 ex VAT)*

RIYAD'S CHOICE

TMC TI5VG+
Price *£64.64 (£55 ex VAT)*
AMD K6-III 450
Price *£123.38 (£105 ex VAT)*
ATI Rage Fury
Price *£92.83 (£79 ex VAT)*
128MB SDRAM
Price *£78.73 (£67 ex VAT)*

WILL'S CHOICE

ATI All in Wonder
Price *£158.62 (£135 ex VAT)*
32MB EDO SIMMs
Price *£35.25 (£30 ex VAT)*
Toshiba 6x DVD-ROM
Price *£75.20 (£64 ex VAT)*

Riyad's Choice

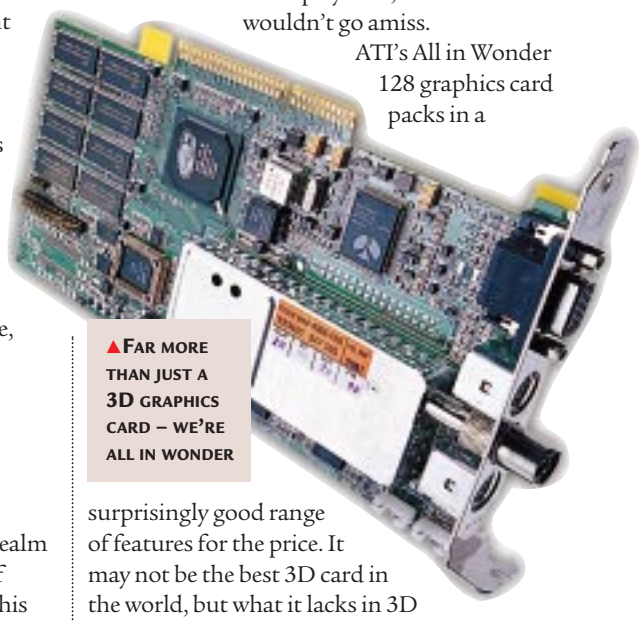
Now we're hitting the realm of serious upgrading. If you're going to spend this kind of money you can completely change the face of your PC. As with the previous two price points the motherboard has to go. We're going to go for an AMD solution again, but with a bit more money to play with we can make it a bit more interesting.

We'll start with the same TMC motherboard as before with 1MB of cache, although this time the cache will be Level 3 instead of Level 2 as we're going to a K6-III CPU. The K6-III has 64KB of Level 1 cache and 256KB of Level 2 both on the chip itself, so the cache on the motherboard operates as Level 3 cache.

We'll go for a 450MHz K6-III CPU which comes in at a bargain price of only £105. There is a 500MHz version available, but this would take us a little too far over our budget. Like the K6-2, the K6-III incorporates AMD's 3DNow! instructions, so a 3D graphics card is in order. Although our budget restricts us a little in this area, we can still stretch to a 32MB ATi Rage Fury. Even though we can use the older memory in this board, we're better off ditching it in favour of 128MB of SDRAM at £67.

Will's Choice

Computers are slowly moving further from the office and closer to the living room, being seen as home entertainment devices as well as work machines. In order to give this machine a multimedia makeover all you'll need is a good graphics card, TV Tuner, DVD-ROM and, to ensure smooth DVD playback, a little extra RAM wouldn't go amiss.



▲FAR MORE THAN JUST A 3D GRAPHICS CARD – WE'RE ALL IN WONDER

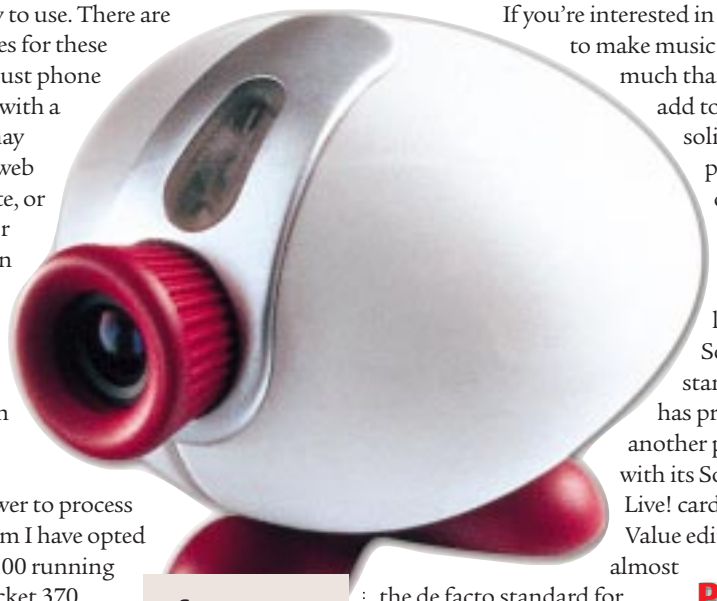
ATI's All in Wonder 128 graphics card packs in a surprisingly good range of features for the price. It may not be the best 3D card in the world, but what it lacks in 3D performance it more than makes up for in accessories. Combining a TV-Tuner, hardware MPEG assistance and TV out, there isn't much else you would need, and for £135 you'd be hard pressed to put together equivalent components for that price.

Prices for DVD-ROMs seem to fluctuate wildly – some come with a hardware MPEG decoder and others are just plain vanilla drives. Since the All in Wonder will be handling the MPEG decoding, we just need a simple DVD-ROM for which Toshiba's six-speed drive provides a good solution at £64. Topping off the bundle with a further 64MB of RAM (two 32MB EDO SIMMs at £30 each) produces a system on which you can watch television and DVD movies all for £259, leaving enough money left over to buy a couple of DVD movies.

Adele's Choice

Video-conferencing has been a buzz word for some years now, with pundits regularly claiming we will all be using video phones soon. However, low-end video conferencing cameras are now cheap and easy to use. There are many more uses for these cameras than just phone conversations with a picture. You may want to add a web cam to your site, or capture stills or video to send in an email. Or, as some people do in the US, you could use them to spy on the nanny.

For the power to process the video stream I have opted for a Celeron 500 running on an Asus Socket 370 motherboard with 128MB of SDRAM. I will also need a fast modem to upload all that data, whether to my website or in an email, so I have also gone for a 3Com WinModem 56K Internal modem which will give me the bandwidth. Finally, the camera itself. As this PC still only runs Windows 95, I stuck to a parallel port camera, rather than getting bogged down in the Windows 95 USB patch. I went for a Philips PCA635VC, which isn't a bad little camera for £55.



▲ SMALL AND LIGHTWEIGHT, THIS VIDEO CAMERA OFFERS LOW COST AND CONVENIENCE

Riyad's Choice

Obviously with £400 you could upgrade this PC to lightning-fast levels, but we'd rather upgrade with a purpose. With this sort of money you can try things with your PC that you might not have thought of before, such as video editing.

For £159 you can get a DC10plus card from Pinnacle. This is an all encompassing entry-level video-editing kit and provides you with everything you need to get going. You'll still need to upgrade the core components though, which means plumping for the old favourite TMC motherboard at £55. You'd have to go for this board since you can't afford to change the memory as well and it has SIMM sockets on it. An AMD K6-III 400MHz will be powerful enough for the job and will only set you back £75.

However, video editing requires a decent amount of hard disk space, so we'll have to buy a new hard drive too. For £102 we can get a 14.4GB IBM DeskStar drive which also sports a nifty 7,200rpm spin rate. Of course the 64MB of EDO memory will hold things back a bit, but the memory can be upgraded at a later date.

Will's Choice

If you're interested in using your PC to make music then there isn't much that you need to add to create a good solid sound platform. Sound cards have come a long way since Creative launched the SoundBlaster standard. Creative has produced another popular option with its SoundBlaster Live! cards, with the Value edition becoming almost the de facto standard for home entertainment systems. In this instance I have opted for the more expensive version, at £102, due to the SPDIF digital input and output and bundled copies of Cubasis and Soundforce.

To complement the SPDIF ports, I decided that a set of Creative's FPS2000 Digital speakers should do the trick. They're not cheap, at £129, but if you intend to do any serious sound work on a PC, there is no point skimping on the speakers.

Once you've created your track, you'll need a medium on which to master it. For £161 you can pick up a top of the range four-speed Hewlett-Packard CD-RW. Producing a competent home studio will set you back £392 in total, leaving enough money to buy a pack of 10 blank CDs at £7.50.

PCW DETAILS

ADELE's CHOICE

Celeron 500
Price *£141 (£120 ex VAT)*
Asustek MEW
Price *£124.55 (£106 ex VAT)*
128MB PC100 SDRAM
Price *£78.72 (£67 ex VAT)*
3Com WinModem 56K Internal
Price *£63.45 (£54 ex VAT)*
Philips PCA635VC Parallel
Price *£64.62 (£55 ex VAT)*

RIYAD'S CHOICE

Pinnacle DC10plus
Price *£186.83 (£159 ex VAT)*
TMC TI5VG+
Price *£64.63 (£55 ex VAT)*
AMD K6-III 400
Price *£88.13 (£75 ex VAT)*
IBM DeskStar 14GXP 14GB
Price *£119.85 (£102 ex VAT)*

WILL'S CHOICE

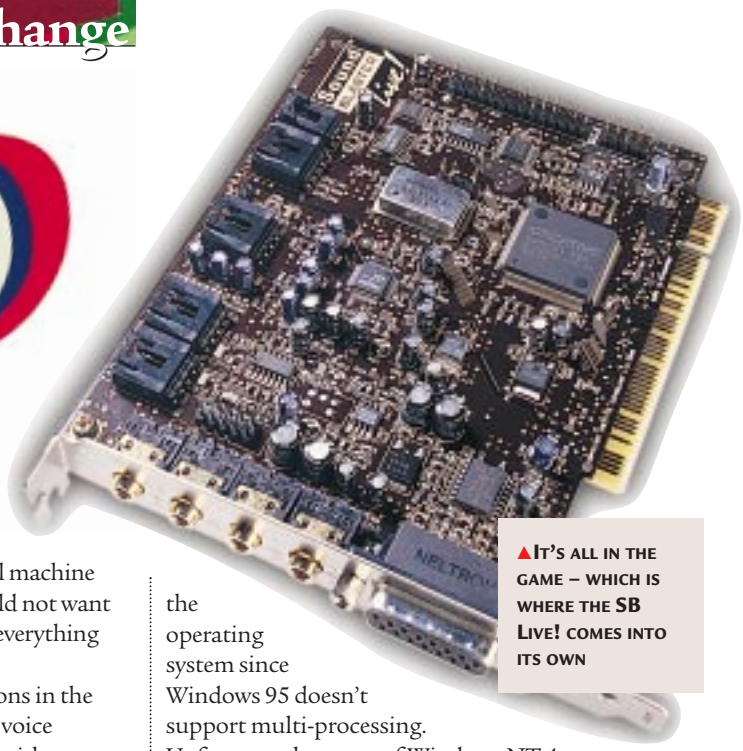
Creative Labs SoundBlaster Live!
Price *£119.85 (£102 ex VAT)*
Creative Labs FPS2000 Digital Speakers
Price *£151.70 (£129 ex VAT)*
Hewlett Packard Surestore 8210i CD-RW
Price *£189.17 (£161 ex VAT)*
Pack of 10 CD-Rs
Price *£8.81 (£7.50 ex VAT)*

Adele's Choice

You can do an awful lot with £500. In fact if you wanted you could probably buy a whole new PC minus the monitor. The spec of our original machine included a good monitor, so we would not want to replace that. However, just about everything else can be updated.

Unless you need SIMD instructions in the Pentium III for applications such as voice recognition, you can easily make do with a Celeron or an AMD K6-III, which are far more moderately priced. So I have opted for a Celeron processor and an Asus Socket 370 motherboard. Obviously I would have to buy new DIMMs and so I have gone the whole hog and bought 128MB.

But there is still money left over in the budget, so I am going for a second, larger hard drive, keeping the original drive on the second EIDE chain as a backup and overflow drive. I am also going to get a new graphics card – nothing flash, just a 16MB ATI Rage Fury and still have the cash for a new sound card, a Creative SoundBlaser Live! Value for a bargain £49. And finally for the last £40 I'll bung in a new 56K modem as well.



▲ IT'S ALL IN THE GAME – WHICH IS WHERE THE SB LIVE! COMES INTO ITS OWN

PCW DETAILS

ADELE's CHOICE

Celeron 500
Price *£141 (£120 ex VAT)*
Asustek MEW
Price *£124.55 (£106 ex VAT)*
128MB PC100 SDRAM
Price *£78.72 (£67 ex VAT)*
Maxtor DiamondMax 4320 – 6.4GB
Price *£74.02 (£63 ex VAT)*
ATI Rage Fury
Price *£61.10 (£56 ex VAT)*
Creative SoundBlaser Live! Value
Price *£57.57 (£49 ex VAT)*
Diamond SupraExpress 56K Pro Internal
Price *£45.82 (£39 ex VAT)*

RIYAD'S CHOICE

Abit BP6
Price *£94 (£80 ex VAT)*
2 Celeron 433 CPUs
Price *£155.10 (£132 ex VAT)*
Windows NT 4 Workstation
Price *£249.10 (£212 ex VAT)*
128MB SDRAM
Price *£78.73 (£67 ex VAT)*

WILL'S CHOICE

Abit BM6 Socket 370 Motherboard
Price *£69.32 (£59 ex VAT)*
466MHz Celeron Processor
Price *£92.82 (£79 ex VAT)*
128MB PC66 SDRAM
Price *£81.07 (£69 ex VAT)*
Microsoft Windows 98 Upgrade
Price *£69.32 (£59.00 ex VAT)*
32MB Matrox Millennium G400 Dual Head
Price *£133.95 (£114 ex VAT)*
Iiyama VM-350 15in monitor
Price *£135.12 (£115 ex VAT)*

Riyad's Choice

Again, £500 will buy you a complete rebuild for your PC if you want one, so I thought I'd try something a bit different. For £80 you can buy a dual Socket 370 motherboard from Abit. Add to this two 433MHz Celeron CPUs at £66 a piece and you have the beginnings of a formidable dual-processor machine that should outperform most fast Pentium III systems when running multi-threaded applications.

You'll also have to change the operating system since Windows 95 doesn't support multi-processing. Unfortunately a copy of Windows NT 4 Workstation will set you back £212, but it does open the door to a multi-processor environment.

Finally you'll need some memory, a 128MB SDRAM module at £67 should be enough. Of course not everyone will benefit from a multi-processor machine, it depends entirely on what sort of applications you're planning to run. However, if you want to run apps like 3D modelling packages a dual-processor machine will be a godsend. Most rendering packages are multi-threaded, so a process can be efficiently split across multiple CPUs. Having a large graphic render split across two CPUs will speed up your work considerably, and as they say, time is money.

Will's Choice

Rather than just going for an all-round upgrade for £500, I decided that it would be better to set up a dual monitor system with a bit more power, able to handle things like word processing on one screen while browsing on the other. The first necessary item is a copy of Windows 98 upgrade, costing £59.

The next thing to consider was the graphics card. I could have bought a standard card and used it in parallel with the existing 8MB Matrox Millennium, however the Matrox Millennium G400 is an excellent 3D card and comes in a dual-head option. The 32MB dual-head version costs £114, which isn't that much more than a good single head 3D card.

Upgrading the processor to a 466MHz Celeron with 128MB of RAM in an Abit BM6 motherboard came to £207, leaving just under £120 to get a monitor. Unfortunately it wasn't possible to get a cheap 17in model for this money, so I went for a good 15in one, in the form of an Iiyama VM-350 at £115. This brings the grand total to £495, leaving enough money to buy a cup of coffee and a packet of Rich Tea biscuits to enjoy while waiting for Windows 98 to install. ❐